



LEGAL & LAND INFORMATION

Lot 4 DP 58227

Site area 653m²

Living zone RS Residential suburban zone

Min set floor level is 50 year floor level is 13.7m RL

councils recommended level is F.F.L 13.13m which we are going with.

Wind region A Classification Low

Snow zone N4

Durability zone C

Earthquake zone 2 land type TC3

Hazard type LMA & Tsunami Evacuation zone

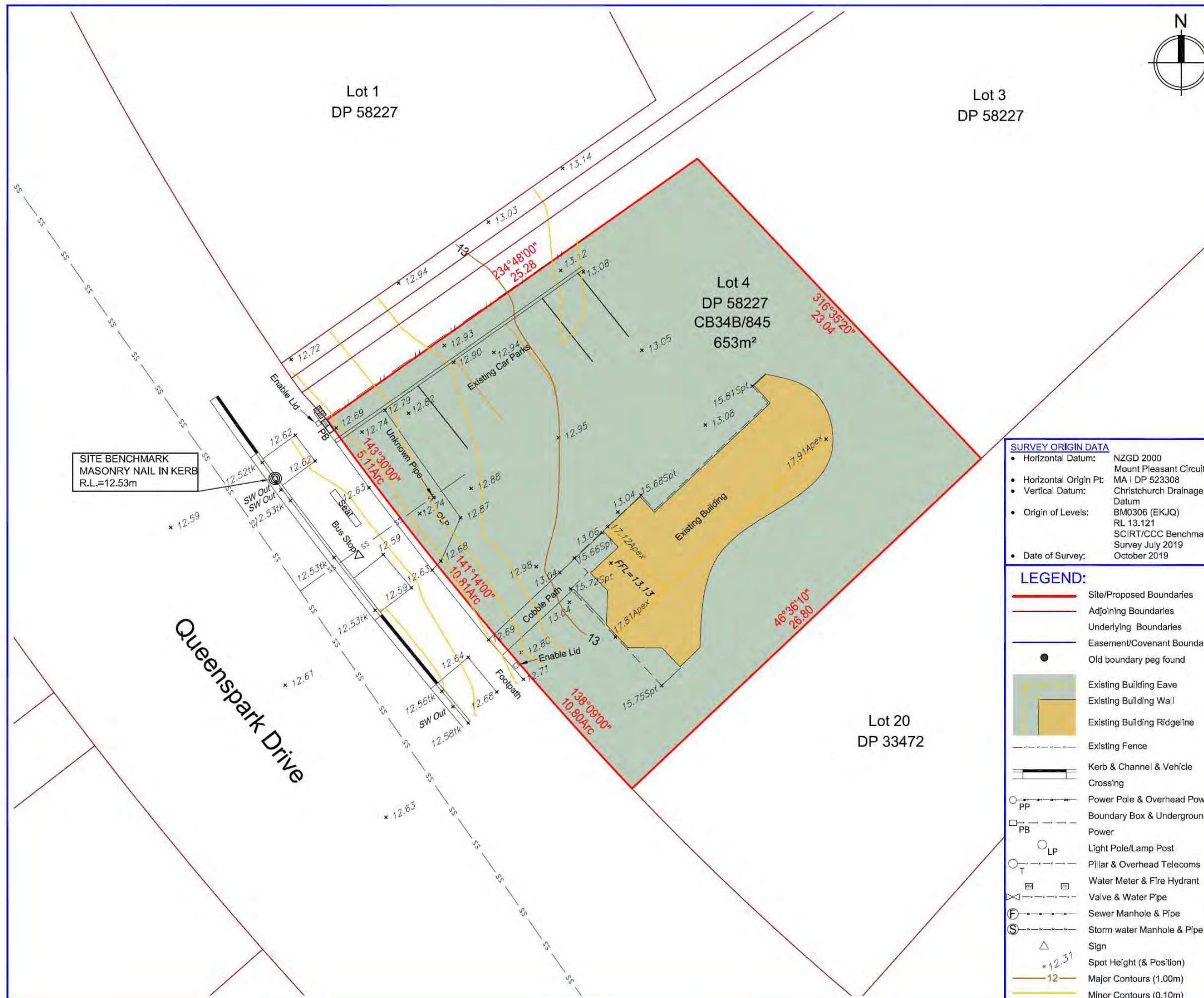
Existing building 152.2m²

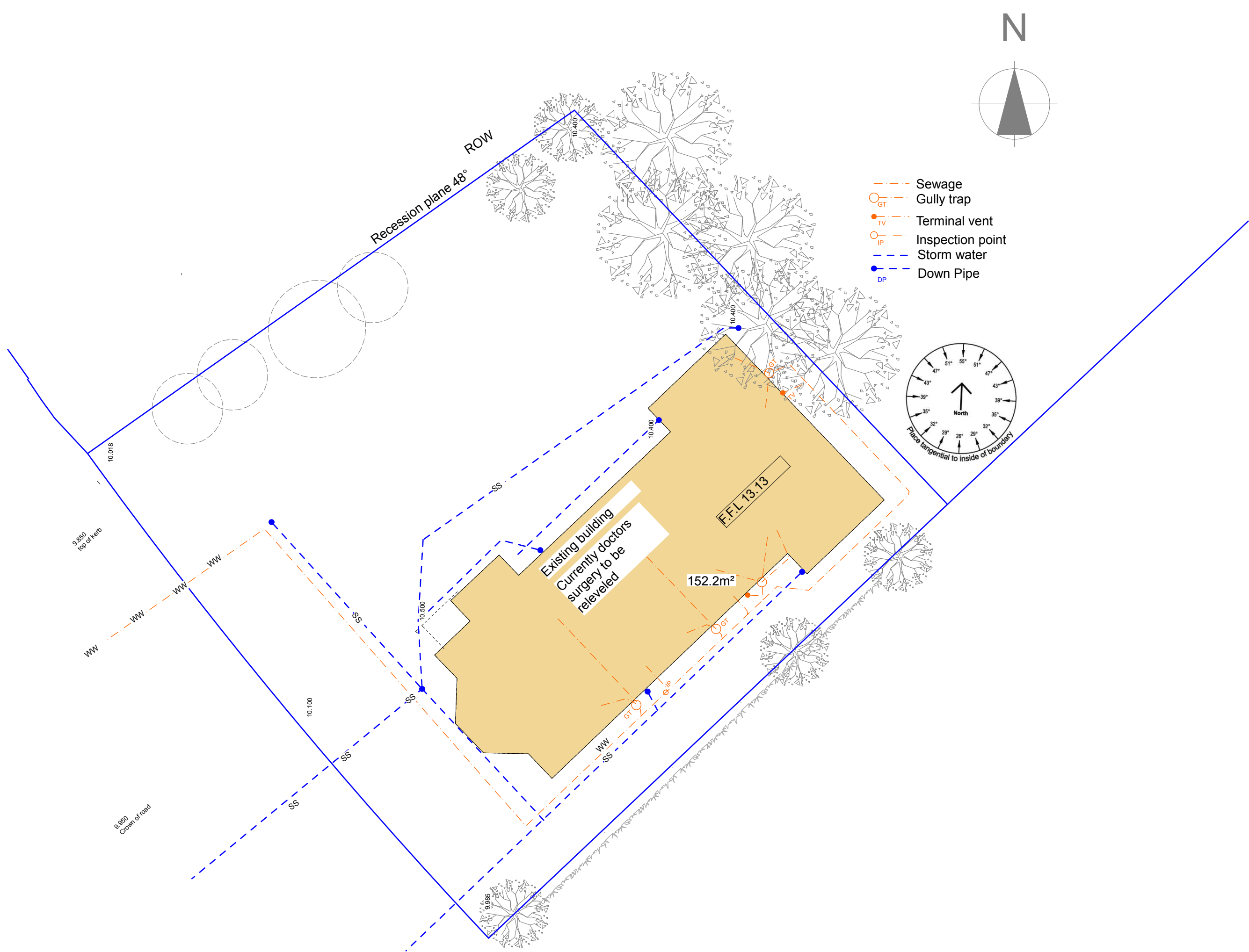
Total building area 152.2m² no extra building

This is a relevel of existing commercial building its current use is a doctors surgery

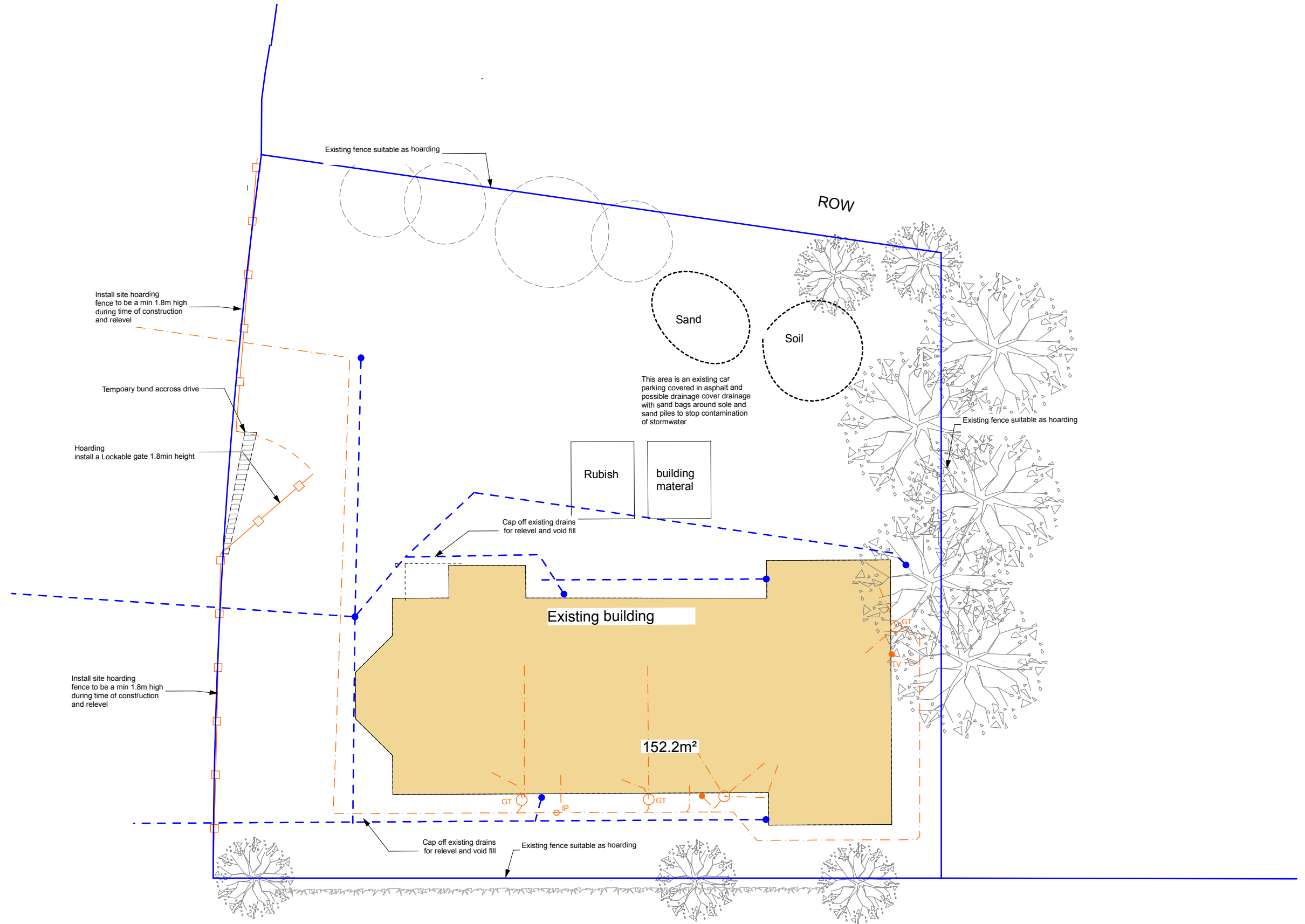
The new owner wants to bring it up level to an insurable level before deciding what to do with the build. Any changes to use will be done later as a building consent.

- A100 LOCATION PLAN
- A101 SURVEY PLAN
- A102 PROPOSED SITE PLAN
- A103 SITE MANAGEMENT PLAN
- A104 EXISTING FLOOR PLAN
- A105 REPAIRS TO EXISTING BUILDING
- A106 RELEVEL DETAILS
- A107 CRACK REPAIR

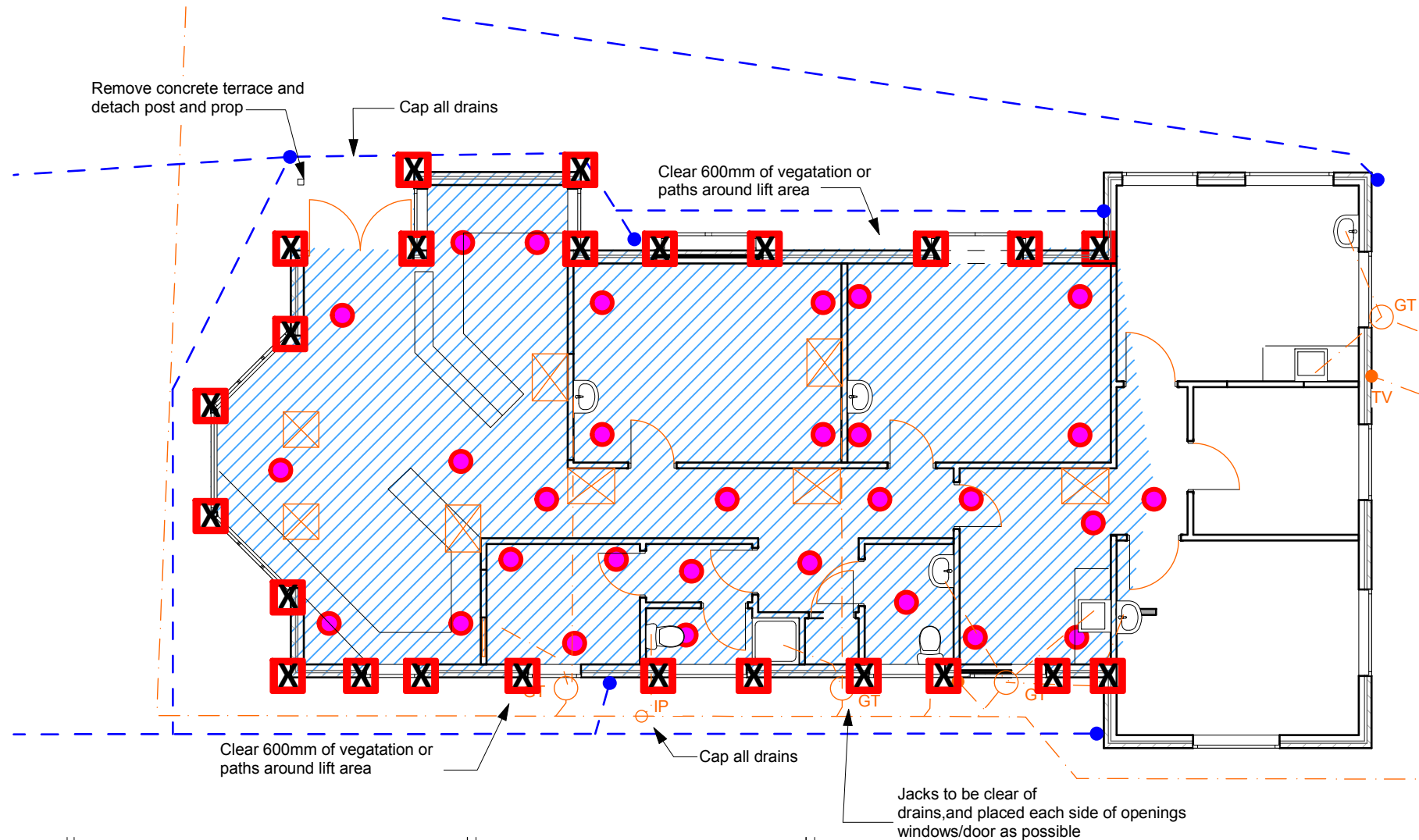
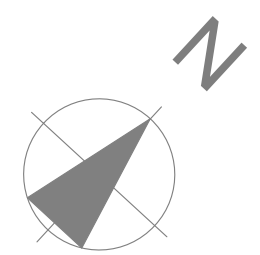
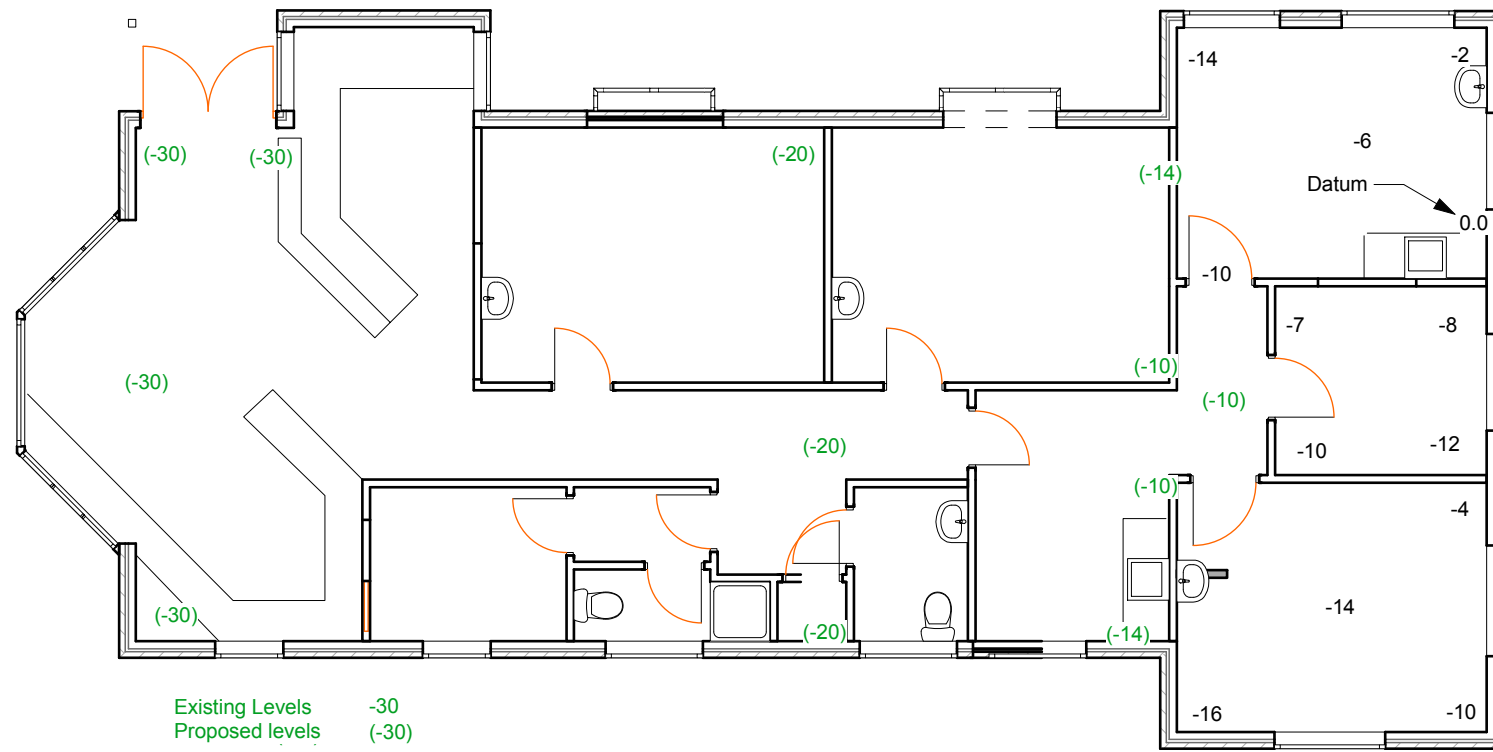




Deborah Wilson Design by Deb Ltd LBP-BP117593 0274143000	ALTERATIONS 164 Queenspark Drive, Parklands Christchurch 8083		Amendments		Drawing		PROPOSED SITE PLAN		Ref
	No	Date	No	Date	Drawn	Checked	Date	SCALE	Drawing No
							18/02/2020	1:150	A102

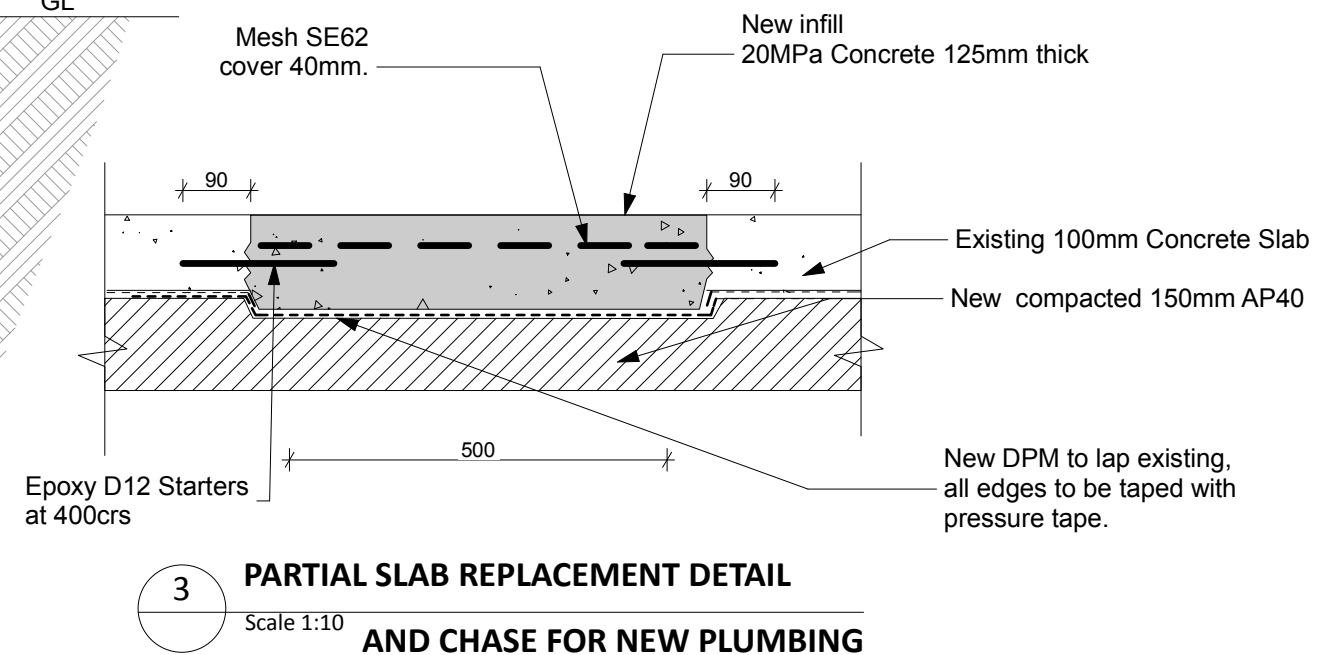
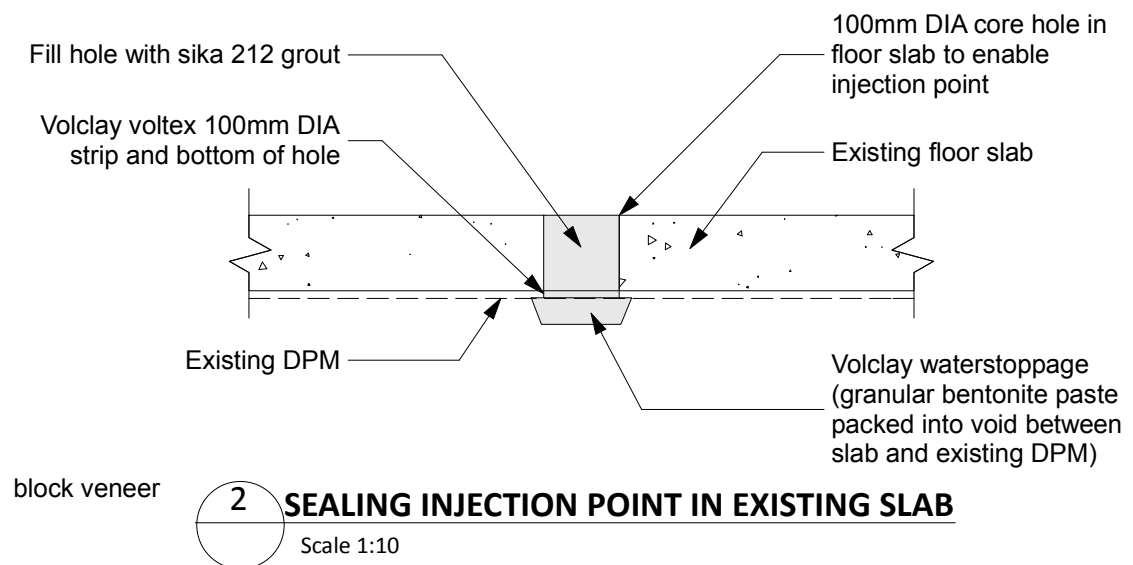
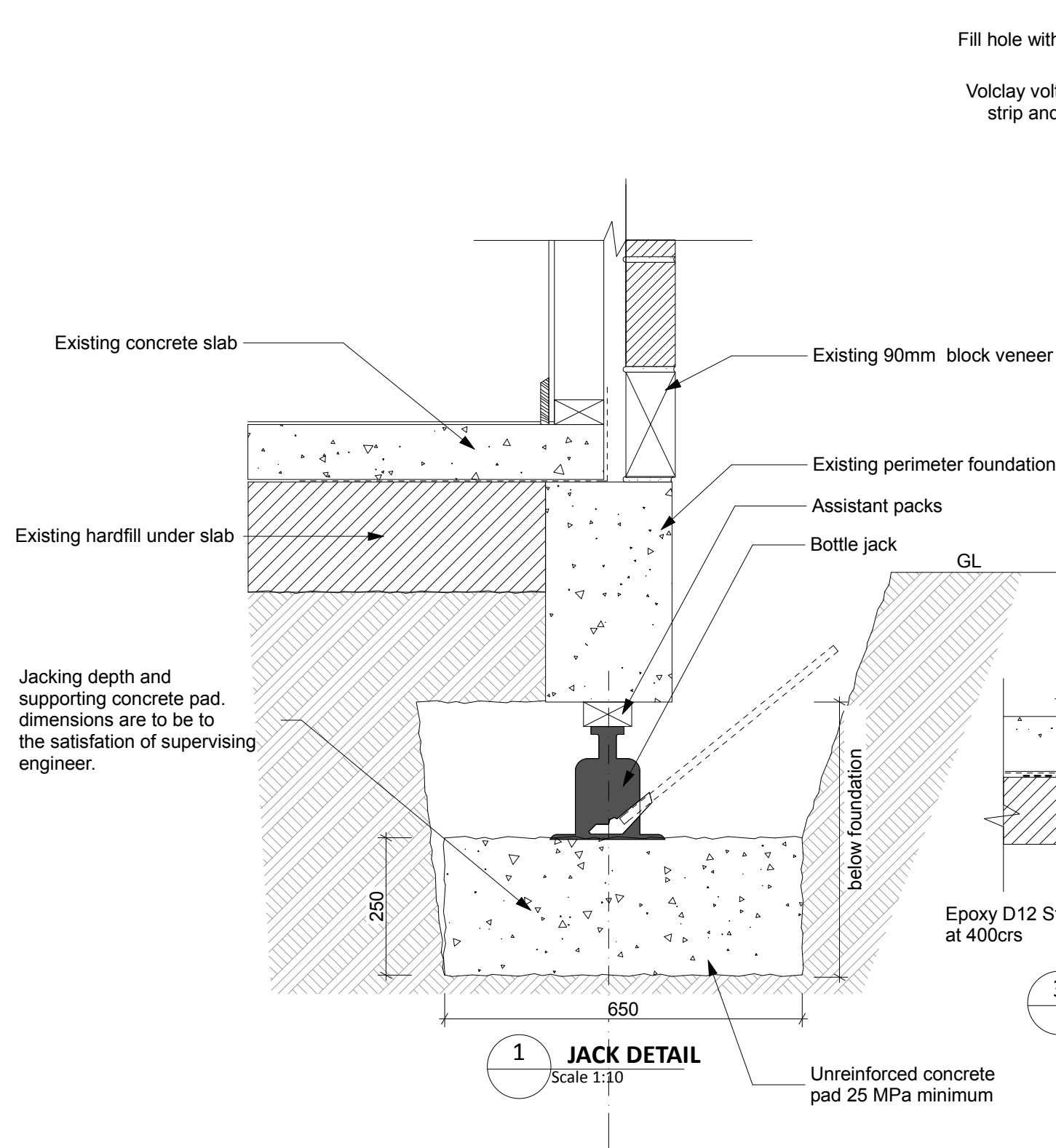


<div>Deborah Wilson</div> <div>Design by Deb Ltd</div> <div>LBP-BP117593</div> <div>0274143000</div>	<div>ALTERATIONS</div> <div>164 Queenspark Drive, Parklands</div> <div>Christchurch 8083</div>				<div>Amendments</div> <table><tr><th>No</th><th>Date</th></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr></table>	No	Date									<div>Drawing</div> <table><tr><th colspan="2">SITE MANAGEMENT PLAN</th></tr><tr><td>Drawn</td><td></td></tr><tr><td>Checked</td><td></td></tr><tr><td>Date</td><td>18/02/2020</td></tr></table> <table><tr><td>SCALE</td><td>1:150</td></tr></table>	SITE MANAGEMENT PLAN		Drawn		Checked		Date	18/02/2020	SCALE	1:150	<div>Ref</div> <div>R1902</div> <div>Drawing No</div> <div>A103</div>
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SITE MANAGEMENT PLAN																											
Drawn																											
Checked																											
Date	18/02/2020																										
SCALE	1:150																										



- X** Jacking point locations (Spacing Max. 2m)
- Red Square** Concrete pads central spacing Max. 2m
- Red Circle** Grout injection locations 100mm core
- Blue Hatched Area** Hatched area to be re-levelled
- Orange Square with X** 600x800 windows in concrete slab for access to foundation for jacking
- Orange Square with X** 600x600 window cut in slab locations to be determined on site
- Orange Line** Sewage
- Orange Circle with GT** Gully trap
- Orange Circle with TV** Terminal vent
- Orange Circle with IP** Inspection point
- Blue Dashed Line** Storm water
- Blue Dot** Down Pipe

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No	Date																	



Deborah Wilson
Design by Deb Ltd
LBP-BP117593
0274143000

ALTERATIONS
164 Queenspark Drive, Parklands
Christchurch 8083

Amendments	No	Date

Drawing

RELEVELING DETAILS	
Drawn	
Checked	
Date	18/02/2020
SCALE	1:10

Ref **R1902**
Drawing No
A106

	PRODUCT	BRIEF DESCRIPTION	THICKNESS	CURE TIME (APPROX ONLY)	STRENGTH	MIXED VOL
T	FLC & DURABOND SUPERFINE	TROWEL APPLIED, 2 PART LATEX/CEMENT BASED. GENERAL PURPOSE FLOOR LEVELLING COMPOUND, INTERIOR/EXTERIOR. COVERAGE RATE: 5.5m² @3mm (24KG FLC POWDER + 4 LITRES FLC LIQUID)	0.5 - 5mm*	12-24 HOURS DRY 24 HOURS OVERLAY	30Mpa	16Ft
WVR	HARDFAST	TROWEL APPLIED, VERY QUICK SETTING, PATCHING COMPOUND. RECOMMENDED FOR SMALL AREAS ONLY. COVERAGE RATE: 3.8m² @3mm (13KG HARDFAST POWDER + 4 LITRES WATER OR FLC LIQUID)	0 - 5mm*	20 MINUTES DRY 45 MINUTES OVERLAY	N/A	18ft
T	MATRIX	TROWEL APPLIED, 2 PART LATEX/ CEMENT BASED GENERAL PURPOSE FLOOR LEVELLING COMPOUND. COVERAGE RATE: 12.5m² @2mm (25KG MATRIX POWDER + 5 LITRES MATRIX LIQUID)	0 - 3mm*	12-24 HOURS DRY 24 -48 HOURS OVERLAY	28Mpa	17ft
T	SCREED 20	TROWEL APPLIED, 2 PART LATEX/ CEMENT BASED FLOOR REPAIR FINISHING COMPOUND DESIGNED TO FILL GREATER DEPTHS THAN STANDARD FLC. COVERAGE RATE: 0.7m² @ 20mm (25KG SCREED POWDER + 4 LITRES FLC LIQUID)	4 - 20mm*	24-48 HOURS DRY 2-7 DAYS OVERLAY	28Mpa	15ft
WF	ULTRAFINISH	ULTRA FINE, WATER MIXED SMOOTHER. CAN BE FINE FINISHED TO A FEATHERED EDGE. SUITABLE FOR LEVELLING OVER OLD LINO OR EMBOSSD VINYL. COVERAGE RATE: APPROX 50m² / 5KG PAIL	0 - 1mm*	1 HOUR DRY 2 HOURS OVERLAY	N/A	18ft
WSL	SUPERFLO	TROWEL OR PUMP GRADE, CEMENT BASED, SELF LEVELLING, SELF SMOOTHING FLOOR FINISHED COMPOUND. EASY NOTCHED TOWEL APPLICATION. COVERAGE RATE: 4.5m² @ 3mm (20KG SUPERFLO POWDER + 4.8 LITRES WATER)	0.5 - 20mm*	2-4 HOURS DRY 12-24 HOURS OVERLAY	30Mpa	15ft
WR	SUPERSET	VERY RAPID SET MORTAR AND LEVELLING COMPOUN (20KG BAG + 3.5 LITRES WATER)	0 - 50mm*	5-10 MINUTES POT LIFE 1-2 HOUR OVERLAY	28Mpa	15ft
W	UNIFLOOR	ECONOMY, WATER ONLY MIX 20KG BAG + 4.5 LITRES WATER	0 - 50mm*	45 MINUTE MIX LIFE DRIES: 4-24 HRS DEPENDING ON THICKNESS	24Mpa	15ft

CODE:
T: TWO PART / MIXED WITH RESIN EMULSION WSL: WATER MIX, SELF LEVELLING WR: WATER MIXED, RAPID SET
WVR: WATER MIXED, VERY RAPID WF: WATER MIX, FINISHING COMPOUND W: WATER MIX

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19174

21st February, 2020

Mr Dominic Lowe,
Christchurch,

Ph: 027 641 1073
Email : dominic.lowe@xtra.co.nz

Dear Dominic,

RE: Structural & Foundation Building Inspection @164 Queenspark Dr, CHCH

A Structural & Foundation Building Inspection of the above property was carried out on the 12th February, 2020. The purpose of the inspection was to check the structural integrity of the Building and identify any areas that had been structurally damaged particularly as a result of the recent Earthquakes since 4th September, 2010 as well as subsequent aftershocks.

Building Description

The Building is single storey approximately 35 years old. It has “brick veneer” cladding plus some areas of weatherboard over timber framing walls. It also has a concrete floor with concrete perimeter foundation and Lightweight Coloursteel Roof.

The building recently has been used as a Medical Centre but is now to be converted to a residential house.

The Building is in the TC3, Blue Zone, with no apparent liquefaction within the property.

Inspection Details

The inspection included a walk around inside and outside of the house identifying any visible damage that has occurred particularly cracks and settlement which may draw structural attention.

House Exterior

- There was some minor cracks to the mortar of the exterior bricks that requires attention.

House Interior

- The interior of the building was in good condition and any minor gib lining cracks have been repaired

Ceiling

- The ceiling of the building was in good condition

Foundation Floor Slab

- Zip levels were plotted for all the building and most rooms were outside the MBIE guidelines. Refer Dwgs
- **124mm** of floor level variation has occurred throughout the concrete floor of the house that is outside the MBIE guidelines of 50mm.

Perimeter Foundation

- The concrete perimeter foundation was in good condition, that had No Structural Concerns.

Roof

- The trusses and purlins were in good condition with No Structural Concerns.
- The outside visual appearance of the roof was in good condition.

Geotech Report

Our Geotech report was carried out on 12 Dec. 2019

- The Ultimate Bearing Capacity is approximately 200kPa from 300mm to 1200mm Below Ground Level,
- The soils consist of a mostly sand from 300mm. to 1300mm depth (depth tested)

Conclusion

The house is Structurally Sound. I therefore can recommend this property as suitable for Insurance and/or Bank Loans as required.

Note the following repairs are recommended to restore the house & garage back to good condition within 6 months of the issue date of this report:

- (1) Contractor to repoint, remortar exterior bricks where required. Refer Photos 2
- (2) Contractor to rake, plaster and repaint interior of house wall linings if necessary if some minor cracking occurs during the releveling process.

Building Concrete Floor Releveling

- (1) It is recommended that 24 external lifting pads down to approx. 700 mm depth to be Installed around the settled section of the perimeter beam to lift the Building foundation to near level & Ensure no further settlement occurs.
- (2) The contractor is to install concrete infill between external lifting pads 1 to 24
- (3) Contractor to use Diameter 100mm Grout holes & 600mm x 600mm windows for internal releveling & Lifting, Refer Dwgs.

Attached is a Producer Statement Design for the proposed work.

When work is in progress I will need to carry out the following to ensure the quality of the remedial work

- **Inspect the contractors Work:**
 - Prior to Pouring of Lifting Pads
 - Completion of re-leveling of concrete floor & building Foundations
- Issue a “Producer Statement Construction Review on satisfactory completion of the work....This will be useful to have, if in future the owner decides to sell the building

Please contact me if you have any further queries. While every effort has been made to determine the entire extent of the work it may be necessary for additional work to be done

which becomes apparent during the course of the construction work. Any modification (addition or reduction) in work will be discussed prior to action for your approval.

Please contact me if you have any queries.

Yours faithfully,



Mike Wilton
B.E. Civil MIPENZ 058341
Civil & Structural Engineer



Adrian Collis
B.E, M.Eng.St (Civil) - CPEng 160987
Civil & Structural Engineer



1: Minor Crack in concrete Floor
to V out & epoxy fill.



2 Minor Gap in mortar to rake & replace
mortar



3: Foundation in good Condition



4 Foundation in good condition

Building Code Clause(s).....B1 & B2.....

PRODUCER STATEMENT – PS1 – DESIGN

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

ISSUED BY:.....MIKE WILTON CONSULTING LTD.....
(Design Firm)

TO:... DOMINIC LOWE
(Owner/Developer)

TO BE SUPPLIED TO:.....CHCH CITY COUNCIL
.....
(Building Consent Authority)

IN RESPECT OF: HOUSE RELEVELLING
(Description of Building Work)

AT:... 164 QUEENSPARK DRIVE „CHRISTCHURCH
(Address)
..... **LOT** **DP** **SO**

We have been engaged by the owner/developer referred to above to provide ...House Relevelling. - Construction Supervision.(Prepour of Floor Lifting pads & ON COMPLETION, services in respect of the requirements of

(Extent of Engagement)

Clause(s)B1 & B2.....of the Building Code for
All ☒ or Part only ☐ (as specified in the attachment to this statement), of the proposed building work.

The design carried out by us has been prepared in accordance with:

- ☒ Compliance Documents issued by the Ministry of Business, Innovation & Employment...B1/AS1.....or
(verification method / acceptable solution)
- ☐ Alternative solution as per the attached schedule.....

The proposed building work covered by this producer statement is described on the drawings titled 164 QUEENSPARK DRIVE „CHRISTCHURCH

164 QUEENSPARK DRIVE „CHRISTCHURCH Design by Deb...and numbered A100-109, A200, A300-301 & A400 – A406t; together with the specification, and other documents set out in the schedule attached to this statement.

On behalf of the Design Firm, and subject to:

- (i) Site verification of the following design assumptions GEOTECH Report by MWC– Ultimate Bearing Capacity 200 to 200 Kpa from 0.1 to 1.2m BGL
- (ii) All proprietary products meeting their performance specification requirements;

I **believe on reasonable grounds** that a) the building, if constructed in accordance with the drawings, specifications, and other documents provided or listed in the attached schedule, will comply with the relevant provisions of the Building Code and that b), the persons who have undertaken the design have the necessary competency to do so. I also recommend the following level of construction monitoring/observation:

☐ CM1 ☒ CM2 ☐ CM3 ☐ CM4 ☐ CM5 (Engineering Categories) or ☐ as per agreement with owner/developer (Architectural)

I, Adrian James Collis... .. am: ☒ CPEng160987.....#
(Name of Design Professional)

☐ Reg Arch#

I am a Member of : ☒ IPENZ ☐ NZIA and hold the following qualifications:...BE Civil, M.Eng St
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 ...  ON BEHALF OF MIKE WILTON CONSULTING LTD
(Design Firm)



Date...28 Feb , 2020 (signature)

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

This form is to accompany **Form 2 of the Building (Forms) Regulations 2004** for the application of a Building Consent.

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

Memorandum from licensed building practitioner: Certificate of design work
Section 30C or section 45, Building Act 2004

The building

Street address of building:

164 QUEENSPARK DRIVE .,CHRISTCHURCH

The owner

Name: DOMINIC LOWE

Address 164 QUEENSPARK DRIVE.,CHRISTCHURCH

Telephone number: 027 641 1073

Email address: dominic.lowe@extra.co.nz

Identification of design work that is restricted building work

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

Design work that is restricted building work	Description	Carried out/ supervised	Reference to plans and specifications
[X]	[If appropriate, provide details of the restricted building work]	[Specify whether you carried out this design work or supervised someone else carrying out this design work]	[If appropriate, specify references]

Primary structure

Foundations and floor	(X)	Foundations & Floor for House RELEVEL	(X) Carried out () Supervised	See Building Consent Plans
Walls	()		(X) Carried out () Supervised	
Roof Structure	()		() Carried out () Supervised	
Lintels and beams	()		() Carried out () Supervised	
Bracing	()		() Carried out () Supervised	
Other	()		() Carried out () Supervised	

External moisture management systems

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

Fire safety systems

Emergency warning systems, evacuation and fire service operation systems, suppression or control systems, or other ()		() Carried out () Supervised	
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Note: The design of fire safety systems is only restricted building work when it involves small-to-medium apartment buildings as defined by the Building (Definition of Restricted Building Work) Order 2011.

Note: continue on another page if necessary.

Are waivers or modifications of the building code required? () Yes (X) No

If Yes, provide details of the waivers or modifications below:

Clause	Waiver/modification required
<i>[List relevant clause numbers of building code]</i>	<i>[Specify nature of waiver or modification of building code]</i>

Note: continue on another page if necessary.

Issued by

Name: Adrian Collis

LBP or registration number: 160987

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

Mailing address: P.O.Box 6160, Upper Riccarton, Christchurch 8442

Street address or registered office:			
Phone number:	Landline:	03 3431220	Mobile: 021 818 393
	Daytime:		After hours: 021 818 393
Fax number:	03 3431225		
Email address:	mikewiltonltd@gmail.com		
Website:			

Declaration

I, Adrian Collis [name of practitioner]

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

a) complies with the Building Code Clauses identified on this form

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

Signature:

on behalf of Mike Wilton Consulting Ltd

Date: 28 February ,20

PRODUCER STATEMENT – PS1 – DESIGN

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(Design Firm)

TO:... DOMINIC LOWE
(Owner/Developer)

TO BE SUPPLIED TO:.....CHCH CITY COUNCIL
.....
(Building Consent Authority)

IN RESPECT OF: HOUSE RELEVELLING
(Description of Building Work)

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All ☒ or Part only ☐ (as specified in the attachment to this statement), of the proposed building work.

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SIGNED BY ...  ON BEHALF OF MIKE WILTON CONSULTING LTD
(Design Firm)



Date...28 Feb , 2020 (signature)

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Section 30C or section 45, Building Act 2004

The building

Street address of building:

164 QUEENSPARK DRIVE .,CHRISTCHURCH

The owner

Name: DOMINIC LOWE

Address 164 QUEENSPARK DRIVE.,CHRISTCHURCH

Telephone number: 027 641 1073

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Damp proofing	(.)		() Carried out () Supervised	
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Issued by

Name: Adrian Collis

LBP or registration number: 160987

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

Mailing address: P.O.Box 6160, Upper Riccarton, Christchurch 8442

Street address or registered office:			
Phone number:	Landline:	03 3431220	Mobile: 021 818 393
	Daytime:		After hours: 021 818 393
Fax number:	03 3431225		
Email address:	mikewiltonltd@gmail.com		
Website:			

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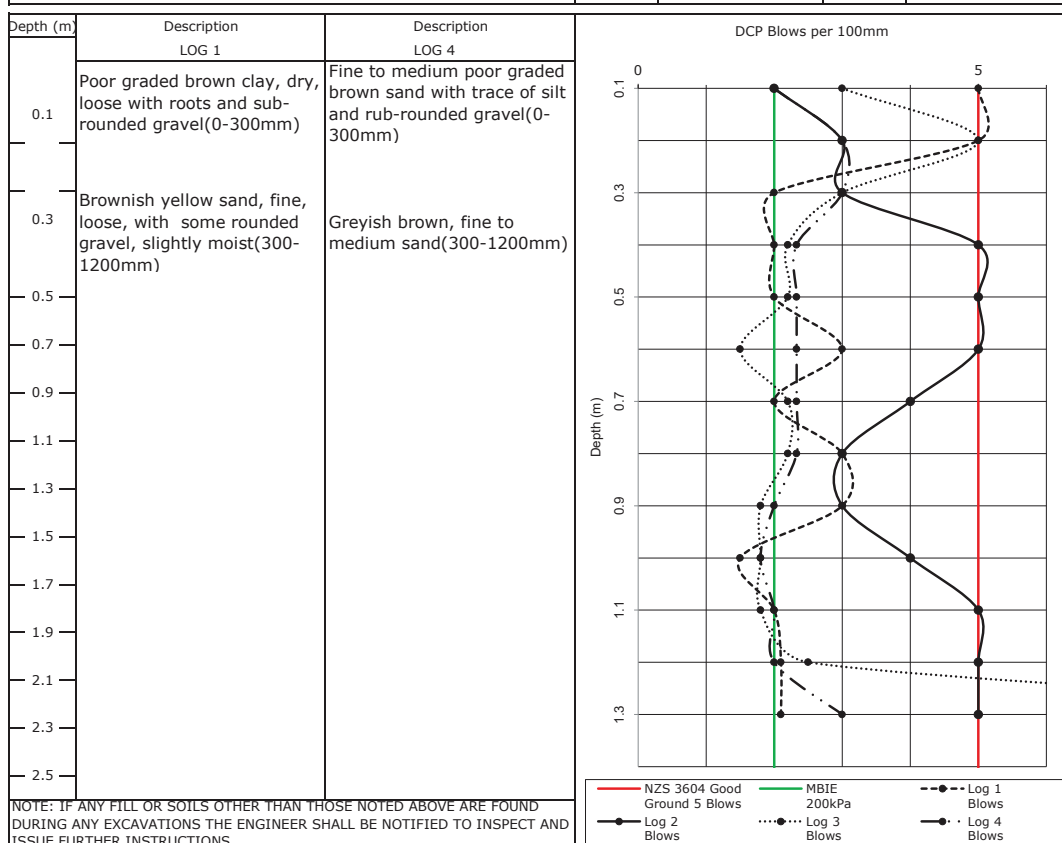
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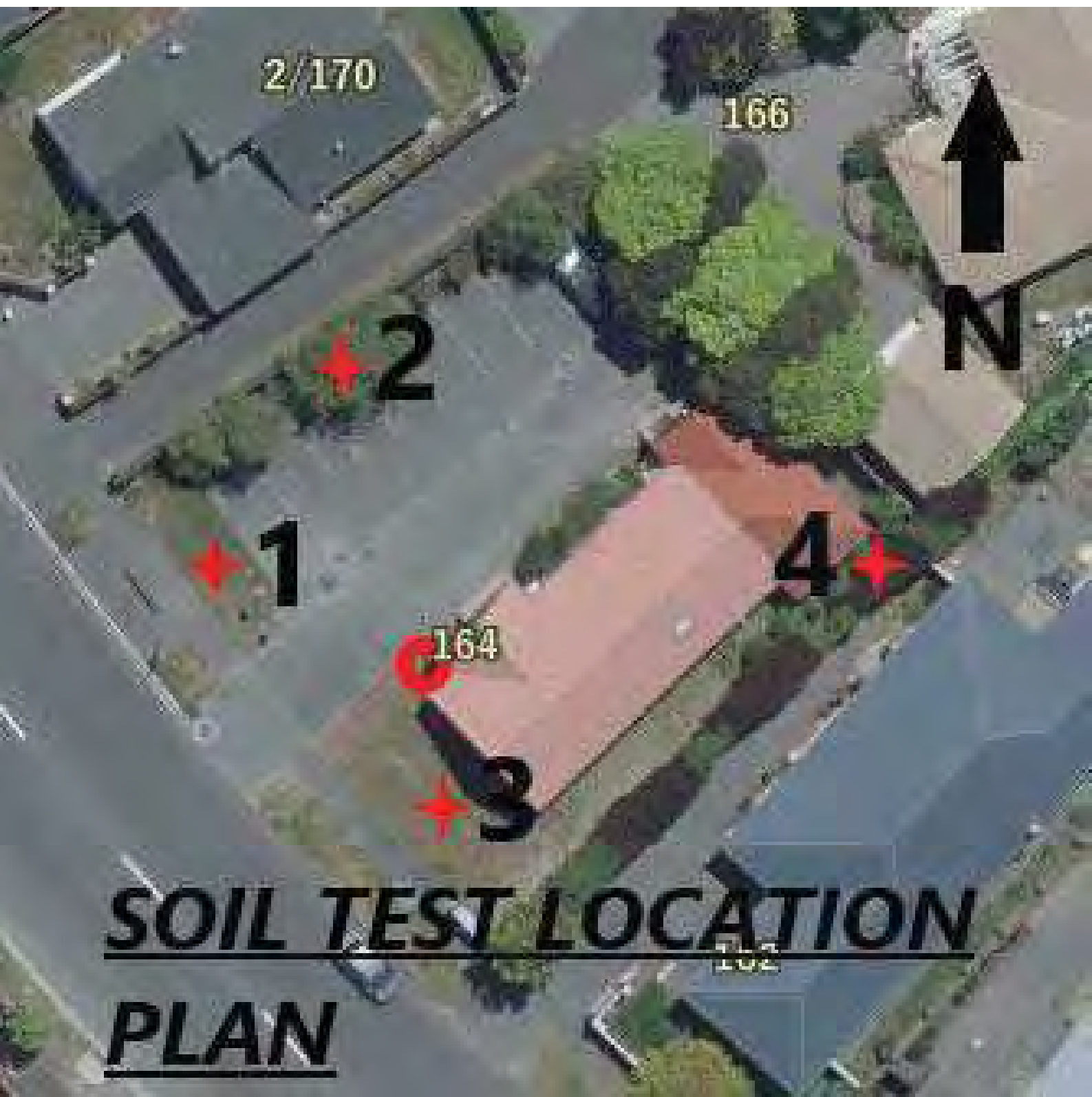


on behalf of Mike Wilton Consulting Ltd

Date: 28 February ,20

Client: Domonic Lowe	JOB NO	19174	DATE	12/12/2019
Project: 19174-164 Queenspark Drive	LOG	1 to 4	PAGE	1 of 1
Note:	LOT		BY	HL





17 March 2020

D A Wilson
64B Victors Road
Christchurch 8025

Dear Deborah

Building Act exemption approved

Building Act Exemption: BCN/2020/1259
164 Queenspark Drive Parklands
Proposed re-level to existing building ONLY

We have considered your application, under Schedule 1, clause 2(a) of the Building Act 2004, for exemption from the requirement to obtain building consent.

We are satisfied that the completed work is likely to comply with the building code, provided it is carried out in accordance with your proposal. Therefore, your application has been approved.

You can download stamped copies of your proposal documents from onlineservices.ccc.govt.nz. Please forward copies to the building owner.

Advice

- All building work must comply with the Building Act, building code, and all other applicable laws.
- This letter does not provide any approval that may be required, other than that stated.
- This approval is valid if the work is completed within two years of **17 March 2020**.

Please ensure all quality assurance procedures offered in the application are followed. Supporting evidence (Producer statements, site records/reports, photographs, etc.) should be provided to the council on completion – propertyfileinfo@ccc.govt.nz. These will be placed on the file for the property, and may prove beneficial for future enquiries (for example, land information memoranda (LIMs) or property file requests).

Yours sincerely



Sarah Congdon
Building Control Officer Level 3
03 941 6776

17 March 2020

D A Wilson
64B Victors Road
Christchurch 8025

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Sarah Congdon
Building Control Officer Level 3
03 941 6776



LEGAL & LAND INFORMATION

Lot 4 DP 58227
Site area 653m²
Living zone RS Residential suburban zone
Min set floor level is 50 year floor level is 13.7m RL
councils recommended level is F.F.L 13.13m which we are going with.
Wind region A Classification Med
Snow zone N4
Durability zone C
Earthquake zone 2 land type TC3
Hazard type LMA & Tsunami Evacuation zone
Existing building 152.2m²
Proposed new garage 54.0m²
Total building area 206.2m²
New site coverage 31.5% max site coverage is 35%

This is building was a commercial building / doctors surgery
The new owner wants to turn it into a house.

- A100 LOCATION PLAN
- A101 SURVEY PLAN
- A102 PROPOSED SITE PLAN & SITE MANAGEMENT PLAN
- A103 EXISTING FLOOR PLAN & DEMO
- A104 PROPOSED HOUSE PLAN & PLUMBING
- A105 HOUSE ELECTRICAL PLAN & BRACING
- A106 PROPOSED GARAGE / LAUNDRY & FOUNDATION PLAN
- A107 GARAGE BRACING,PLUMBING ELECTRICAL & ROOF FRAMING & CATCHMENTS
- A200 HOUSE ELEVATIONS & LIGHT AND VENTILATION
- A201 HOUSE ELEVATIONS & LIGHT AND VENTILATION
- A202 PROPOSED ELEVATIONS GARAGE
- A300 CROSS SECTION A-A HOUSE
- A301 CROSS SCTION B-B GARAGE
- A302 CROSS SCTION C-C GARAGE
- A400 FOUNDATION & GARAGE DETAILS
- A401 SHADOWCLAD WINDOW DETAILS
- A402 SHADOWCLAD DETAILS
- A403 SHADOWCLAD FRAMING DETAILS
- A404 ROOF DETAILS
- A405 HARDIFLEX DETAILS
- A406 HARDIFLEX FRAMING DETAILS
- A407 STANDARD DOOR DETAILS
- A408 SLIDING DOOR DETAILS
- A409 WINDOW DETAILS
- A410 BATHROOM DETAILS
- A411 WINDOW & DOOR SCHEDUAL

Christchurch
City Council

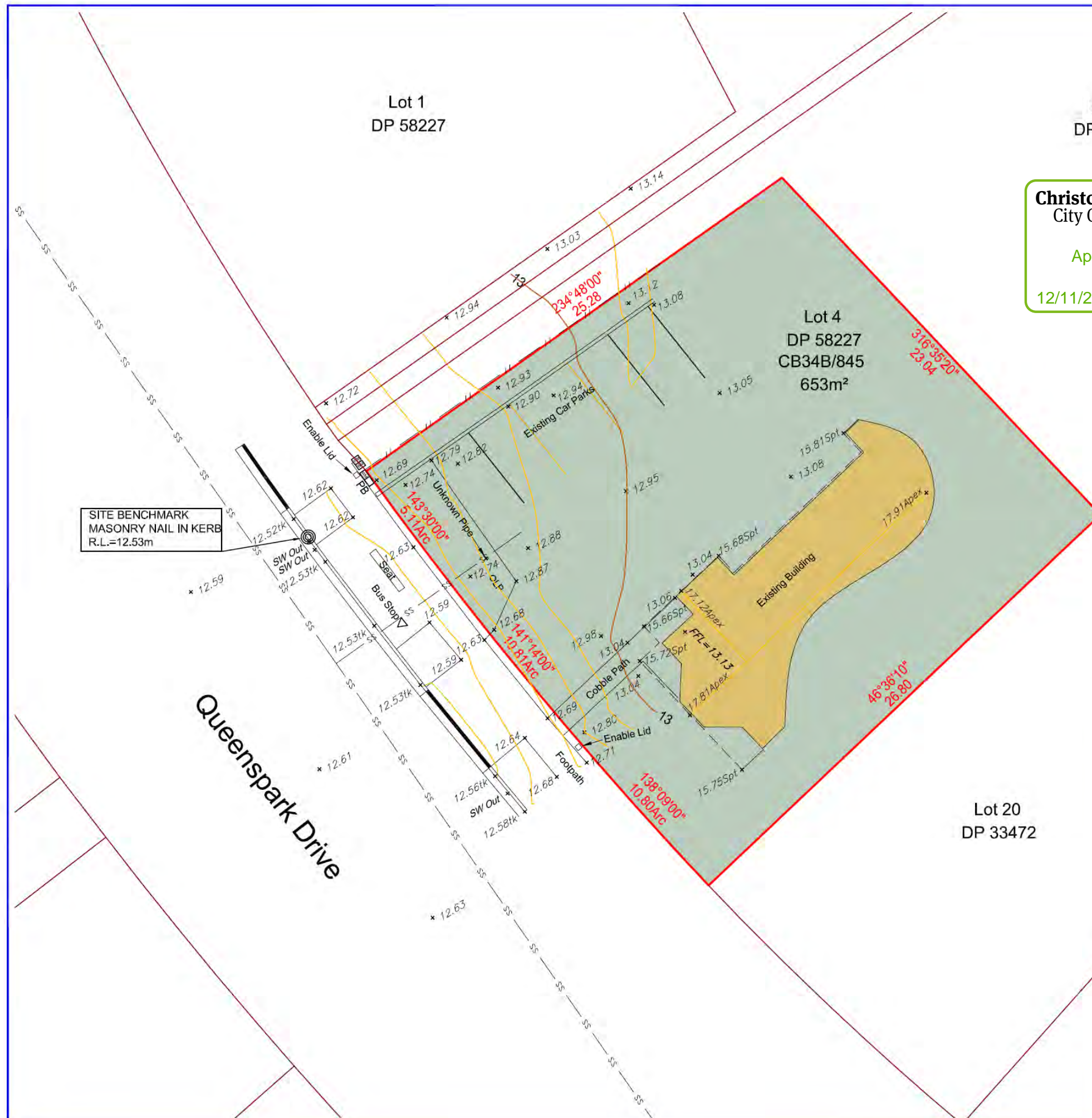
BCN/2020/10088

Approved Building Consent
Document

12/11/2020

Page 1 of 28

Stuthridge, Evan



Christchurch City Council
BCN/2020/10088
Approved Building Consent Document
12/11/2020 Stuthridge, Evan

Page 2 of 28

- SITE DATA**
- Property Address: 164 Queenspark Drive, Parklands, Christchurch
 - Registered Owners: Graeme Paul Bennetts and David John Strack 1/2 share and David John Strack and Judith Margaret Bennetts 1/2 share
 - Legal Description: Lot 4 DP 58227
 - Record of Title: RT CB34B/845
 - Total Area: 653m²
 - Local Authority: Christchurch City Council
 - Zoning: Residential Suburban

- SERVICE DATA**
- Topographical and other physical features shown are based on surveys undertaken by Mainland Surveying Ltd and information sourced from relevant infrastructure owners.
 - Where services have been visibly sighted their positions have been located by survey measurements. Where services have not been visibly sighted their positions have been derived from the relevant infrastructure owners records or may not be shown on this plan.
 - While care has been taken to ensure that the derived information shown on this plan is accurate all services should be located on site prior to any excavation or maintenance work being undertaken in accordance with the infrastructure owner's requirements.

- PROPERTY DATA**
- Existing lot boundaries shown are derived from pre-Canterbury Earthquake 2010 information sourced from Land Information New Zealand and may no longer be accurate.

SURVEY ORIGIN DATA

- Horizontal Datum: NZGD 2000
- Horizontal Origin Pt: Mount Pleasant Circuit MA I DP 523308
- Vertical Datum: Christchurch Drainage Datum
- Origin of Levels: BM0306 (EKJQ) RL 13.121
SCIRT/CCC Benchmark Survey July 2019
- Date of Survey: October 2019

LEGEND:

- Site/Proposed Boundaries
- Adjoining Boundaries
- Underlying Boundaries
- Easement/Covenant Boundaries
- Old boundary peg found
- Existing Building Eave
- Existing Building Wall
- Existing Building Ridgeline
- Existing Fence
- Kerb & Channel & Vehicle Crossing
- Power Pole & Overhead Power
- Boundary Box & Underground Power
- Light Pole/Lamp Post
- Pillar & Overhead Telecoms
- Water Meter & Fire Hydrant
- Valve & Water Pipe
- Sewer Manhole & Pipe
- Storm water Manhole & Pipe
- Sign
- Spot Height (& Position)
- Major Contours (1.00m)
- Minor Contours (0.10m)

A Initial Issue	SW	30.10.19
Revision	App	Date

Verify all dimensions on site before commencing work. Do not scale from this drawing. No liability shall be accepted for unauthorized use of this drawing.

Client
DOMINIC LOWE

Project Title
164 QUEENSPARK DRIVE,
PARKLANDS,
CHRISTCHURCH

Sheet Title
LEVEL AND FEATURE
SURVEY

A101



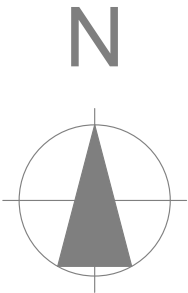
480B Moomhouse Ave Christchurch mainlandsurveying.co.nz +64 3 3664747

Scale (A3 Original) 1: 200

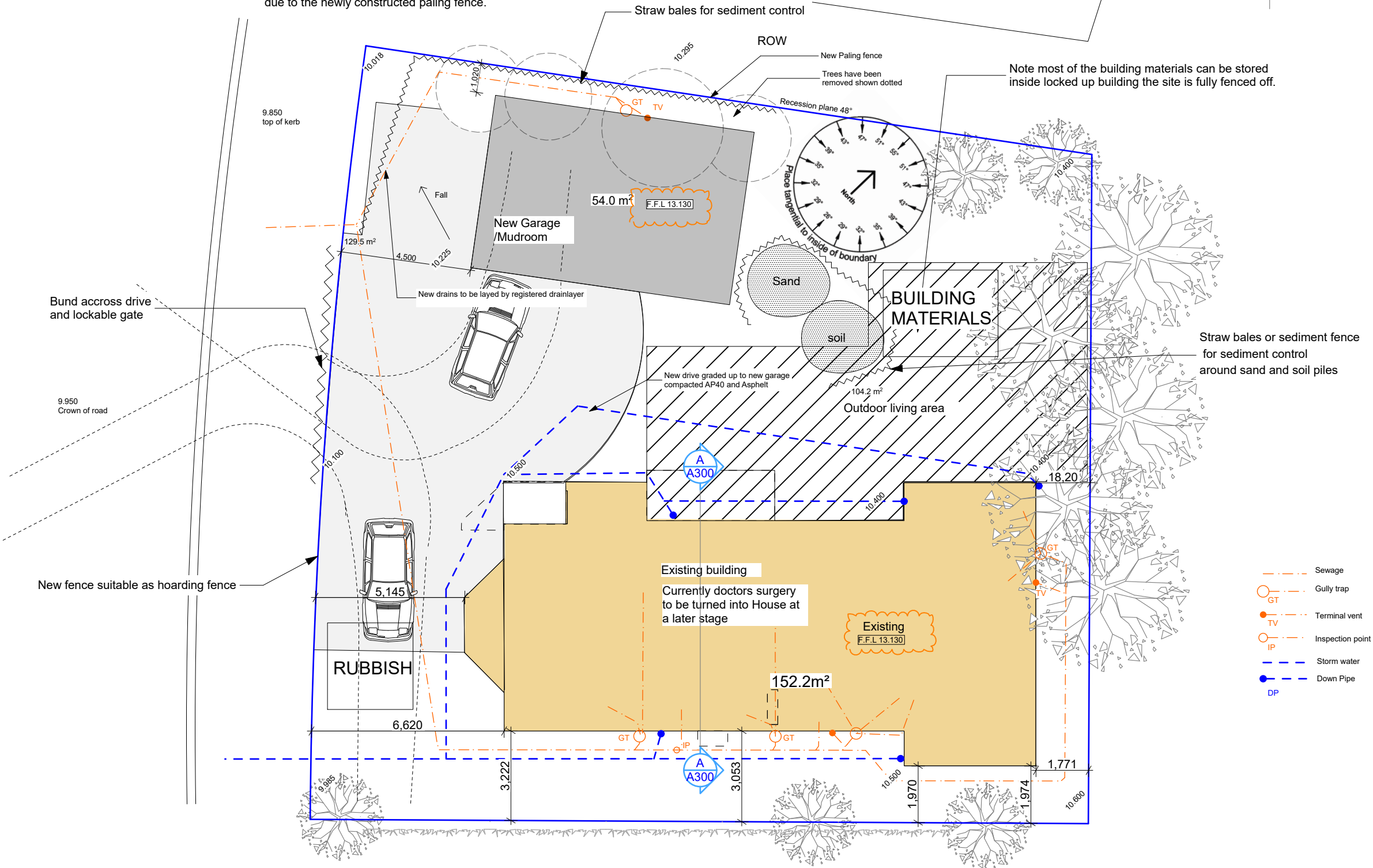


Project No	Drawing No	Sheet	Revision
2018	4001	01	A

2018-4001-A-Level and Feature Survey.dwg Plotted on 30.10.2019 at 2:51 PM



Note the site is very level with in 300mm over the site and 168mm to the kerb and has little risk of sediment runoff due to the newly constructed paling fence.



Ref

Drawing No

A102

PROPOSED SITE PLAN & SITE
MANAGEMENT PLAN

Drawn

Checked

Date

30/10/2020

SCALE

1:150

No

Date

R1

9/10/2020

R2

30/10/2020

Amendments

sediment control fences

Finished floor levels

ALTERATIONS

164 Queenspark Drive, Parklands

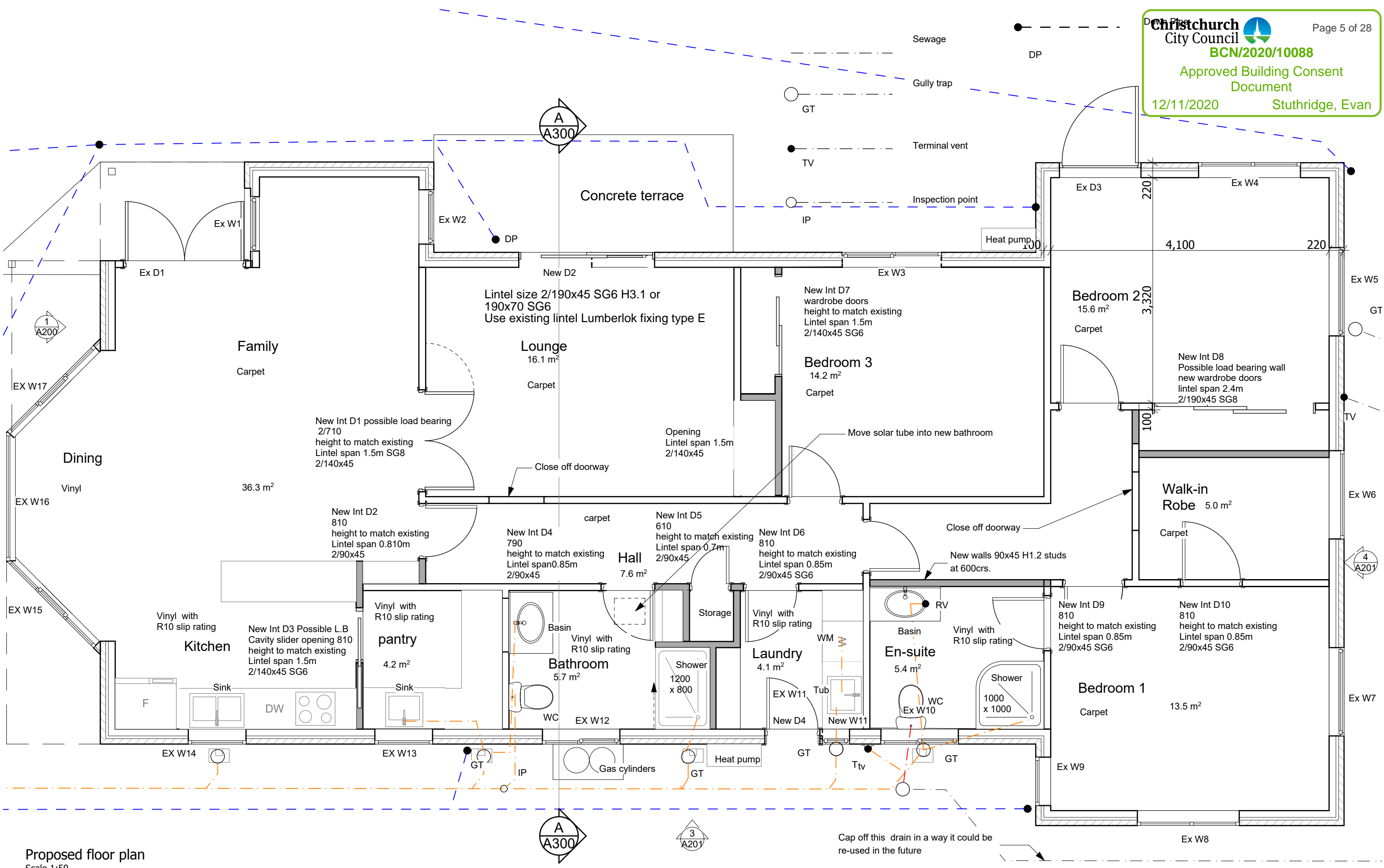
Christchurch 8083

Deborah Wilson

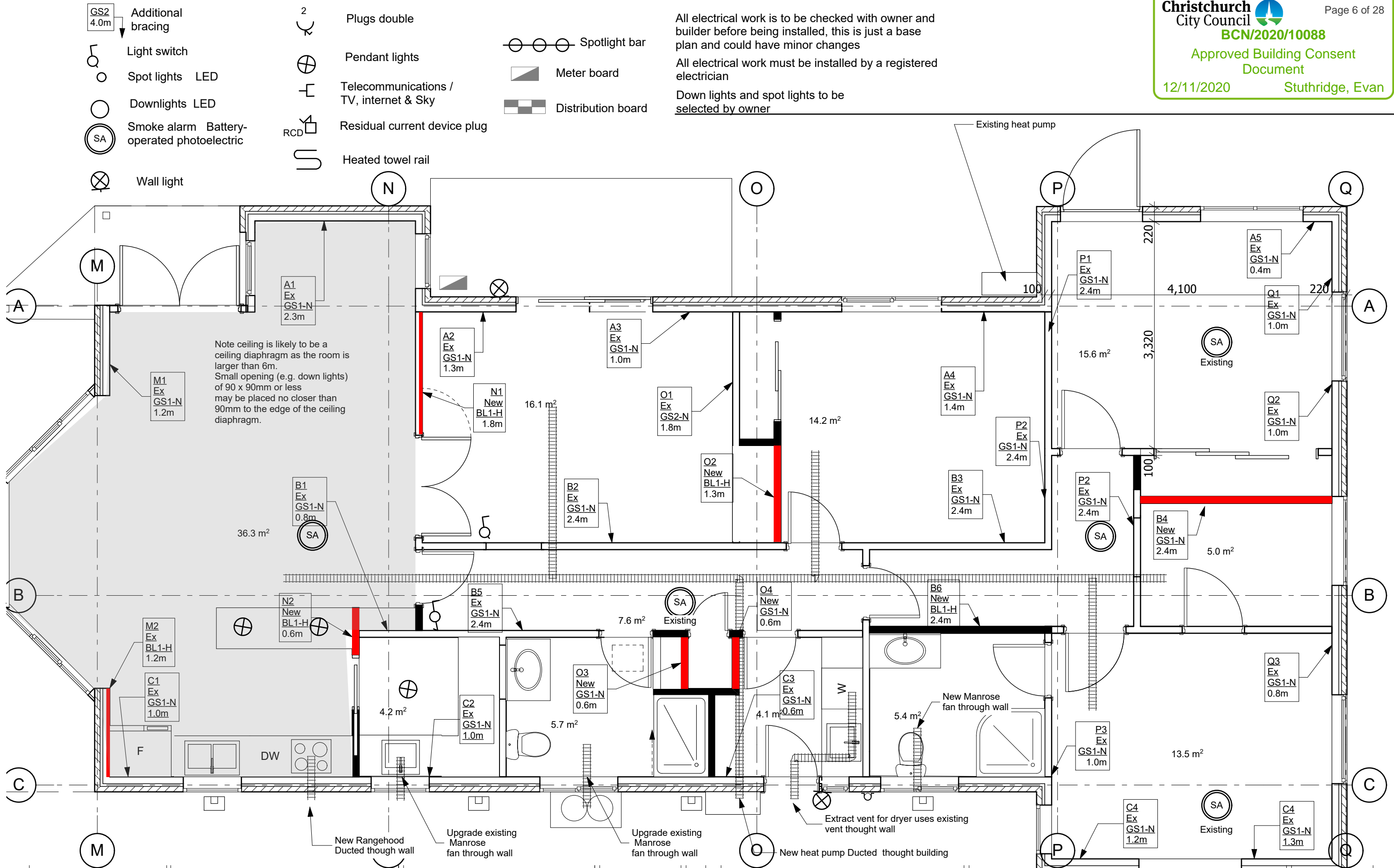
Design by Deb Ltd

LBP-BP117593

0274143000



Proposed floor plan
Scale 1:50



Deborah Wilson
Design by Deb Ltd
LBP-BP117593
0274143000

ALTERATIONS
164 Queenspark Drive, Parklands
Christchurch 8083

Amendments	No	Date

Drawing

HOUSE ELECTRICAL PLAN &
BRACING

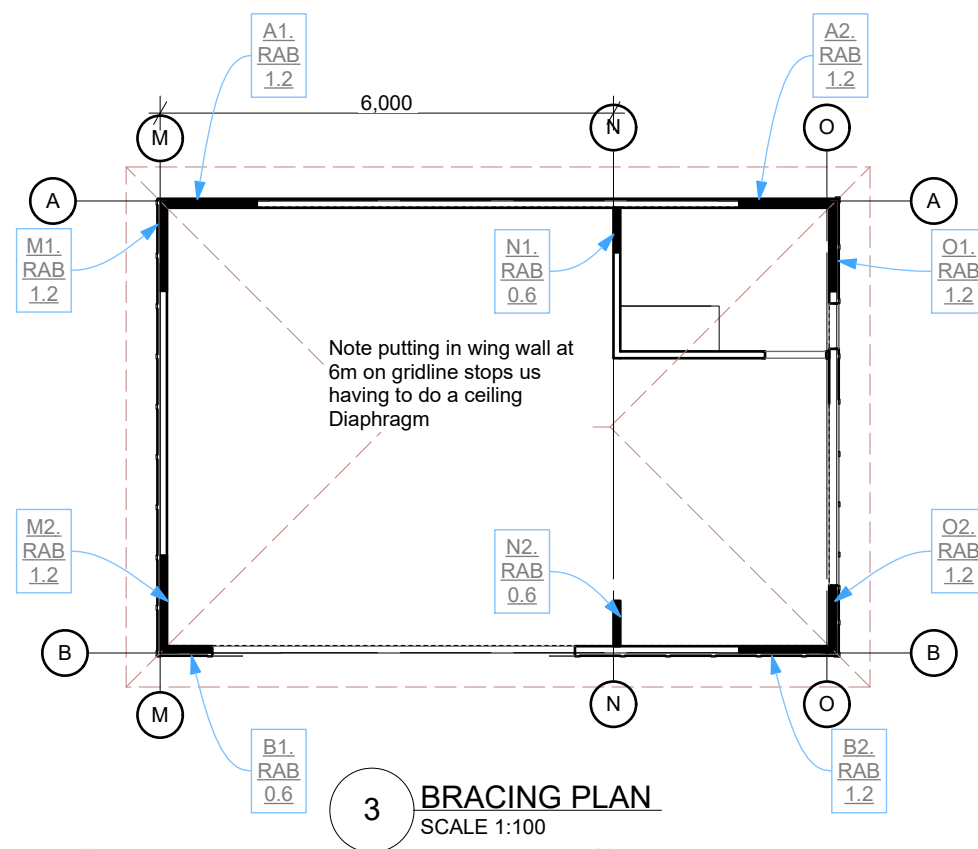
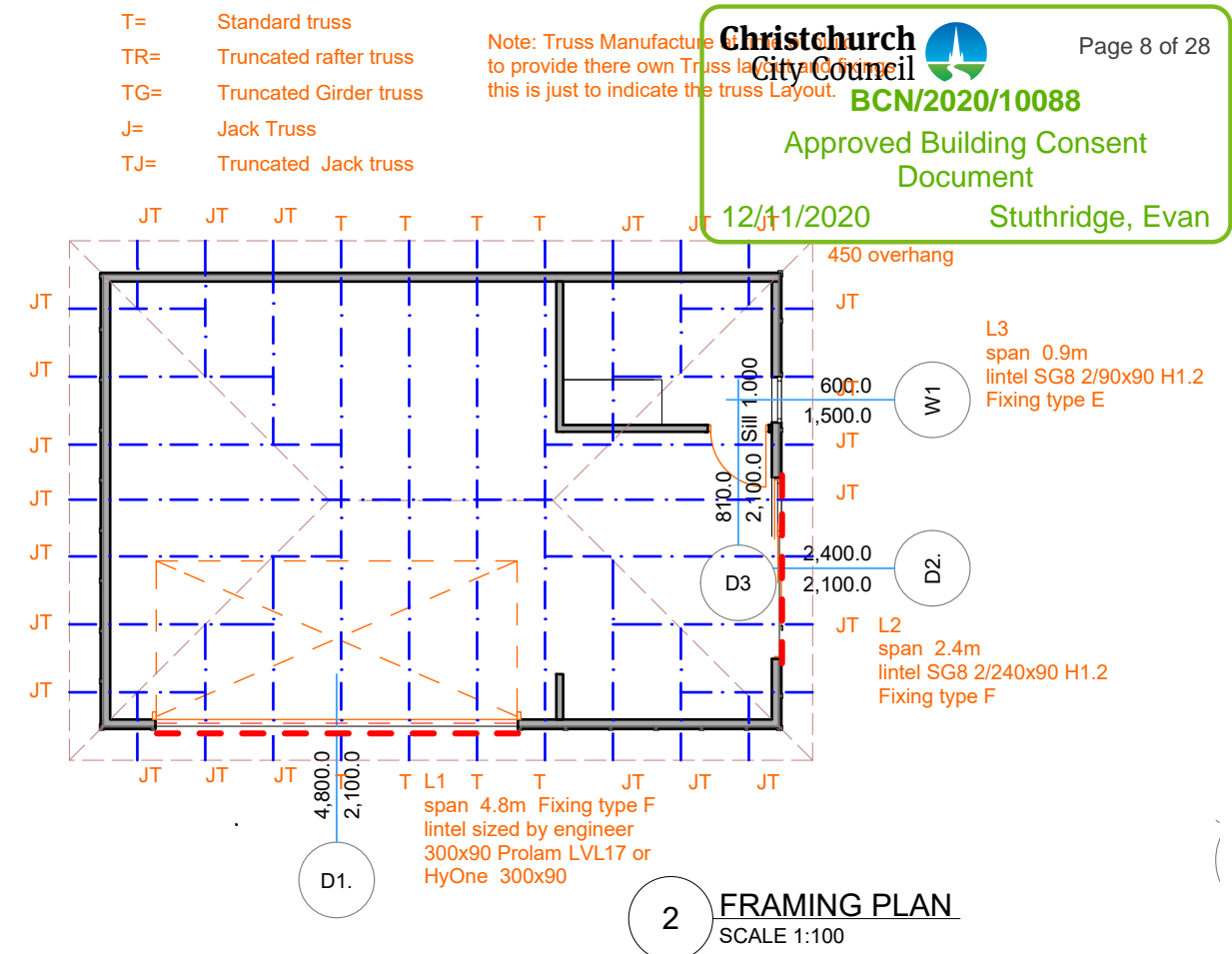
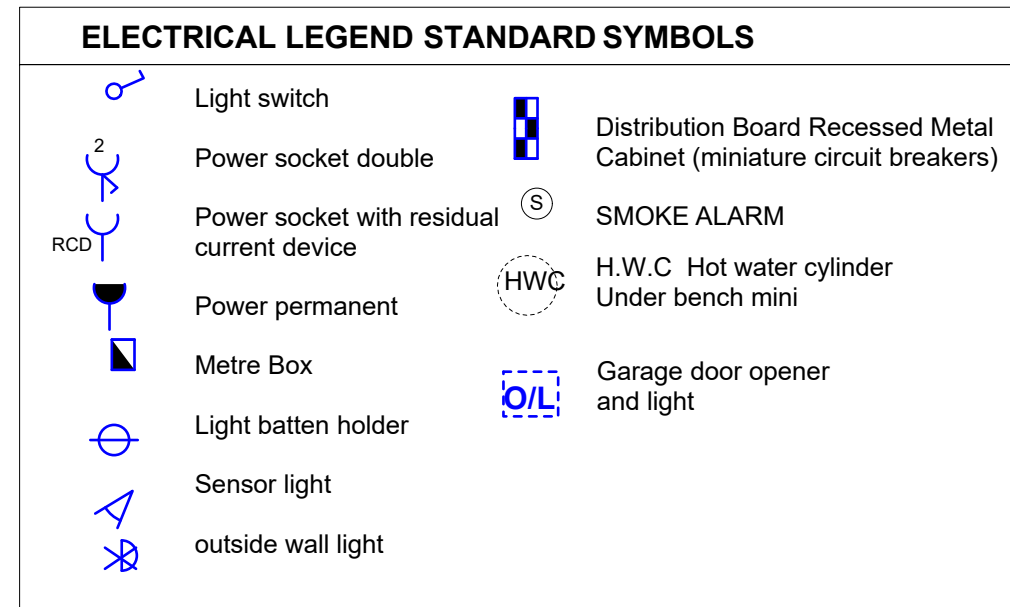
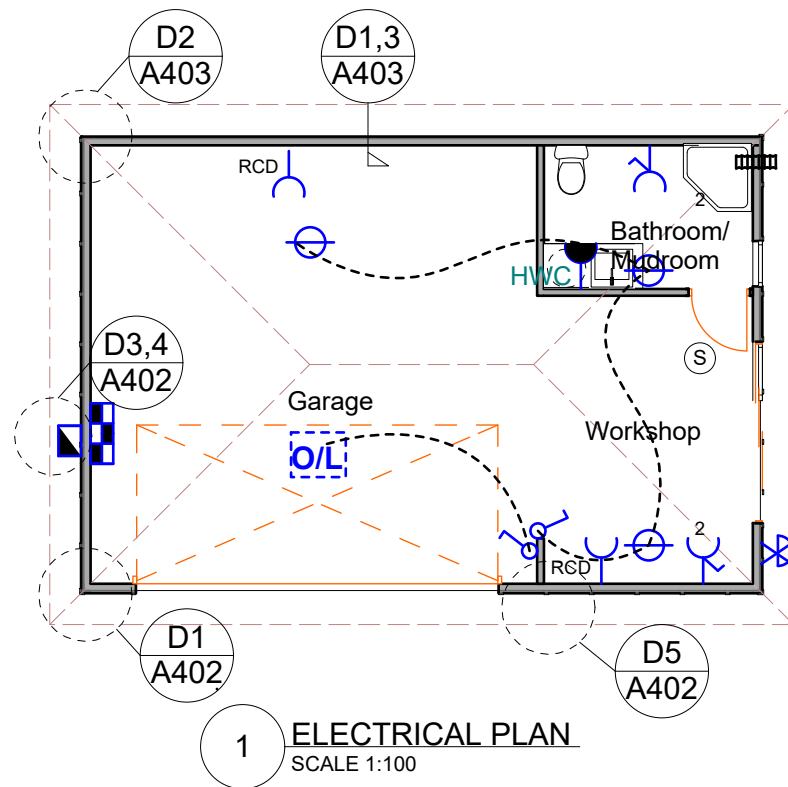
Drawn	
Checked	
Date	24/09/2020

SCALE
1:50

Ref R1903

Drawing No

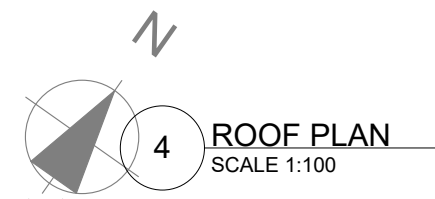
A105



Note: For all RAB fixing see RAB board Bracing Details in

Legend
B3. RAB 2.4
Bracing number
bracing type
length of wall

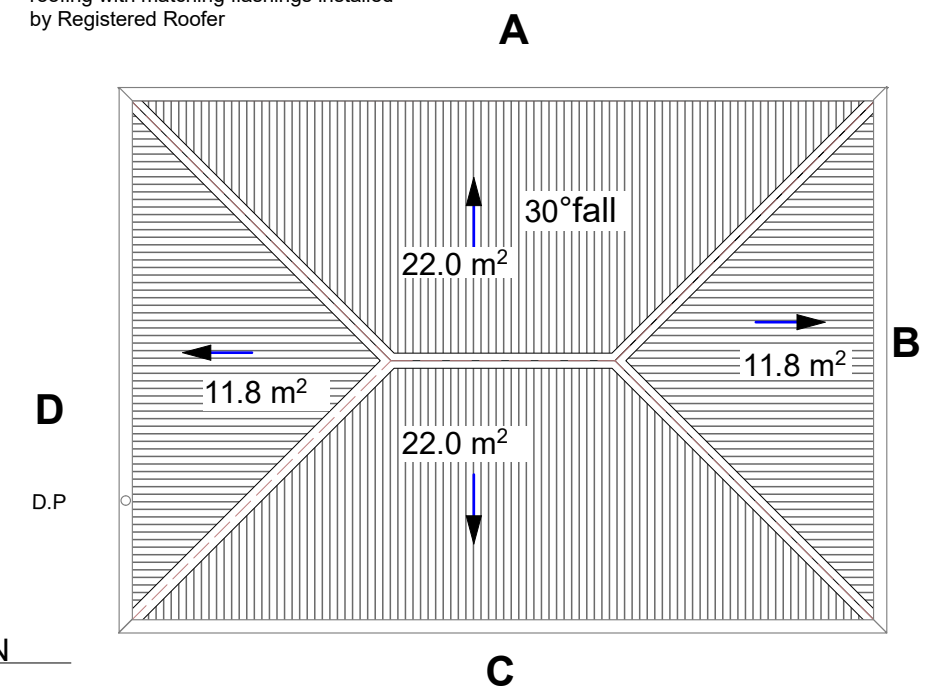
Note: entire house is to be wrapped in RAB board but only the units shown need to be fixed as per bracing specification

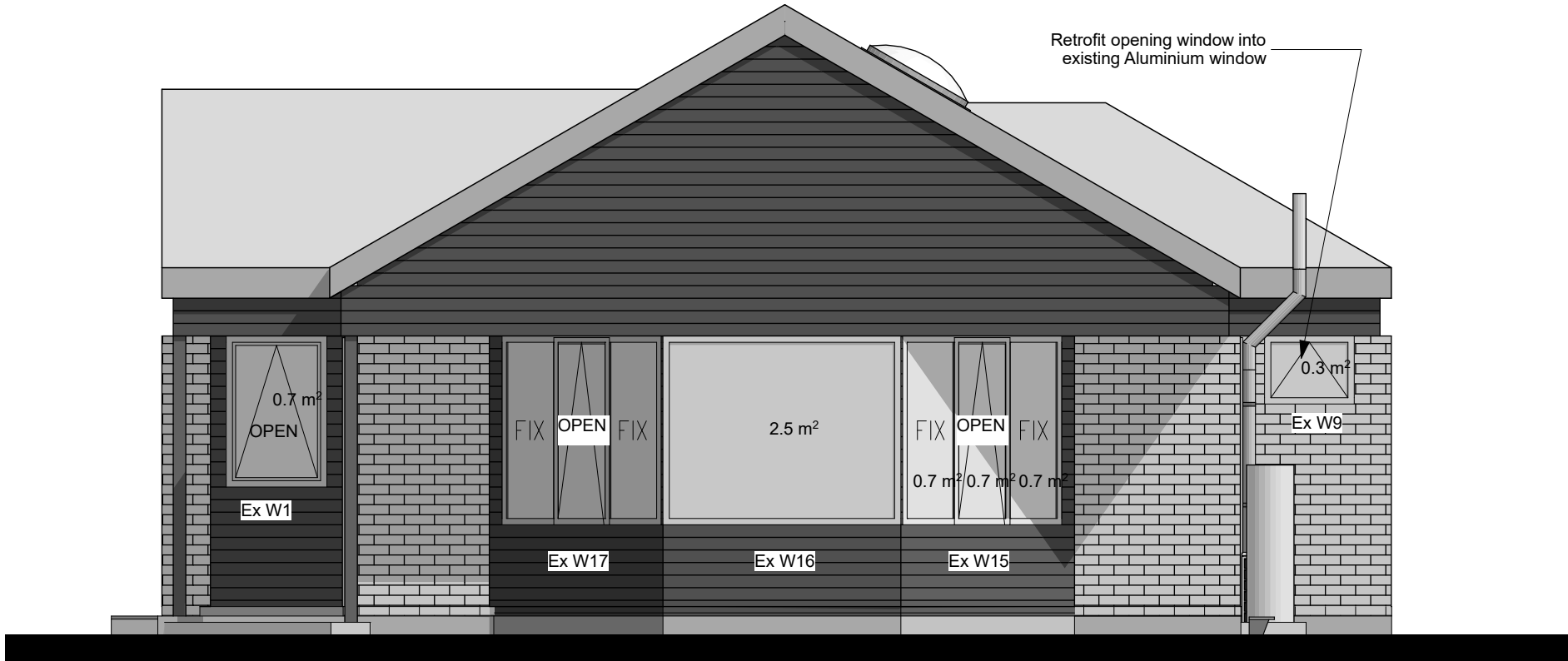


Wind zone Low
Durability corrosion zone 1
Snow Zone 4
Earthquake zone TC2

New Corrugated Longrun ColorSteel roofing with matching flashings installed by Registered Roofer

Garage Roof 30°
Roof plan area x Rainfall x Roof pitch = Catchment area
 $67.6m^2 \times 1.5 \times 1.2 = 121.68m^2$
External gutter $100mm^2 = 12,168mm^2$
Down pipe $100 \times 100mm = 9,000mm^2 = 2 DP$
or Round $125mm = 12,272 = 1DP$
downpipes required
Gutter size 175x125 rectangular



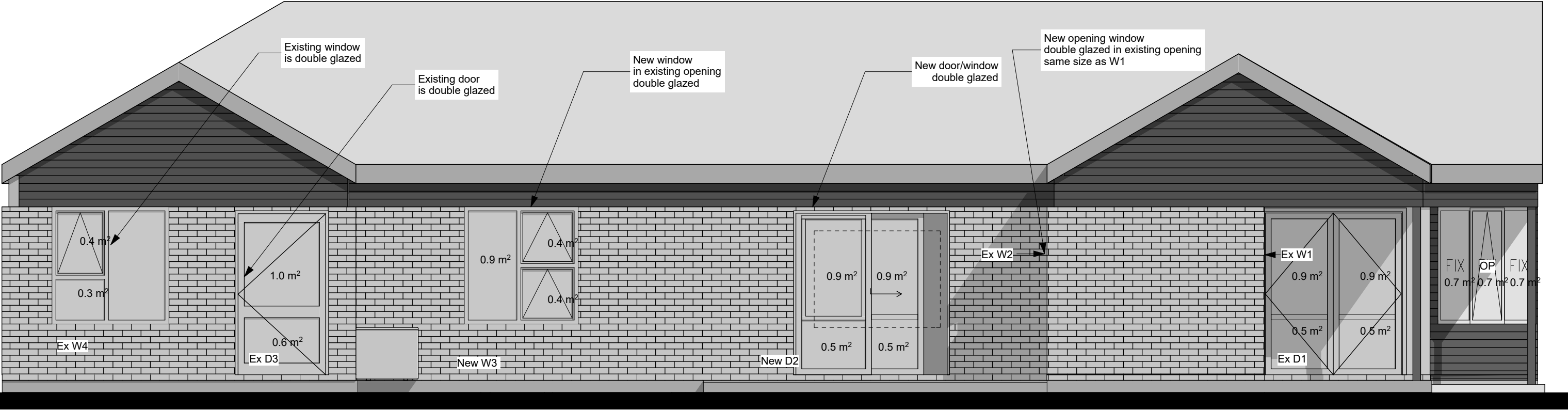


Room	Light min 10%		Ventilation min 5%	
Dining Family Kitchen area 36.3m²	Ex W1 = 0.7m²	11.8m²÷36.3m² =0.325x100 =32.5%	Ex W1 = 0.0m²	2.5m²÷36.3m² =0.06x100 =6.8%
	Ex W2 = 0.7m²		Ex W2 = 0.7m²	
	Ex D1 = 2.8m²		Ex D1 = 0.9m²	
	Ex W14 = 0.9m²		Ex W14 = 0.4m²	
	Ex W15 = 2.1m²		Ex W15 = 0.7m²	
	Ex W16 = 2.5m²		Ex W16 = 0.0m²	
	Ex W17 = 2.1m²		Ex W17 = 0.7m²	
	Total = 11.8m²		Total = 2.5m²	
Lounge area 16.1m²	New D2 = 2.8m²	2.8m²÷16.1m² =0.17x100 =17.4%	New D2 = 1.4m²	1.4m²÷16.1m² =0.086x100 =8.7%
	Total = 2.8m²		Total = 1.4m²	
Bedroom 3 area 14.2m²	New W3 = 1.7m²	1.7m²÷14.2m² =0.119x100 =11.9%	New W3 = 0.8m²	0.8m²÷14.2m² =0.056x100 =5.6%
	Total = 1.7m²		Total = 0.8m²	
Bedroom 2 area 15.6m²	Ex D3 = 1.6m²	3.7m²÷15.6m² =0.237x100 =23.7%	Ex D3 = 0.0m²	0.8m²÷15.6m² =0.051x100 =5.12%
	Ex W4 = 1.7m²		Ex W4 = 0.4m²	
	Ex W5 = 0.4m²		Ex W5 = 0.4m²	
	Total = 3.7m²		Total = 0.8m²	

1 NORTH WEST ELEVATION
Scale 1:50

Dining room window is single glazed
owner to install Low E film on the inside

Family room window is single glazed
install Low E film to inside



2 NORTH WEST ELEVATION
Scale 1:50

Bedroom 2

Bedroom 3

Lounge

Family

Existing single doors & window
to have Low E film installed

Dining

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LBP-BP117593
0274143000

ALTERATIONS
164 Queenspark Drive, Parklands
Christchurch 8083

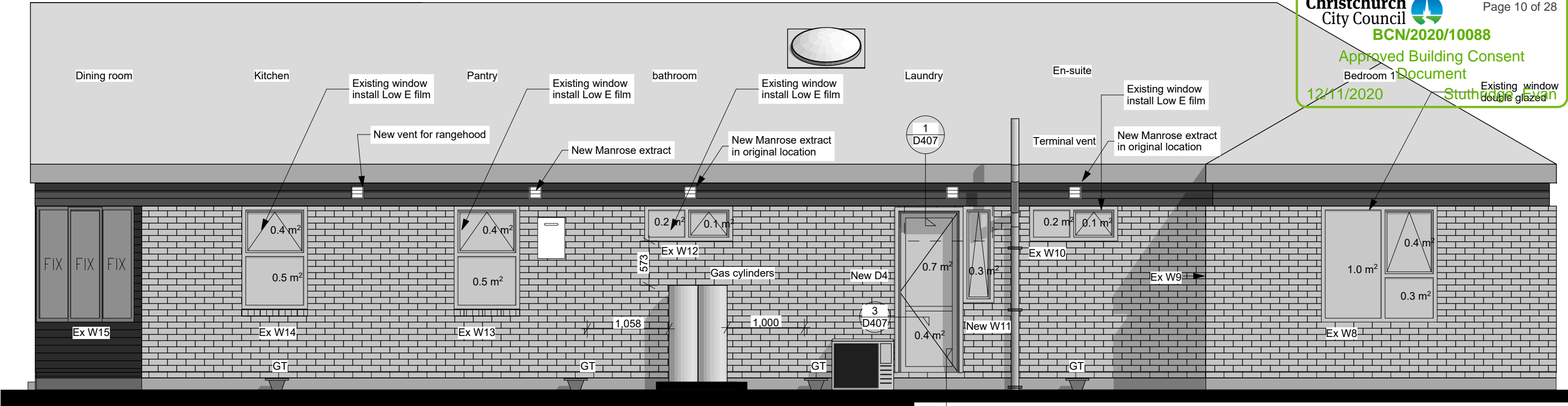
Amendments

No	Date

Drawing

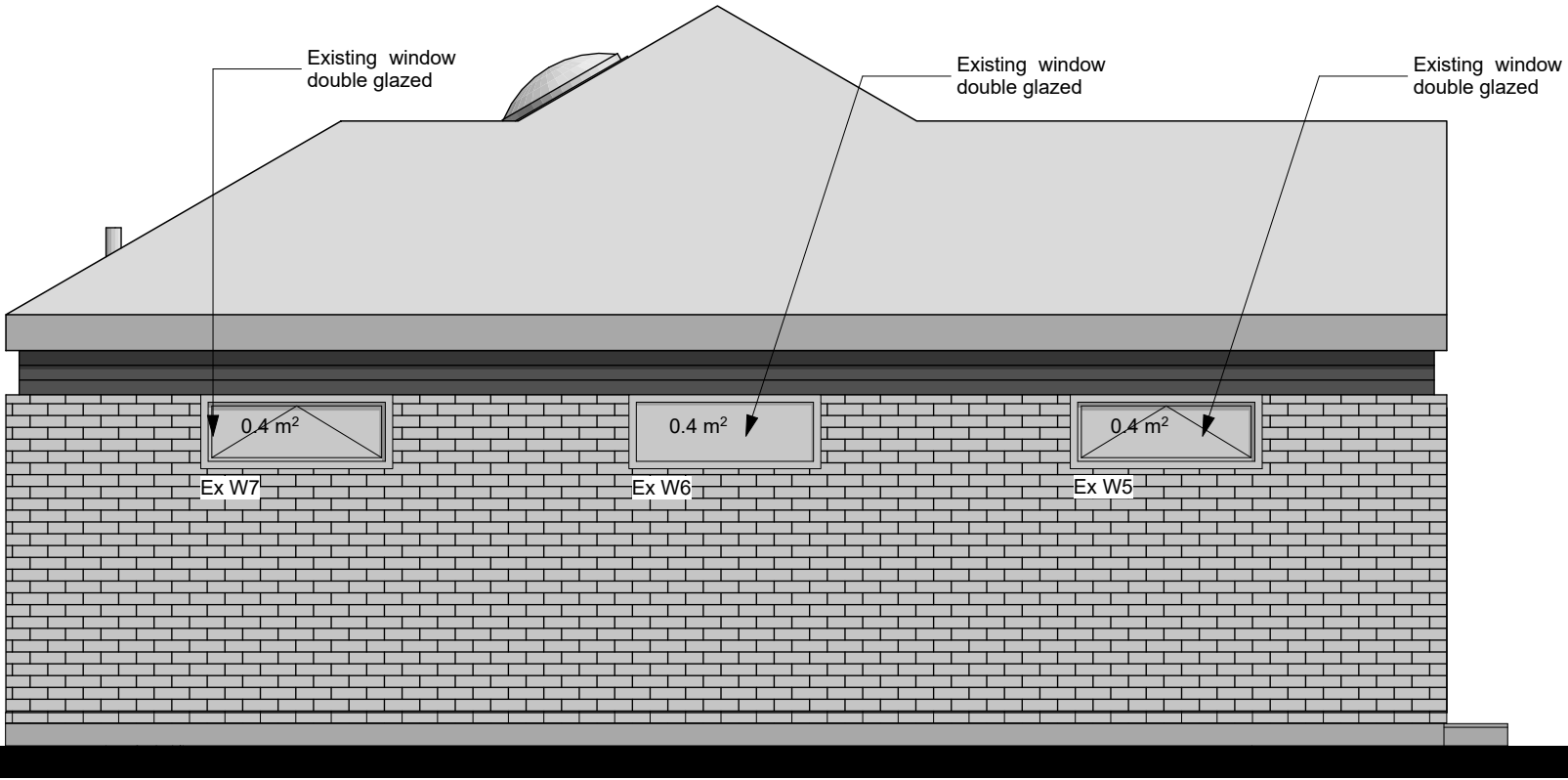
HOUSE ELEVATIONS & LIGHT AND VENTILATION		
Drawn		SCALE 1:50
Checked		
Date	24/09/2020	

Ref **R1903**
Drawing No
A200



3 SOUTH EAST ELEVATION
A104 Scale 1:50

2
D407

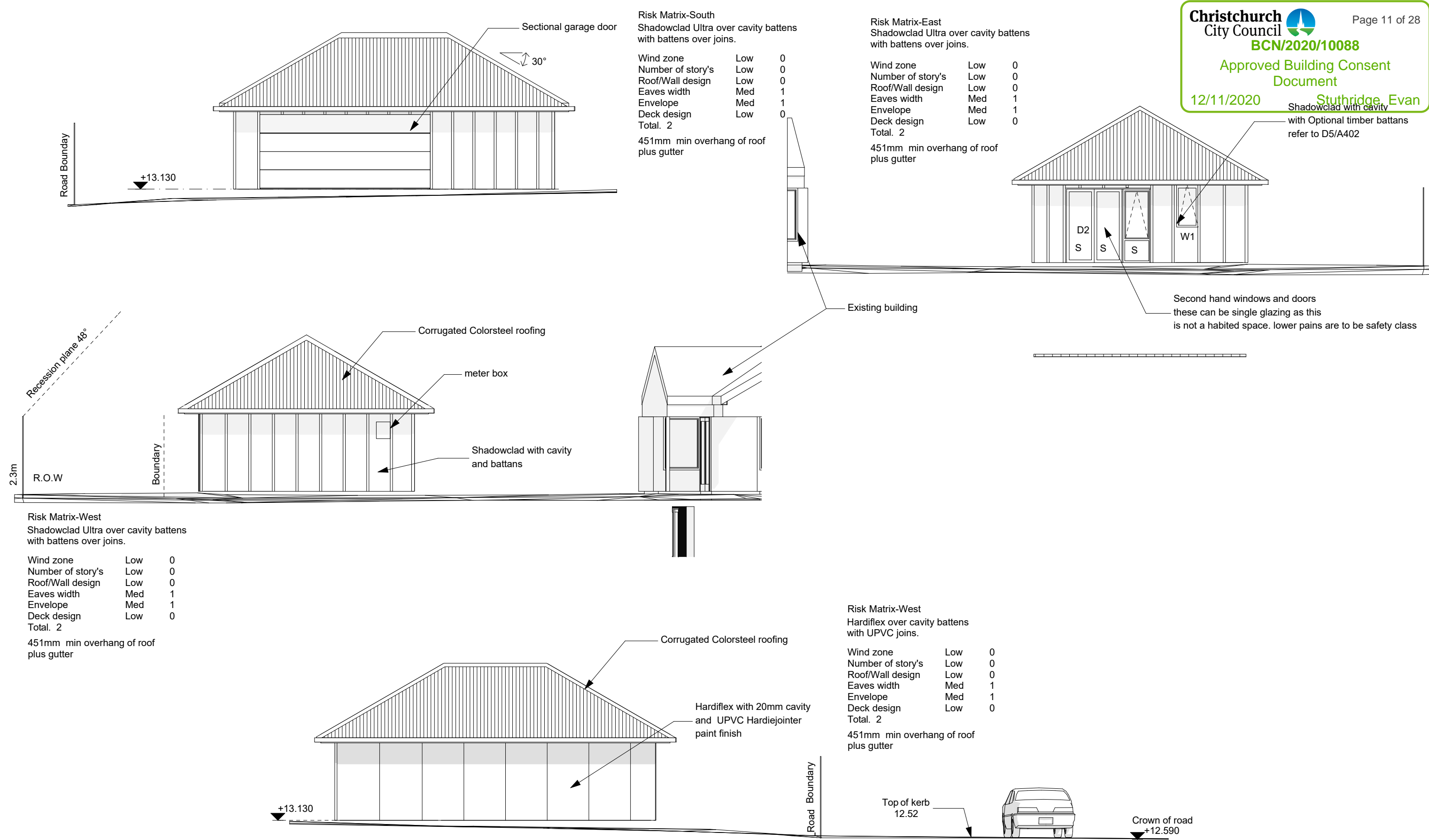


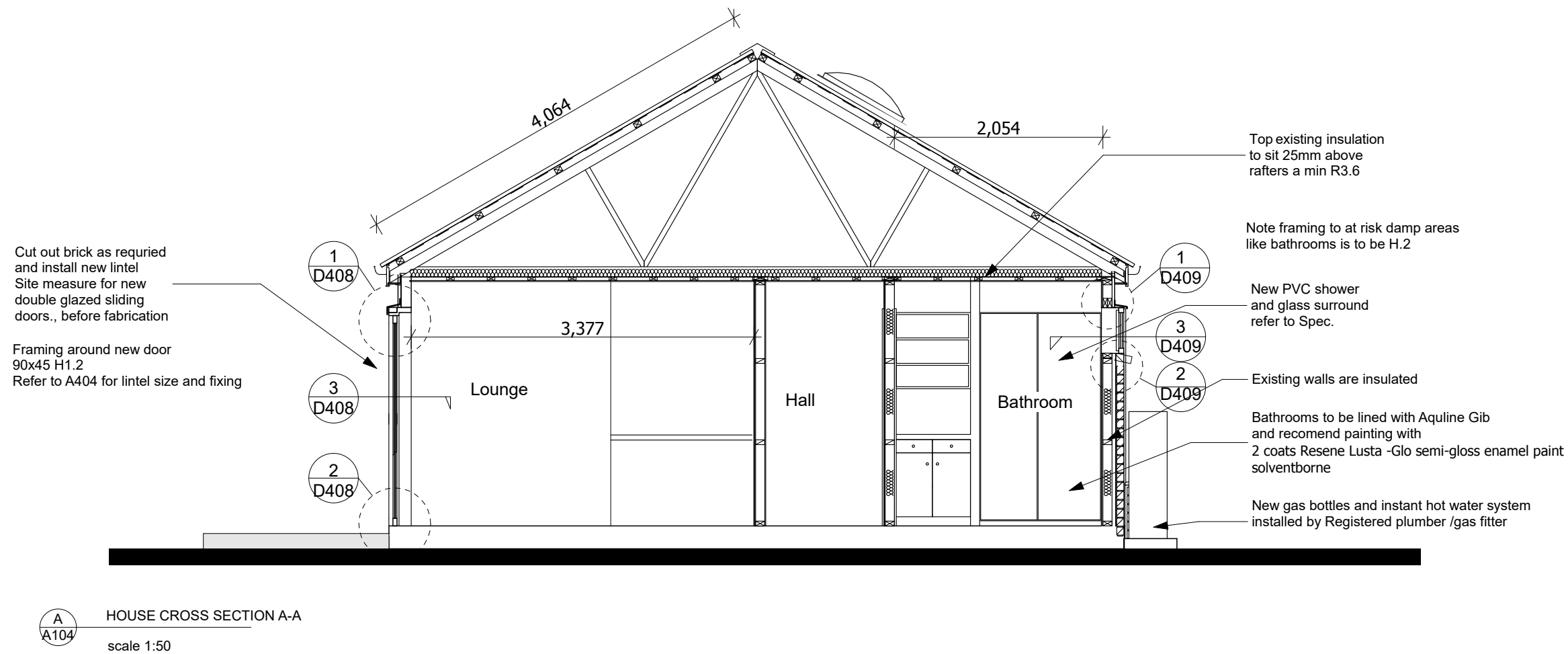
4 NORTH EAST ELEVATION
A104 Scale 1:50

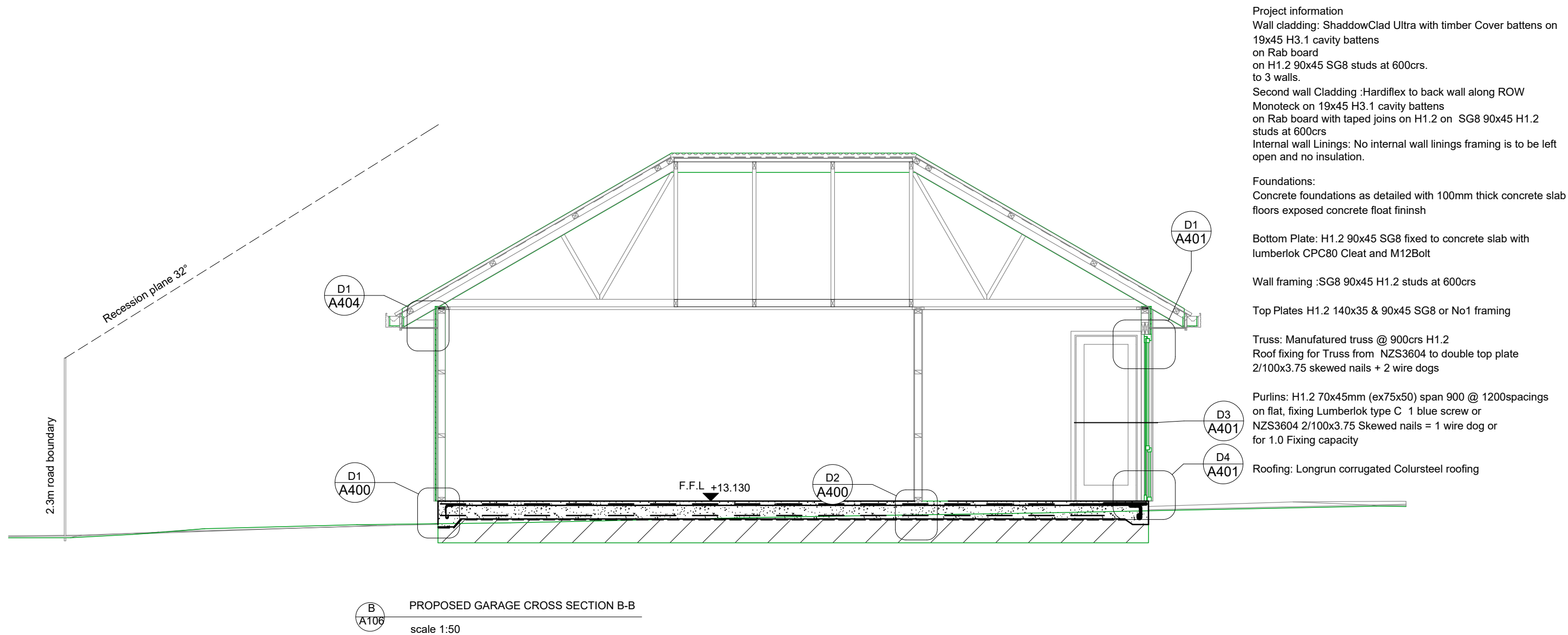
Room	Light min 10%		Ventilation min 5%		
Walk-in robe Bedroom 1 area 18.5m²	Ex W6 =0.4m²	2.8m²÷18.5m² =0.151x100 =15.1%	Ex W6 =0.0m²	1.1m²÷18.5m² =0.059x100 =5.9%	Ok
	Ex W7 =0.4m²		Ex W7 =0.4m²		
	Ex W8 =1.7m²		Ex W8 =0.4m²		
	Ex W9 = 0.3m²		Ex W9 = 0.3m²		
	Total =2.8m²		Total =1.1m²		
En-suite area 5.4m²	Ex W10 = 0.3m²	0.3m²÷5.4m² =0.055x100 =5.5%	Ex W10 = 0.2m²	0.2m²÷5.4m² =0.037x100 =3.7%	Note non habitable space requires task lighting and mechanical extraction
	Total =0.3m²		Total =0.2m²		
Laundry area 4.1m²	New W11 = 0.3m²	1.4m²÷4.1m² =0.341x100 =34.1%	New W11 = 0.3m²	0.3m²÷4.1m² =0.073x100 =7.3%	Ok
	New D4 =1.1m²		New D4 =0.0m²		
	Total =1.4m²		Total =0.3m²		
Bathroom area 5.7m²	Ex W12=0.3m²	0.3m²÷5.7m² =0.052x100 =5.2%	Ex W12=0.2m²	0.2m²÷5.7m² =0.035x100 =3.5%	Note non habitable space requires task lighting and mechanical extraction
	Total =0.3m²		Total =0.2m²		
Butlers pantry area 4.2m²	Ex W13=0.9m²	0.9m²÷4.2m² =0.214x100 =21.4%	Ex W13=0.4m²	0.4m²÷4.2m² =0.095x100 =9.5%	Note non habitable space requires task lighting and mechanical extraction
	Total =0.9m²		Total =0.4m²		
	Note part of this window could be painted out due to bench height				

No	Date

HOUSE ELEVATIONS & LIGHT AND VENTILATION		
Drawn		
Checked		
Date	24/09/2020	
SCALE	1:50	







Deborah Wilson

Design by Deb Ltd
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0274143000

ALTERATIONS

164 Queenspark Drive, Parklands
Christchurch 8083

Amendments	No	Date

Drawing

PROPOSED GARAGE CROSS SECTION B-B		
Drawn		
Checked		
Date	24/09/2020	
	SCALE	

Ref **R1903**

Drawing No

A301



Project information
Wall cladding: ShaddowClad Ultra with timber Cover battens on 19x45 H3.1 cavity battens on Rab board on H1.2 90x45 SG8 studs at 600crs. to 3 walls.
Second wall Cladding :Hardiflex to back wall along ROW
Monotek on 19x45 H3.1 cavity battens on Rab board with taped joints on H1.2 on SG8 90x45 H1.2 studs at 600crs
Internal wall Linings: No internal wall linings framing is to be left open and no insulation.

Foundations:
Concrete foundations as detailed with 100mm thick concrete slab floors exposed concrete float finish

Bottom Plate: H1.2 90x45 SG8 fixed to concrete slab with lumberlok CPC80 Cleat and M12Bolt

Wall framing :SG8 90x45 H1.2 studs at 600crs

Top Plates H1.2 140x35 & 90x45 SG8 or No1 framing

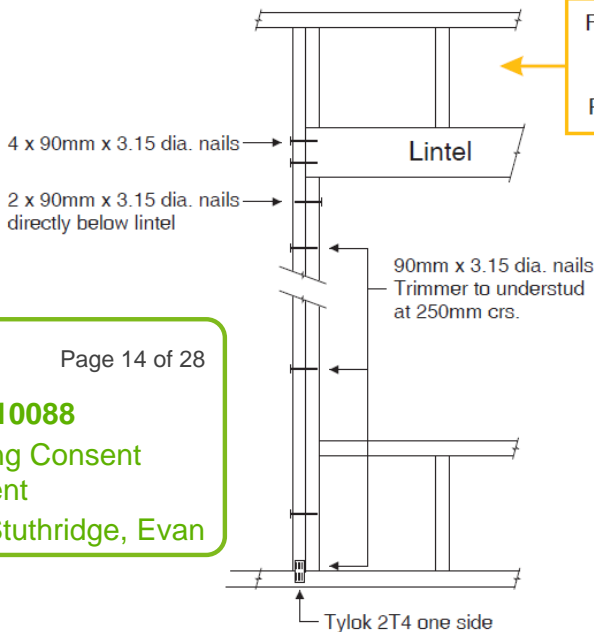
Truss: Manufactured truss @ 900crs H1.2
Roof fixing for Truss from NZS3604 to double top plate 2/100x3.75 skewed nails + 2 wire dogs

Purlins: H1.2 70x45mm (ex75x50) span 900 @ 1200spacings on flat, fixing Lumberlok type C 1 blue screw or NZS3604 2/100x3.75 Skewed nails = 1 wire dog or for 1.0 Fixing capacity

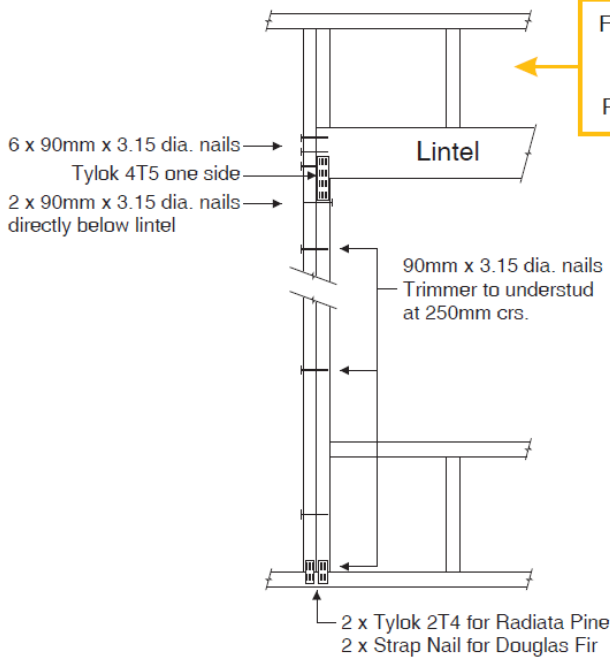
Roofing: Longrun corrugated Colursteel roofing

LINTEL FIXING OPTIONS

TYPE E 1.4kN



TYPE F 4.0kN



Stud numbers
indicative only.
Refer Table 8.5
NZS 3604:2011

Stud numbers
indicative only.
Refer Table 8.5
NZS 3604:2011

Christchurch
City Council
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Stuthridge, Evan

Page 14 of 28

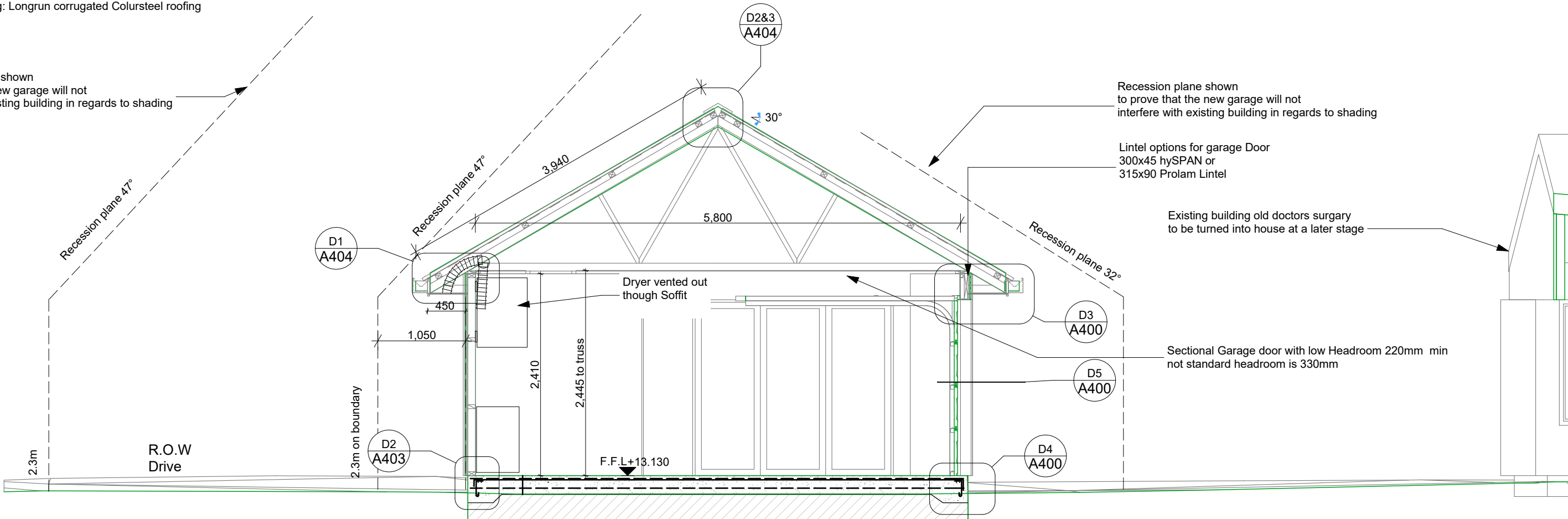
Recession plane shown
to prove at the new garage will not
interfere with existing building in regards to shading

Recession plane shown
to prove that the new garage will not
interfere with existing building in regards to shading

Lintel options for garage Door
300x45 hySPAN or
315x90 Prolam Lintel

Existing building old doctors surgery
to be turned into house at a later stage

Sectional Garage door with low Headroom 220mm min
not standard headroom is 330mm



C
A106
PROPOSED GARAGE CROSS SECTION C-C
scale 1:50

Deborah Wilson

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0274143000

ALTERATIONS
164 Queenspark Drive, Parklands
Christchurch 8083

Amendments

No	Date

Drawing

PROPOSED GARAGE CROSS
SECTION C-C

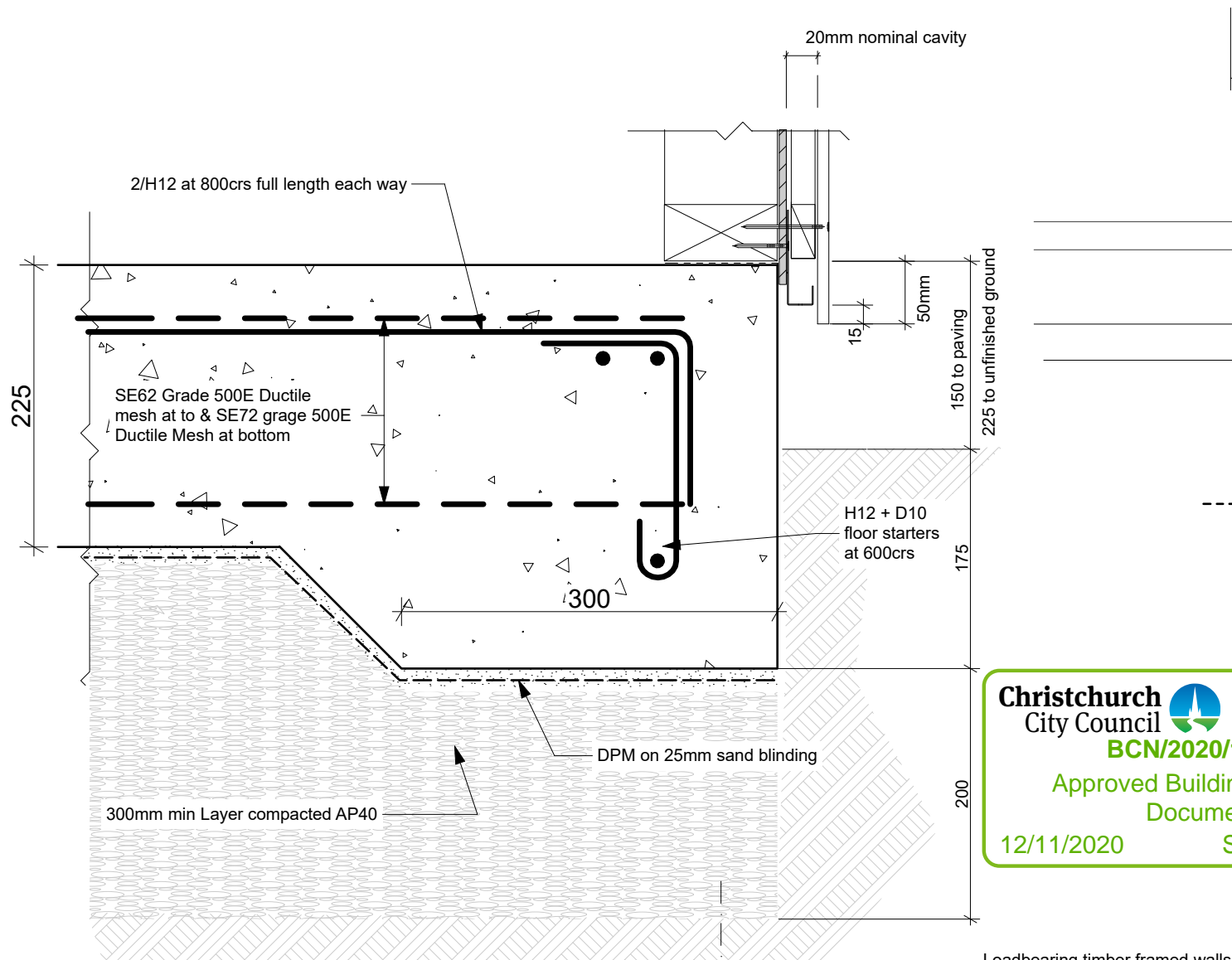
Drawn
Checked
Date 24/09/2020

SCALE
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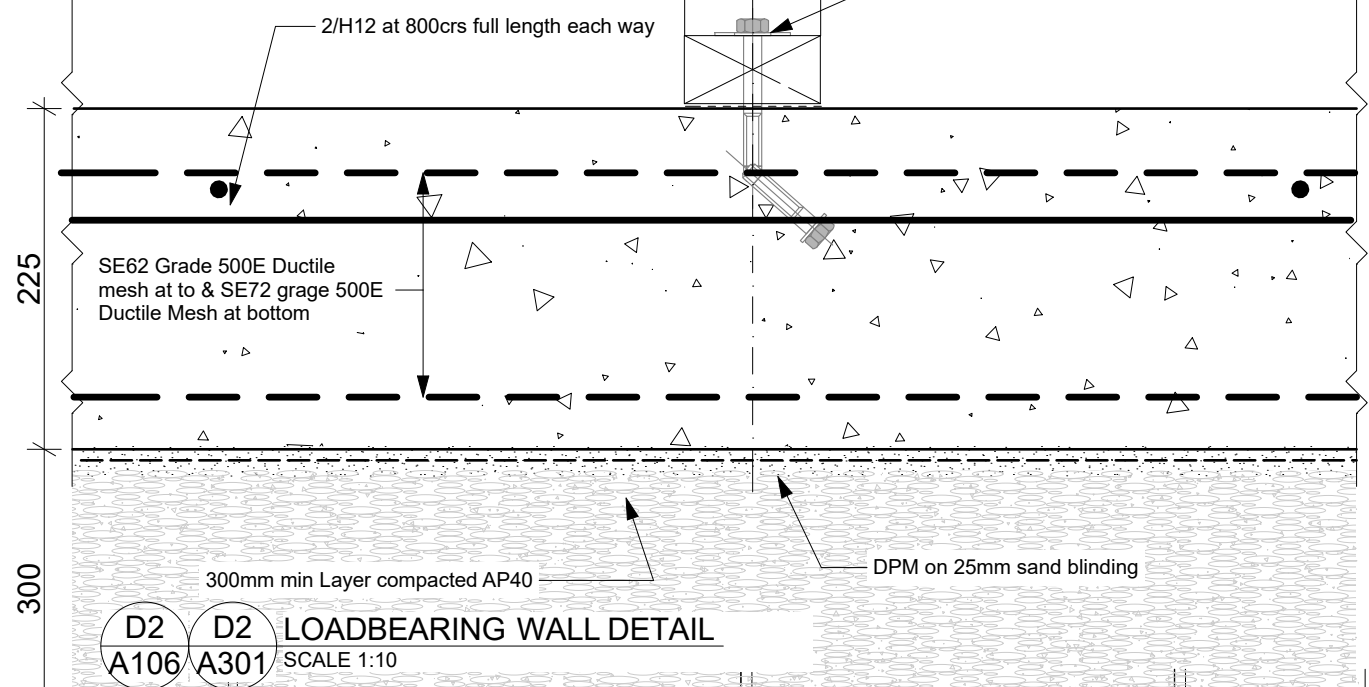
Ref R1903

Drawing No

A302

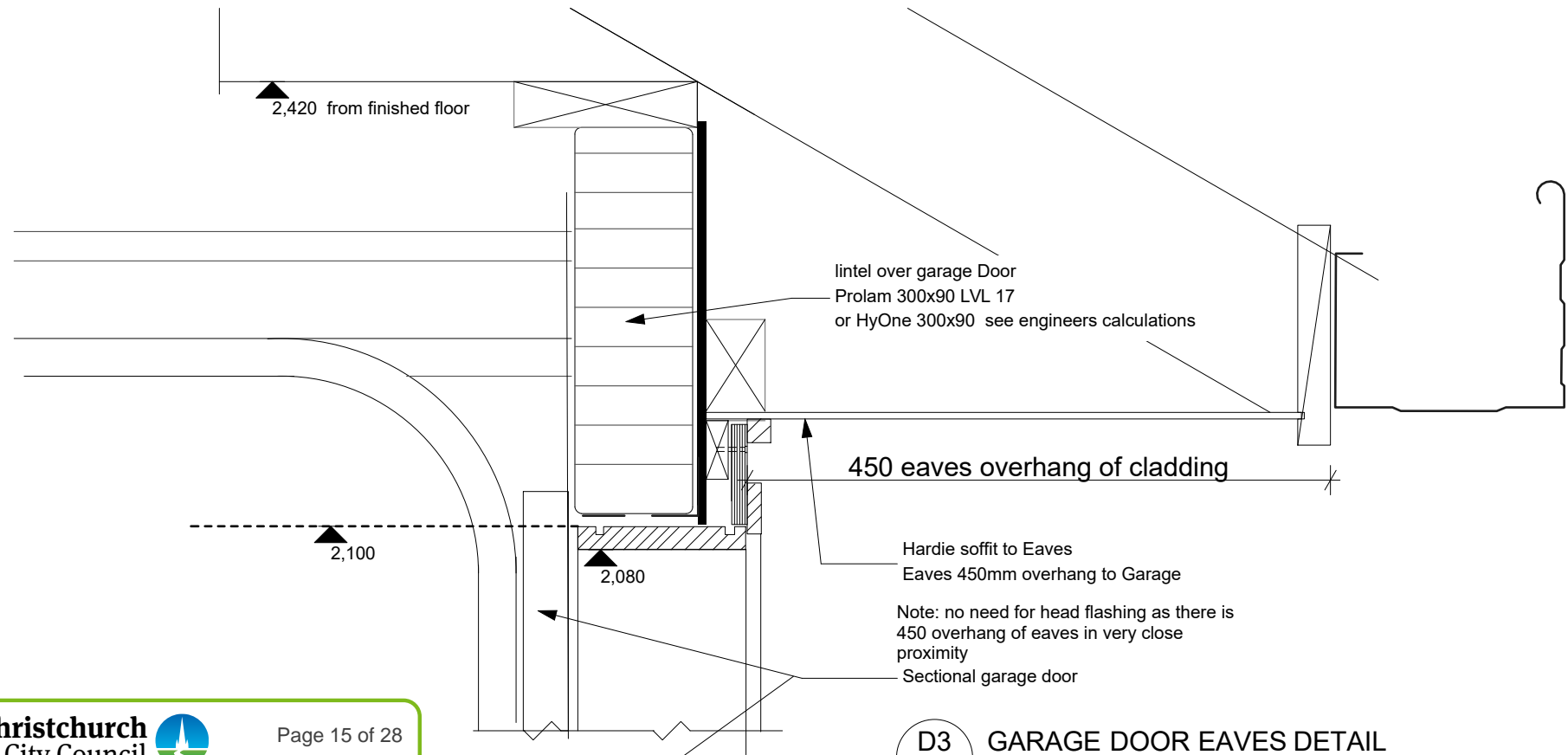


D1 A106 D1 A301 FOUNDATION DETAIL
SCALE 1:5

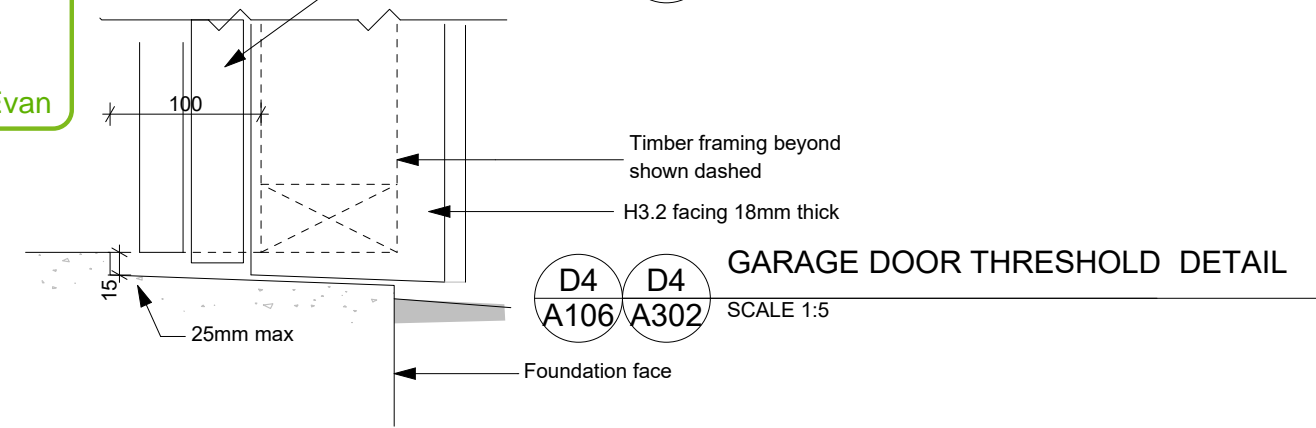


D2 A106 D2 A301 LOADBEARING WALL DETAIL
SCALE 1:10

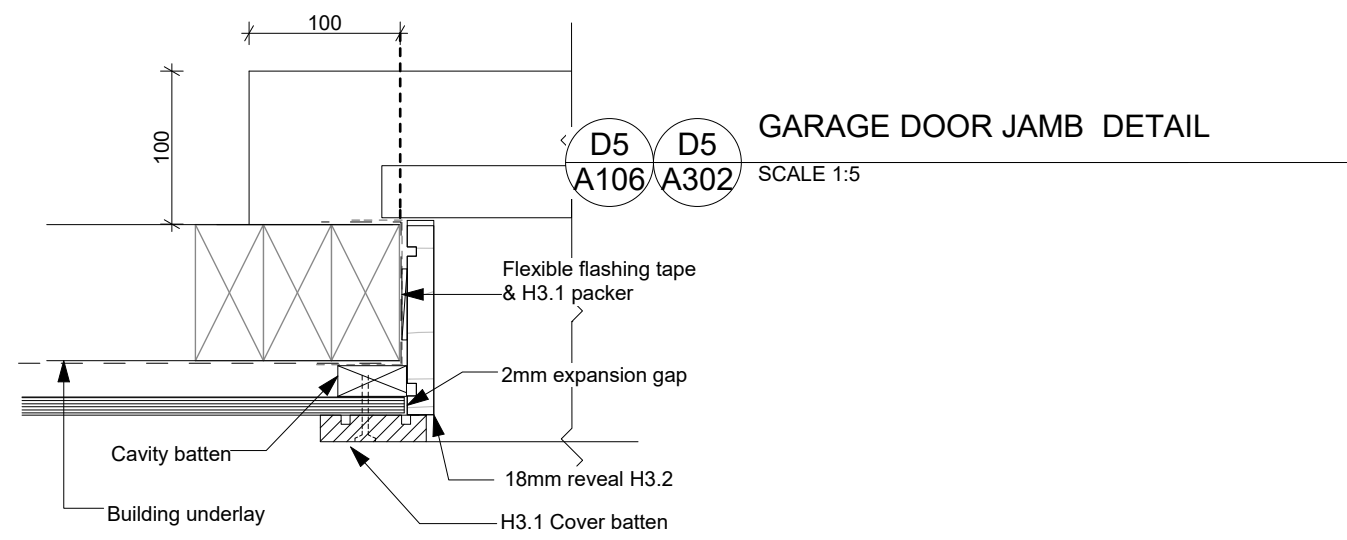
Christchurch City Council
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D3 A302 GARAGE DOOR EAVES DETAIL
SCALE 1:5



D4 A106 D4 A302 GARAGE DOOR THRESHOLD DETAIL
SCALE 1:5



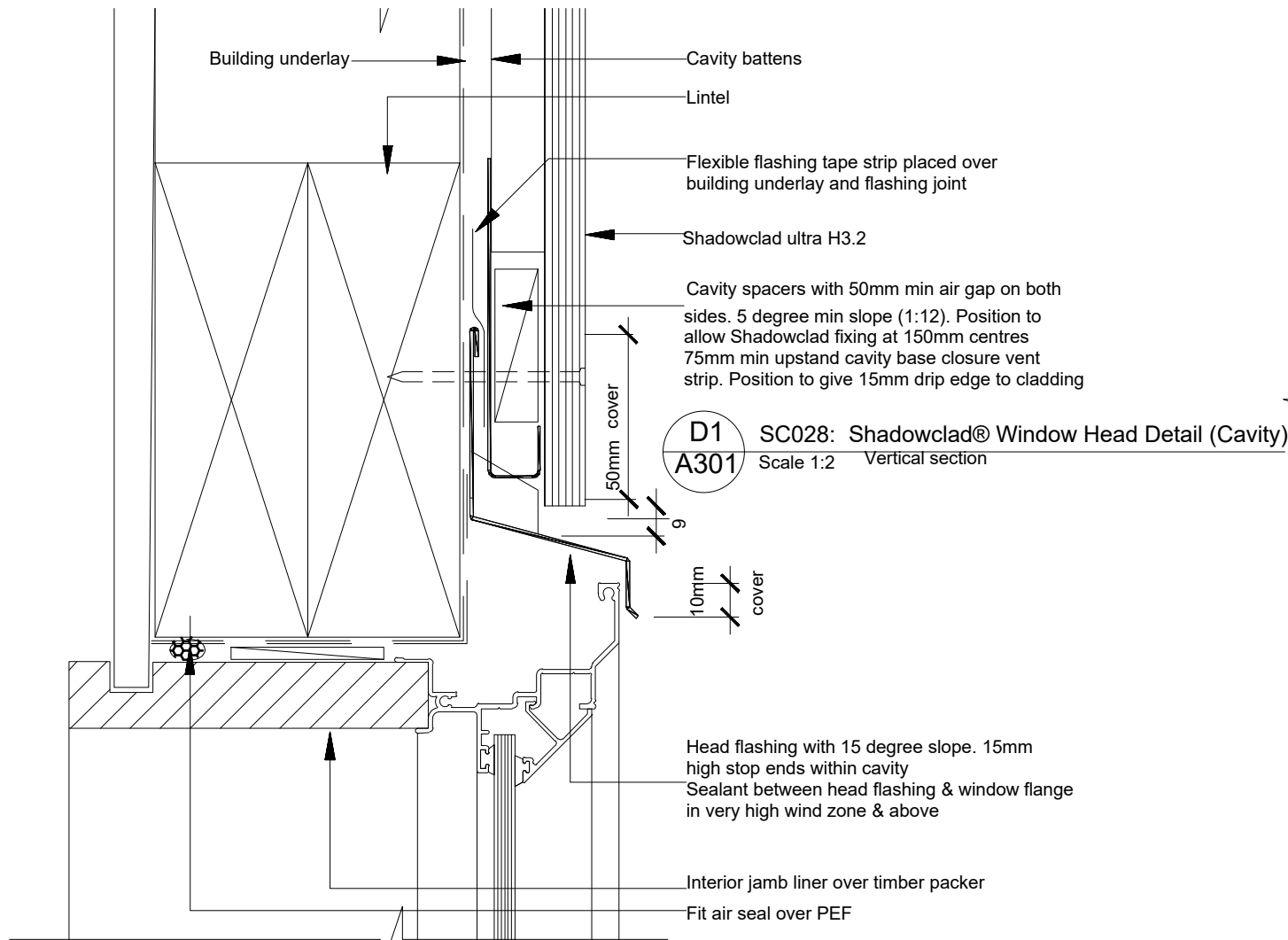
D5 A106 D5 A302 GARAGE DOOR JAMB DETAIL
SCALE 1:5

Deborah Wilson
Design by Deb Ltd
LBP-BP117593
0274143000

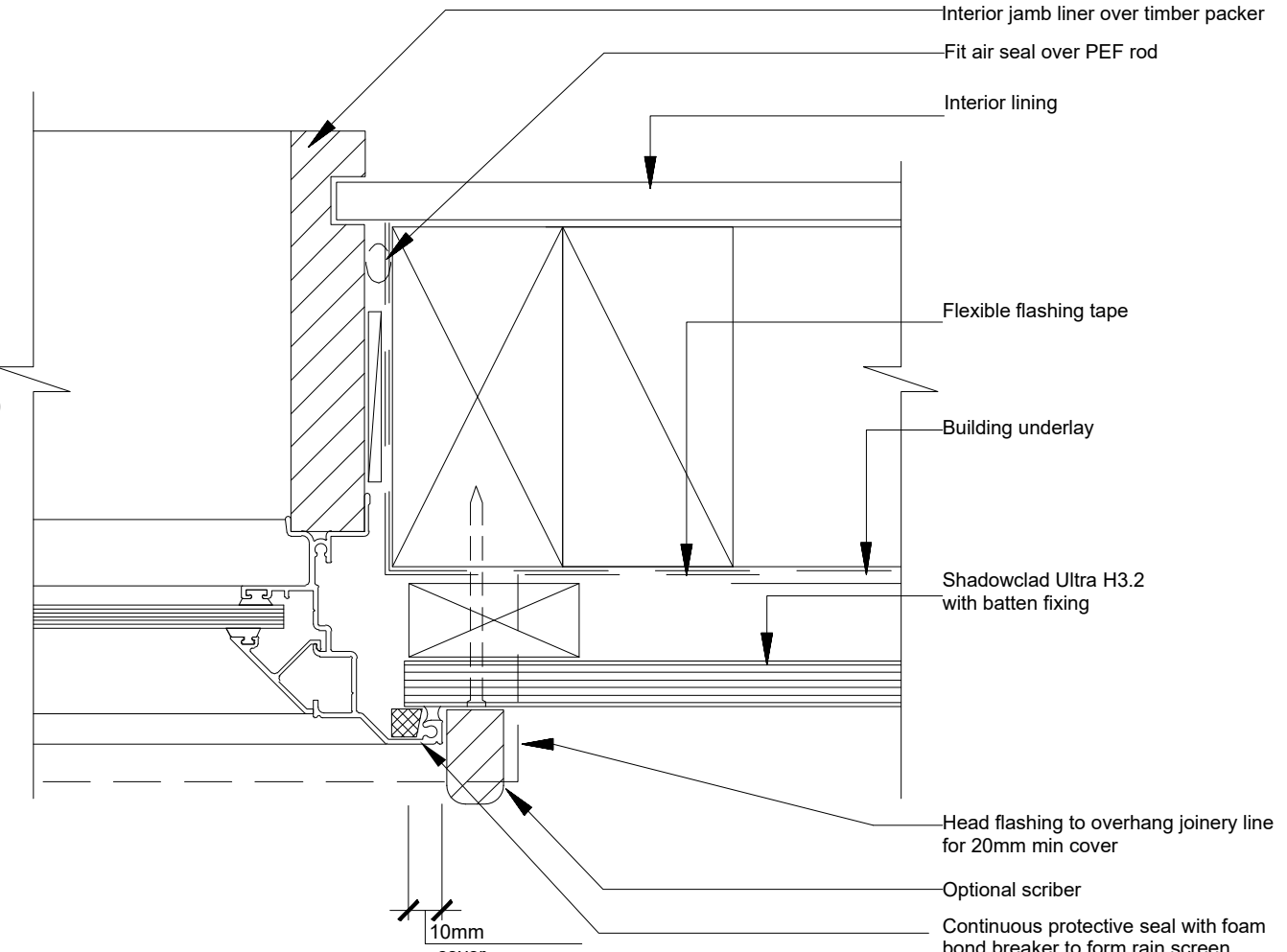
ALTERATIONS
164 Queenspark Drive, Parklands
Christchurch 8083

Amendments	No	Date

Drawing	FOUNDATION & GARAGE DETAILS		Ref R1903 Drawing No D400
	Drawn		
	Checked		
	Date	24/09/2020	
	SCALE	1:10	



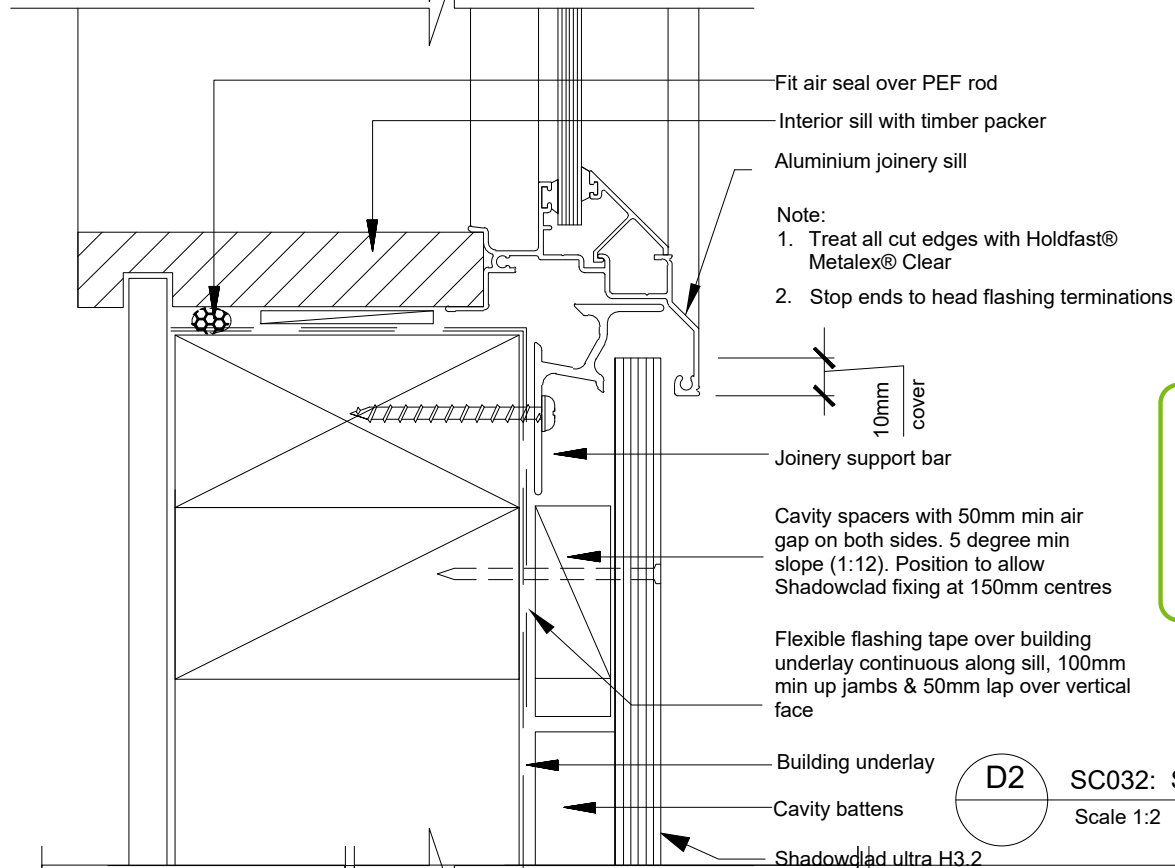
D1 SC028: Shadowclad® Window Head Detail (Cavity)
A301 Scale 1:2 Vertical section



D3 SC030: Shadowclad® Jamb Detail (Cavity)
A301 Scale 1:2 Plan

Note:

1. Treat all cut edges with Holdfast® Metalex® Clear
2. 50mm strip of neutral cure silicon sealant must be provided at the termination point of all Z flashings at windows, corner boxes, etc.

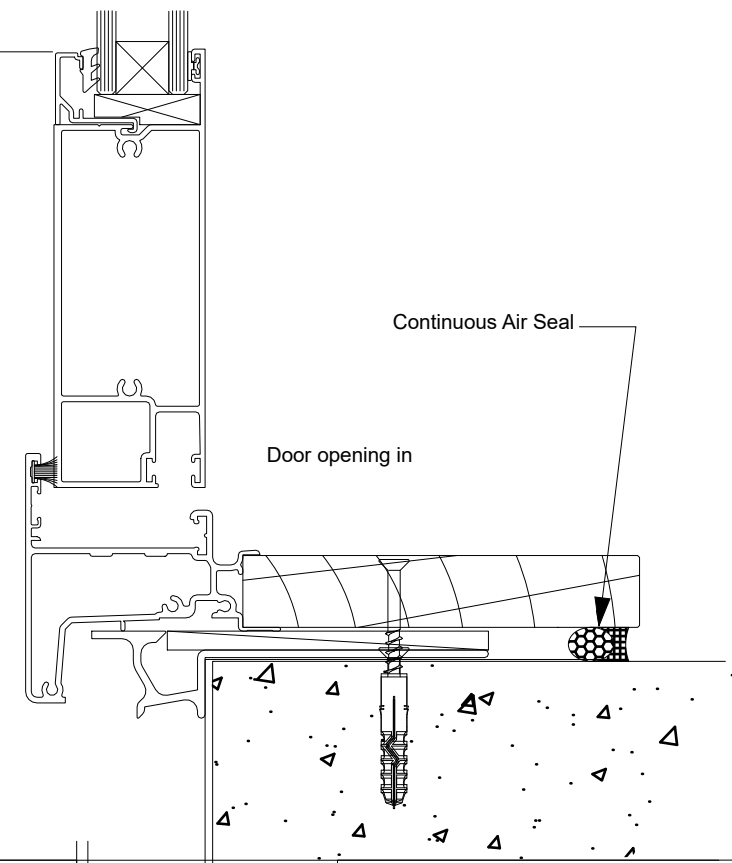


D2 SC032: Shadowclad® Window Sill Detail (Cavity)
Scale 1:2 Vertical section

Christchurch City Council
BCN/2020/10088
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12/11/2020 **Stuthridge, Evan**

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D4 DOOR DETAIL
A301 Scale 1:2



Deborah Wilson
Design by Deb Ltd
LBP-BP117593
0274143000

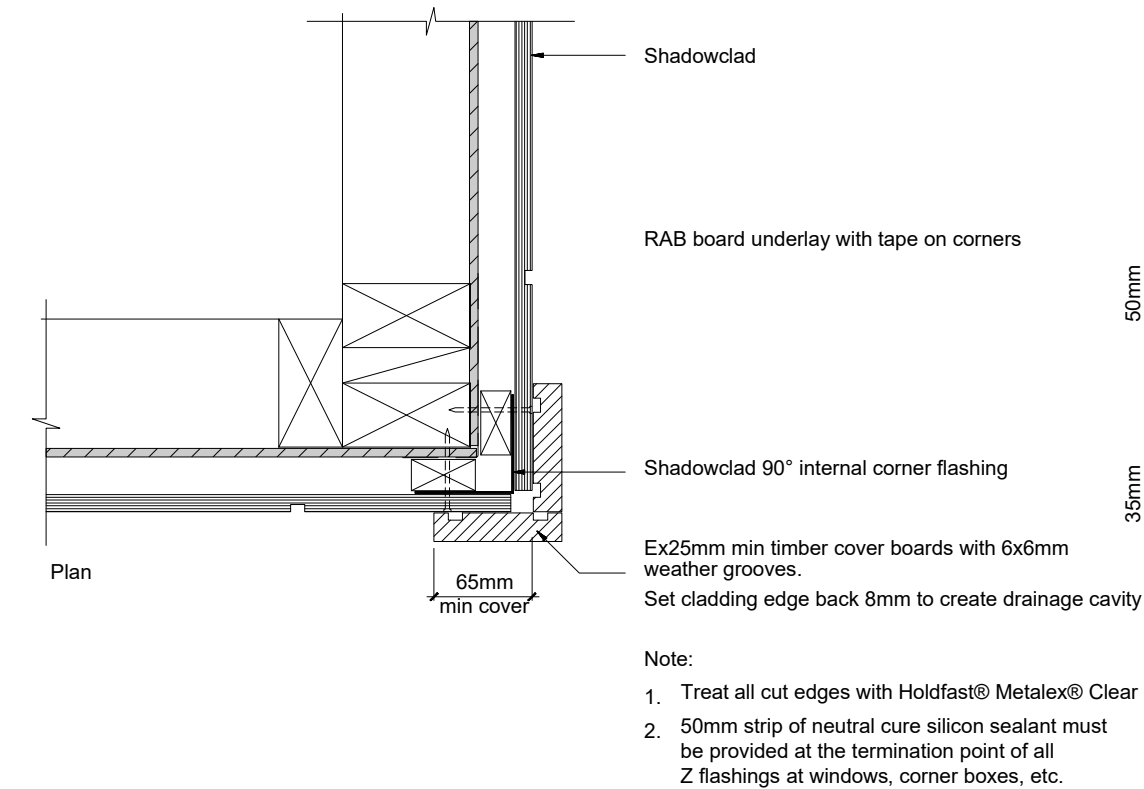
ALTERATIONS
164 Queenspark Drive, Parklands
Christchurch 8083

Amendments	No	Date

Drawing

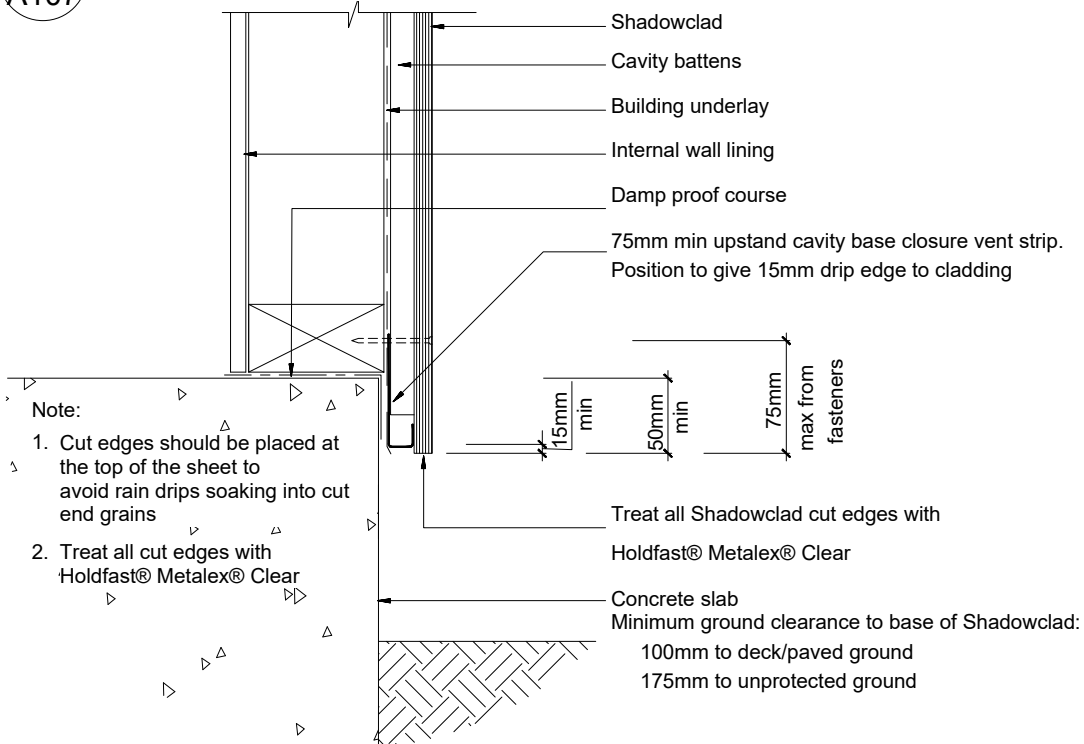
SHADOWCLAD WINDOW DETAILS		
Drawn		SCALE 1:2
Checked		
Date	24/09/2020	

Ref **R1903**
Drawing No
D401



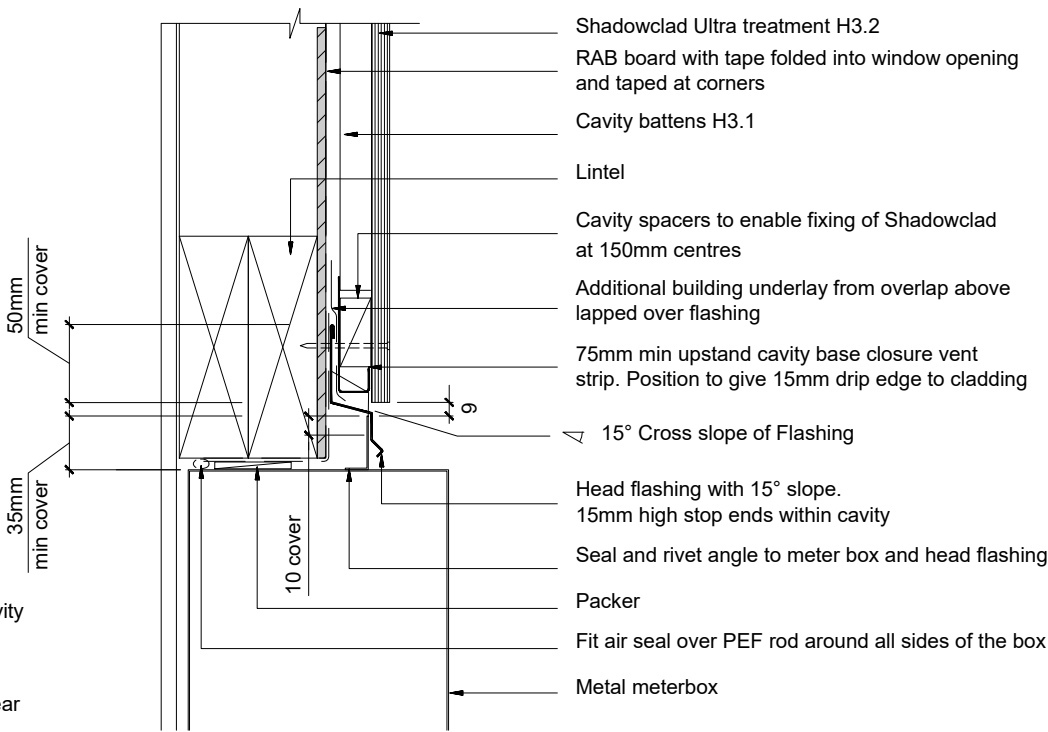
D1 SC022: Shadowclad® External Corner with Cover Boards (Cavity)

A107 SCALE 1:5



D2 SC042: Shadowclad® Overhangs and Ground Clearances (Cavity)

A301 SCALE 1:5 Vertical section

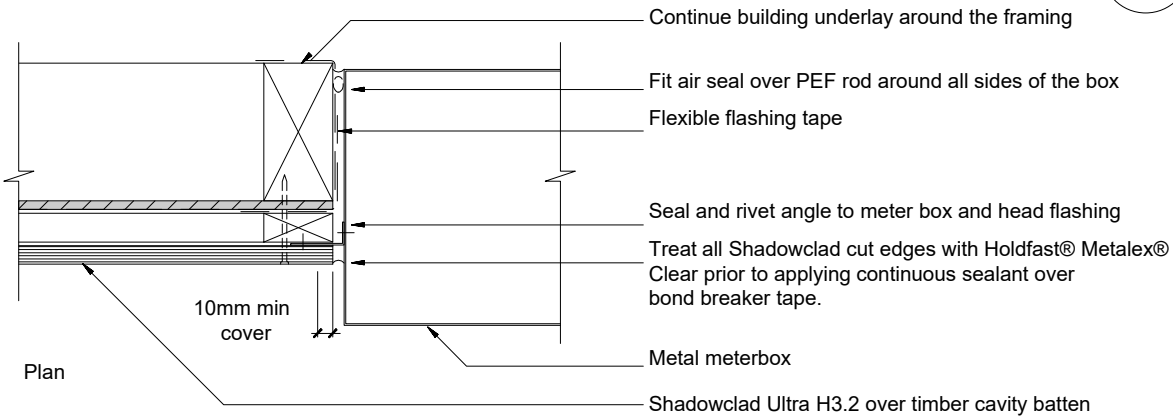


Note:

1. Treat all cut edges with Holdfast® Metalex® Clear

D3 SC034A: Shadowclad® Meterbox Vertical Cross Section (Cavity)

A107 SCALE 1:5

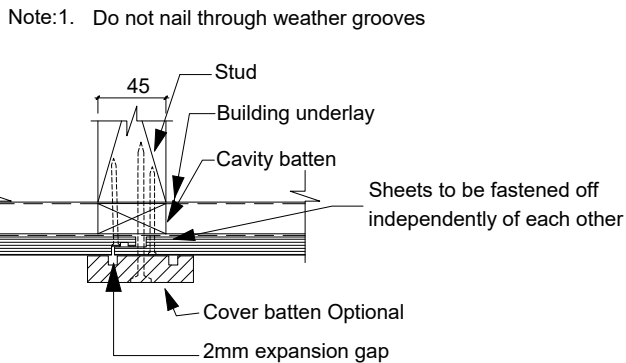


Note:

1. Treat all cut edges with Holdfast® Metalex® Clear
2. 50 mm strip of neutral cure silicon sealant must be provided at termination points of all Z flashings at meter boxes

D4 SC034B: Shadowclad® Meterbox Horizontal Cross Section (Cavity)

A107 SCALE 1:5



D5 SC010: Shadowclad® Vertical Joint with Optional Cover Batten (Cavity)

A107

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0274143000

ALTERATIONS

164 Queenspark Drive, Parklands
Christchurch 8083

Amendments

No	Date

Drawing

SHADOWCLAD DETAILS

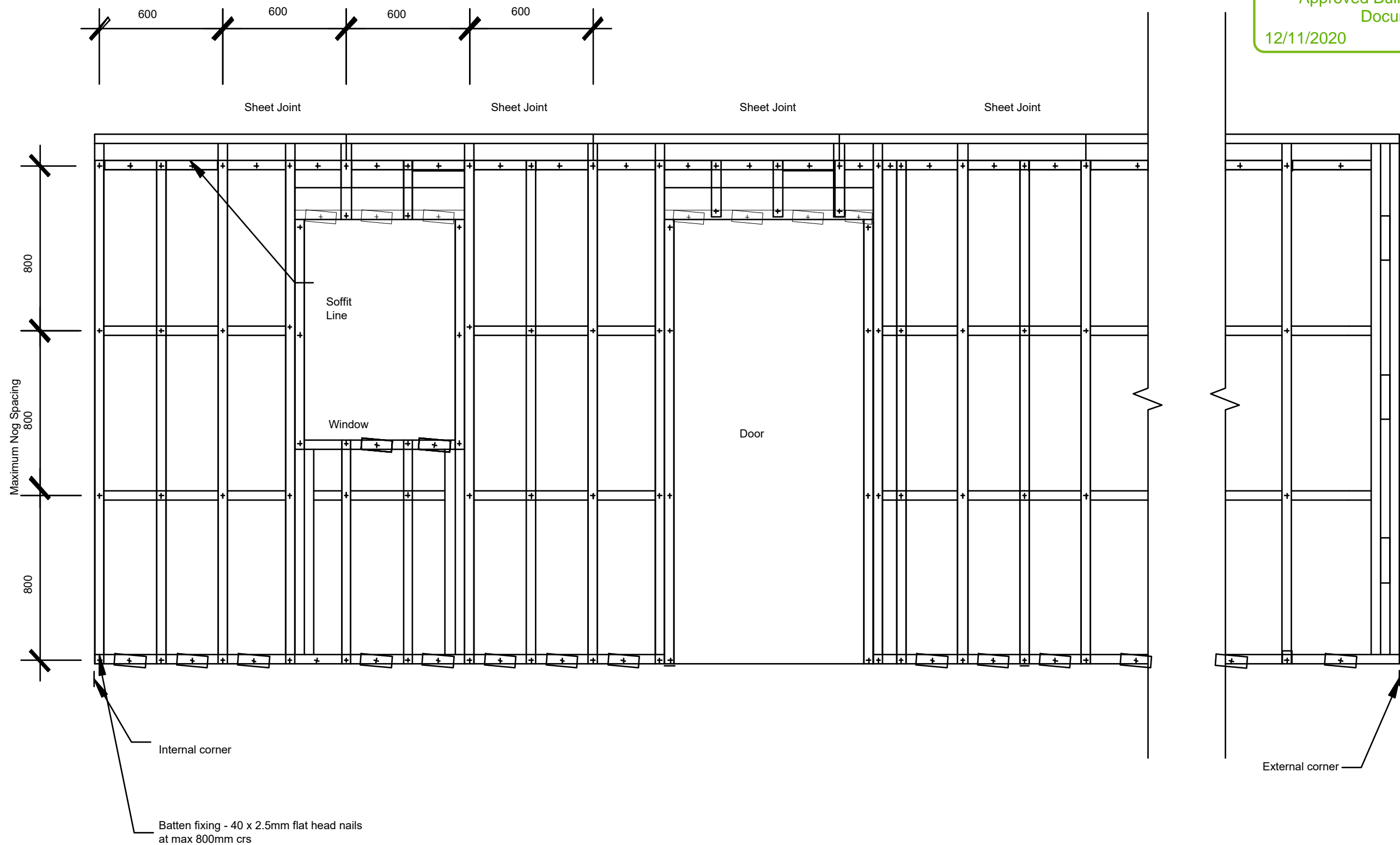
Drawn
Checked
Date 24/09/2020

SCALE 1:5

Ref R1903

Drawing No

D402



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0274143000

ALTERATIONS

164 Queenspark Drive, Parklands
Christchurch 8083

Amendments	No	Date

Drawing

SHADOWCLAD FRAMING DETAILS

Drawn

Checked

Date

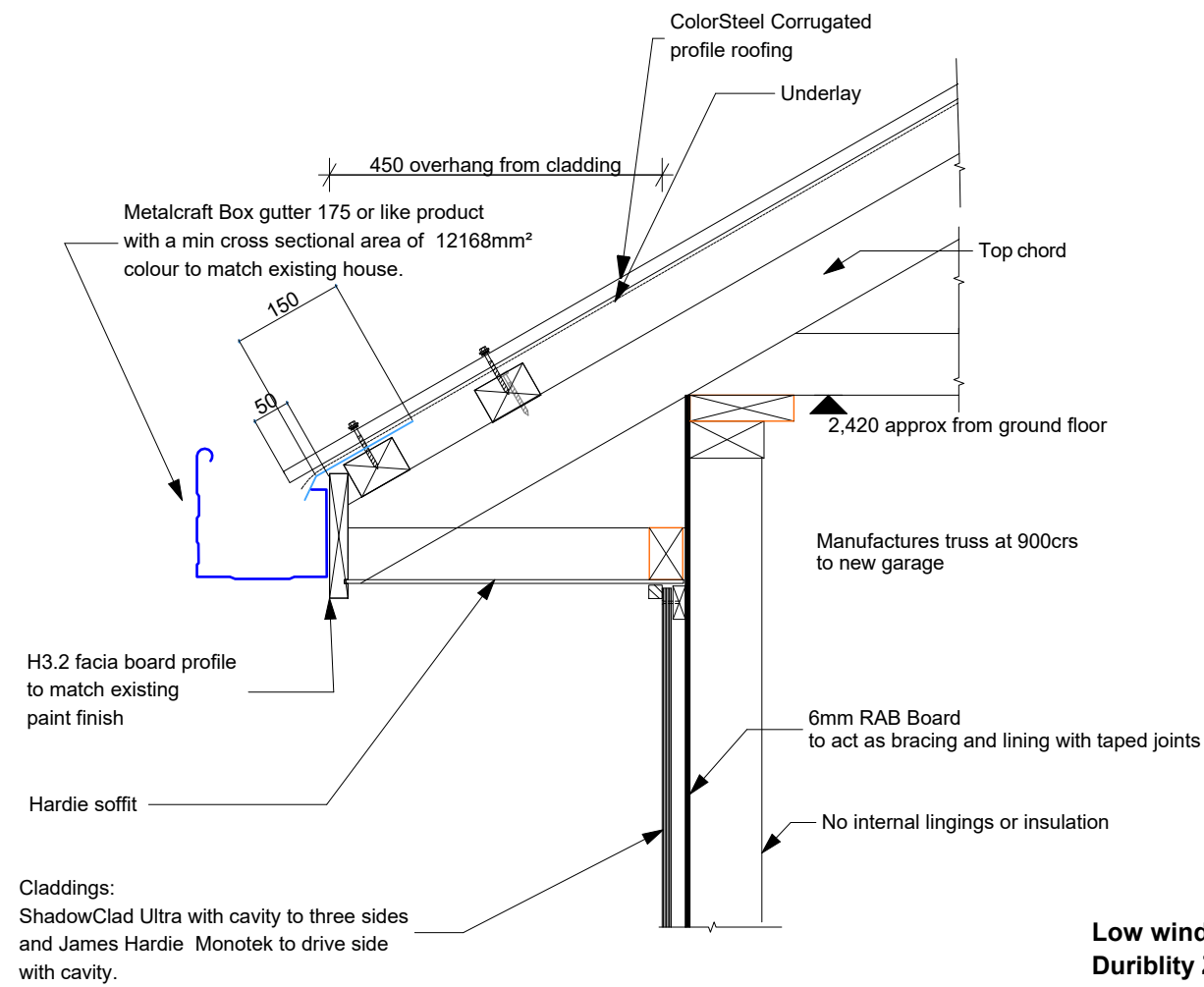
24/09/2020

SCALE

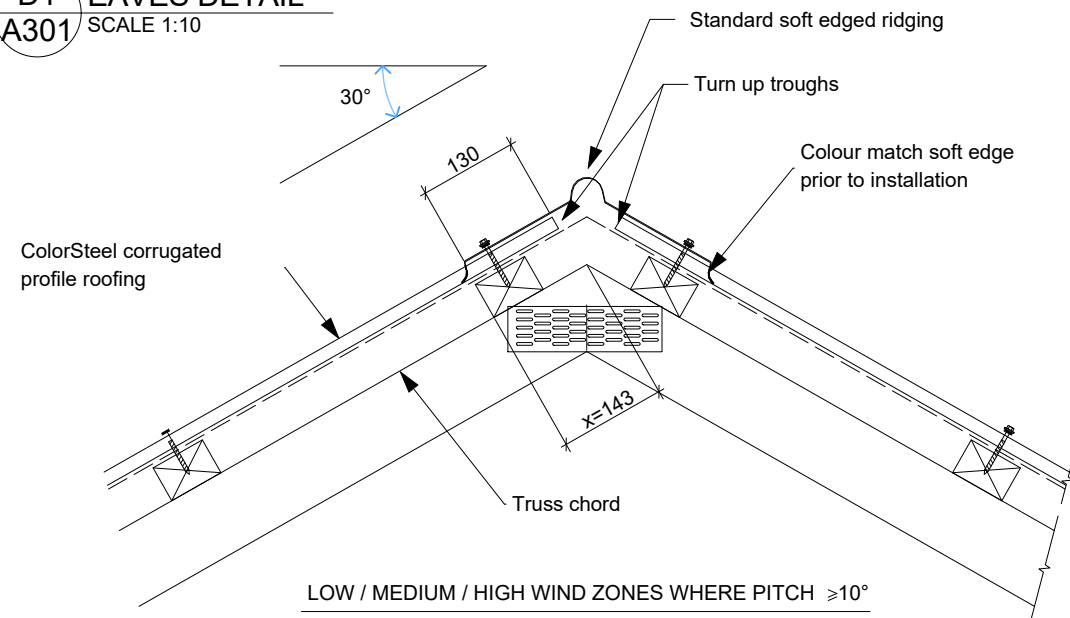
Ref **R1903**

Drawing No

D403



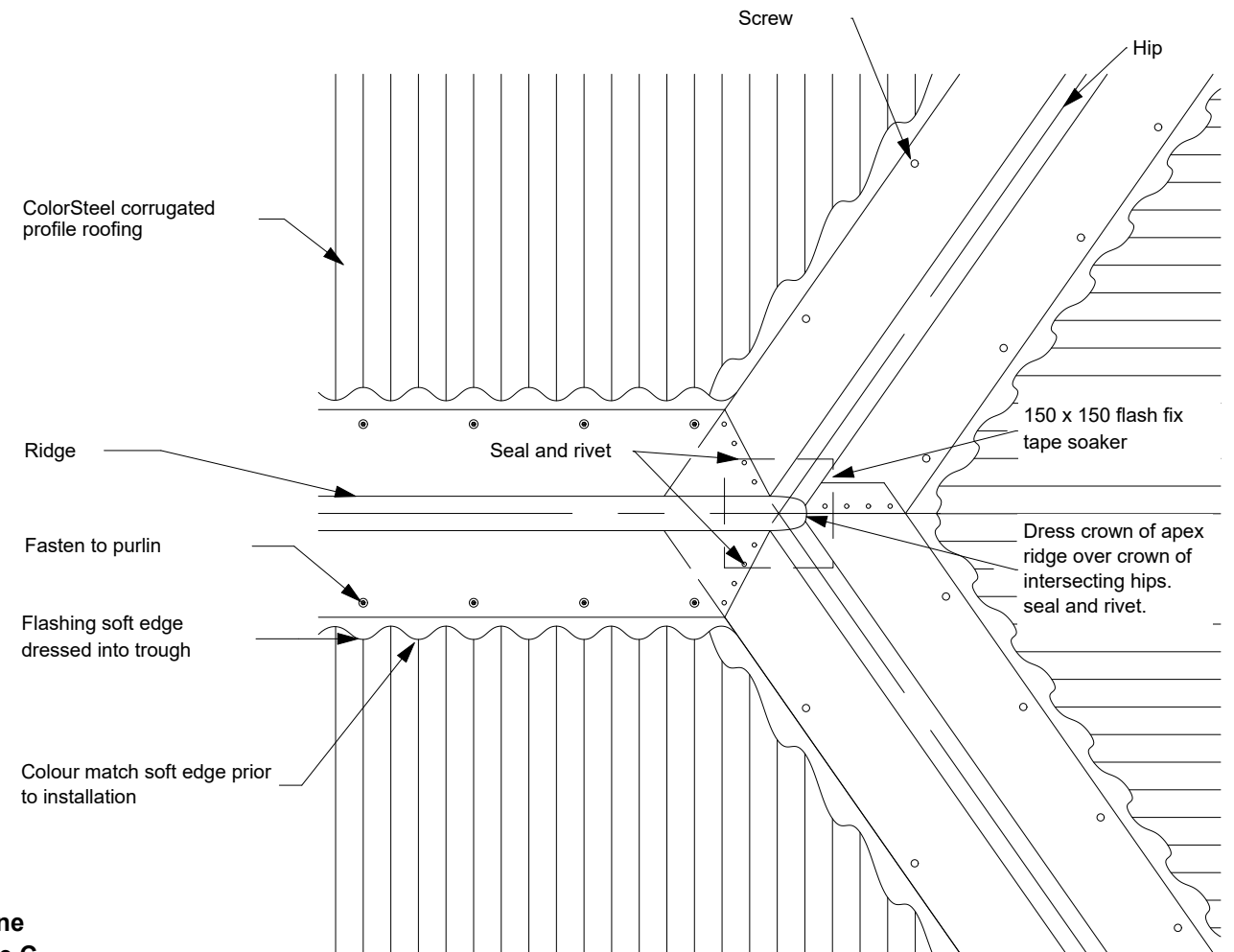
D1 EAVES DETAIL
A301 SCALE 1:10



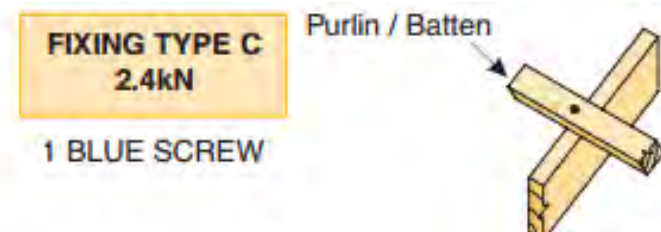
Roof Pitch	8	10	15	20	25	30	35	45
Dimension X	168	167	162	156	150	143	134	115
Dimension Y	218	217	212	206	200	193	184	165

For standard ridge using ex 50mm purlins on flat

D2 RIDGE DETAIL
A302 SCALE 1:10



D3 ROOF DETAIL
A300 SCALE 1:10

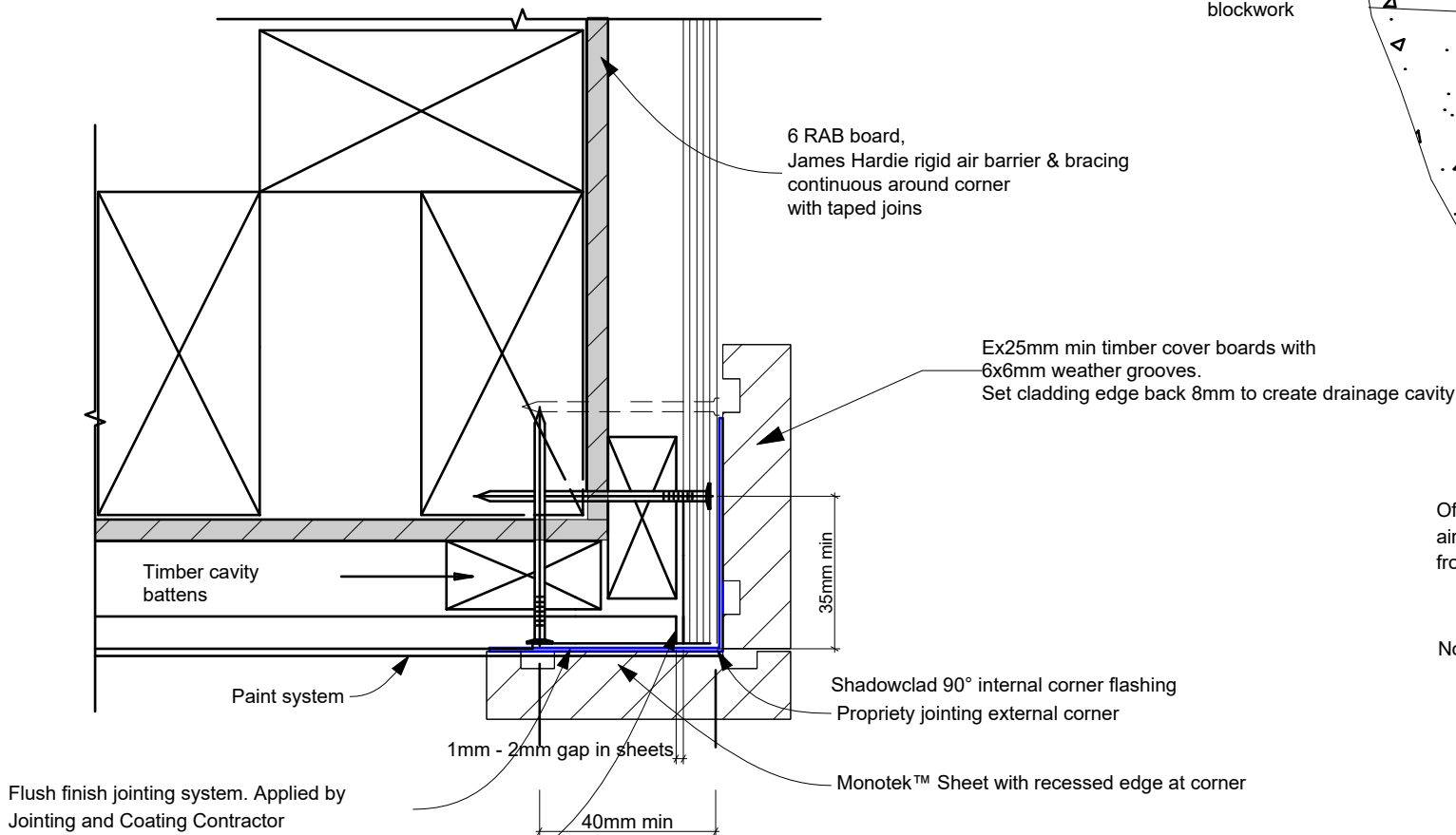
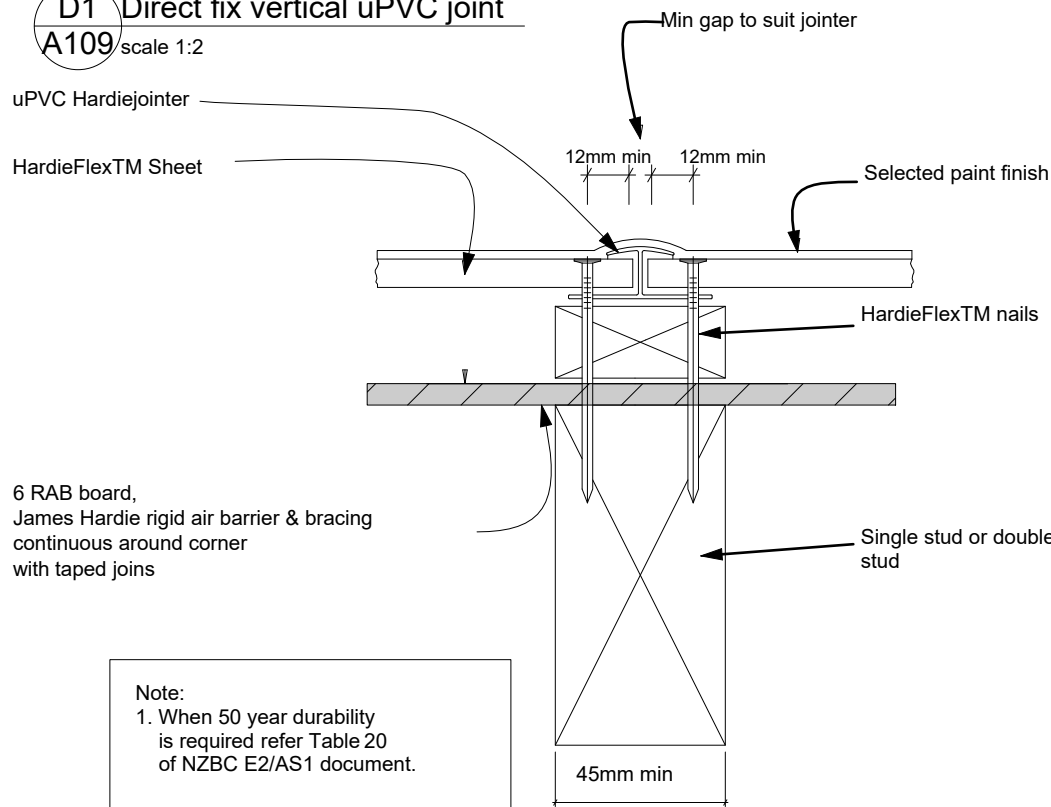


D4 PURLIN FIXING DETAIL
SCALE 1:10

No	Date

ROOF DETAILS	
Drawn	
Checked	
Date	24/09/2020
SCALE	1:10

D1 Direct fix vertical uPVC joint
A109 scale 1:2



Silicone sealant to sheet gap. Must be compatible with flushing compound.
Note: Proprietary systems corner - refer installation as per manufacturers' recommendations

D2 Cavity External Corner to Shadowclad and Hardieflex
A107 Scale 1:2

6mm RAB board
James Hardie rigid air barrier must be continuous and fitted behind vent strip.

Stud
Bottom plate
D P C

Concrete slab or blockwork

20mm nominal cavity

Timber cavity batten

HardieFlex™ Sheet

Selected finish to continue under bottom edge of sheet

100mm long horizontal batten beyond

D3 CAVITY CONCRETE FOOTING Foundation Detail
A302 Scale 1:2

James Hardie uPVC vent strip. Mitre at corners. Keep clear of debris

Finished ground level

50mm
15
150mm min to permanent paving or 225mm min to unpaved ground t

6 RAB board, James Hardie rigid air barrier & bracing continuous around corner with taped joints

Offset nog to block airflow into roof space from cladding cavity

Bond breaker tape if sealant used

Silicone sealant or fix eaves mould

Nog

6 - 8mm gap

Soffit

D4 Cavity Soffit Detail
A302 Scale 1:2

Stud

Continuous packers
Eaves mould as required

HardieFlex™ Sheet and edges to be sealed before fixing

Selected finish seal face of sheet behind eaves mould

Timber cavity batten

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ALTERATIONS

164 Queenspark Drive, Parklands
Christchurch 8083

Amendments

No	Date

Drawing

HARDIFLEX DETAILS

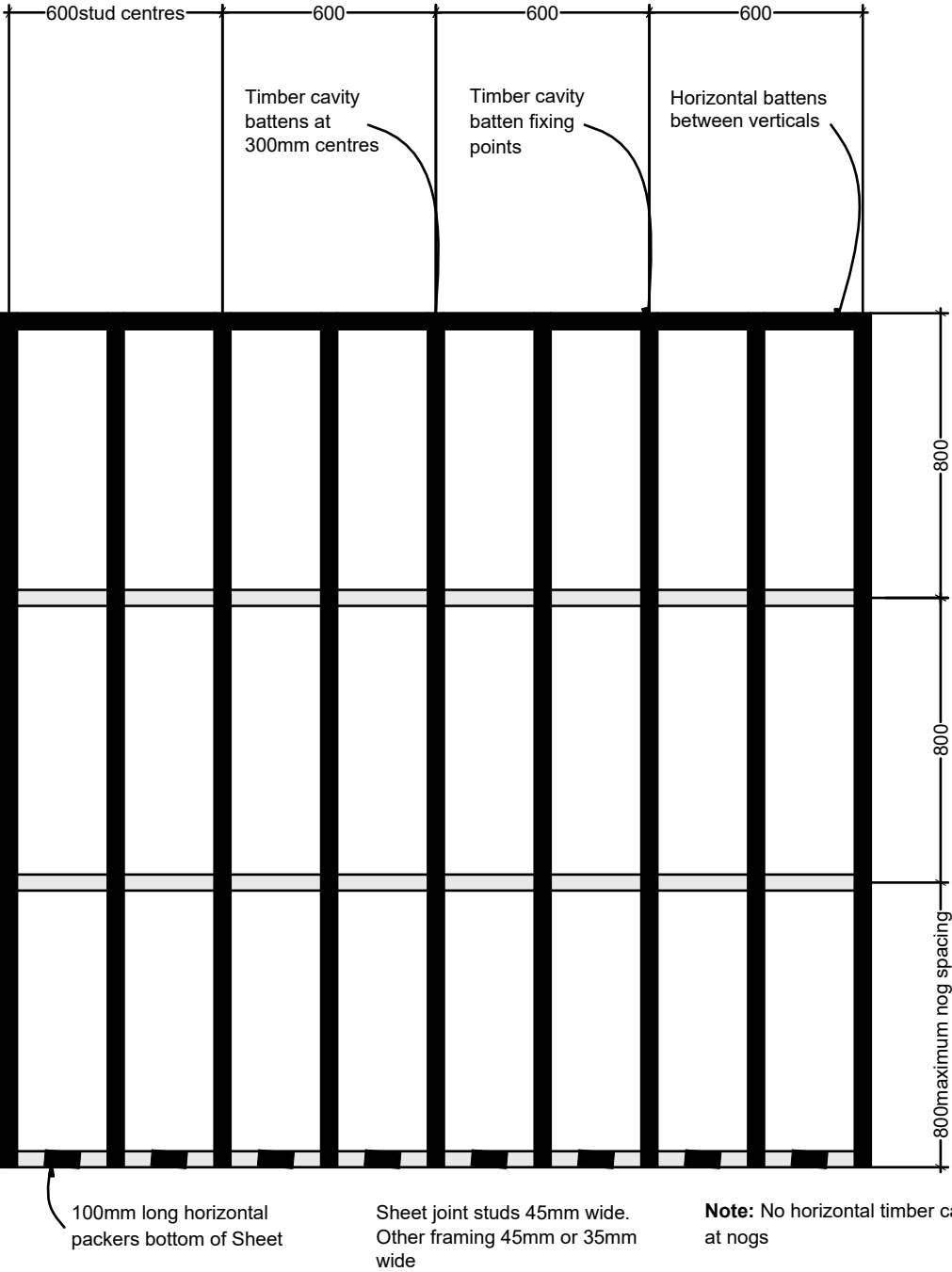
Drawn	
Checked	
Date	24/09/2020

SCALE
1:5 & 1:2

Ref **R1903**

Drawing No

D405



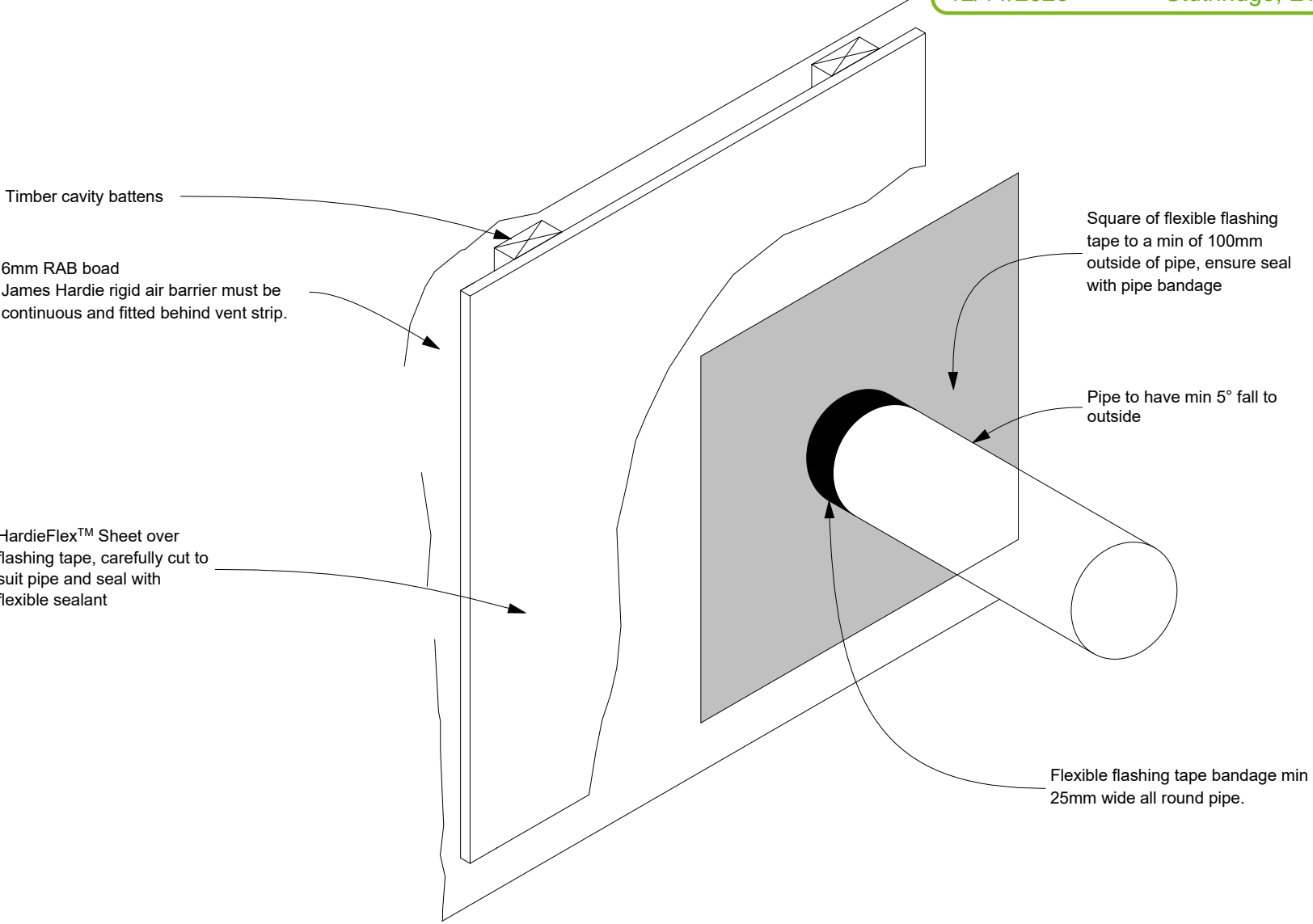
Note: Horizontal packers must be set to a fall of 5° minimum where shown

D1

HARDIFLEX FRAMING

SCALE 1:20

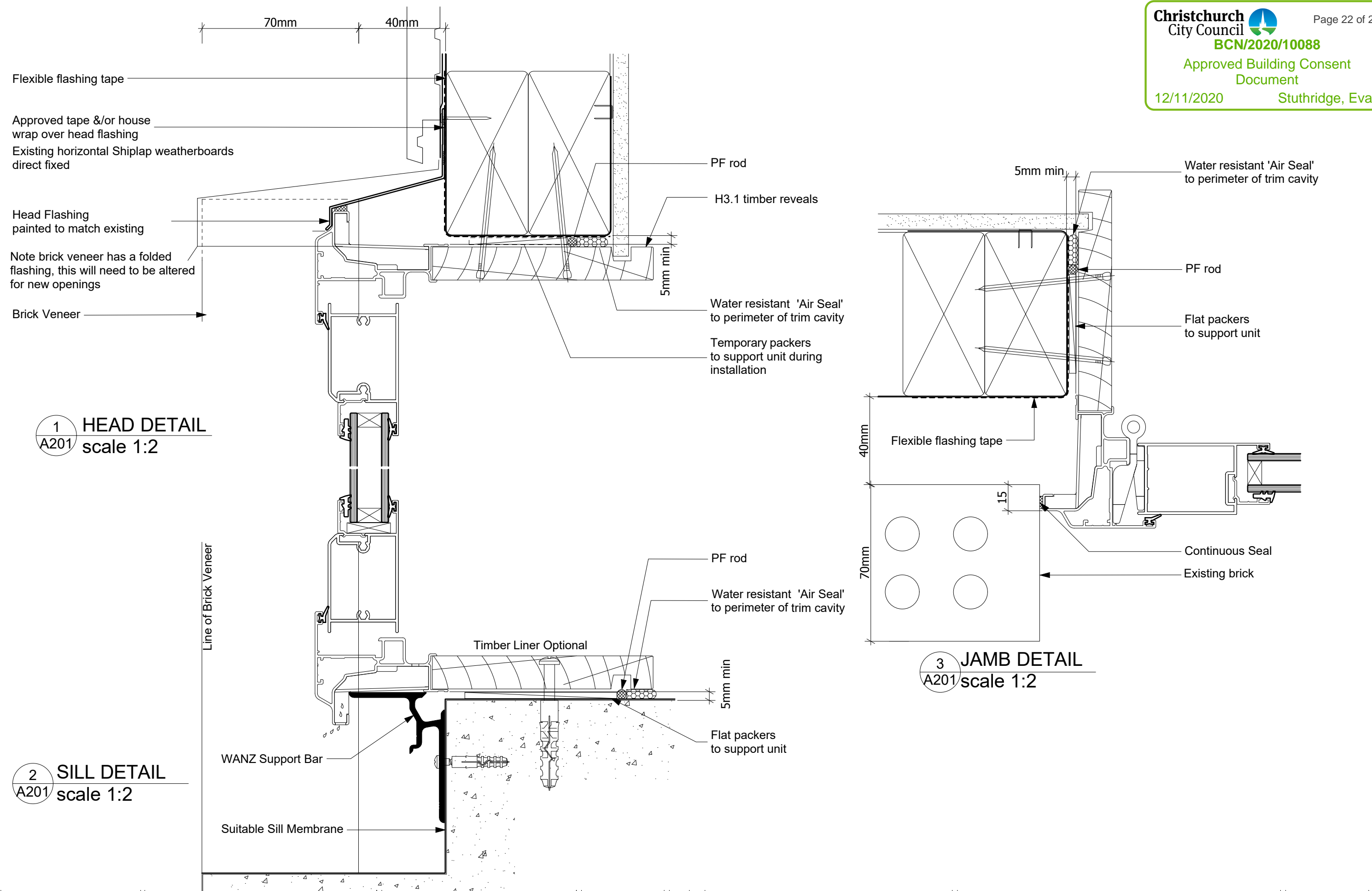
Note: If studs are placed at 400mm centres no intermediate battens are required and nogs may be placed at max 1200mm centres. 100mm long packers will be required between battens as shown

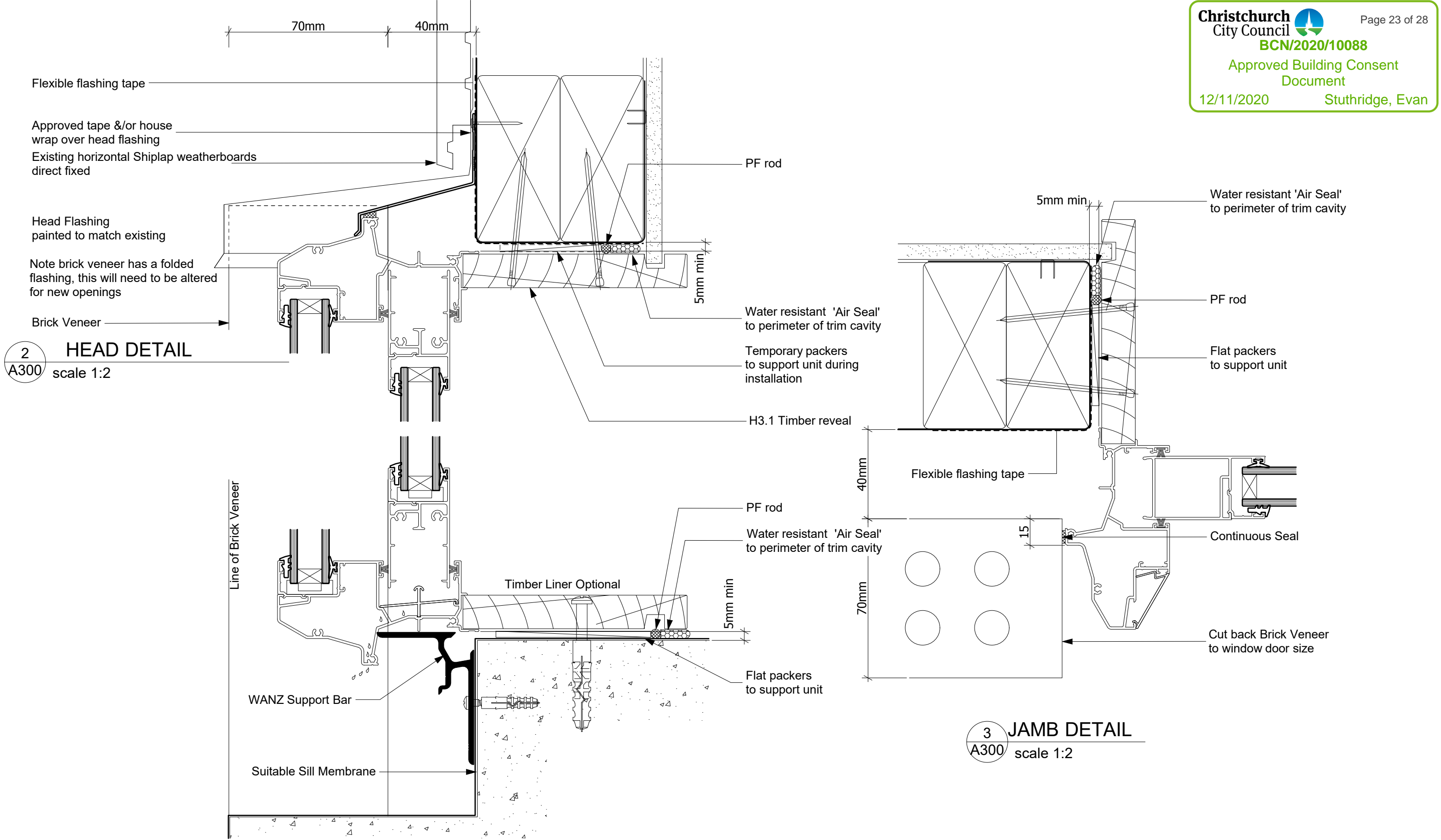


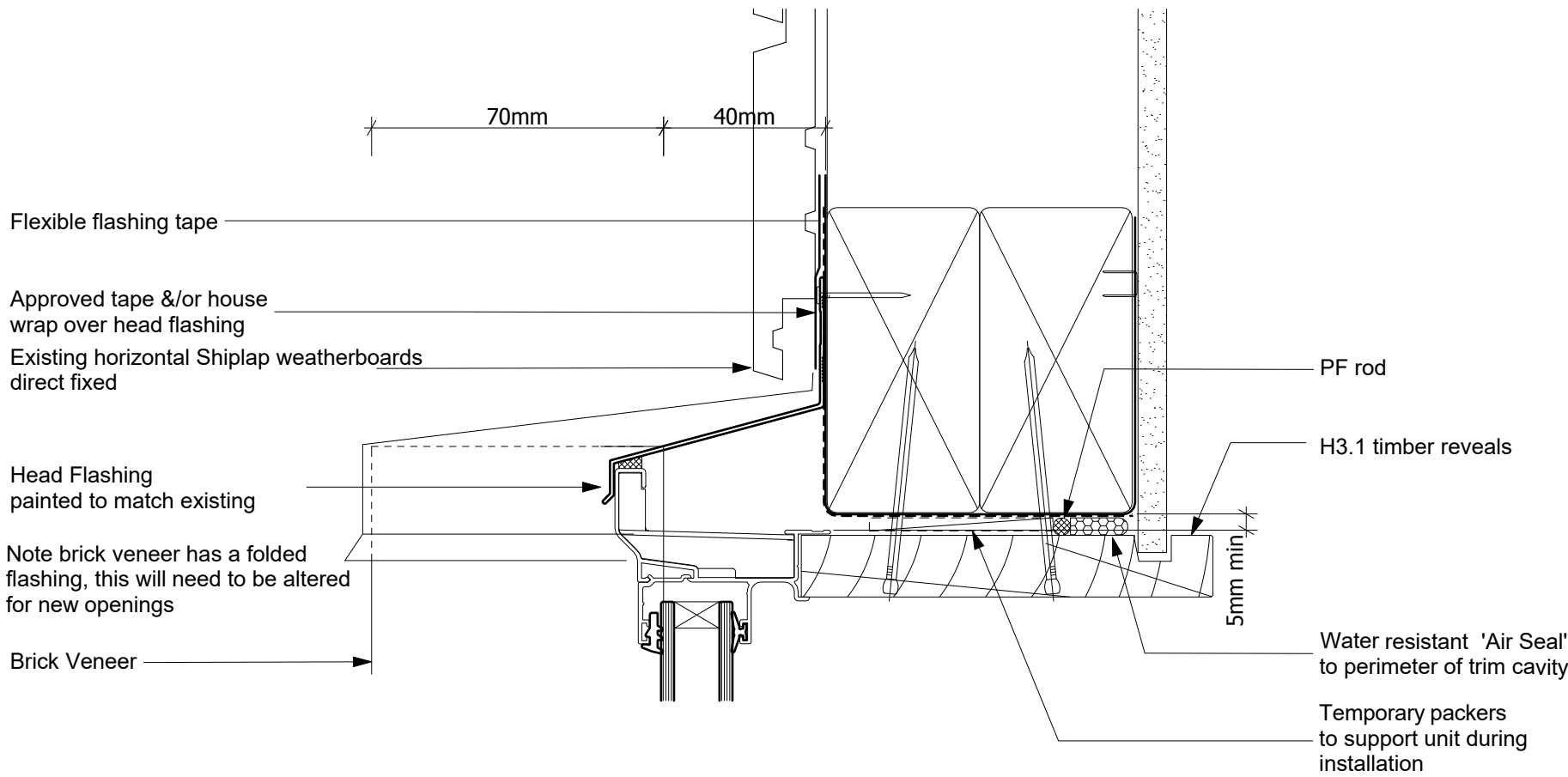
D2
A107

Cavity Pipe Penetration

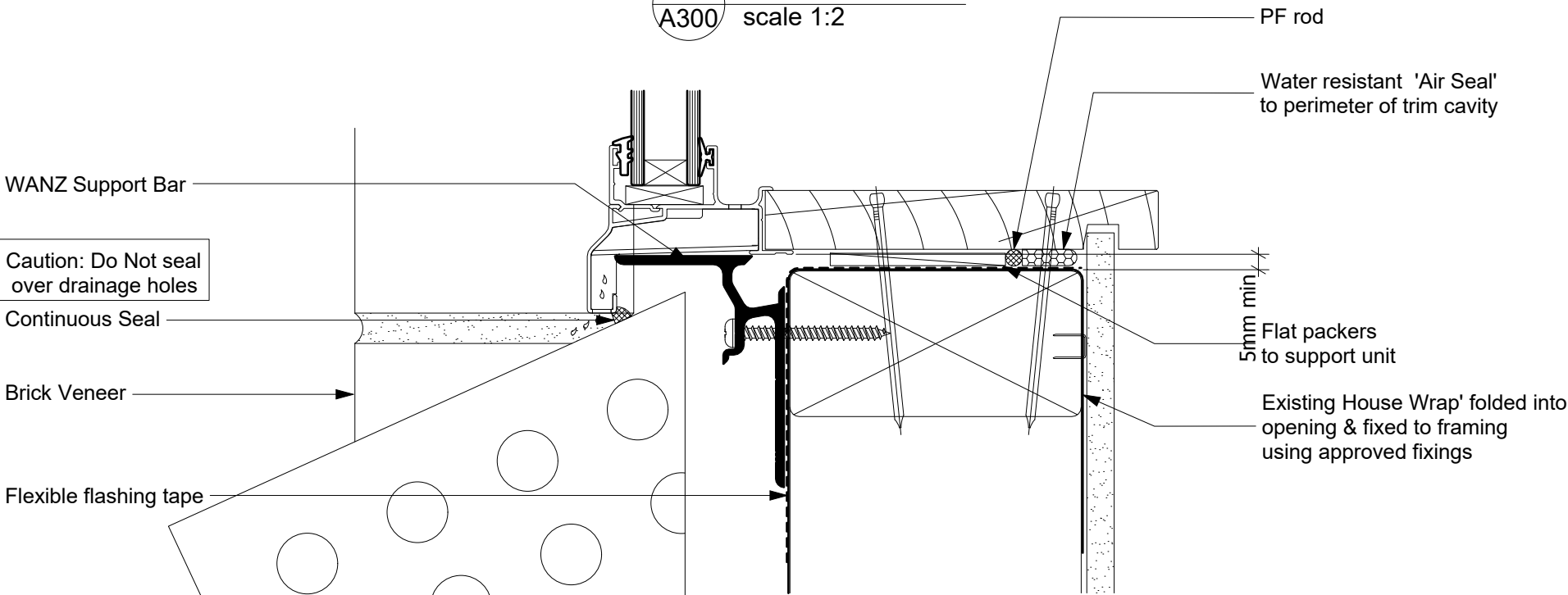
SCALE 1:10



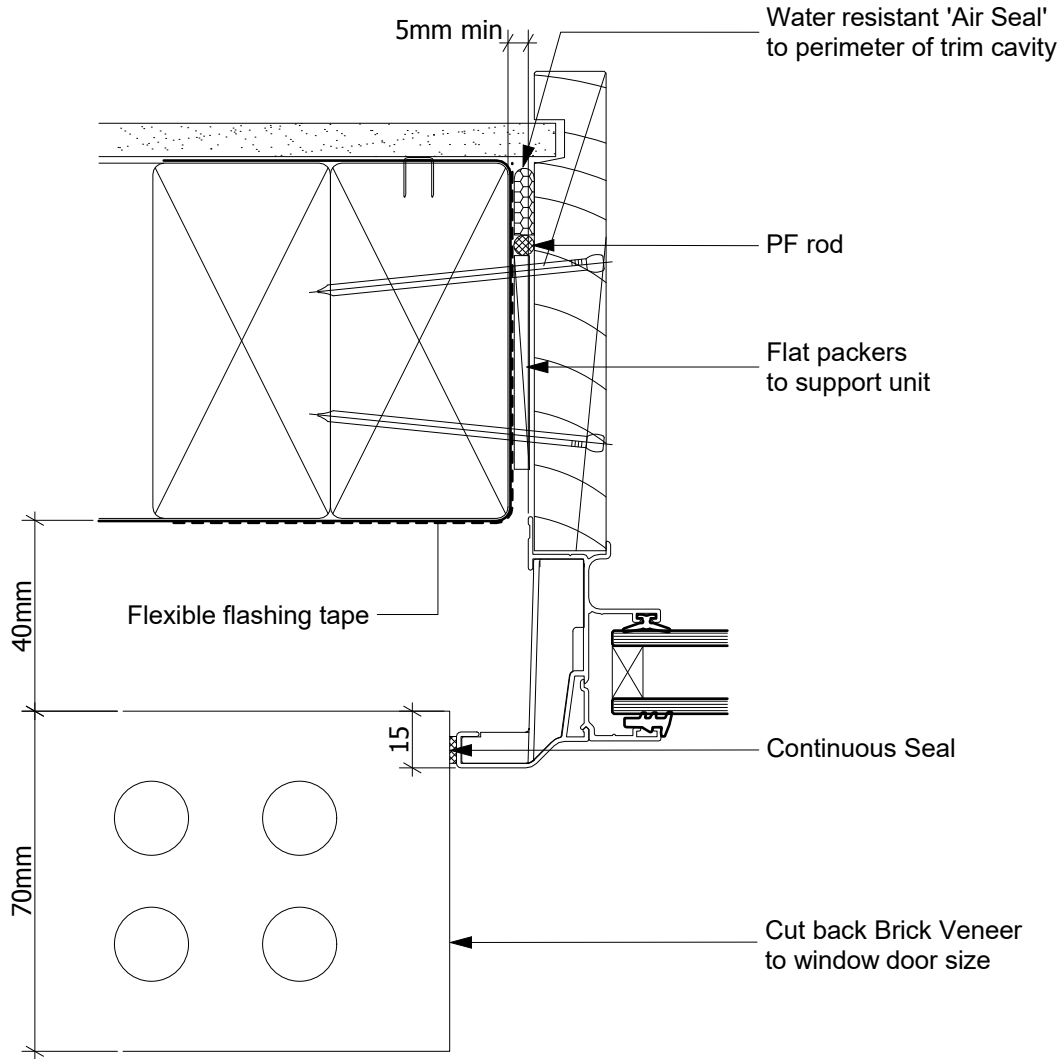




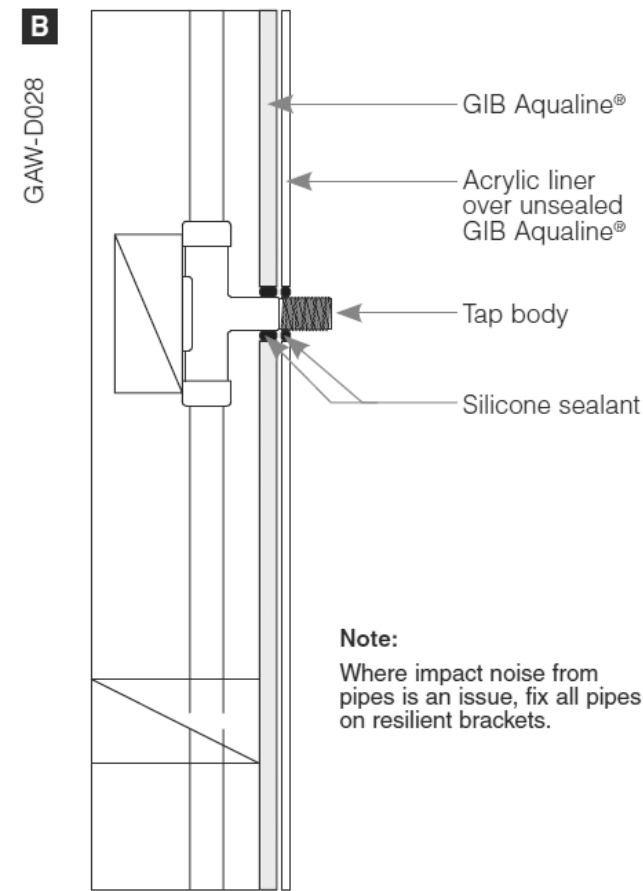
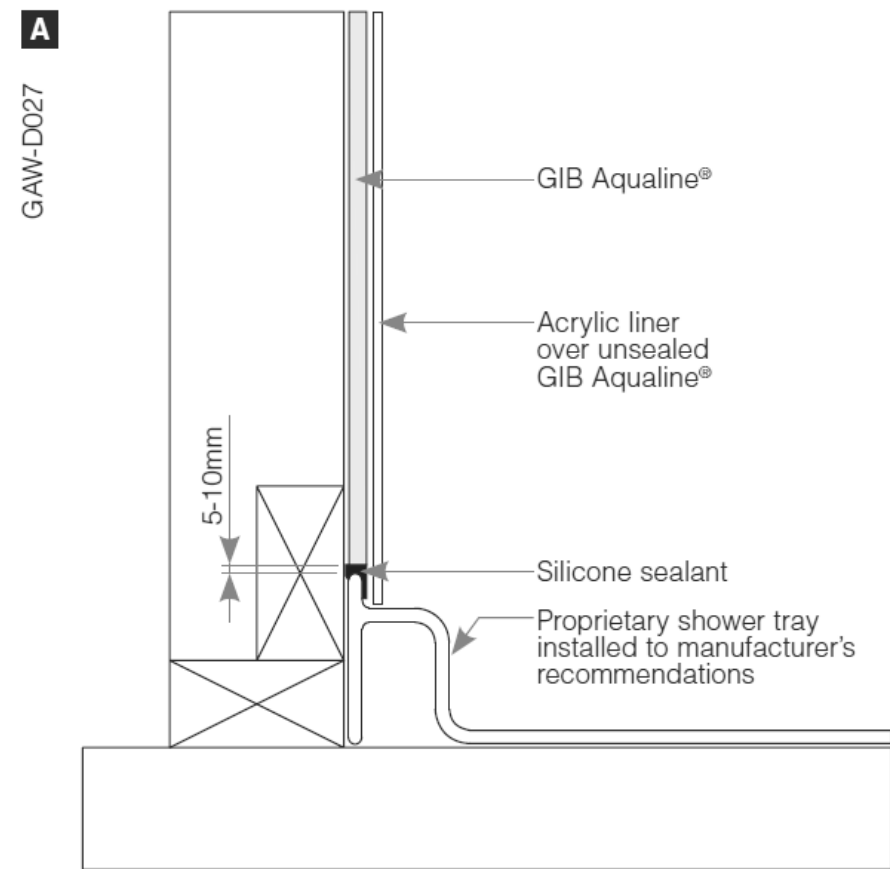
1 HEAD DETAIL
A300 scale 1:2



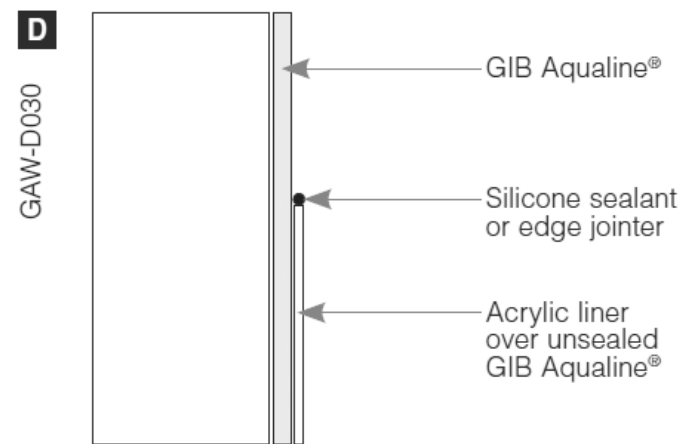
2 SILL DETAIL
A300 scale 1:2

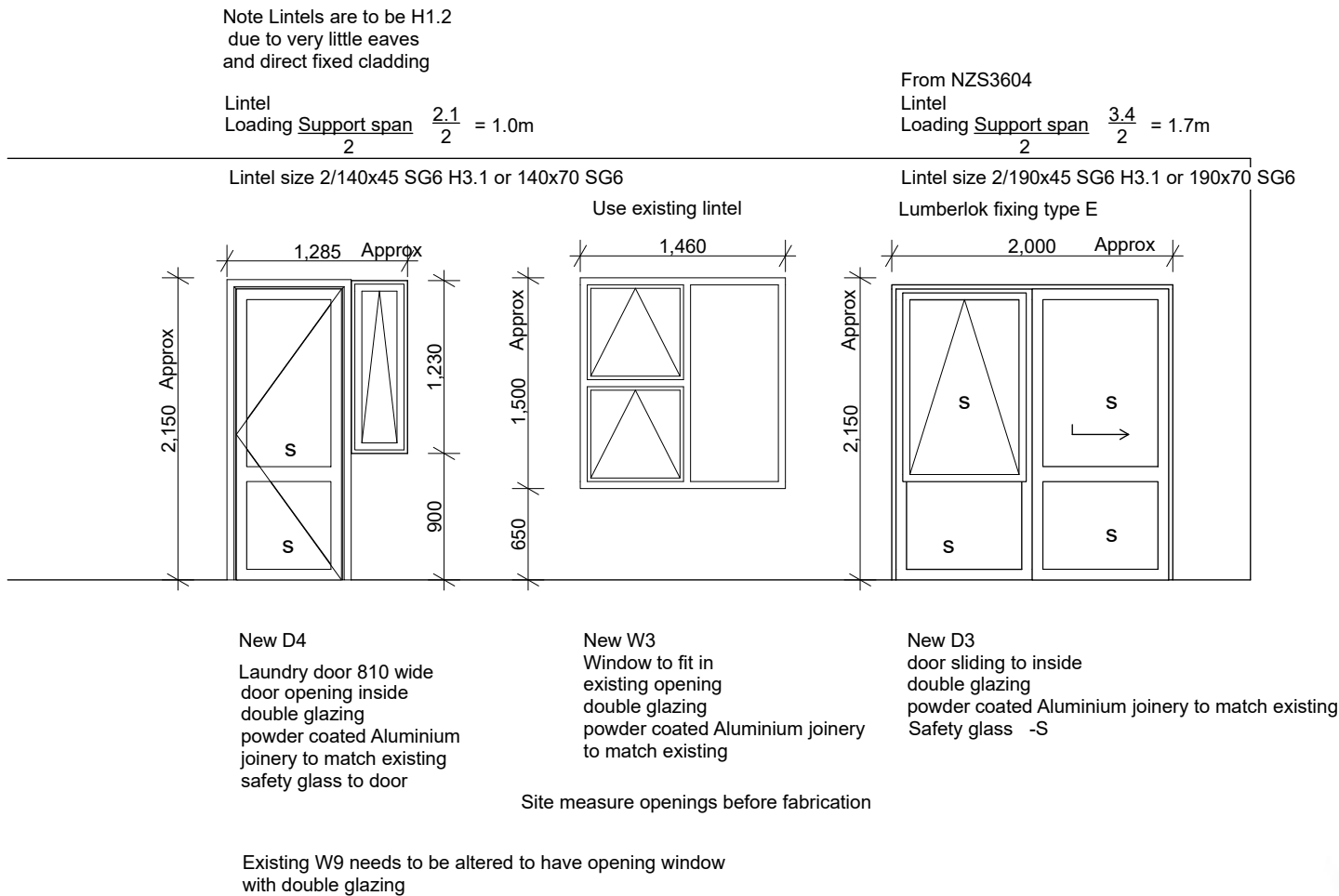


3 JAMB DETAIL
A300 scale 1:2

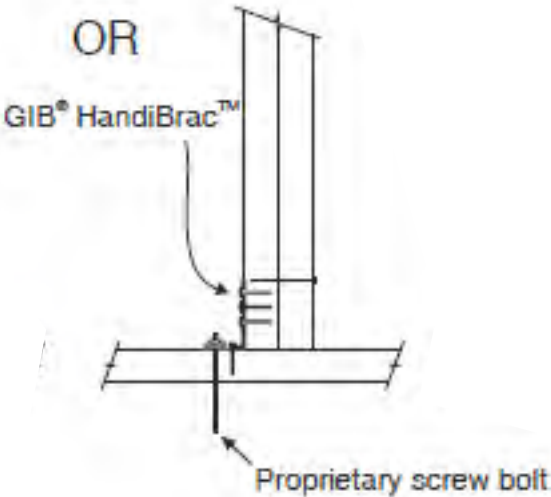
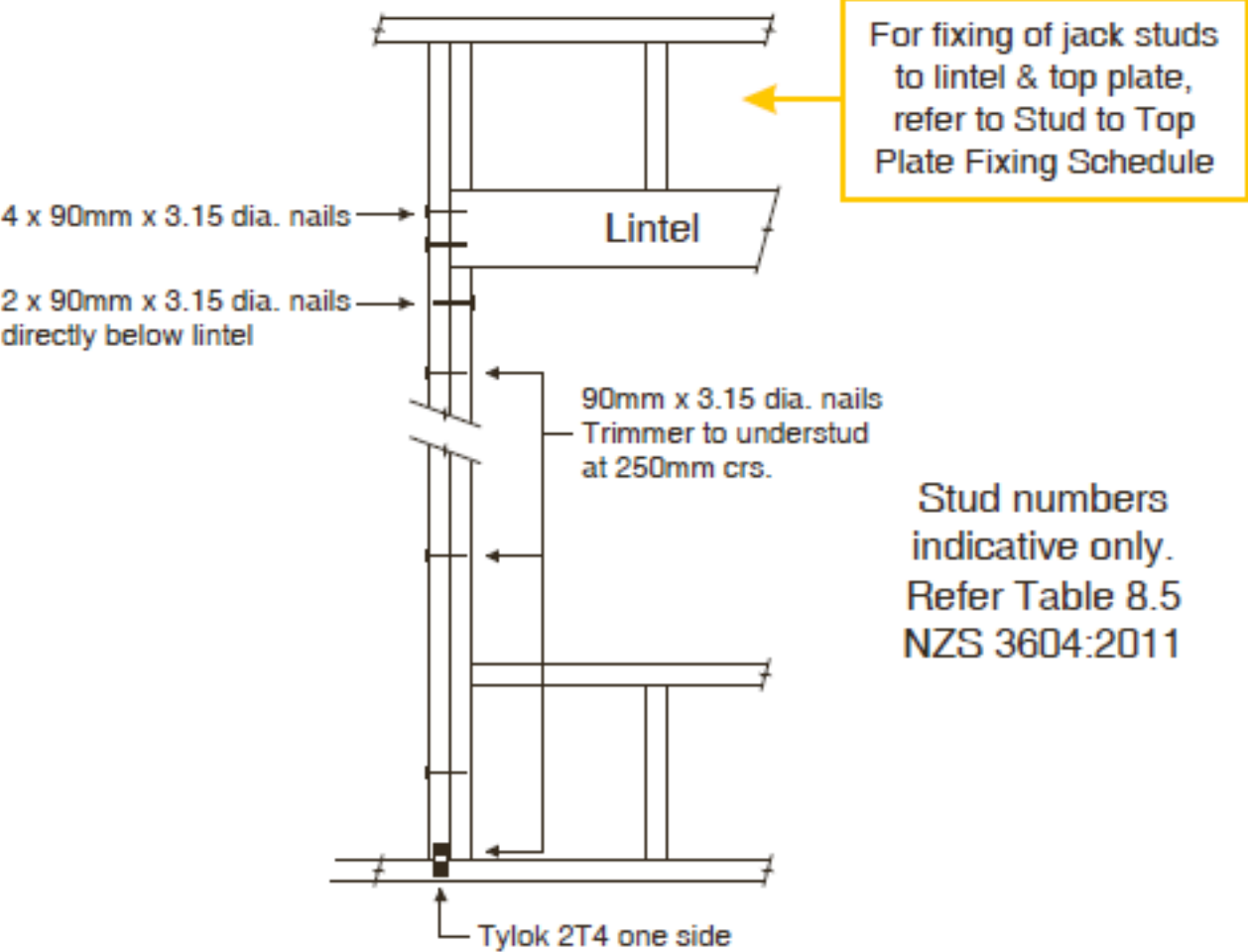


Note framing to at risk damp areas like bathrooms is to be H.2





TYPE E
1.4kN

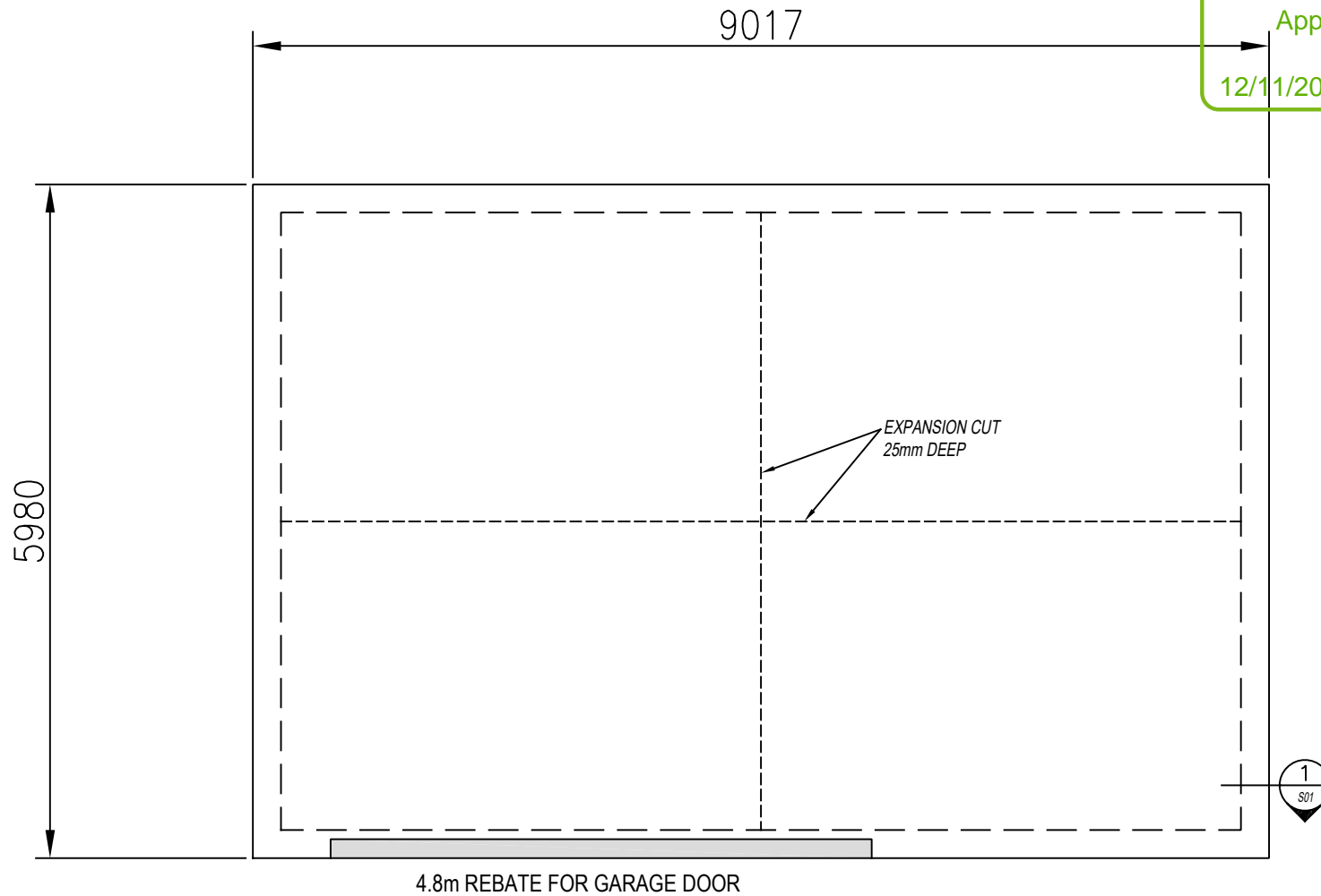


BCN/2020/10088

 Approved Building Consent
 Document

12/11/2020

Stuthridge, Evan


FOUNDATION PLAN

SCALE: NTS

Postal Address: PO.Box 6160, Christchurch 8442, Phone: (03) 3431220

**MIKE WILTON
CONSULTING**

 PROJECT TITLE
 164 Queenspark Drive,
 CHRISTCHURCH

 DRAWING TITLE
 FOUNDATON PLAN

 CLIENTS NAME
 DOMINIC LOWE

JOB NO. 19174

DATE 07/02/20

SCALE @ A4 NTS

DRAWN FX

 REV NO.
1

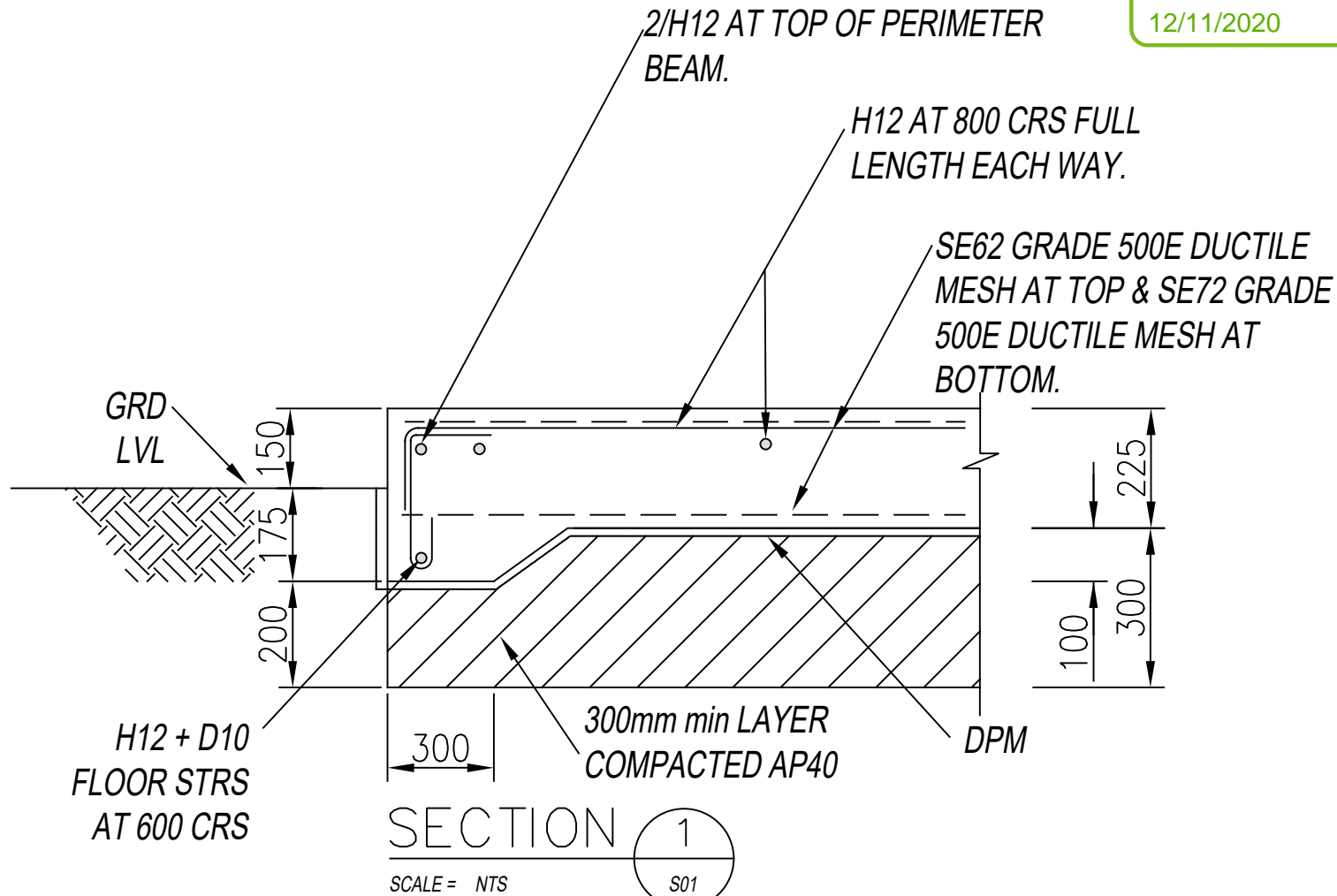
 SHEET NO.
S01

BCN/2020/10088

Approved Building Consent
Document

12/11/2020

Stuthridge, Evan



Postal Address: PO.Box 6160, Christchurch 8442, Phone: (03) 3431220

**MIKE WILTON
CONSULTING**

PROJECT TITLE
164 Queenspark Drive,
CHRISTCHURCH

DRAWING TITLE
FOUNDATON DETAILS

CLIENTS NAME
DOMINIC LOWE

JOB NO. 19174

SCALE @ A4 NTS

REV NO. 1

DATE 07/02/20

DRAWN FX

SHEET NO. S02



Design By Deb Ltd

PROJECT SPECIFICATION

164 Queenspark Drive

164 Queenspark Drive

Parklands

Christchurch

Issued for Consent

R-1902

PROJECT OVERVIEW

Scope

Re level to existing building plus a new garage and laundry building.

Site Address 164 Queenspark Drive

Suburb Parklands

City Christchurch

Lot # 4 DP 58227

Site Conditions

Wind Zone L - Low Wind Speed

Earthquake Zone Zone 2

Exposure Zone Zone C - Medium

Snow Loading Zone Zone N4

Related Parties

Architectural Designer

Design By Deb Limited, Deborah Wilson, Deb@DesignByDeb.co.nz, 1/7 Wanstead Place, Woolston, Christchurch, Christchurch, 8062

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1 PRELIMINARIES & GENERAL

1.1 Project Overview

1.1.1 Contract Documents

The Contract Documents are complementary and comprise this Specification, the accompanying drawings, the Contract together with Schedules as specified below, any written documentation clarifications issued during tendering/estimating, any manufacturer/supplier information issued with this Specification, any list of agreed Subcontractors, the contract establishment letter and any other relevant correspondence, and any Site Instructions or additional details or instructions issued as Variations.

If the Architect/Designer has not been engaged to administer the Contract or observe the works, then the term Architect/Designer, where referred to in this specification, means Contract Administrator.

These Project Specific Conditions supersede the Standard Conditions where they are in conflict. Refer any ambiguity or apparent discrepancy within or between any Contract Documents to the Architect/Designer, whose interpretation shall be binding on all parties.

Ensure that all Trades are aware of all Conditions and that subcontract prices are accepted on this basis, and in a form acceptable to the Registered Master Builders Federation or the Certified Builders Association. Ensure that all persons engaged on the works are aware of all items in this specification and on the drawings that may in any way affect their section of the works.

1.1.2 Site

Relevant site conditions are believed to be correctly represented in the Contract Documents, however the Contractor (and Subcontractors where appropriate) are requested to inspect the site to ascertain for themselves the nature and extent of the works and the rights and interests that may be interfered with in the execution of the works, as no claims for additional payment will be recognised on the grounds of insufficient description.

1.1.3 Adjacent Owners

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

1.1.4 Protection

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

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

caused by overloading.

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

1.1.5 Responsibility

The Contractor will be held responsible for the full period of his legal responsibility in connection with this Contract for ensuring that all work execution, materials, and fittings, are completely in accordance with Contract requirements.

The Contractor is responsible to the Principal for the appropriateness and fitness, in relation to a reasonable expectation or requirement, of all of the materials and workmanship incorporated into the works by himself or his subcontractors; for this reason few specific guarantees are required in these contract documents. The terms and conditions of any warranty or guarantee required or provided shall not in any way negate the minimum remedies available under common law as if no warranty or guarantee had been furnished.

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

Workmanship in all trades is required to be equal to or better than recognised good trade practice. The Contractor shall provide all necessary setting out information and component dimensions for subcontractors and shall check and be responsible for the accuracy of their work.

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

Specialist Finishes Subcontractors are responsible for ensuring that substrates are completely appropriate for them to achieve first class results, and to this end shall, in sufficient time, instruct the Contractor with regard any fixings, primings, sealings or whatever for the substrate that vary in any way from the substrate manufacturer's standard recommendations. The Contractor shall advise the Architect/Designer with regard these variances, and not proceed until the Architect/Designer has agreed to them.

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

Ensure that all materials or items incorporated into any particular construction or finish are compatible and that their individual use is approved by the manufacturers and/or suppliers of the other parts of the system.

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

The Contractor shall make provision for all temporary works and services required for the satisfactory completion of the contract works. The Contractor shall pay all associated costs and fees; carry out all necessary maintenance, alterations and servicing requirements; and remove temporary works and services on completion of the contract works. Temporary works and services shall comply with the requirements New Zealand Building Code.

1.1.6 Specification

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

All clauses in all specification sections apply to their full extent and meaning to the entire Contract. Trade sections and paragraphs have been introduced into this specification for reference only and it shall not be construed that each trade section is a complete segregation of the materials and labour of that trade. The onus is on all trades to be conversant with any and all clauses which in any way affect their work.

(Be aware that the 'scope' noted in the 'Project Overview', and scope and general extent clauses within this specification, are included to provide a general indication only and must NOT be interpreted as schedules of quantities - the exact nature and extent of all aspects of the works are shown on the drawings).

1.1.7 Standards

New Zealand Standards (NZS), Australian Standards (AS), Joint Standards (AS/NZS), Acts of Parliament, Regulations made thereunder, Codes of Practice, and any specific Manufacturer's Instructions or Manufacturer's Recommendations that are referred to in these Contract Documents shall all be deemed to be the latest published edition thereof at the time of drawings issue, and shall be followed by the Contractor and all Subcontractors to the full extent applicable consistent with the intent of this Contract. Documents cited within other cited publications are deemed to form part of this specification.

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

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

1.1.8 Authorities and Charges

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

The Principal has obtained a Land Use Consent. The Principal has applied for and paid for the Project Information Memoranda, the Building Consent and other approvals required for the works to start. The PIM and Building Consent will be forwarded to the Contractor as quickly as possible after they are issued by the Territorial Authority. Note: It is an offence under the Building Act to carry out work not in accordance with a Building Consent.

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

1.1.9 Code Compliance Certificate

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

1.1.10 Coordination of the Works

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

1.1.11 Documents Interpretation

Except where they are clearly to the contrary, all dimensions are deemed to be to the bare surface of concrete, masonry, timber framing or other basic construction material. All figured dimensions take precedence over scaled sizes. Where any detail is included in more than one drawing the larger scale detail takes precedence. Where any ambiguity exists refer to the Architect/Designer for interpretation.

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

When the term 'allow' occurs in the Documents, except with reference to Monetary Allowances, the cost of the item shall be at the risk of the Contractor.

The terms 'approved', 'directed', and 'selected' when used in the Documents refers to the approval, direction or selection of or by the Architect/Designer. Please give adequate notice of when these decisions are required. 'Architect/Designer' shall mean the Architect or Designer, their representative or any Consulting Engineer engaged by the Architect/Designer.

1.1.12 Work Shown and Mentioned

The Contract Documents show the extent and nature of the works but there is no warranty expressed or implied that they show each and every minor detail or item required to be included by the Contractor. Should any material, structural member, fixing, or item or work appear to be inadequately described, yet obviously necessary for the neat, strong and satisfactory completion of the work, it shall be incorporated into the Contract Works.

1.1.13 Site Safety

Comply with the Health and Safety at Work Act 2015 (HSWA), and with all relevant Health and Safety at Work Regulations 2016, and with all relevant WorkSafe New Zealand (WorkSafe) Approved Codes of Practice and WorkSafe Information and Guidance, particularly those for construction and building maintenance. Comply with the relevant provisions of the New Zealand Building Code, in particular Clause F5.

So far as is reasonably practicable and according to a PCBU's (person conducting a business or undertaking) primary duty of care, take all necessary steps required to make the site and the contract works safe, and to provide and maintain a safe working environment. Ensure that all those working on or visiting the site are aware of the site safety rules and are not unnecessarily exposed to hazards.

Each PCBU, so far as is reasonably practicable, must ensure the health and safety of workers, and that other people are not put at risk by its work. If more than one PCBU has a duty in relation to the same matter, each PCBU with the duty must, so far as is reasonably practicable, consult, co-operate with, and co-ordinate activities with all other PCBUs who have a duty in relation to the same matter. PCBUs can enter reasonable agreements with other PCBUs to meet their duties, but cannot contract out of their duties.

Notify WorkSafe as soon as possible when a notifiable event occurs. Take all reasonable steps to preserve the site of the notifiable event in accordance with WorkSafe requirements. Ensure that the site of the event is not disturbed until authorised otherwise by WorkSafe. Keep records of all notifiable events.

Scaffolding shall comply with all Statutory and Local Authority Regulations, with the WorkSafe 'Best Practice Guidelines for Scaffolding', AS/NZS 1576 (Scaffolding equipment), AS/NZS 4576 (Guidelines for Scaffolding), and AS/NZS 4994 (Roof edge scaffolding), and shall be maintained for the duration and removed on completion.

The use of ballistic fixings must absolutely comply with all relevant safety recommendations at all times. No rubbish fires are allowed on site. Portable/personal disc/tape players, radios and iPods must not be used anywhere on the site. No smoking on site, except in the designated location in accordance with the Smoke Free Environments Act 1990, the location of which will be determined by the Contractor, with the approval of the Principal.

A PCBU's primary duty of care includes, but is not limited to, so far as is reasonably practicable:

- providing and maintaining a work environment that is without risks to health and safety;
- providing and maintaining safe plant and structures;
- providing and maintaining safe systems of work;

- ensuring the safe use, handling and storage of plant, structures and substances;
- providing adequate facilities for the welfare at work of workers in carrying out work for the business or undertaking, including ensuring access to those facilities;
- providing any information, training, instruction, or supervision that is necessary to protect all persons from risks to their health and safety arising from work carried out as part of the conduct of the business or undertaking;
- monitoring the health of workers and the conditions at the workplace for the purpose of preventing injury or illness of workers arising from the conduct of the business or undertaking.

Before commencing work on the site, the Contractor shall prepare and submit to the contract administrator a health and safety plan. The health and safety plan shall include, but not be limited to:

- the health and safety of all people on the site and on other properties, and the general public;
- identification of existing and potential construction hazards and risks;
- safety procedures to eliminate, isolate or minimise construction hazards;
- the equipment to be used to minimise the hazards;
- the maintenance of a register of hazards for the site;
- the name and qualifications of the site safety person;
- emergency procedures;
- first aid facilities and safety equipment;
- the methodology for notifying, recording and investigating accidents and injuries.

Carry out all construction operations in accordance with the submitted health and safety plan.

1.1.14 Variations

The Architect/Designer or Owner will issue Site Instructions (SI) to amend or clarify the works. Upon receipt of a SI the Contractor shall immediately notify the Architect/Designer if he believes there are price or timing adjustment implications. The Architect/Designer will then issue a Variation Price Request (VPR) for pricing of the possible Variation by the Contractor, within the time stipulated, or within 10 days if no time is stipulated. If the Contractor does not return the VPR within the time stipulated the Architect/Designer will assess it at reasonable rates. Once agreement is reached on price and/or timing a Variation Order (VO) for the item will be issued. Note that works covered by a SI or a VPR must NOT be actioned until the VO is issued.

When a Variation is contemplated and timing does not allow SI and VPR action the Contractor is to advise, and record in the site diary, an estimate of price and timing implications. If accepted by the Architect/Designer, a VO will be issued immediately. The Contractor shall then co-operate with the Architect/Designer to establish agreed pricing.

Claims for Variations neither priced nor estimated prior to being put in hand (but considered valid) will be incorporated into Progress Payment Certificates or the Draft Final Accounts as claimed and accepted but with a proviso allowing 5 (five) days for written objections by either the Principal or the Contractor, to any aspect of them, for further consideration.

The Main Contractor's Variations Margin agreed pre-contract will be the maximum accepted for any trade unless higher rates are nominated pre-contract and are accepted. The Main Contractor's agreed Variations Margin shown shall be deemed to include all preliminary and general costs, overheads, variation processing costs, and profit. If no margin is given, a 5% overall margin will be

applied.

Note that 'loss of anticipated profit' claims consequent upon reduction of works extent will NOT be recognised, and that the cost of processing Variations is deemed to be included in the P & G Allowance.

Also note that for Variations pricing all materials shall be charged at the actual net invoiced cost plus margin; i.e. recognised 'Trade Price', volume discounted where appropriate.

1.1.15 Progress Claims

Progress Claims shall be in writing, shall be in accordance with the requirements of the Construction Contracts Act 2002, and shall include all of the following:

- The overall amount claimed.
- The percentage completion and amount claimed for each Subcontractor. For accurate claim verification please ensure that this breakdown exactly matches the trades costs breakdown agreed-to pre-contract.
- The total Contract Sum Adjustment for any/all Variations authorised prior to the claim.
- Items covered by Monetary Allowances listed separately.
- And, if specifically requested, confirmation that amounts previously claimed on behalf of Subcontractors, certified by the Owner, and paid by the Principal, have actually been paid to the Subcontractor (apart from normal retentions).

Note that retentions will be held exactly in accordance with the Conditions of Contract.

1.1.16 Cleaning and Completion

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

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

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

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

2 CONCRETE

2.1 Preliminary

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

2.2 Compliance

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

Comply with all relevant provisions and recommendations of:

2295:2006(NZS)	Pliable, permeable building underlays
2904:1995(AS/NZS)	Damp-proof courses and flashings
3101.1&2:2006(NZS)	Concrete Structures Standard
3104:2003(NZS)	Specification for concrete production
3109:1997(NZS)	Concrete construction
3112.1:1986(NZS)	Methods of test for concrete - Tests relating to fresh concrete
3112.2:1986(NZS)	Methods of test for concrete - Tests relating to the determination of strength of concrete
3114:1987(NZS)	Specification for concrete surface finishes
3121:2015(NZS)	Water and aggregate for concrete
3122:2009(NZS)	Specification for Portland and blended cements (General and special purpose)
3124:1987(NZS)	Specification for concrete construction for minor works
3125:1991(NZS)	Specification for portland-limestone filler cement
3604:2011(NZS)	Timber-framed buildings
4200.1:2017(AS NZS)	Pliable building membranes and underlays - Part 1: Materials
4200.2:1994(AS/NZS)	Pliable building membranes and underlays - Installation requirements
4389:2015(AS/NZS)	Roof safety mesh
4671:2001(AS/NZS)	Steel reinforcing materials
4859.1:2018(AS NZS)	Thermal insulation materials for buildings - Part 1: General criteria and technical provisions
NZBC B1	Structure
NZBC B2	Durability
NZBC E2	External moisture
NZBC E2/AS1	External Moisture

2.3 Workmanship

2.3.1 Qualifications

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

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

2.3.2 Formwork

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

Design and construct formwork to withstand total weights and all construction loads. Formwork constructed tightly to prevent undue slurry leaks, with no wire formwork ties, and no part of the formwork ties left within required concrete cover. 20 x 20mm fillet corners. Any release agents used shall be non staining and shall be compatible with all subsequently applied finishes.

Position construction/crack control joints (except where shown otherwise) under walls or elsewhere as approved, in accordance with the following maximum criteria:

- Slabs on ground - area 50 sq.m, length 7.5m.
- Suspended slabs - area 150 sq.m, length 15m.
- Walls - length 10m, lift 4m.

Retarders only to provide a scabbled surface at construction joints.

Formwork suitable for required F2 finish to exposed locations for subsequent plastering.

Coordinate with all trades to build in all necessary starters, fixings, anchorages, chases, sleeves, bolts, conduits, electrical / plumbing devices etc., and check their exact positioning before pouring.

Coordinate with all trades to form all necessary holes, openings etc. with their positions and sizes exactly as required.

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

2.3.3 Concreting & Curing

All concrete shall be power mixed in a plant approved by the Ready Mixed Concrete Association for required grade. All structural concrete shall have a compressive strength of 25MPa at 28 days. 19mm max aggregate, 80mm slump, and with a maximum water cement ratio of 0.55.

Where considered desirable the manufacturer may add an air entrainment agent complying with NZS 3109 and 3119. No other additives may be used without specific approval of the engineer. Mixes shall be capable of being readily placed and compacted and finished as specified. The manufacturer shall

carry out quality control testing to NZS 3104. All other concrete 20 MPa Ordinary Grade with maximum water cement ratio 0.7.

Note that appropriate cold weather pouring and curing techniques MUST be adopted if construction timing/temperatures so dictate.

Advise for inspection 24 hours before placing any concrete. Sequence and size of concrete pours to approval. No concrete pouring in wet weather. Clean out all formwork thoroughly before pouring. Handling, placing and vibration/compaction of concrete shall all be exactly to NZS 3109 requirements, and carried out by skilled operatives. Slabs power float finished to NZS 3114 U2 surface by kelly float, with steel troweling to a similar finish in corners etc., and to a U3 finish localized to resilient flooring areas.

Cure all concrete for 14 days. Do not use sprayed membranes. As soon as practicable pond all horizontal surfaces, or fully cover with polythene or hessian (kept wet). Periodically hose down all formwork. Stripped vertical surfaces shall be kept wet with perforated hoses or similar.

Form shrinkage control joints in concrete floor slabs-on-ground by saw cutting, without chipping, spalling and tearing the surface, to the locations and layout shown on the drawings. Saw cuts shall extend to a quarter of the depth of the slab. Saw cutting shall take place no later than 24 hours after initial set for average ambient temperatures above 20°C, and 48 hours for average ambient temperatures below 20°C.

2.3.4 Surface Finishes

General floor slabs - U3 finish.

Foundation sides exposed to view - F5.

2.3.5 Documentation

Concrete delivery dockets shall state job, date and time of mixer loading, grade, strength, and slump. Dockets shall be kept and forwarded to the Architect/Designer. Water must NOT be added after the concrete leaves the plant.

2.4 Concrete

2.4.1 Scope

This section sets out the requirements for the supply, forming, casting and finishing of all concrete and concrete elements, including precast concrete elements if required, and the building in of all cast-in items, required for the satisfactory completion of the works. All aspects of this work shall be carried out to comply with the requirements of the New Zealand Building Code and relevant Standards, and in accordance with the project design documentation, and with any relevant product manufacturers' recommendations.

The supply and fixing of reinforcing for concrete is covered in separate specification Reinforcing Steel. The supply and placing of blockwork grout is covered in separate specification section Blockwork.

The following is a list and/or general description of the extent of Insitu Concrete works, which are more specifically defined in the contract documents, required for the completion of the contract works:

2.4.2 Requirements

2.4.2.1 Safety

Comply with the Health and Safety at Work Act 2015 (HSWA), and with all relevant Health and Safety at Work Regulations 2016, and with all relevant WorkSafe New Zealand (WorkSafe) Approved Codes of Practice and WorkSafe Information and Guidance, in particular the '[OSH Guidelines For the Provision of Facilities and General Safety in the Construction Industry](#)'.

Precast concrete shall be handled in accordance with the WorkSafe '[Approved Code of Practice for The Safe Handling, Transportation and Erection of Precast Concrete](#)'.

Carry out all construction operations in accordance with the Contractor's project-specific Health and Safety Plan.

2.4.2.2 Quality Assurance - Option 1

Ensure that the construction of all concrete work complies in all respects with the design drawings and the specifications.

Prepare and submit details of the quality assurance procedures for concrete work for approval. These procedures should encompass all aspects of concrete construction.

The quality assurance procedure shall encompass all aspects of concrete construction including, but not limited to:

- concrete quality; and
- formwork quality; and
- construction tolerances; and
- reinforcing steel placement; and
- cast-in items; and
- concrete finishes.

Notify the name of the concrete construction representative to be responsible for the quality control of concrete work. The nominated representative shall complete and sign a written quality control checklist for each on-site concrete pour. A copy of each completed checklist shall be submitted to the Contract Administrator before pouring commences, and in sufficient time for pre-pour inspections to be carried out. The format and detail of the checklist shall be agreed to prior to the commencement of any concrete work.

Supply evidence of concrete production quality standards in advance of construction in accordance with the requirements of NZS 3109.

2.4.2.3 Tolerances

Unless specified otherwise, dimensional tolerances of concrete work shall conform to NZS 3109: Table 5.2 - 'Tolerance for insitu construction', and NZS 3109: Table 5.1 - 'Tolerance for precast components', and to NZS 3114 for off-the-form and unformed surface tolerances.

To ensure that elements such as external cladding, precast items, and lifts will properly fit the building, maintain responsibility for the accurate control of the overall set-out of the concrete structure and concrete elements.

An absolute tolerance on the position of all structural elements of 15mm shall be maintained over the full height of the structure in all directions.

Employ a registered surveyor to reset all gridlines and column positions at every second floor. Column locations, slab edge positions and positions of openings shall be adjusted to ensure that each is within 10mm of the correct position through the height of the building.

Take particular care to ensure that individual members and the building structure as a whole do not twist over the height of the building.

2.4.2.4 Erection & Temporary Works

Maintain responsibility for all erection, propping and temporary support of the works, and any other works required for the completion of the contract works, including lifting design, rigging analysis, propping and shoring design.

The extent and details of the erection systems, propping, etc., will be dependent on proposed construction methods, transport and handling methods, and construction programme. Where required, engage a Chartered Professional Engineer experienced in this type of work to undertake the design and supervision of erection systems, propping, etc. Provide written confirmation that this has been done to the Contract Administrator.

Any additional reinforcement to suit temporary erection or support methods shall be the responsibility of the Contractor.

2.4.2.5 Inspections

All stages of the concrete construction work shall be reviewed in accordance with the requirements of NZS 3109: Section 1.3, and the conditions of the Building Consent.

All inspections shall be properly documented by the Contractor. Provide all necessary quality control checklists prior to pouring and in sufficient time for pre-pour inspection.

Give notice and provide reasonable opportunity to inspect the section of work prior to pouring. Give at least 1 working day's notice of intent to place concrete in any area.

Any instructions issued shall be carried out before concrete placing commences. Unless approval is given by the Contract Administrator and/or BCA, no concrete shall be placed in that section of work.

Any concrete placed without authorisation may require removal from the works at the Contractor's expense.

2.4.2.6 Materials & Workmanship

Adhere to the requirements of NZS 3109, except where specified otherwise or instructed by the Contract Administrator.

2.4.2.7 Producer Statement

Furnish a fully completed Producer Statement when the works are sufficiently complete and are ready for application for a Code Compliance Certificate. The Producer Statement shall cover all concrete construction work completed under this section of the specification - Concrete.

In the case of exemption the reinforcing is to be inspected by the engineer before pouring concrete.

2.4.3 Reinforcement

Refer to separate section Reinforcing Steel.

Store reinforcing steel material flat, clear of the ground, on evenly spaced bearers, in a secure area clear of the building works. Keep materials protected from damage and contamination at all times. Do not use damaged, distorted or defective material.

Ensure that all reinforcing is adequately supported off the ground and remains clean from delivery until placing. Before placing reinforcing steel, check that it is free of any loose mill scale and any contamination that may impair bonding to concrete.

Take all necessary measures to ensure that reinforcing steel is not damaged or displaced during concreting.

2.4.4 Formwork

Formwork shall conform to NZS 3109: Section 5, and comply with the provisions of NZS 3114 applicable to the class of surface finish specified.

Formwork and falsework shall have sufficient strength to retain and support the wet concrete being placed to the required profiles and tolerances.

The formwork surface finish shall be of suitable quality necessary to produce the specified concrete finish. Any formwork with a deteriorated or damaged surface that does not meet the requirements of the surface finish shall not be used.

Fair-faced concrete formwork shall be constructed so as to provide straight and true angles and so as to produce cast surfaces within a maximum tolerance of 5mm of the given dimensions, and without visible offsets, bulges, or misalignment of the concrete. Form neat, clean arrised edges, except where chamfers are indicated on the drawings or required to match existing detail - in which case the fillets shall form part of the mould and not be loosely placed.

Plywood formwork shall be constructed from Formply plywood sheets or C-grade faced standard plywood sheets (according to concrete finish), placed in a regular pattern and tightly butted together to avoid grout loss. The joints shall be sealed to prevent grout loss. Plywood formwork shall not be permitted to stain visually exposed concrete. Unless indicated otherwise on the drawings, timber or plywood formwork shall have 20mm fillets at the inside corners of beams, columns and walls.

The formwork face shall be adequately clean and treated with a general purpose concrete form release agent in accordance with the manufacturer's requirements. Diesel oil based products are not permitted. Care shall be taken to ensure that the release agent is kept out of contact with the reinforcement and is compatible with any subsequent paint or finish system applied to the finished concrete.

All ties and spreaders shall be of an approved type and placed so as to leave a regular, neat pattern on the concrete surface when withdrawn and filled. The ends of cast-in ties shall be set at least 40mm from the concrete surface. Wire ties are not permitted for the purpose of restraining, securing or supporting formwork.

Steel formwork shall be used where specified or appropriate, with all joints welded and ground smooth and flush to a uniform surface. All internal corners shall be formed by folding the steel, not butting.

Any surface required with a ribbed or grooved surface shall be formed by adhering battens of the appropriate profile to the form bed and/or mould, and treated generally as above.

Erected formwork shall be set and checked for dimensional accuracy and alignment before, during and after concreting, and any damaged formwork replaced. All debris shall be removed from the formwork immediately before concrete is placed.

When not in use, formwork shall be cleaned, oiled and stored flat on an even surface, and protected from exposure to moisture and contamination on all sides.

Formwork shall be removed without shock or vibration and in such a manner as to prevent damage and to permit the concrete to take the imposed stresses gradually. Do not permit bars or other tools to lever against set concrete when removing formwork. Any damage to the concrete occurring during removal shall be repaired by an approved method at the Contractor's expense.

Removal of formwork in multi-storey structures shall conform to NZS 3109: Section 5.4.5.

2.4.5 Finishes

2.4.5.1 NZS 3114

Unless specified otherwise in this specification or on the drawings, concrete finishes shall comply with the provisions of NZS 3114 applicable to the surface finish class specified.

Concrete surface finishes not specified in this specification or on the drawings shall be in accordance with Table 1 or Table 2 of NZS 3114 according to surface type, location and application/use.

2.4.5.2 Slab Finishes

Refer to the Schedule of Surface Finishes below for the finishes required unless specified otherwise in the contract documents.

Arrange the pouring to allow adequate time for floating and finishing.

Floating and any subsequent finishing shall be at the correct time to obtain the quality of compaction and finish required. No finishing work shall be carried out on any area where there is free surface water. The application of dry cement or sand to absorb free water is not permitted.

All trowelling ridges shall be removed while soft, or by subsequent light grinding. Slabs not fulfilling the standard of finish required shall be ground smooth or otherwise treated to the satisfaction of the Contract Administrator. Care shall be taken to avoid ridges where a newly poured slab meets existing edges.

2.4.5.3 Formed Finishes

Refer to the Schedule of Surface Finishes below for the finishes required unless specified otherwise in the contract documents.

Concrete which will be concealed within the finished building shall be cast with minimum grout loss, honeycombing, and without conspicuous off-sets or bulges.

2.4.5.4 Schedule of Surface Finishes

Schedule of Surface Finishes (according to application):

- Slabs to take plaster or tiles: *U2 Class Finish*.
- Other slabs: *U3 Class Finish*.
- Top surfaces of foundation beams and pads: *U2 Class Finish*.
- Concrete below ground: *F1 Class Finish*.
- Concrete to take plaster or tiles: *F2 Class Finish*.
- Concrete surfaces not exposed in the finished building: *F3 Class Finish*.
- Concrete surfaces exposed inside or outside the finished building: *F5 Class Finish*.
- Precast concrete surfaces exposed finishes: *F5 Class Finish & U3X Class Finish* - as described herein (sample required).
- Feature architectural finish: *F6X Class Finish* - as described herein (sample required).
- External walkways and landings: *U5 Class Finish (soft broom)*.
- Exterior paving: *U2E Class Finish* - exposed aggregate as described herein (sample required).

Description of Specific Concrete Finishes:

2.4.6 Concrete

2.4.6.1 Normal Concrete

Unless specified otherwise herein, all concrete except for 'no fines' concrete shall be Normal Concrete (N) Grade as defined by NZS 3109, produced in accordance with NZS 3104 from a New Zealand Ready

Mixed Concrete Association audited plant, with sufficient cement quantity to ensure satisfactory finish and durability.

Normal Concrete maximum aggregate size shall be 19mm. Calcium chloride shall not be used.

Cement shall comply with:

NZS 3122: 'Specification for Portland and blended cements (General and special purpose)';

NZS 3125: 'Specification for portland-limestone filler cement'.

Chemical admixtures use in Normal Concrete shall comply with AS 1478.

'No fines' concrete shall be coarse aggregate/cement/water mix without sand but with selected aggregate where necessary.

The aggregate used, and overall mix design (including the use of additives) of Normal Concrete, shall meet the provisions of Section 2 of CCANZ TR 3 Alkali Silica Reaction. Evidence of this may be required by the Contract Administrator. Use of low alkali cements or aggregates from an alternative source may be required where the aggregate contains deleterious material.

Normal Concrete used in the works shall have the following minimum strengths at 28 days unless noted otherwise on the drawings:

- Blinding concrete: *10 MPa*.
- 'No fines' concrete: no minimum strength.
- Bored piles: *25 MPa*.
- Foundation pads and strip footings: *25 MPa*.
- Floor slab-on-grade: *30 MPa*.
- Superstructure generally: *30 MPa*.
- Precast concrete: *30 MPa*.
- Toppings to proprietary suspended floor systems: *30 MPa*.
- All other structural concrete not specifically mentioned: *25 MPa*.
- Driveways, pavements, landscaping: *20 MPa*.

Supply details of Normal Concrete mix designs for review prior to the ordering of any concrete.

Where a mix from the Normal Concrete range is specified with a special requirement as specified in NZS 3109, then it becomes a Special Concrete (S) - refer to Special Concrete.

2.4.7 Concreting

2.4.7.1 Handling, Placing & Compaction

All concreting shall conform to NZS 3109 unless modified in this specification.

Concrete shall be transported, handled, placed and compacted so as to:

- Prevent segregation or loss of materials;
- Produce a monolithic mass between planned joints or the extremities of members, or both;
- Completely fill the formwork to the intended level, expel entrapped air, and closely surround all

reinforcement, tendons, ducts, anchorages and embedments; and

- Provide the specified finish to the formed surfaces of the member;
- Ensure there is no contamination of the concrete;
- Ensure that the transporting, handling, placing and compaction of the concrete is complete before setting reactions have passed the point which prevents the concrete from attaining its potential fully cured properties.

Concrete shall not be pumped without the Contract Administrator's approval. Where such approval is given, only a standard 'structural' concrete mix design may be used - the use of a pump mix design will not be accepted.

Vibrators shall be used for the compaction of all concrete, including floor slabs. Immersion vibrators shall be moved to new positions as frequently as necessary to ensure uniform vibration of the whole mass and fully compacted concrete. On no account shall immersion vibrators be allowed to come into contact with the face of formwork. Vibrators shall not be used to transport concrete along the forms.

2.4.7.2 Curing & Protection

All concrete shall be cured in accordance with NZS 3109:Section 7.8.

The use of concrete curing compounds shall be only as agreed with the Contract Administrator (specifically for each occasion before it is used). Ensure that any agreed concrete curing compound is compatible with subsequent floor coverings or surface treatments, including any sealers, paints, waterproofing membranes, etc.

All concrete elements shall be protected from damage at all times. Any damaged items shall be repaired or remade to the satisfaction of the Contract Administrator.

2.4.7.3 Unfavourable Conditions

Take all necessary precautions and measures during unfavourable conditions, as required by NZS 3109: Section 7.2, to ensure quality and finish of the concrete is not compromised or reduced in any manner.

2.4.8 Construction Joints

2.4.8.1 Construction Joints

The location, type and detail of construction joints shall be as specified and shown on the drawings. Construction joints shall not be repositioned or eliminated from the locations shown on the drawings without approval. Where a construction joint is not specified or shown on the drawings, the location, type and detail of the joint must be approved before work commences.

2.4.8.2 Shrinkage-Control Joints - Saw Cutting

Shrinkage-control joints shall be formed in concrete slab-on-grade floors by saw-cut grooves to the layout and details shown on the drawings.

Saw cutting shall be carried out as soon as possible, after the concrete has set and before shrinkage cracking has occurred - typically within 24 hours of pouring, and without excessive chipping, spalling or tearing of the concrete. Saw cuts shall be straight and true and within 10mm of the true joint alignment.

Unless shown otherwise on the drawings, saw cut grooves shall extend to one quarter of the of the slab thickness, and be between 3-5mm in width. Under no circumstances shall the reinforcement through the joint be cut by saw cutting.

As detailed on the drawings, the joint shall be sealed with the specified sealant.

2.4.9 Penetrations and Detailing

Form all penetrations, rebates, fillets, nibs, upstands, and other detailing as shown on the drawings. Sleeves, conduits, pipes, cores or other penetrations shall not be cast in concrete unless they are indicated on the drawings. If not indicated, they must be approved by the Contract Administrator. All penetrations and concrete detailing shall be accurately positioned and formed at the time of pouring the concrete (without movement or displacement).

Set concrete shall not be cut, hacked or cored unless specific approval is obtained from the Contract Administrator.

2.4.10 Building In

As the work proceeds, build in all anchors, bolts, fixings, and other built-in items as shown on the drawings and as necessary for the satisfactory completion of the works.

Build in all necessary pockets, chases, grooves, pipe and cable sleeves, conduits, fixings, fittings, etc., required by other trades. Liaise with other trades and confirm the requirements and supply of all built-in items related to their work, and shall ensure that such items are supplied and/or positioned.

Unless specified as supplied by another trade or other party, all items specified or indicated on the drawings as built-in shall be supplied by the Contractor.

Where an item is not specified or shown on the drawings as built-in, submit all necessary details for approval before proceeding. Such items shall only be built-in when approved by the Contract Administrator.

Built-in items shall not be repositioned or eliminated from the locations shown on the drawings without prior approval.

Ensure that all built-in items are correctly positioned and that they are not displaced during concreting. Ensure suitable personnel are on call during concreting to correct any displacement that may occur. Advise the Contract Administrator immediately if any built-in item has been positioned incorrectly or left out.

No claim will be recognised for cutting away or drilling concrete work already executed as a result of not conforming to these requirements and making the necessary provisions beforehand.

2.4.11 Cast-In Structural Steelwork Items

All cast-in steelwork that is exposed to weather or water vapour on completion shall be hot-dip galvanised. If welding to the cast-in item is necessary, grind off the galvanising in area of welding, carry out welding, and protect the exposed bare steel with an approved cold galvanising (cold-galv) treatment in accordance with the manufacturer's requirements.

Ensure that all cast-in structural steel items are correctly positioned and that they are not displaced during concreting. Ensure that suitable personnel are on call during concreting to correct any displacement that may occur. Advise the Contract Administrator immediately if any cast-in structural steel item has been positioned incorrectly or left out.

2.4.12 Foundations

Form concrete foundations to the layout and details shown on the drawings. Concrete foundations shall be cast against formwork on each side unless otherwise approved by the Contract Administrator.

Where approval is given to cast against ground, an additional 25mm thickness of concrete will be required on each unformed face to provide additional cover.

Allow to underpin or otherwise support adjacent foundations as necessary to ensure complete stability and no damage to adjacent structures at all times.

Cast in sleeves for all pipes and cables that pass through foundations - coordinate the location of each sleeve with the relevant trade.

Give notice and provide reasonable opportunity to inspect all foundation excavations before placing any tidy concrete or hardfill.

2.4.13 On-Ground Floor Slabs

2.4.13.1 Concrete Floor Slab-on-Grade

Unless specified or shown otherwise, cast ground-bearing concrete floor slabs on a damp proof membrane (DPM) sheet concrete underlay, laid over maximum 25mm thick layer of compacted sand blinding.

The concrete mix should be designed to ensure durability and shrinkage. The use of low sand percentage, a low water content, superplasticiser and air entrainment is required.

Cement content shall not be less than 300 kg/m³, regardless of the minimum specified concrete strength.

The slab shall be constructed between formed construction joints as shown on the drawings, and in a sequence so that two adjacent sections are not poured one after the other.

Immediately after screeding the slab shall be smoothed using a bull float. Finishing shall be carried out with the use of a power float; initially operated with the blades flat, and finally operated with the blades slightly tilted.

All slabs shall have construction joints or saw-cuts at not more than 5.0m intervals in each direction, unless shown otherwise on the drawings.

Along lines of saw-cuts accurately cut out alternate bars of the floor reinforcement and mark the proposed line of saw-cut from outside the pour area. The time of sawing will vary depending on weather conditions, and shall be such as to prevent uncontrolled cracking of the slab. Sawing of the joints shall commence as early as possible, typically within 12-18 hours, and when the concrete has sufficiently hardened to permit cutting without excessive chipping, spalling and tearing. Saw-cuts shall be to the depth shown on the drawings and shall be made using a self-propelled diamond-tipped floor saw machine.

2.4.13.2 Damp-Proof Membrane

Damp-Proof Membrane (DPM) - refer to separate section Waterproofing for specification of damp proof membrane.

Damp-proof membrane shall be continuous under slabs-on-ground and under foundations. Sheet DPM joints shall be overlapped minimum 150mm and continuously sealed with a pressure-sensitive tape or as recommended by the manufacturer.

Damp-proof membrane shall be turned up or down against foundations, walls and columns as appropriate, and tape-seal around protrusions and service pipes.

Protect the DPM during all operations until the floor slab is complete. Repair any damage that may occur or replace damaged DPM with new sections.

2.4.13.3 Shrinkage-Control Joints - Saw Cutting

Shrinkage-control joints shall be formed in concrete slab-on-grade floors by saw-cut grooves to the layout and details shown on the drawings.

Saw cutting shall be carried out as soon as possible, after the concrete has set and before shrinkage cracking has occurred - typically within 24 hours of pouring, and without excessive chipping, spalling or tearing of the concrete. Saw cuts shall be straight and true and within 10mm of the true joint alignment.

Unless shown otherwise on the drawings, saw cut grooves shall extend to one quarter of the of the slab thickness, and be between 3-5mm in width. Under no circumstances shall the reinforcement through the joint be cut by saw cutting.

2.4.13.4 Shrinkage-Control Joints - Crack Inducer

Shrinkage-control joints shall be formed in slab-on-grade floors with the use of cast-in ground crack inducers, installed to the layout and details shown on the drawings in accordance with the manufacturer's requirements. Unless shown otherwise on the drawings, ground crack inducers shall extend to one quarter of the of the slab thickness. Both sides of the crack inducer shall be adequately taped to the DPM to prevent displacement during pouring.

2.4.14 Epoxy Grouting of Reinforcing Bars

All epoxy grouted reinforcing bars shall comply with the following provisions and shall be subject to the approval of the Contract Administrator.

Epoxy grouting is not an alternative construction method to the details shown on the drawings.

Remedial work to rectify new concrete work must be carried out in accordance with the Contract Administrator's instruction.

Drill all epoxy grouted reinforcing bars into concrete in accordance with the design drawings - when required for connecting into existing concrete.

The holes must be drilled with hammer drills. Diamond core drilling is not acceptable.

Holes for vertical bars shall be plumb in all directions, and holes for horizontal starters shall slope downward at a 15° angle.

The depth of hole and embedment of the reinforcing bars shall be to the minimum depths shown on the drawings. Epoxy anchoring adhesive shall be Sika AnchorFix-3+ or approved equivalent high-performance, 2-part epoxy anchoring adhesive. Alternatives cannot be used without written approval of the Contract Administrator. The grout shall be non-shrink. Moisture sensitive epoxy resins shall not be used. If the hole size is larger than the minimum specified, a sand filled grout may be required. The epoxy grout shall be used strictly in accordance with the manufacturer's requirements.

Holes must be dry prior to filling with epoxy unless the epoxy used is suitable for wet holes or underwater application. If the concrete is moist then the bonding surface must be roughened to provide a depth of surface roughness of 2-3mm or more so that the loss in chemical bonding can be replaced by mechanical bonding.

All holes shall be cleaned out using a stiff-bristled wire bottle brush and an oil-free compressed-air source so that all dust and debris are removed from the side of the hole. Give notice and provide reasonable opportunity for inspection of the holes prior to placement of bars and epoxy grouting.

The hole shall be partially filled with epoxy grout prior to inserting the reinforcing bar. Holes shall be filled from the bottom up (rather than pouring from the top). Vertical holes can be filled with pourable-grade epoxy. Horizontal holes must be filled with 'plastic' epoxy using pre-filled cartridges and sealant gun. Standard cartridges shall be modified by placing plastic hosing over the cartridge nozzle of sufficient length to reach the base of the drilled hole.

After the bar has been placed in position, ensure that the epoxy fills the hole to the surface of the concrete. Top holes if necessary. Bars shall be placed in the holes, given one turn to expel air voids, and shall be fully supported (if necessary) and left undisturbed for at least 24 hours. After 24 hours horizontal bars installed at 15° angle can be bent horizontal/level.

Notify the name of the person responsible for ensuring this specification is adhered to.

Pull-out tests shall be undertaken on a minimum 15% of all epoxy grouted bars, but with a minimum of three tests for each applicable bar size. The tension test load shall not be less than 70% of the yield strength of the bar, or as otherwise directed by the Contract Administrator. All costs for testing shall be borne by the Contractor.

2.4.15 Grouting of Ducts

All ducts and associated gaps forming the interface between adjacent concrete components, where noted on the drawings, shall be grouted with Sika Grout 212 or approved equivalent high strength, shrinkage compensated, pourable cementitious grout.

Grouting shall be carried out so that air is expelled as grouting continues, and the voids between concrete units are completely filled with grout. The grout shall be mixed and placed in strict accordance with the manufacturer's requirements.

Ensure the quality assurance of mixing and placing grout at all times. Provide the grout manufacturer's testing programme, and ensure its is adhered to throughout construction. The tests shall demonstrate that grout, when placed:

- has a minimum 7-day strength of 40 MPa; and
- flows to entirely cover the interface between the concrete components/elements; and
- does not bleed mix-water to create voids at the interface; and
- does not shrink.

Clean off any spillage or leakage immediately after the completion of grouting.

Allow at least 24 hours for the grout to cure before applying any load to the grouted joint.

2.4.16 Repair & Cleaning of Concrete

2.4.16.1 Proposed Remedial Works

When the exposed concrete surfaces of the building are complete, they shall be closely inspected for faults in surface finish, damage to corners or edges, dirty marks, splashes or dribbles and visible imperfections of every kind.

Submit any proposed remedial work procedures to the Contract Administrator for approval. If proposed remedial work procedures are not approved, remedial work shall be as specified herein.

2.4.16.2 General Repair & Cleaning

All defects and imperfections shall be removed and rectified to the satisfaction of the Contract Administrator.

The removal of surface markings shall be carefully carried out with the use of wire brushing, pumice stone, carborundum stone, or washing and scrubbing - such as will remove the marks without scratching, discolouring or otherwise affecting the surrounding or underlying concrete.

Patching or filling of fair faced concrete and making good broken edges and corners shall be done with coloured sands and cement where necessary to match the colour of the surrounding concrete when dry.

Epoxy or similar adhesives shall be used when required.

2.4.16.3 Concrete Repair Using Concrete or Dry-pack

Correct all imperfections on the concrete surface necessary to produce the surface finish that conforms to NZS 3114. Unless directed otherwise, the repair of imperfections in formed concrete shall be completed within 24 hours after removal of formwork, or within 24 hours after concrete placing for unformed concrete. Otherwise, epoxy resin repairs are required.

Repairs to surfaces with a F3-finish shall be colour-matched with the parent concrete. Where necessary, limestone or marble dust shall be mixed with the sand, and white cement mixed with Portland cement to ensure a satisfactory colour match. Ensure that the texture of the repair matches the texture of the adjacent surface. Defective areas may need to be over-excavated to ensure the surface finish of the repair is rectangular or other regular shape.

Fins and encrustations shall be neatly removed from F4-finish and F5-finish specified surfaces. Encrustations shall be removed from U3-finish specified surfaces.

Where the concrete is damaged, honeycombed, fractured or otherwise defective, and where excessive depressions exist in the concrete surface, the concrete shall be removed and replaced with dry-pack, mortar, or concrete as outlined below.

Where bulges and abrupt irregularities protrude beyond the tolerances for formed surfaces as specified in NZS 3114, the protrusions shall be reduced by brush-hammering and grinding so that the surface is within the specified limits. After such dressing, the irregularities shall not exceed the tolerance specified in NZS 3114.

Dry-pack shall not be used for filling behind reinforcement or for filling hole that extend completely through a concrete section.

Mortar placed under impact shall be used for repairing defects that are too wide for dry-pack filling and too shallow for concrete filling and are no deeper than the far side of the reinforcement nearest the surface.

Formwork tie holes shall be neatly plugged with mortar filling. The mortar shall be colour-matched with the surrounding concrete.

2.4.16.4 Concrete Repair Using Epoxy Resin

Epoxy resin or epoxy resin bonded repairs shall be used when repairs have not been made within 24 hours after the removal of formwork, or not made within 24 hours after placing unformed concrete. Such repairs shall not be undertaken until the parent concrete has had a minimum of 3 weeks curing.

Imperfections to be repaired with epoxy resin shall be chipped back to sound concrete and the edges of the cavity trimmed square for a minimum depth of 3mm.

Immediately prior to carrying out a repair, the surface of the cavity shall be cleaned of all contaminants by sandblasting, or etching with a 5% solution of hydrochloric acid or other approved method. If acid-etch is used, immediately the foaming ceases the cavity shall be thoroughly flushed and cleaned with clean, fresh water, then completely dried using an appropriate heat source.

Following preparation, the surface of the cavity shall be primed with one or more coats of an approved unfilled epoxy resin prepared and cured in accordance with the manufacturer's requirements.

A compatible epoxy resin with an approved filler, or wet concrete, shall be prepared, applied to the primed surface and trowelled to a smooth finish and allowed to cure. Epoxy resin shall only be used in accordance with the manufacturer's requirements. Ensure to leave the surrounding surface clean and free from contamination.

The finished repair surface shall conform NZS 3114. Any grinding required shall be carried out using a silicon carbide or other suitable abrasive with water (wet grind).

2.5 Thermakraft Underlay, DPM & DPC

2.5.1 Scope

Supply and install Thermakraft Underlays and Membranes, as specified herein, to the locations identified on the drawings, complete with all accessories required for proper installation and performance. All aspects of this work shall be in complete accordance with Thermakraft Ltd technical information and installation requirements (check www.thermakraft.co.nz, or call 0800 806 595 for the latest editions), other relevant product manufacturers' recommendations, and as shown on the design drawings.

No substitutions are permitted for the specified products from Thermakraft Ltd.

The following is a list and a general description of the extent of the Thermakraft Underlays and Membranes works, which are more specifically defined in the contract documents, required for the completion of the contract works:

2.5.2 Requirements

2.5.2.1 Safety

Comply with the Health and Safety at Work Act 2015 (HSWA), and with all relevant Health and Safety at Work Regulations 2016, and with all relevant WorkSafe New Zealand (WorkSafe) Approved Codes of Practice and WorkSafe Information and Guidance, particularly those for construction and building maintenance.

2.5.2.2 Warranty

Thermakraft Ltd Product Warranty:

- 15 Years Warranty - for all Thermakraft warranted products installed, according to the warranty conditions.
- Provide the Thermakraft Ltd Product Warranty on the manufacturer's standard warranty form.
- Commence the warranty from the date of permanent installation.

2.5.2.3 Substitutions

Thermakraft Ltd products shall be as specified herein and as indicated on the approved drawings. The substitution of Thermakraft branded products for alternative brands like products are permitted but must be checked with owner and designer.

The substitution of a specified Thermakraft product for an alternative Thermakraft branded product by the Contractor shall only be permitted with the Contract Administrator's written authorisation, and shall be at no additional cost to the Principal. Should any resultant extra work and/or redesign work be required to accommodate alternative Thermakraft branded products to satisfy design, performance and compliance requirements, then the cost of these shall be borne by the Contractor.

2.5.3 Damp-Proof Course

PerrimeterDamp Proof Course. A bitumen saturated, heavy Kraft lightly coated with Perlite.

Available in 50mm, 75mm, 90mm, 100mm, 150mm, 200mm, 250mm and 300mm roll widths.

Perrimeter DPC is used as a general damp proof course (DPC) for separating timber and wood-based products and metal from concrete, masonry, brick, and stone surfaces, and as a moisture barrier.

Also used as a concealed flashing behind brick veneer cladding in accordance with NZS 4229 and NZBC E2/AS1.

Installed in accordance with the manufacturer's requirements, and as shown on the drawings.

2.5.4 Wall Underlay

Rab board is used as wall underlay.

2.5.5 Roof Underlay

Thermabar 397 Synthetic Foil. A fire-retardant, self-supporting, white-faced, double-sided aluminium light diffuser foil insulation/vapour control layer, synthetic underlay. Nominal weight 218g/m². Thermabar 397 Synthetic Foil is not suitable for installation in residential or associated buildings.

Installed as a roof underlay over timber or steel roof framing on unlined and uninsulated roofs in accordance with the manufacturer's requirements, BRANZ Appraisal No.1000 (2018), and as shown on the drawings.

Thermabar 397 Foil roof underlay can be used under roof claddings, or directly under roof cavity battens in accordance with Thermakraft requirements.

When used on its own as a reflective insulating vapour control layer, separate Thermabar 397 Foil from the roof cladding as detailed.

Thermabar 397 Foil roof underlay must be installed in a manner that prevents ponding of water, and supported on safety mesh or netting as specified - refer to Thermakraft's requirements when used in conjunction with netting and bulk insulation.

Do not leave Thermabar 397 Foil exposed on roofs for more than a total of 30 days before covering.

Installed Location:

2.5.6 Underlay Support

Roof Underlay Support - [Ausmesh Safety Netting](#). A 150mm x 300mm x 2mm diameter galvanised wire safety mesh complying with AS/NZS 4389.

Used as a support for roof underlays and non-rigid insulation, and installed in accordance with the manufacturer's requirements, AS/NZS 4389, and as shown on the drawings. Suitably jointed and tensioned when installed to avoid any sagging and to keep the roof underlay in a flat plane.

Do not walk or stand on installed Ausmesh Safety Mesh or use it as a working platform.

Installed Location:

2.5.7 Window Flashing Tape

2.5.7.1 Aluband Window Flashing Tape

[Aluband Window Flashing Tape](#). A polymeric faced, bituminous modified, self-adhesive tape with a release backing paper. Designed to be used in conjunction with Thermakraft Corner Moulded Piece and Thermakraft underlays as part of the Thermakraft Window Sealing Warranty System.

Aluband Window Flashing Tape is suitable for use on timber or steel framed buildings, in conjunction with a compatible flexible underlay, around framed joinery openings as a secondary weather barrier, in NZS 3604 Wind Zones up to and including 'Extra High'.

Aluband Window Flashing Tape can be used on the sill and lintel of framed joinery openings, and to seal flashing upstands to a flexible underlay.

Physical Properties:

- Thickness: 0.65mm.
- Installation temperature range: minimum 5°C; maximum 30°C.
- Maximum UV exposure: 42 days.
- Tape width: Available in 75mm, 150mm, and 200mm wide rolls.

The width of Aluband Window Flashing Tapes used shall be selected to suit the depth of framed openings and Thermakraft installation requirements.

Installed in accordance with the requirements of the [Thermakraft Aluband Application & Installation Guide](#) and [BRANZ Appraisal No.878 \(2014\)](#), to the locations and details shown on the drawings.

Aluband Window Flashing Tape should not be applied directly or indirectly (over flexible underlay) to timber that has been freshly LOSP treated. Always allow LOSP solvent to fully flash off before covering with underlay and applying Aluband Window Flashing Tape.

Do not leave Aluband Window Flashing Tape exposed to weather and UV light for more than 42 days after installation.

Flashing Tape Size:

Installed Location:

2.5.8 Underlay Penetration Seals

2.5.8.1 Multi-Fit Penetration Seals

[Thermakraft Multi-Fit Penetration Seals](#). A range of pipe and service penetration seals consisting of soft, flexible EPDM membrane with a self-adhesive flange.

Multi-Fit Penetration Seals are part of the Thermakraft membrane system, and are a patented airtight solution for round or rectangular pipes, cables or conduits when passing through underlay barriers.

Pipe seals accommodate pipe diameters from 15mm up to 110mm. Cable seals accommodate cable diameters from 7mm up to 22mm, and 80mm trunking.

Installed in accordance with the manufacturer's requirements and [BRANZ Appraisal No.942 \(2017\)](#), with stand-alone flexible wall underlay over timber or steel wall framed walls on buildings situated in NZS 3604 Wind Zones up to and including 'Very High'.

Installed in accordance with the manufacturer's requirements and [BRANZ Appraisal No.942 \(2017\)](#), with flexible wall underlay used over a rigid wall underlay on buildings situated in NZS 3604 Wind Zones up to and including 'Extra High'.

2.5.9 Co-operation

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

Coordinate with other trades to install Thermakraft Underlays, DPMs, and DPCs as required.

2.5.10 Workmanship

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

All installation work shall be carried out by experienced and competent tradespersons, familiar with the specified products and installation techniques, in accordance with the manufacturer's requirements, and to fully comply with all warranty requirements.

All cutting, joining, and fixing techniques shall be exactly as recommended by the manufacturer, and carried out with the use of suitable tools and equipment appropriate for the application. All work shall be such as to leave a neat, efficient, and weathertight installation.

2.5.11 Delivery & Handling

Store underlay rolls on end, undercover, on a flat, clean and dry surface. Keep stored materials dry, out of direct sunlight, and protected from damage and contamination at all times.

Handle materials in accordance with the manufacturer's requirements and in a manner that prevents damage to or deterioration of the product.

Do not use damaged or defective materials, or products that are beyond their designated shelf life.

Installers shall be familiar with and comply with the manufacturer's safe handling requirements and precautions for use, and shall use appropriate safety gear when handling materials.

Installers shall conform with all relevant [WorkSafe NZ](#) Guidelines and Codes of Practice - including the [OSH Guidelines For the Provision of Facilities and General Safety in the Construction Industry](#), as well as the [Best practice guidelines for working on roofs](#) for roofing installations.

2.5.12 Preparation

2.5.12.1 General

Prior to installation, carry out all necessary inspections and preparatory work required, and ensure that all preliminary works by other trades has been completed to specification and as shown on the approved drawings.

Do not commence installation until all necessary preliminary works by others is complete and to the required standard. The commencement of work shall be deemed to indicate full acceptance by the installer that all preliminary works by other trades is complete.

Supporting timber framing shall comply with NZS 3604, or with NZS 3603 and AS/NZS 1170 for specific design, and have a maximum moisture content of 20% at the time of cladding installation. Allow LOSP treated timber to sufficiently flash-off before installing Thermakraft building underlays and foils.

Supporting light structural steel framing shall comply with the requirements of AS/NZS 4600 or the NASH Standard for Residential and Low-rise Steel Framing, Part 1: Design Criteria. Comply with the light structural steel framing fabricator's specifications and requirements for fixing cladding and roofing components.

Supporting heavy steel structures shall comply with NZS 3404.

2.5.13 Installation - Wall Underlay

2.5.13.1 Aluband Window Flashing Tape

Install Aluband Window Flashing Tape in accordance with the manufacturer's requirements, to the locations and details shown on the approved drawings.

Window Sills:

- Fit Thermakraft Corner Moulded Piece to the bottom corners of the opening.
- Cut Aluband Window Flashing Tape to the length of the sill trimmer plus an additional 400mm.
- Apply the tape over the underlay along the sill trimmer, with the back edge flush with the inside edge of the framing, and returned minimum 200mm up both trimming studs.
- Fold the tape minimum 50mm over the face of the underlay on the outside of the opening.
- Press the tape firmly in place over the underlay to ensure a continuous weathertight seal is maintained.

Window & Door Lintels:

- Install Aluband Window Flashing Tape to the top corners of framed window and door openings, over the underlay and 200mm along the lintel and 200mm down the trimming stud, with the back edge flush with the inside edge of the framing.
- Fold the tape minimum 50mm over the face of the underlay on the outside of the opening.
- Press firmly in place over the underlay to ensure a weathertight seal.
- Apply a 100mm strip of Aluband Window Flashing Tape at 45° over the taped outside face of each corner.

Avoid joining Aluband Window Flashing Tape. Where necessary, form joins with minimum 100mm overlap, keep any required joining to an absolute minimum.

Do not over-stretch tape during installation, and ensure adequate adhesion and weathertightness is maintained against the underlay.

Do not leave Aluband Window Flashing Tape exposed to weather and UV light for more than 42 days after installation - replace with new window flashing tape if 42 day's exposure is exceeded.

2.5.14 Installation - Roof Underlay

2.5.14.1 Thermabar 397 Light Diffuser Foil Insulation

Thermabar 397 Light Diffuser Foil Insulation shall be installed, white face down, over the specified support netting/strapping, run horizontally or vertically over the purlins, starting from the gutter/lowest point up to the ridge/highest point, extending maximum 20mm into gutters, with minimum 150mm side and end laps, lapped such that any water will be shed to the outside of the underlay, and sufficiently tensioned without sagging.

Fix at maximum 300mm centres to purlins for direct fix roof cladding, or firmly secure as show on the drawings if overlaid with battens.

Finish Thermabar 397 along roof edges and junctions, valley gutters, and at the ridge as shown on the drawings. Carefully cut underlay at roof openings at 45° angle away from each corner and lap-tape

closed to framed up-stands in accordance with Thermakraft requirements and as detailed. Leave underlay minimum 50mm distance clear of the outer liner of flue stacks.

When installed as a vapour barrier, seal all laps and edges, and all pipes and ducts etc. penetrating the vapour barrier, with Thermakraft Pure Foil Tape 403F in accordance with Thermakraft requirements.

Take all necessary care to ensure no contact with electrical cords, cables or fittings - 100mm minimum clearance is recommended - is made during installation of foil insulation.

2.5.15 Completion

Check that all underlays have been installed correctly and are properly supported, and that all underlay edges, joins and ends are correctly finished prior to closing off with claddings - all in accordance with Thermakraft installation requirements.

Check installed membranes and underlays for defective work and damage - replace and/or repair as necessary to the required standard.

Leave all of this work complete, and free of defects, and to the required standard in accordance with the manufacturer's warranty requirements.

Issue to the Owner a copy of the Thermakraft maintenance requirements and the Thermakraft product warranties for the installed products.

3 CARPENTRY

3.1 Preliminary

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

3.2 Compliance

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

Comply with all relevant provisions and recommendations of:

1170.2:2011(AS/NZS)	Structural design actions - Wind actions
1734:1997(AS/NZS)	Aluminium and aluminium alloys - Flat sheets, coiled sheet and plate
2269.0:2012(AS/NZS)	Plywood - Structural - Part 0: Specifications
2908.2:2000(AS/NZS)	Cellulose-cement products - Flat sheets
3601:1973(NZS)	Metric dimensions for timber
3602:2003(NZS)	Timber and wood-based products for use in building
3603:1993(NZS)	Timber Structures Standard
3604:2011(NZS)	Timber-framed buildings
3622:2004(NZS)	Verification of timber properties
3631:1988(NZS)	New Zealand timber grading rules
3640:2003(NZS)	Chemical preservation of round and sawn timber
AS/NZS 1080.1:2012	Timber - Methods of test - Method 1: Moisture content
NZBC E2	External moisture

3.3 General

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

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

3.4 Timber Framing

3.4.1 Scope

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

3.4.2 Workmanship

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

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

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

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

3.4.3 Timber Framing

3.4.3.1 Timber Grade and Quality

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

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

Do not use damaged, faulty or defective materials.

3.4.3.2 Timber Treatment

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

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

3.4.3.3 Storage & Handling

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

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

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

3.4.3.4 Framing Installation

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

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

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

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

3.4.3.5 Concrete Separation

Separate timber framing with an approved continuous damp proof course when in direct contact with concrete or masonry. Ensure that the DPC material is compatible with the timber treatment. Free draining separations to external vertical faces shall be 12mm minimum and as noted on the drawings.

3.4.3.6 Timber Re-treatment

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

3.4.3.7 Edge Notching and Centre Holes

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

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

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

3.4.3.8 Framing Protection

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

3.4.3.9 Built-up Framing Members

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

3.4.4 Steel Fixings

3.4.4.1 Fastenings and Connectors

Unless otherwise noted or specified, timber framing fastenings and connectors shall be as specified in the relevant fixing schedules of NZS 3604 or have an equivalent capacity as specified therein. Timber framing connectors and fixings shall comply with the product information as required in NZS 3604

2.4.6, and shall be used and installed in accordance with the manufacturer's recommendations. Pre-drill nail holes in split-prone framing as necessary.

3.4.4.2 Durability of Fixings & Fastenings

Unless otherwise noted or specified, the minimum durability of timber framing fixings and fastenings, excluding nails and screws, shall comply with the durability requirements of NZS 3604 Table 4.1.

Galvanised steel fixing components, excluding nails and screws, shall have galvanised coating masses in accordance with NZS 3604 Table 4.2.

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

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

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

3.4.4.3 Bolts and Coachscrews

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

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

3.4.5 Sub Floor Framing

Unless specified or shown otherwise, jack studs supporting sub-floor bearers for 2kPa floors shall be to the dimensions and spacings given in NZS 3604 Table 6.3, and be located over a supporting pile, and have the greater sectional dimension parallel with the bearer supported by the jack stud. Fix jack studs to ordinary piles in accordance with NZS 3604 6.5.2.

Jack stud size and spacing:

3.4.6 Wall Framing

3.4.6.1 Plates

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

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

3.4.6.2 Studs

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

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

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

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

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

3.4.6.3 Lintels

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

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

3.4.6.4 Sill & Head Trimmers

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

3.4.6.5 Dwangs

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

3.4.6.6 Ribbon Boards

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

3.4.7 Roof Framing

3.4.7.1 Ceiling Joists

Unless specified or shown otherwise, ceiling joists shall be to the dimensions and spacings given in NZS 3604 Table 10.3.

Ceiling joists shall be installed parallel true to line and plane, and shall be joined directly over framing supports and lapped minimum 300mm, or butted and flitched, in accordance with NZS 3604 10.2.1.6.5.

Do not support ceiling joists from a strutting beam.

3.4.7.2 Purlins

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

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

Provide all necessary blocking and lateral support to purlins laid on edge in accordance with NZS 3604

10.2.1.16.6, and as detailed.

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

3.4.7.3 Roof Trusses

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

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

3.4.7.4 Roof Bracing

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

3.4.8 Ceiling Framing

Unless specified or shown otherwise, timber ceiling battens shall be to the dimensions and spacings shown on the drawings and in accordance with NZS 3604: Table 13.1, and shall be installed true to line, level and plane, and fixed to the underside of floor joists, rafters, ceiling joists or truss chords in accordance with NZS 3604: Table 13.3.

Ceiling battens shall be of Merchantable grade or better timber complying with NZS 3631.

3.5 Shadowclad

3.5.1 Scope

12mm 'Shadowclad Ultra Groove' H3.1 LOSP treated plywood cladding to the wall surfaces shown on the drawings. All aspects of the work shall be in full accordance with the Shadowclad Specification and Installation Guide (Ph 0800 326 759 to confirm date of the most recent edition).

3.5.2 Preparation

3.5.2.1 Timber Frame, Building Wrap, Vented Cavity

Coordinate with all other trades to achieve correct conditions for the cladding installation.

Check that the timber wall framing complies with NZS 3604, or specific design, has studs at maximum 600mm centres and dwangs at maximum 800mm centres, is plumb and in true alignment, includes all blocking required for cavity battens fixing at openings, joints, corners and soffits etc., and has a maximum moisture content of 20% at the time of Shadowclad installation.

Check that the building wrap as specified has been installed in accordance with NZBC requirements and the manufacturers recommendations, and with all finishing tapes, flashings etc. at windows, doors, corners and penetrations all correctly incorporated to provide a continuous seal.

Where the studs are at greater than 450mm centres, check that appropriate additional restraint is correctly installed to the wrap, to keep bulk insulation from pushing the wrap into the cavity.

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

3.5.2.2 Timber Frame, Rigid Barrier, Vented Cavity

Coordinate with all other trades to achieve correct conditions for the cladding installation.

Check that the timber wall framing complies with NZS 3604, or specific design, has studs at maximum 600mm centres and dwangs at maximum 800mm centres, is plumb and in true alignment, includes all blocking required for cavity battens fixing at openings, joints, corners and soffits etc., and has a maximum moisture content of 20% at the time of Shadowclad installation.

Check that the rigid air barrier as specified has been installed in accordance with NZBC requirements and the manufacturers recommendations, with all finishing tapes, flashings etc. at windows, doors, corners and penetrations all correctly incorporated to provide a continuous seal.

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

3.5.3 Vertical Sheet Joins

Shiplap spaced 9mm.

Shiplap spaced 2mm with H3.1 LOSP treated 65 x 18mm battens with twice 6 x 6mm weather grooves in rear.

3.5.4 Panel Finish Coating

Paint or film-forming stain, minimum film build 90 microns.

Location:

3.5.5 Aluminium Flashing Finish

Mill Finish (for powder coating by others pre installation).

3.5.6 Internal Corner Backflashings

90° Angle.

Internal W Angle.

3.5.7 External Corner Backflashings

Shadowclad 90° Angle (back flashing internal corners). A 65 x 65mm aluminium back flashing, used on Shadowclad external corners (cavity) with timber cover boards with 6x6mm weather grooves.

3.5.8 Horizontal Z Flashing

Include horizontal 'Z' flashing for horizontal joints between panels.

3.5.9 Workmanship

All Shadowclad installation work shall be carried out by skilled tradesmen experienced in cladding work and in full compliance with NZBC E2/AS1. Upon delivery, store plywood on four evenly spaced level bearers, and protect the plywood and flashings from rain dirt etc. Handle the plywood carefully, and reject any sheets with damaged edges or faces.

3.5.10 Installation

3.5.10.1 Durability Zone B or C (Cavity, Timber Frame)

Install the ventilated cavity base strip, the cavity battens, and the Shadowclad flashings in accordance with all NZBC E2/AS1 and Shadowclad requirements. Ensure additional cavity battens are provided for cladding junctions, openings edges, corners etc. as detailed or required. Cavity battens fixed sufficiently to hold in place until the cladding is installed. Ensure special nailing pattern is followed for cavity battens where Shadowclad is used as a bracing element.

Sheet setout as drawn for expressed or battened joints, otherwise neatly set out from corners, incorporating expansion gaps at vertical joins as noted. All sheet edges fully supported. Seal all cut edges of Shadowclad with Metalex Clear, and seal 150mm up the back face in potentially damp situations.

Fix at 150mm centres to all sheet edges, 7mm in from the sheet edge (except at top or bottom laps), and 300mm centres to all intermediate supports. Minimum timber framing fixings for cavity fix are 60 x 2.8 nails or 8g x 65mm screws, use hot dip galvanised (or better) fixings.

Note: special fixing requirements are required when the Shadowclad forms part of the bracing element, and allow additional length to suit when fixing over a rigid air barrier.

3.5.11 Completion

Ensure base clearances to E2/AS1 are provided. Ensure that those selecting the finish coating are aware that it must have a Light Reflectance Value of 40% or more for 50 year durability of bracing panels. Ensure the appropriate persons are aware of the Shadowclad maintenance requirements noted in the Shadowclad specification literature.

3.6 James Hardie HardieFlex Sheet

3.6.1 Scope

Supply and install James Hardie 7.5mm thick HardieFlex Sheets as a fibre-cement sheet cladding material to the walls identified on the drawings, complete with all accessories. The sheets are to be finished with a paint system.

All aspects of this work shall be in complete accordance with the [James Hardie HardieFlex Sheet Technical Specification](#) (check www.jameshardie.co.nz, or call 0800 808 868 for the latest edition) and other relevant product manufacturers' recommendations.

3.6.2 Elements

To the areas noted as 'Fire-rated' on the drawings, additionally comply with all relevant aspects of the James Hardie Fire and Acoustic Design Manual (check on 0800 808 868 for the latest edition) and other relevant product manufacturers' recommendations.

3.6.3 Co-operation

Co-ordinate with other trades to ensure that appropriate clearances are allowed from roofing products and associated flashings etc, that the panels correctly allow for door and window installation, and that services penetrations are correctly handled to maintain full weathertightness and panel integrity.

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

3.6.4 Preparation

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

Check that the building underlay or rigid air barrier has been installed in full accordance with the manufacturer's requirements and the drawings, and completely finished to all penetrations including doors, windows, services, etc. Check junctions to all other building elements and ensure that all necessary works have been completed eg. flashings etc that will enable the panels and all accessories to be installed.

Check that the ground levels are sloping away from the building so that there will be no ponding water against the building, and that the ground will remain clear of the panels by at least 100mm at all times in accordance with E2/AS1.

3.6.5 Sealant

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

3.6.6 Workmanship

All installation work shall be carried out by an LBP, or supervised by an LBP, in accordance with James Hardie HardieFlex Sheet Technical Specification and other relevant product manufacturers' recommendations.

3.6.7 Delivery & Handling

Carry all sheets on edge. Stack sheets flat on a level platform off the ground ie. use the supplied delivery pallet on level ground (if no pallet then evenly spaced bearers on level ground at 600mm crs maximum). Keep sheets and accessories dry at all times. Avoid damage to sheet edges, ends, and surfaces. Keep uPVC flashings etc. out of direct sunlight, and store all accessories on flat and avoid

damage to any. All installers to be familiar with and comply with the James Hardie Safe Working Practices in the Technical Specification, to use appropriate safety gear, and in particular to be aware to avoid breathing silica dust. Do not use any damaged or blemished sheets or accessories.

3.6.8 Installation

Fix uPVC vent strip through the building underlay or rigid air barrier. Ensure that the openings in the vent strip are kept clear and unobstructed at all times. Fix H3.1 timber cavity battens through the building underlay or rigid air barrier to the framing. Install the sheets through the timber cavity battens and building underlay or rigid air barrier to the framing in accordance with the Technical Specification, complete with all accessories eg. mouldings, sealant, underflashings, etc. Sheet joints are to be formed on framing. Install James Hardie mould accessories to complete the installation.

Horizontal control joints to be formed on cavity batten framing with a uPVC 'h' mould control joint flashing. Ensure that the battens are not fixed to the floor joists.

Horizontal drainage joints to be formed at floor joist with folded Z-flashing as per E2/AS1 requirements. Ensure the panels are not fixed to the floor joists.

Ensure that all cut edges of panels are primed prior to installation with Dulux 1 Step Prep, Resene Quick Dry, or similar. Ensure that the bottom edge of the sheet overhangs below the bottom plate by 50mm, and is clear of the ground surface by at least 100mm; the finished ground clearance shall be in accordance with E2/AS1. Install flexible flashing tape to all junctions and penetrations (including cables etc), with the addition of a pipe bandage for pipes to maintain weathertightness and air pressure resistance, and seal around.

Horizontal drainage joints to be formed at floor joist level with aluminium 'h' mould. Ensure that the sheets are not fixed to the floor joists.

Where the sheets are performing as fire-rated elements, fix sheets and all accessories in complete accordance with the James Hardie Fire and Acoustic Design Manual and other relevant product manufacturers' recommendations.

Install H3.1 finger-jointed pine timber trim, scribes, eaves moulds, etc. to complete the sheet junctions as shown on the drawings.

3.6.9 Vertical Sheet Joins

Vertical joints to be formed with uPVC jointers.

3.6.10 Fixings

Fix timber cavity battens and other accessories with galvanised nails in accordance with James Hardie requirements.

Fix sheets with galvanised nails in accordance with James Hardie requirements.

3.6.11 Timber Cover Battens

Fix timber cover battens and other timber trim accessories with jolt-head Grade 316 stainless steel nails in accordance with JH requirements, punched below the surface and flushed with exterior grade builder's fill.

3.6.12 Completion

Ensure that the sheets have been fixed correctly, that all vertical joints and accessories have been completed correctly, and that all penetrations have been taped correctly.

Check that no damage has occurred to any installed sheet element or associated component, replace as necessary.

Check that no dirt has been mounded up within 175mm of the sheets, and maintain the clearance.

Ensure that the sheets are painted within 90 days of the sheet installation, complete with all accessories and flashings.

Hand over a copy of the latest edition of the James Hardie HardieFlex Sheet Product Warranty to the client. Hand over a copy of the latest James Hardie HardieFlex Sheet Maintenance Schedule to the client.

3.7 James Hardie Pre-Cladding

3.7.1 Scope

Supply and install RAB Board 6mm fibre-cement sheet as a rigid air barrier to the walls identified on the drawings, complete with all accessories. RAB Board 6mm is suitable for use in bracing application in residential applications. All aspects of this work shall be in complete accordance with the [James Hardie Rigid Air Barriers Installation Manual](#) (check www.jameshardie.co.nz, or call 0800 808 868 for the latest edition), [BRANZ Appraisal No.611 \(2011\)](#), and other relevant product manufacturers' recommendations. Use the James Hardie RAB Board Installation Checklist at all relevant stages of the work.

3.7.2 Elements

To the areas noted as 'Fire-rated' on the drawings, additionally comply with all relevant aspects of the James Hardie Fire and Acoustic Design Manual (check on 0800 808 868 for the latest edition) and other relevant product manufacturers' recommendations.

To the areas noted as 'Bracing' on the drawings, additionally comply with all relevant aspects of the James Hardie Bracing Design Manual (check on 0800 808 868 for the latest edition) and other relevant product manufacturers' recommendations.

3.7.3 Co-operation

Co-ordinate with other trades to ensure that appropriate clearances are allowed from roofing products and associated flashings etc, that the panels correctly allow for door and window

installation, and that services penetrations are correctly handled to maintain full weathertightness and panel integrity.

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

3.7.4 Preparation

Check that the timber framing elements are in accordance with NZS 3604, or in accordance with NZS 3603 and AS/NZS 1170 for specific design, and in accordance with James Hardie requirements.

Framing shall be plumb and in true alignment, complete and suitable for the panels, and maximum moisture content as per NZS 3602. Ensure that the framing is true in line with no projections due to structural and bracing bracketry etc. Ensure that the bottom plate hold-downs are correctly installed.

Check that the ground levels are sloping away from the building in accordance with E1/AS1, with no ponding water against the building, and that the ground will remain clear of the sheet by at least 100mm at all times.

3.7.5 Workmanship

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

3.7.6 Delivery & Handling

Carry all sheets on edge. Stack sheets flat on a level platform off the ground eg., use the supplied delivery pallet on level ground, or minimum 4 evenly spaced bearers on level ground. Keep sheets and accessories dry at all times. Avoid damage to sheet edges, ends, and surfaces. Keep uPVC flashings and jointers out of direct sunlight, and store all accessories on flat and avoid damage to any. All installers to be familiar with and comply with the James Hardie Safe Working Practices in the Installation Manual, to use appropriate safety gear, and in particular to be aware to avoid breathing silica dust. Do not use any damaged or blemished sheets or accessories.

3.7.7 Installation

Fix sheets vertically directly to framing in accordance with the Installation Manual.

Vertical joints on framing to be sealed with a joint sealing tape, for both non-bracing and bracing applications.

Ensure that all cut edges of sheets where exposed are primed prior to installation with Dulux 1 Step Prep, Resene Quick Dry, or similar. Ensure that the bottom edge of the sheet overhangs below the bottom plate by 15mm, and is clear of the ground surface by at least 100mm; the finished ground clearance shall be in accordance with E2/AS1. Install flexible flashing tape to all junctions and penetrations (including cables etc), with the addition of a pipe bandage for pipes to maintain weathertightness and air pressure resistance. Do not use sealant.

Where the sheets are performing as bracing elements, fix sheets and all accessories in complete accordance with James Hardie Bracing Design Manual and other relevant product manufacturers' recommendations.

Where the sheets are performing as fire-rated elements, fix sheets and all accessories in complete accordance with James Hardie Fire and Acoustic Design Manual and other relevant product manufacturers' recommendations.

3.7.8 Horizontal Joints

Horizontal joints to be formed at floor joist level with a uPVC flashing. Ensure that the sheets are not fixed to the floor joists.

3.7.9 Fixings

Fix sheets with galvanised nails in accordance with James Hardie requirements.

3.7.10 Completion

Ensure that the sheets have been fixed correctly, that all vertical joints and horizontal joints have been completed correctly, and that all penetrations have been taped correctly. Check that no damage has occurred to any installed sheet element or associated component, replace as necessary. Check that no dirt has been mounded up within 100mm of the sheet, and maintain the clearance. Ensure that the cladding is installed within 90 days of the sheet installation. Hand over a copy of the latest edition of the James Hardie Rigid Air Barriers Product Warranty to the client.

4 ROOFING

4.1 Preliminary

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

4.2 Compliance

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

Comply with all relevant provisions and recommendations of:

1170.2:2011(AS/NZS)	Structural design actions - Wind actions
1397:1993(AS/NZS)	Steel sheet and strip - hot-dipped, zinc-coated or aluminium/zinc-coated
1562.1:1992(AS)	Design and installation of sheet roof and wall cladding. Part 1: Metal
1562.2:1999(AS/NZS)	Design and installation of sheet roof and wall cladding - Corrugated fibre-reinforced cement
2295:2006(NZS)	Pliable, permeable building underlays
2728:2013(AS/NZS)	Prefinished/prepainted sheet metal products for interior/exterior building applications - Performance requirements
2904:1995(AS/NZS)	Damp-proof courses and flashings
3500.3:2015(AS/NZS)	Plumbing and drainage - Part 3: Stormwater drainage
3604:2011(NZS)	Timber-framed buildings
4200.1:1994(AS/NZS)	Pliable building membranes and underlays - Materials
4200.1:2017(AS NZS)	Pliable building membranes and underlays - Part 1: Materials
4389:2015(AS/NZS)	Roof safety mesh
4534:2006(AS/NZS)	Zinc and zinc/aluminium-alloy coatings on steel wire
NZBC B2	Durability
NZBC E1	Surface Water
NZBC E2	External moisture
NZBC E2/AS1	External Moisture
NZMRM Code of Practice	NZ Metal Roof and Wall Cladding Code of Practice - Version 3.0
NZMRM Code of Practice	NZ Metal Roof and Wall Cladding Code of Practice - Version 2.2
NZS 3441	Zinc coated steel coil

4.3 Metalcraft Roofing - Longrun Roofing

4.3.1 Scope

Supply and install the selected Metalcraft Roofing as a Roof Cladding to the roofs identified on the drawings complete with all accessories. All aspects of this work shall be in complete accordance with

Metalcraft Roofing guides and technical manuals, (check 0800 766 369 for the latest editions), and other relevant product manufacturers' recommendations, and as shown on the drawings.

No substitutions are permitted for Metalcraft Roofing Roof Cladding.

4.3.2 Co-operation

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

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

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

4.3.3 Material

Steel, 0.55mm BMT.

4.3.4 Product

Colorsteel Endura.

4.3.5 Profile

Metalcraft Roofing profile 'Corrugate'.

Location:

4.3.6 Colour

Colour to be selected by owner

4.3.7 Components & Accessories

Roof Flashings. Roof flashings shall be fabricated from the same material and coating as the roofing material, to maintain durability and compatibility requirements.

Unless otherwise noted or specified, flashings shall be formable grade 0.55 BMT, to the same standards as the profiled sheets, and notched or provided with a soft edge when installed across the cladding profile - in accordance with the manufacturer's requirements.

Flashings, flashing fastenings and fastening frequency shall be in accordance with the manufacturer's technical literature and the NZMRM Code of Practice.

Do not construct flashing joints and flashing junctions in a manner that rely entirely on sealant to maintain weathertightness.

4.3.8 Installation

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

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

Set-out the roofing sheets exactly square to building axis and maintain this accurate setout throughout the works, and set-out to lap sheets away from the prevailing wind.

Install the underlay running up and down the slope with minimum 300mm side laps. Do NOT install any fixings to the underlay (to avoid dissimilar metals/electrolysis) - install the underlay length by length as the roofing proceeds and ensure it is taut and evenly lapped when the roofing screws are installed.

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

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

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

Screw fix, screws to comply with AS3566 (Self-drilling construction screws) Class 4 and in accordance with Metalcraft Roofing recommendations. (Do NOT use stainless steel screws to fix prepainted cladding). Use only low carbon (<15%) non-conductive sealing washers. Screw at centres as required by Metalcraft Roofing Products, to fully comply with the Wind Zone requirements, purlins spacings etc. Screws for Colorsteel should be factory prepainted for an accurate colour match.

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

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

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

4.3.9 Completion

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

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

4.4 Metalcraft Roofing - Rainwater & Fascia Systems

4.4.1 Scope

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

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

4.4.2 Co-operation

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

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

4.4.3 Material

Steel - 0.55mm BMT.

4.4.4 Product

Colorsteel Endura.

4.4.5 Spouting Profile

Box Gutter 175mm.

4.4.6 Downpipe Profile

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

Rectangular Downpipe, 75mm x 55mm.

4.4.7 Preparation

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

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

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

4.4.8 Installation

4.4.8.1 Workmanship

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

Handle spouting and fascia without scratching, distorting or damaging.

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

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

4.4.8.2 Spouting

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

4.4.8.3 Downpipes

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

4.4.8.4 Completion

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

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

4.5 Workmanship

4.5.1 Guarantees

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

- Butyl roofer - ten years from completion.
- Galvanised steel roofer - two years after completion.

- Aluminium roofer - ten years after completion.
- Acrylic/f.glass roofer - ten years after completion.

4.5.2 Co-operation

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

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

4.5.3 Alternatives

Tenderers are invited to submit a price variation for similar roofing products. Consideration of finished roofs in the alternative product and the extent that drawings will need to be modified to incorporate it will be the main items in the decision on the alternative proposed.

4.6 Roofing Systems - Profiled Steel

4.6.1 Scope

Supply standard corrugated profile 0.55BMTxG300 galvanized steel roofing and install it to the areas shown on the Roof Plan. All handling and fixing techniques, and all jointing and sealing materials and techniques, shall be exactly as recommended by the roofing manufacturer.

4.6.2 Preparation

Co-operate to ensure that roof framing has appropriate spacings and fixings, is in accordance with NZS 3604, and coordinate to ensure that all timber members required for ridges, hips, valleys, barges, penetrations, junctions with vertical faces, etc. are correctly in place. Lap sheets away from the prevailing wind. Set-out the roofing sheets exactly square to the building axis and maintain this throughout the works.

4.6.3 Fixings

4.6.3.1 Fixings - Corrugated Steel Roofing

Screw fix with screws that comply with AS 3566 (Self-drilling construction screws) Class 3 or 4. Use only low carbon (15% or less content) non-conductive sealing washers. Screw at centres as advised by the local Rollformer, to fully comply with the Wind Zone requirements, purlins spacings etc. Use fixing systems that will accommodate thermal expansion for long lengths. NO use of abrasive disc cutters.

4.6.4 Flashing

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

4.6.5 Completion

Protect the galvanizing from damage at all times; replace the whole sheet where a significant depth of the coating has been damaged. Completely clean off all drill and power saw swarf and pop-rivet shanks as the work proceeds (at least daily, and keep them and other rubbish out of the spoutings).

4.7 Underlay, Foil & DPC

4.7.1 Scope

Supply and install Underlays, Foil and DPC materials, as specified herein, to the locations identified on the drawings, complete with all accessories required for proper installation and performance. All aspects of this work shall be in accordance with the product manufacturer's technical literature and installation requirements, other relevant product manufacturers' recommendations, and as shown on the design drawings.

This specification should be read in conjunction with other relevant specification sections as they are interrelated.

4.7.2 Requirements

4.7.2.1 Safety

Comply with the Health and Safety at Work Act 2015 (HSWA), and with all relevant Health and Safety at Work Regulations 2016, and with all relevant WorkSafe New Zealand (WorkSafe) Approved Codes of Practice and WorkSafe Information and Guidance, particularly those for construction and building maintenance.

4.7.2.2 Inspections

Inspections shall take place at each of the stages as scheduled in the Building Consent. Confirm a written programme to facilitate these inspections, including notification when each stage of the work is ready for inspection.

If this contract is for exemption the Registrard Roofing instaler will provide a PS3 at completion of works and it will be lodged with the property file. The Owner is responsible for sorting this.

4.7.2.3 Co-operation

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

Coordinate with other trades as required to install underlays, foils and DPC.

4.7.2.4 Workmanship

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

All installation work shall be carried out by experienced and competent tradespersons, familiar with the specified products and installation techniques, in accordance with the manufacturer's requirements, and to fully comply with all warranty requirements.

All cutting, joining, fixing and sealing techniques shall be exactly as recommended by the manufacturer, and carried out with the use of suitable tools and equipment appropriate for the application. All work shall be such as to leave a neat, efficient, and weathertight installation.

4.7.2.5 Delivery & Handling

Inspect materials for damage and defects upon delivery; reject any damaged or defective products, and immediately contact the supplier for replacement. Do not use damaged or defective products, or products that are beyond their designated shelf life.

Store underlay rolls on end, under cover in a clean, dry environment, in accordance with the manufacturer's recommendations. Keep stored products dry, out of direct sunlight, and protected from damage, moisture and contamination at all times.

Handle products in accordance with the manufacturer's requirements, and in a manner that prevents damage to the product and does not reduce its performance.

Installers shall be familiar with and comply with the manufacturer's safe handling requirements and precautions for use, and shall use appropriate safety gear when handling materials.

Installers shall conform with all relevant [WorkSafe NZ](#) Guidelines and Codes of Practice - including the [OSH Guidelines For the Provision of Facilities and General Safety in the Construction Industry](#), and the [Best practice guidelines for working on roofs](#) for roofing installations.

4.7.2.6 Completion

Check underlay, flashing tape, etc., have been installed correctly, and that all edges, joins and ends are correctly finished prior to closing off with wall/roof cladding.

Check for damage and defective work - replace and/or repair as necessary to the required standard in accordance with the manufacturer's requirements.

Leave all of this work complete, free of damage and defects, and to the standard required for the installation of subsequent cladding and/or roofing, and in accordance with all warranty requirements.

Remove all associated rubbish and excess material from the site.

5 ALUMINIUM JOINERY

5.1 Preliminary

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

5.2 Compliance

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

Comply with all relevant provisions and recommendations of:

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

5.3 Aluminium Windows & Doors

5.3.1 Alternatives

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

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

5.3.2 Installation Type

5.3.2.1 Timber Frame Installation - Cavity Construction

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

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

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

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

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

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

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

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

5.3.3 Interior Finish

Architraved.

5.3.4 Reveal

Timber reveals for paint finish with all sides primed. Min treatment H3.1 or hardwood

5.3.5 Glass Platform

Single Glazed.

5.3.6 Finish

5.3.6.1 Powder Coated Aluminium - Semi Gloss

Polyester powder coating in accordance with WANZ Powder Coating Quality Assurance System and AAMA 2603-98 performance is required.

5.3.7 Hardware

Hardware colour matched to Aluminium Joinery.

Hinges, stays, catches, fasteners, latches, locks and furniture as offered by the window and door manufacturer. Key alike all lockable window hardware able to be keyed alike.

Account for all keys and deliver separately to the site manager. Factory fit all required and scheduled hardware.

5.3.8 Workmanship

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

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

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

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

Glass will be cut true and square, sized to provide correct edge clearances, blocked into place as required, and all units will be delivered either pressure fit, pocket glaze, or beaded/wedged, unless site glazing is required. Glazing gaskets will be compatible with all adjacent materials, and cut 1% over-length to absolutely avoid stretching during installation. Frames will be braced etc. as necessary for transportation to the site.

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

5.3.9 Delivery and Installation

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

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

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

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

Thoroughly check all preparatory work to openings prior to installation, including underlay, corner seal tapes, adjacent cladding, pre-installed flashings, waterproofing systems etc. as appropriate. Use

inert barriers or coatings to prevent contact between dissimilar metals or between aluminium and concrete.

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

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

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

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

6 PAINTING & DECORATING

6.1 Preliminary

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

6.2 Compliance

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

Comply with all relevant provisions and recommendations of:

2310:2002(AS/NZS)	Glossary of paint and painting terms
2311:2017(AS/NZS)	Guide to the painting of buildings
3750.0:2008(AS/NZS)	Paints for steel structures - Introduction and list of Standards
BRANZ IB 257	Wood primers

6.3 General

6.3.1 Alternatives

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

6.3.2 Preparation

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

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

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

Clean down all surfaces with sugar soap, strippers, mould killers, etching agents, etc. as required. Sand or rub all sharp edges off exterior timbers and other materials as appropriate before painting. Finish rub down ALL surfaces. Ensure that the moisture content of all substrates is appropriate. Remove locks, fastenings, and similar hardware before painting and refix on completion. Remove all electrical switch and power plates before painting and refix them on completion. Mask adjacent surfaces as required to a true line and remove the masking on completion. Dust and wipe down all

surfaces for Painter work and completely remove all dust, rubbish, dirt etc. from areas involved immediately prior to commencement. To each area of the works complete all surface preparation before applying paint to any surface.

6.3.3 Protection

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

6.3.4 Qualifications

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

6.3.5 Workmanship

Strictly adhere to all Manufacturers' instructions.

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

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

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

6.3.6 General

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

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

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

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

6.3.7 Materials

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

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

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

6.3.8 Completion

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

7 PLUMBING

7.1 Preliminary

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

7.2 Compliance

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

Comply with all relevant provisions and recommendations of:

3000:2018(AS NZS)	Electrical installations - Known as the Australian/New Zealand Wiring Rules
3500.4:2015(AS NZS)	Plumbing and drainage - Part 4: Heated water services
NZBC G12	Water Supplies

7.3 General

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

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

7.4 Rheem Domestic Electric Water Heaters

7.4.1 Scope

Supply, install and commission the selected Rheem Domestic Electric Water Heaters to the locations shown on the drawings, complete with all necessary fittings and accessories for proper operation and functionality. All aspects of this work shall be in strict accordance with Rheem technical literature and installation requirements (check www.rheem.co.nz, or call 0800 657 336 for the latest editions), other relevant product manufacturers' recommendations, with all relevant Standards, Regulations and Acts, and the Plumbing specification, and as shown on the drawings.

No substitutions are permitted for Rheem Domestic Electric Water Heaters.

7.4.2 Mains Pressure Electric Water Heaters

Rheem 312025 Mains Pressure Electric Vitreous Enamel Water Heater. 25 litre storage capacity, mains pressure supply, single electric heating element. Galvanised steel casing - suitable for indoor installations only, 405mm diameter x 385mm high, left hand connection. Maximum 70°C, minimum 60°C thermostat settings. 1000kPa maximum working pressure.

240V/50Hz electrical connection, 2.4kW maximum load.

Standard magnesium anode. 15kg approximate weight when empty.

Location:

7.4.3 Co-operation

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

Co-ordinate with all trades to install Rheem Domestic Electric Water Heaters and accessories as required.

7.4.4 Workmanship

Rheem Domestic Electric Water Heater installation shall be carried out by experienced tradesmen, familiar with the specified products and installation techniques, under the direct supervision of a NZ certified Registered Plumber, in accordance with the manufacturer's instructions and with the requirements of AS/NZS 3500.4, AS/NZS 3000, NZBC G12, and with all local codes and regulatory authority requirements.

Electrical wiring and prescribed electrical work (by others) shall be carried out by a qualified electrician in accordance with the electrical standards and regulations and the Electrical specification.

Adequately protect all surrounding work surfaces during installation. Any damage to fittings or finished surfaces shall be made good by the appropriate trade at the Plumber's expense.

7.4.5 Delivery & Handling

Store Rheem Domestic Electric Water Heaters and accessories under cover on a flat surface in accordance with the manufacturer's recommendations. Keep products clean and dry, and protect from damage and contamination. Do not use damaged or defective products. Handle Rheem products in accordance with the manufacturer's recommendations.

7.4.6 Installation

Install the selected Rheem Domestic Electric Water Heaters, complete with accessories, to the locations shown on the drawings in accordance with the Rheem Installation Instructions and complying with the New Zealand Building Code.

Ensure that the required clearances are provided for the servicing and removal of the water heater and accessories, and that the water heater information label / rating plate and thermostat can be viewed and read when installed.

Ensure that the pipework is correctly sized and that a non-return valve is installed on the cold water line to the water heater. Provide a 50mm minimum clear opening around pipes and fittings connected to the water heater that pass through the support platform or floor.

Where required, install a safe tray below the water heater to prevent water damage to the building or property in the event of a leak.

Install a suitable moisture barrier under indoor water heaters installed on a concrete surface that is not fully cured or prone to dampness.

Ensure that the water heater sacrificial anode, if fitted, is the correct anode type.

Seismically restrain water heaters in accordance with NZBC G12/AS1 6.11.4, or Section 203 of NZS 4603, or with the specific design shown on the drawings.

Connect Rheem water heaters to the mains pressure hot and cold water system, with all necessary safety devices, valves, fittings and accessories, to achieve the required operation performance and functionality.

Install relief valve drains to expansion control valves and pressure relief valves in accordance with NZBC G12/AS1 or AS/NZS 3500.4, and follow all requirements when water heaters are located where freezing is likely.

Electrical connections to water heaters must be made in complete accordance with AS/NZS 3000 and the Rheem Installation Instructions. A 20mm flexible conduit is required for the electrical cable to the water heater. The power supply to the water heater must not be switched on until the water heater is filled and a satisfactory megger reading is obtained.

Commission Rheem Domestic Electric Water Heaters in accordance with the manufacturer's instructions.

7.4.7 Completion

Check that the Rheem Domestic Electric Water Heaters have been installed correctly and have been commissioned and are operating at the required performance and functionality. Check that pipework connections are leak free. Check that the water heaters are properly restrained against earthquake forces.

Check for damage, defects, faults and leaks and replace/repair as necessary.

Leave the works area clean and free of rubbish. Remove rubbish and waste material from the site.

Issue to the Owner a copy of the Rheem Domestic Electric Water Heater maintenance requirements and a copy of the Rheem Warranty for the installed water heaters.

Issue all As-Built Documentation required to the relevant parties.

7.5 Workmanship

7.5.1 Co-operation

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

7.5.2 Workmanship

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

The cutting away and checking of timbers shall be limited to such dimensions as will not prejudice the purpose for which the timber is used; observe NZS 3604 restrictions on the holing and checking of

joists and beams. Chasing and checking of other materials only to approval. Install seismic restraints to storage tanks and HWCs.

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

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

7.5.3 Pipework

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

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

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

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

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

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

7.5.4 Temperature Movement

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

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

7.5.5 Excavation

Allow to carry out all excavation that is required to suit the services installed by this trade. Check for other services before excavation. Trenches true to line and level, base of trenches clear of loose material, and shore trenches as required to suit the ground conditions. Backfilling shall be carried out by this trade, and be to the requirements specified in Siteworks.

7.5.6 Testing

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

7.5.7 Warranties

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

7.6 Materials

7.6.1 Materials

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

7.6.2 Alternatives

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

7.6.3 Materials Separation

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

8 DRAINLAYING

8.1 Preliminary

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

8.2 Compliance

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

Comply with all relevant provisions and recommendations of:

1254:2010(AS/NZS)	PVC-U pipes and fittings for stormwater and surface water applications
1260:2017(AS NZS)	PVC-U pipes and fittings for drain, waste and vent applications
1546.1:2008(AS/NZS)	On-site domestic wastewater treatment units - Septic tanks
1547:2012(AS/NZS)	On-site domestic wastewater management
2032:2006(AS/NZS)	Installation of PVC pipe systems
3500.2:2018(AS NZS)	Plumbing and drainage Part 2: Sanitary plumbing and drainage
3500.3:2018(AS NZS)	Plumbing and drainage Part 3: Stormwater drainage
7643:1979(NZS)	Code of practice for the installation of unplasticized PVC pipe systems
BS 5572	Code of practice for sanitary pipework
NZBC G13	Foul Water

8.3 General

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

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

8.4 Workmanship

8.4.1 General

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

8.4.2 Co-operation

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

8.4.3 Materials

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

8.4.4 Workmanship

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

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

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

8.4.5 Excavation

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

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

9 ELECTRICAL

9.1 Preliminary

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

9.2 Compliance

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

Comply with all relevant provisions and recommendations of:

2053.1:2001(AS/NZS)	Conduits and fittings for electrical installations - General requirements
2201.1:2007(AS/NZS)	Intruder alarm systems - Client's premises - Design, installation, commissioning and maintenance
2293.2:2019(AS NZS)	Emergency lighting and exit signs for buildings - Part 2: Routine service and maintenance
3000:2018(AS NZS)	Electrical installations - Known as the Australian/New Zealand Wiring Rules
3012:2010(AS/NZS)	Electrical installations - Construction and demolition sites
3085.1:2004(AS/NZS)	Telecommunications installations - Basic requirements
3100:2009(AS/NZS)	Approval and test specification - General requirements for electrical equipment
3112:2011(AS/NZS)	Approval and test specification - Plugs and socket-outlets
3191:2008(AS/NZS)	Electrical flexible cords
5000.1:2005(AS/NZS)	Electric cables - Polymeric insulated - For working voltages up to and including 0.6/1 (1.2) kV
60227.5:2003(AS/NZS)	Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V - Flexible cables (cords)
60335.2.30:2015(AS NZS)	Household and similar electrical appliances - Safety - Part 2.30: Particular requirements for room heaters
60335.2.30:2015(AS NZS) I NCIEC	Household and similar electrical appliances - Safety - Part 2.30: Particular requirements for room heaters
60335.2.35:2013(AS/NZS)	Household and similar electrical appliances - Safety - Part 2.35: Particular requirements for instantaneous water heaters
60598.2.2:2016(AS NZS)	Luminaires - Part 2.2: Particular requirements - Recessed luminaires
60598.2.22:2005(AS/NZS)	Luminaires - Particular requirements - Luminaires for emergency lighting
60898.1:2004(AS/NZS)	Electrical accessories - Circuit-breakers for overcurrent protection for household and similar installations - Circuit-breakers for a.c. operation
61009.1:2015(AS/NZS)	Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBOs) - Part 1: General rules

6104:1981(NZS) Specification for emergency electricity supply in buildings
NZECP 54 Recessed luminaires

9.3 Workmanship

9.3.1 General

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

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

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

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

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

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

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

9.3.2 Co-operation

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

9.3.3 Workmanship

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

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

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

9.3.4 Wiring

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

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

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

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

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

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

Wire exterior lighting in screened cable.

10 SPECIALIST SERVICES & EQUIPMENT

10.1 Preliminary

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

10.2 Compliance

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

Comply with all relevant provisions and recommendations of:

1170.2:2011(AS/NZS)	Structural design actions - Wind actions
AS/NZS 4505:2012	Garage doors and other large access doors

10.3 Dominator Garage Doors

10.3.1 Scope

Supply, install, and commission the selected Dominator Garage Doors to the locations identified on the drawings, complete with all accessories for proper installation and system operation. All aspects of this work shall be in strict accordance with the manufacturer's technical literature and installation requirements (check www.dominator.co.nz, or call 03 384 5145 for the latest editions), other relevant product manufacturers' recommendations, and as noted and detailed on the drawings.

No substitutions are permitted for Dominator Garage Doors.

10.3.2 Residential Sectional Doors

Dominator Milano Sectional Door. Steel sectional door with a horizontal, fine pencil-rib pattern.
Door Panels: manufactured from COLORSTEEL® pre-painted steel, or powder coated steel - Dulux Duralloy® standard colours; textured wood grain or smooth finish - texture and colour as specified.
Door Guides: two-piece roll-formed track guides; nylon wheels with ball bearings.
Hinges: full sized hinges spanning the panel length.
Weather Seal: deep cushioning neoprene base weather strip. Option for mohair jamb-edge weatherstrips available.
Opening operation: manual or automatic (as specified). External locking for manual doors.

Face mounted installation - fastened to the interior face of the wall opening.

Door opening (daylight) height: from 1825mm, up to 3450mm.

Door opening (daylight) width: from 2000mm, up to 6600mm.

Standard headroom clearance from top of opening: minimum 320mm for manual operation; minimum 350mm for automatic operation.

Low headroom clearance from top of opening: minimum 200mm - automatic operation only.

Sideroom clearance: minimum 140mm.

Drive through clearance height: daylight opening height.

Manufactured and installed in accordance with AS/NZS 4505 and the manufacturer's requirements, to the locations, dimensions, and details as scheduled and shown on the drawings.

Location:

10.3.3 Insulated Sectional Doors

Dominator Milano Insulated Sectional Door. Insulated, steel sectional door with a horizontal, fine pencil-rib pattern.

Door Panels: manufactured from COLORSTEEL® pre-painted steel, or powder coated steel - Dulux Duralloy® standard colours; textured wood grain or smooth finish - texture and colour as specified.

Insulation: 40mm thick, graphite-infused expanded polystyrene (EPS); R-value R1.25; 18kg/m³.

Door Guides: two-piece roll-formed track guides; nylon wheels with ball bearings.

Hinges: full sized hinges spanning the panel length.

Weather Seal: deep cushioning neoprene base weather strip. Option for mohair jamb-edge weatherstrips available.

Opening operation: automatic (as specified).

Face mounted installation - fastened to the interior face of the wall opening.

Door opening (daylight) height: from 1825mm, up to 3450mm.

Door opening (daylight) width: from 2000mm, up to 6600mm.

Standard headroom clearance from top of opening: minimum 350mm for automatic operation.

Low headroom clearance from top of opening: minimum 200mm - automatic operation only.

Sideroom clearance: minimum 140mm.

Drive through clearance height: daylight opening height.

Manufactured and installed in accordance with AS/NZS 4505 and the manufacturer's requirements, to the locations, dimensions, and details as scheduled and shown on the drawings.

Location:

10.3.4 Door Material & Colour

Color to be selected by owner

10.3.5 Door Opener

Dominator GDO-9 Sectional Door Opener. Automatic door opener for residential single or double sectional garage doors up to 18m².

1000N (100Kg) maximum lifting force. 24V DC motor; 230-240VAC 50Hz supply. 2.2W standby power. IP20 rated. Standard 1-piece/4-piece C-rail with chain drive system - belt drive system optional. 130mm/sec nominal travel speed. Soft start/soft stop operation. Battery backup and solar charging options. Includes powerhead, TrioCode multi-frequency coding system, remote controlled courtesy light, key ring transmitters.

Suitable for steel spring balanced doors only. Installed as a component of the specified Dominator Sectional Door(s) in accordance with the manufacturer's requirements to the required operating functionality.

Location:

10.3.6 Co-operation

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

Co-ordinate with other trades as required to install Dominator Garage Doors and mechanical openers and associated cabling, to the required tolerances and functionality

Confirm Dominator Garage Door opening site-measurements, fixing types, and other necessary information prior to manufacture.

10.3.7 Workmanship

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

All installation and commissioning work shall be carried out to fully comply with the Dominator Ltd Warranty, by experienced and competent installers, familiar with the specified products and installation techniques, in accordance with the manufacturer's installation requirements and as shown on the drawings. All work shall be such as to leave a neat, efficient and robust installation.

Electrical wiring (by others) shall be carried out by a qualified Electrician in accordance with the Electrical Standards and Regulations. The Electrician shall provide the power supply; the Door Installer shall commission and verify the operation of the door.

Issue to the Owner a copy of the manufacturer's maintenance requirements and a copy of the Dominator Product and Installation Warranty when commissioning is complete.

10.3.8 Delivery & Handling

Store Dominator Garage Doors and accessories undercover, off the floor on a flat, even and level surface and as recommended by the manufacturer. Keep components and accessories dry and protected from damage and contamination at all times. Do not use damaged or defective products and materials.

Handle components and accessories in accordance with the manufacturer's requirements and in a manner that prevents damage, distortion or deterioration to the door and accessories - including surface marking.

10.3.9 Preparation

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

Check that the door opening has been formed to the dimensions and details shown on the drawings, and that the opening is square and true to plane, with jambs plumb and parallel, and head/lintel true to level.

Check threshold rebates are correctly size and formed to suit the door operation.

Check door installation clearances for headroom, sideroom and backspace.

10.3.10 Installation

Install and commission the specified Dominator Garage Doors to the required operation and functionality in accordance with the manufacturer's installation requirements and as shown on the drawings, complete with sliding carriage assemblies, operating controls and other accessories

necessary for proper operation.

Installation tolerances shall not exceed Dominator recommendations. Door tracks and guides shall be accurately aligned and fixed plumb and parallel, and the door head true to level. Fixing type and spacing shall be appropriate for the door size and operation, with allowance for imposed wind loads, in accordance with Dominator requirements. Unless specified otherwise, fixings shall be hot-dip galvanised.

10.3.11 Completion

Check that the Dominator Garage Doors have been installed correctly, and that all moving and locking components and controls have been commissioned to the required tolerances and functionality.

Check for damage and defects - replace or repair as necessary.

Leave this work complete and in full working order to the required operating performance and functionality.

Remove all rubbish and excess material from site.

Issue to the Owner a copy of the manufacturer's maintenance requirements and a copy of the Dominator Ltd Product and Installation Warranty for the completed works.

GIB EzyBrace® Systems specification GS1-N

Specification code	Minimum length (m)	Lining requirement
GS1-N	0.4	Any 10mm or 13mm GIB® Standard plasterboard to one side only

WALL FRAMING

Wall framing to comply with;

- NZBC B1 — Structure B1/AS1 Clause 3 Timber (NZS 3604:2011).
- NZBC B2 — Durability B2/AS1 Clause 3.2 Timber (NZS 3602).

Framing dimensions and height as determined by NZS 3604:2011 stud and top plate tables for load bearing and non-bearing walls. The use of kiln dried stress graded timber is recommended.

BOTTOM PLATE FIXING

Timber floor

Pairs of hand driven 100 x 3.75mm nails at 600mm centres; or three power driven 90 x 3.15mm nails at 600mm centres.

Concrete floor

Internal Wall Bracing Lines: In accordance with the requirements of NZS 3604:2011 for internal wall plate fixing or 75 x 3.8mm shot fired fasteners with 16mm discs spaced at 150mm and 300mm from end studs and 600mm centres thereafter.

External Wall Bracing Lines: In accordance with the requirements of NZS 3604:2011 for external wall bottom plate fixing.

WALL LINING

- Any 10mm or 13mm GIB® plasterboard lining.
- Sheets can be fixed vertically or horizontally.
- Sheet joints shall be touch fitted.
- Use full length sheets where possible.

PERMITTED ALTERNATIVES

For permitted GIB® plasterboard alternatives refer to p. 5 in GIB EzyBrace® Systems literature.

FASTENING THE LINING

Fasteners

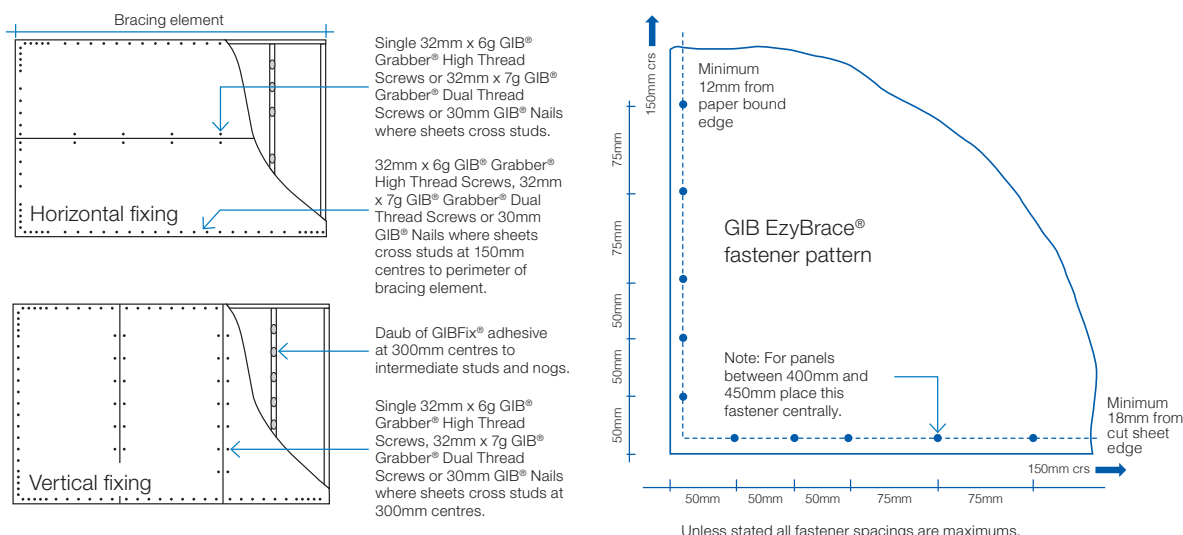
32mm x 6g GIB® Grabber® High Thread Screws, 32mm x 7g GIB® Grabber® Dual Thread Screws or 30mm GIB® Nails. If using the GIBFix® Angle use only 32mm x 7g GIB® Grabber® Dual Thread Screws.

Fastener centres

50,100,150, 225, 300mm maximum from each corner and 150mm thereafter around the perimeter of the bracing element. For vertically fixed sheets place fasteners at 300mm maximum centres to intermediate sheet joints. For horizontally fixed sheets place single fasteners to the sheet edge where it crosses the stud. Use daubs of GIBFix® adhesive at 300mm maximum centres to intermediate studs. Place fasteners no closer than 12mm from paper bound sheet edges and 18mm from any sheet end or cut edge.

JOINTING

Joint strength is important in delivering bracing system performance. All fastener heads stopped and all sheet joints GIB® Joint Tape reinforced and stopped in accordance with the GIB® Site Guide.



In order for GIB® systems to perform as tested, all components must be installed exactly as prescribed. Substituting components produces an entirely different system and may seriously compromise performance. Follow the specifications. This specification sheet is issued in conjunction with the publication GIB EzyBrace® Systems

GIB EzyBrace® Systems specification GS2-N

Specification code	Minimum length (m)	Lining requirement
GS2-N	0.4	Any 10mm or 13mm GIB® Standard plasterboard fixed to each side of the wall framing

WALL FRAMING

Wall framing to comply with;

- NZBC B1 — Structure B1/AS1 Clause 3 Timber (NZS 3604:2011).
- NZBC B2 — Durability B2/AS1 Clause 3.2 Timber (NZS 3602).

Framing dimensions and height as determined by NZS 3604:2011 stud and top plate tables for load bearing and non-bearing walls. The use of kiln dried stress graded timber is recommended.

BOTTOM PLATE FIXING

Timber Floor

Pairs of hand driven 100 x 3.75mm nails at 600mm centres; or three power driven 90 x 3.15mm nails at 600mm centres.

Concrete floor

Internal Wall Bracing Lines: In accordance with the requirements of NZS 3604:2011 for internal wall plate fixing or 75 x 3.8mm shot fired fasteners with 16mm discs spaced at 150mm and 300mm from end studs and then 600mm centres thereafter.

WALL LINING

- A layer of 10mm or 13mm GIB® plasterboard to each side of the wall.
- Sheets can be fixed vertically or horizontally.
- Sheet joints shall be touch fitted.
- Use full length sheets where possible.

PERMITTED ALTERNATIVES

For permitted GIB® plasterboard alternatives refer to p. 5 in GIB EzyBrace® Systems literature.

FASTENING THE LINING

Fasteners

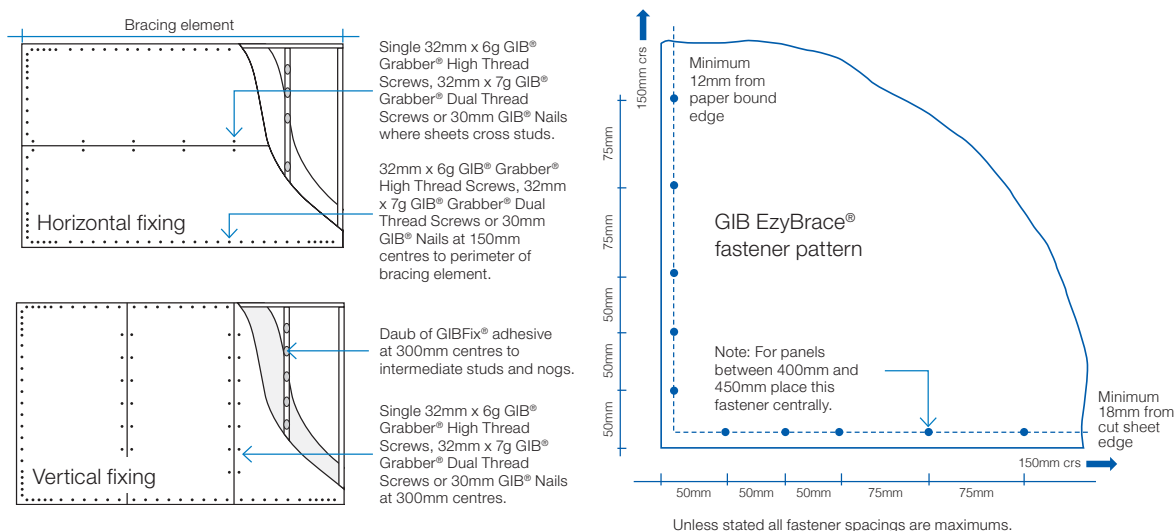
32mm x 6g GIB® Grabber® High Thread Screws, 32mm x 7g GIB® Grabber® Dual Thread Screws or 30mm GIB® Nails. If using the GIBFix® Angle use only 32mm x 7g GIB® Grabber® Dual Thread Screws.

Fastener centres

50,100,150, 225, 300mm maximum from each corner and 150mm thereafter around the perimeter of the bracing element. For vertically fixed sheets place fasteners at 300mm maximum centres to intermediate sheet joints. For horizontally fixed sheets place single fasteners to the sheet edge where it crosses the stud. Use daubs of GIBFix® adhesive at 300mm maximum centres to intermediate studs. Place fasteners no closer than 12mm from paper bound sheet edges and 18mm from any sheet end or cut edge.

JOINTING

Joint strength is important in delivering bracing system performance. All fastener heads stopped and all sheet joints GIB® Joint Tape reinforced and stopped in accordance with the GIB® Site Guide.



In order for GIB® systems to perform as tested, all components must be installed exactly as prescribed. Substituting components produces an entirely different system and may seriously compromise performance. Follow the specifications. This specification sheet is issued in conjunction with the publication GIB EzyBrace® Systems

GIB EzyBrace® Systems specification BL1-H

Specification code	Minimum length (m)	Lining requirement	Other requirements
BL1-H	0.4	10mm or 13mm GIB Braceline® to one side only	Hold downs

WALL FRAMING

Wall framing to comply with;

- NZBC B1 — Structure B1/AS1 Clause 3 Timber (NZS 3604:2011).
- NZBC B2 — Durability B2/AS1 Clause 3.2 Timber (NZS 3602).

Framing dimensions and height as determined by NZS 3604:2011 stud and top plate tables for load bearing and non-bearing walls. The use of kiln dried stress graded timber is recommended.

BOTTOM PLATE FIXING

Timber floor

Use panel hold downs at each end of the bracing element. The GIB HandiBrac® is recommended. See details in GIB EzyBrace® Systems or GIB® Site Guide.

Pairs of hand driven 100 x 3.75mm nails at 600mm centres; or Three power driven 90 x 3.15mm nails at 600mm centres.

Concrete floor

Use panel hold downs at each end of the bracing element. The GIB HandiBrac® is recommended. See details in GIB EzyBrace® Systems or GIB® Site Guide. Within the length of the bracing element bottom plates are to be fixed in accordance with the requirements of NZS 3604:2011.

WALL LINING

- A layer of 10mm or 13mm GIB Braceline®
- Sheets can be fixed vertically or horizontally.
- Sheet joints shall be touch fitted.
- Use full length sheets where possible.

PERMITTED ALTERNATIVES

For permitted GIB® plasterboard alternatives refer to p. 5 in GIB EzyBrace® Systems literature.

FASTENING THE LINING

Fasteners

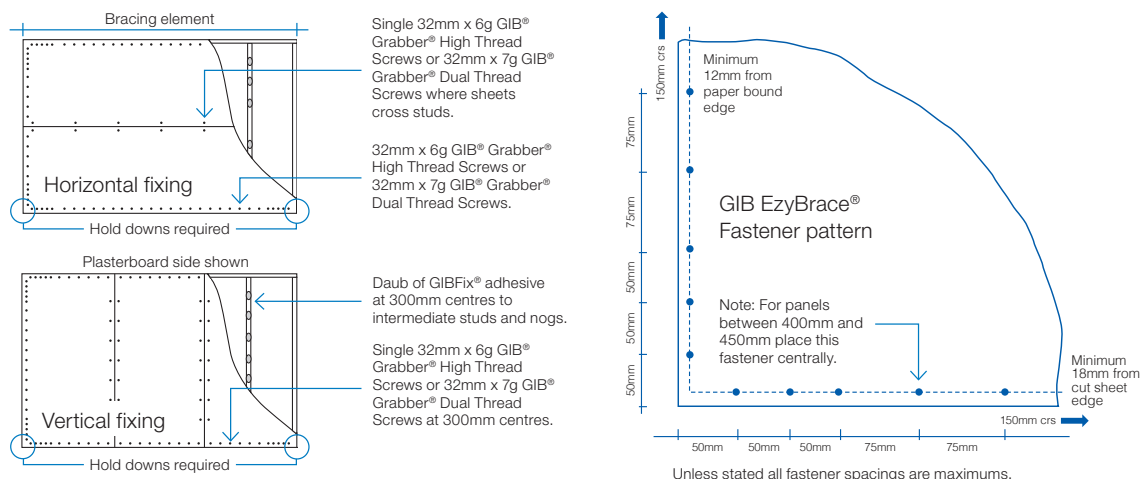
32mm x 6g GIB® Grabber® High Thread Screws or 32mm x 7g GIB® Grabber® Dual Thread Screws. If using the GIBFix® Framing System or if fastening through GIBFix® Angles use only 32mm x 7g GIB® Grabber® Dual Thread Screws.

Fastener centres

50,100,150, 225, 300mm from maximum each corner and 150mm thereafter around the perimeter of the bracing element. For vertically fixed sheets place fasteners at 300mm maximum centres to the sheet joint. For horizontally fixed sheets place single fasteners to the sheet edge where it crosses the stud. Use daubs of GIBFix® adhesive at 300mm maximum centres to intermediate studs. Place fasteners no closer than 12mm from paper bound sheet edges and 18mm from any sheet end or cut edge.

JOINTING

Joint strength is important in delivering bracing system performance. All fastener heads stopped and all sheet joints GIB® Joint Tape reinforced and stopped in accordance with the GIB® Site Guide.



In order for GIB® systems to perform as tested, all components must be installed exactly as prescribed. Substituting components produces an entirely different system and may seriously compromise performance. Follow the specifications. This specification sheet is issued in conjunction with the publication GIB EzyBrace® Systems

Ceiling diaphragms

GIB® plasterboard ceiling diaphragms are stiff and strong horizontal elements which effectively transfer loads to bracing walls. They themselves do not have a bracing unit rating but are used when bracing lines exceed 6m separation. The basic shape of a ceiling diaphragm is square or rectangular. Protrusions are permitted but cut-outs are not. The length of a ceiling diaphragm shall not exceed twice its width. Dimensions are measured between supporting bracing lines. Supporting bracing lines shall have a bracing capacity no less than the greater of 100 bracing units or 15 bracing units per metre of diaphragm dimension, measured at right angles to the line being considered, see figure 21.

Limitations for GIB® plasterboard ceiling diaphragms

Ceiling diaphragms may be constructed using any GIB® plasterboard provided perimeter fixing is at;

150mm centres for: Diaphragms up to 7.5m in length, no steeper than 15°.

100mm centres for: Diaphragms up to 7.5m in length, no steeper than 45°. Diaphragms up to 12m in length, no steeper than 25°.

Diaphragms outside these parameters must be specifically designed.

General fixing requirements for GIB® Ceiling Diaphragms:

- Linings must be installed over the entire area of the diaphragm.
- Fastening must be no less than 12mm from sheet edges and not less than 18mm from sheet ends.
- Sheets must be supported by framing members (e.g., ceiling battens) spaced at no more than 500mm centres for 10mm GIB® plasterboard and at no more than 600mm centres for 13mm GIB® plasterboard.
- Sheets within the diaphragm area may be fastened and finished conventionally in accordance with the publication entitled, "GIB® Site Guide". All joints shall be GIB® Joint Tape reinforced and stopped. It is recommended that sheet butt joints are formed off framing and back-blocked (see "GIB® Site Guide").
- Use full width sheets where possible. At least 900mm wide sheets with a length not less than 1800mm shall be used. Sheets less than 900mm wide but no less than 600mm may be used provided all joints with adjacent sheets are back-blocked (see "GIB® Site Guide" and figure 22).
- Fasteners are placed at the specified centres around the ceiling diaphragm with the corners fastened using the GIB EzyBrace® fastener pattern.

FIGURE 20: PROTRUSIONS AND CUTOUTS

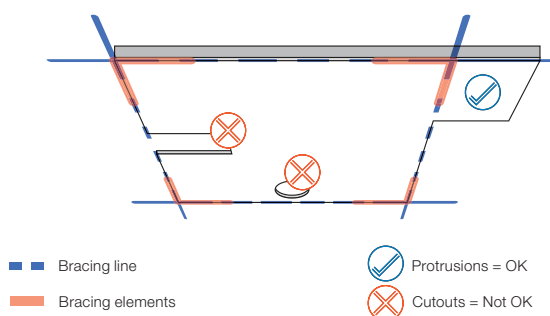


FIGURE 21: DIAPHRAGM BRACING LINING SPACINGS

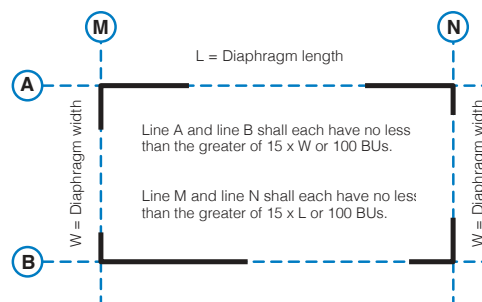


FIGURE 22: GIB® CEILING DIAPHRAGM SHEET WIDTHS AND LENGTHS

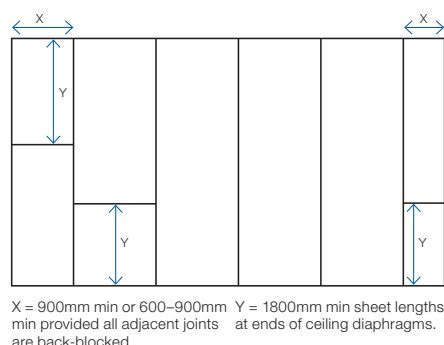
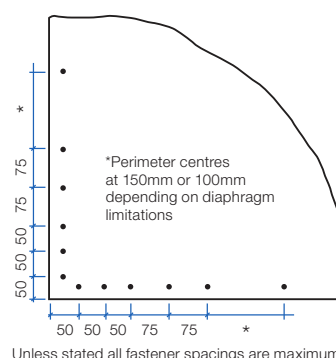


FIGURE 23: GIB EZYBRACE® FASTENER PATTERN



Ceiling battens in ceiling diaphragms

Ceiling diaphragms may be constructed using steel or timber ceiling battens.

Battens shall be spaced at a maximum of:

- 500mm for 10mm GIB® plasterboard.
- 600mm for 13mm GIB® plasterboard.

Timber battens shall be fixed in accordance with the requirements of NZS 3604:2011.

Metal battens shall be GIB® Rondo® battens with two external flanges of 8mm to allow direct screw fixing to roof framing.

GIB® Rondo® metal battens shall be fixed with 2/32mm x 8g GIB® Grabber® Wafer Head Self Tapping screws to supporting framing.

GIB® Rondo® metal battens must be fixed directly to the roof framing. If a clip system has been used, a timber block (min 300mm) or a continuous timber member can be fixed alongside the bottom chord to permit a direct connection to the batten, see figure 26.

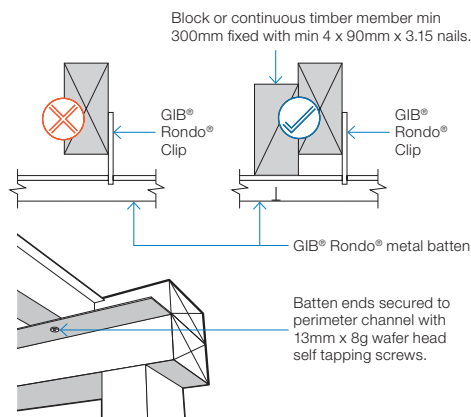
For GIB® Rondo® metal battens, a GIB® Rondo® metal channel or metal angle is required at the perimeter of the diaphragm. The perimeter channel shall be fastened to the top plate with 32mm x 8g GIB® Grabber® Wafer Head Self Tapping screws or 32mm x 7g GIB® Grabber® Dual Thread screw at 300mm centres maximum.

Linings are fastened to metal using 25mm x 6g GIB® Grabber® Self Tapping screws and to timber framing using 32mm x 6g GIB® Grabber® High Thread screws. Alternatively 32mm x 7g GIB® Grabber® Dual Thread screws can be used in both cases. Fastener centres are specified on p.18.

Coved ceiling diaphragms can be achieved by using nominally 32 x 32 x 0.55mm proprietary galvanised metal angles ("back-flashing") at the changes in direction. These angles shall be:

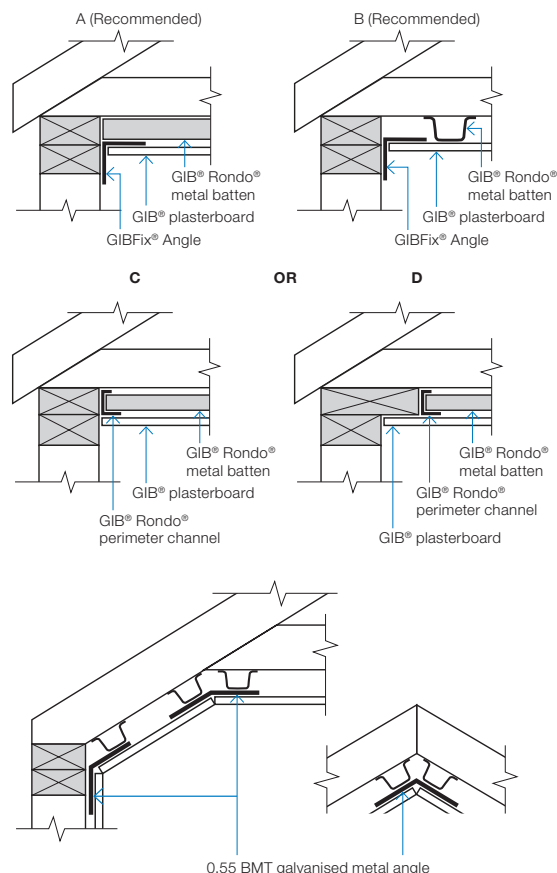
- Fastened at 300mm on each edge to metal battens using 32mm x 8g GIB® Grabber® Wafer Head Self Tapping screws or 32mm x 7g GIB® Grabber® Dual Thread screws.
- Fastened to timber framing using 32mm x 7g GIB® Grabber® Dual Thread screws when linings are installed.

FIGURE 26: GIB® RONDO® METAL CEILING BATTEN INSTALLATION



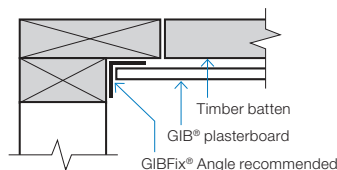
GEB016

FIGURE 27: GIB® RONDO® METAL CEILING BATTENS WITH CORNER ANGLES



GEB017

FIGURE 28: TIMBER CEILING BATTENS*



GEB018

Openings in ceiling diaphragms

SMALL OPENINGS

Small opening (e.g. down lights) of 90 x 90mm or less may be placed no closer than 90mm to the edge of the ceiling diaphragm.

LARGE OPENINGS

Openings are allowed within the middle third of the diaphragms length and width. Fixing of sheet material to opening trimmers shall be at 150mm centres. Neither opening dimension shall exceed a third of the diaphragm width. Larger openings or openings in other locations require specific engineering design.

Where fireplace flue or range hood openings are required in a ceiling diaphragm use a galvanised metal backing plate as shown in figure 25, with a maximum hole diameter of 350mm.

Figure 25 can also be used for range hood openings in walls.

For information on openings in ceiling diaphragms contact the GIB® Helpline on 0800 100 442.

FIGURE 24: LARGE OPENINGS IN CEILING DIAPHRAGMS

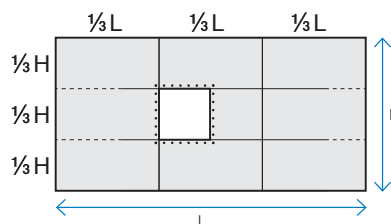
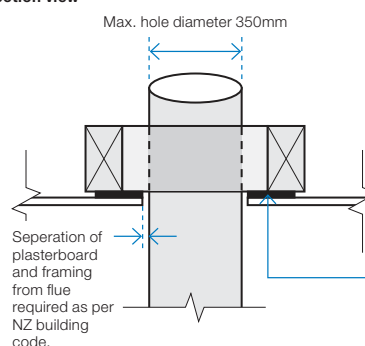
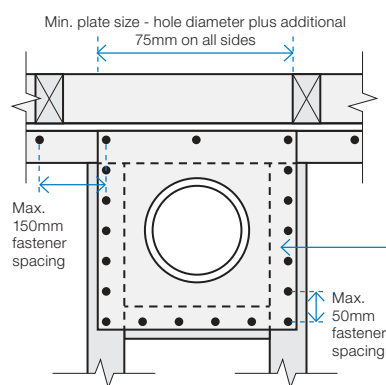


FIGURE 25: FIREPLACE FLUES AND RANGE HOOD OPENINGS

Section view



Plan view



Plasterboard ceiling not shown in plan view

Steel plate
0.55 BMT
Galvanised sheet
Max. opening
350mm diameter.
Installed prior to
GIB® plasterboard.

Framing
90 x 45mm framing
trimmed to provide
extra fixing.

GIB® plasterboard ceiling
Installed over the
steel plate and into
framing using a
minimum of 32mm
x 6g GIB® Grabber
High Thread or
32mm x 7g GIB®
Grabber Dual Thread
screws at 50mm
max centre spacing.

GIB Aqualine[®] Wet Area Systems



GIB Aqualine® Wet Area Systems Specification and Construction Guide

 Residential and non-residential applications.

 Bathrooms, laundries, toilets and kitchens.

GIB Aqualine® Wet Area Systems, March 2007

Winstone Wallboards Ltd accepts no liability if the GIB Aqualine® Wet Area System is not designed and installed in strict accordance with instructions contained in this publication.

Use only the Current Specification

This publication may be superseded by a new publication. Winstone Wallboards accepts no liability for reliance upon publications that have been superseded. Before proceeding, you should check that this is the current version of the publication. Simply call the GIB® Helpline on 0800 100 442 or visit www.gib.co.nz

Beware of Substitution

The performance of GIB® Systems is very sensitive to design detailing, product specifications and construction practices. All GIB® Systems have been developed specifically for New Zealand conditions and independently tested or assessed to ensure the required level of performance. Therefore for GIB® Systems

it is important to use only GIB® branded components where specified and closely follow the specified design details and construction practices, so you can be confident that the required level of performance and quality is achieved on site.

Customised Design Solutions

The systems detailed in this book should cover most common wet area situations. However, for projects where specific performance is necessary, GIB® Technical Services can assist you to develop customised solutions. Simply contact us through the GIB® Helpline on 0800 100 442.

This publication supersedes the following publication:

GIB Aqualine® Wet Area Systems, October 2002 (v2).



BRANZ Appraised
Appraisal No.427 [2007]

GIB Aqualine® Wet Area Systems, March 2007.



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THIS PUBLICATION

This publication is not intended as the definitive guide on wet area construction and wet area systems, but rather as a helpful guide to best practice around areas where there is intermittent water exposure and splash zones within residential and non-residential buildings – in particular, areas covered by the New Zealand Building Code (NZBC), Clause E3 Internal Moisture. The information herein is designed to be helpful to designers, contractors and home-owners wishing to achieve a result that is easy to incorporate into modern design, simple and clear to construct, and that will satisfy the needs, requirements and expectations of both the NZBC and the end user.

Wet areas in the home often require relatively frequent and expensive renovation or repair, often because of the ingress of water to the structure of the building.

It is important to introduce materials and systems which have been specially designed to cope with the conditions that are common in wet areas, and to ensure they are installed correctly, using best practice, and are compatible to form a complete wet area system.

The code numbers shown with each “typical detail”, e.g. GAW-D030, match the code numbers for drawings available as downloads on the GIB® website at www.gib.co.nz

The reference numbers (e.g. GAW-D030) stand for:



WHAT IS A WET AREA?

Generally, wet areas are described as spaces to where fresh water is reticulated, such as bathrooms, toilets, laundries and kitchens. Wet areas fall into two categories; these are well explained and documented in the NZBC, Clause E3.

1. Water splash areas – These are areas subject to intermittent splash of liquid water around sanitary fittings and appliances such as baths, vanities, laundry tubs, sinks, etc. These areas are required to have an impervious, easily cleaned surface.
2. Shower enclosures – These are areas subject to more frequent, larger quantities of water, and include shower enclosures and shower over bath areas. The NZBC E3/AS1 requires these areas to be impervious, and specifically excludes any paint and wallpaper finishes. Where ceramic tile or stone finishes are applied, E3/AS1 requires that they “shall be laid on a continuous impervious substrate or membrane”.

The requirements of these wet areas are described on page 6 of this publication and in full in Clause E3 of the NZBC. Clause E3 also refers to other requirements not covered in this publication, such as ventilation, condensation control and overflow management, which will require separate consideration. Ongoing maintenance of wet areas is also important to maximise the life of the wet area.

GIB AQUALINE®

Although able to cope with infrequent short-term exposure, standard gypsum plasterboard will have a shortened life expectancy when frequently exposed to water or moisture.

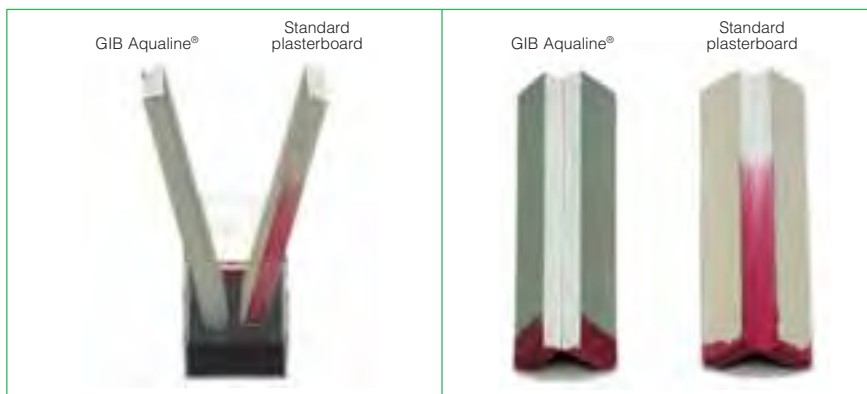
The NZBC does not call for water resistant linings in wet areas but it is highly desirable to incorporate lining materials which will maintain their integrity longer when exposed more frequently to water or steam and particularly to one-off events such as leakages or flooding of a room.

GIB Aqualine® is ideal in such situations because it features a water resistant wax polymer impregnated core.

Unlike other commonly used substrates, the GIB Aqualine® core not only resists penetration of water through the lining into the framing behind, but also resists water “wicking” up the core, a common cause of long-term damage where a water resistant lining has not been used.

GIB Aqualine® will maintain its integrity for extended periods, particularly where wicking over large areas can destroy the integrity of the interface between the lining and paint or wallpaper surfaces or between the lining and the tile adhesive.

The illustrations below graphically show the difference between GIB Aqualine® and standard plasterboard after a two-hour soak test in red dye.





Introduction/Design Considerations

GIB AQUALINE® *continued***Where to Use GIB Aqualine®**

Though not required by NZBC, it is highly desirable to include GIB Aqualine® in all areas at risk of water or moisture damage, in order to prolong the life expectancy of that space.

They include:

	WALLS	CEILINGS
BATHROOMS	✓	✓
SHOWERS	✓	✓
LAUNDRY	✓	✓
KITCHEN	✓	
TOILET	✓	

Benefits

- Water resistant and durable to help protect against water damage
- Proven substrate for paint, wallpaper, tiles, sheet vinyl and rigid sheet shower linings with installations in over 300,000 bathrooms in New Zealand
- Suitable for both residential and non-residential applications
- Dimensionally stable, will not buckle or warp, hence an excellent substrate for ceramic tiles
- Conventional jointing methods
- Easy to cut and form openings
- Contains fibreglass and other additives for strength and fire resistance
- May be used in GIB® Bracing, GIB® Fire Rated and GIB® Noise Control Systems (see Compliance with the NZBC, Clauses B1, C3 and G6). Consult the appropriate GIB® literature for installation details
- Green face paper for ease of recognition.

Sheet Dimensions and Weights

SHEET DIMENSIONS (ALL SHEETS 1200mm WIDE AND TE/TE)		MAXIMUM WEIGHT/m ²
Thickness (mm)	Length (mm)	
10	2400, 2700, 3000, 3600	7.8kg
13	2400, 2700, 3000, 3600	10.2kg

Handling and Storage

- GIB Aqualine® must be stored under cover, stacked flat and clear of the floor with sufficient support to avoid sagging
- GIB Aqualine® must be handled as a finishing material.

APPRAISAL

The document entitled *GIB Aqualine® Wet Area Systems* 2007 has been appraised by BRANZ, Appraisal Certificate, No. 427 (2007).

COMPLIANCE WITH THE NEW ZEALAND BUILDING CODE (NZBC)

Structure – Clause B1

The design and material specification for steel and timber framing used in GIB Aqualine® systems must be in accordance with the performance requirements of NZBC Clause B1 (Structure). See Bracing in Wet Areas on page 5.

Durability – Clause B2

When installed and maintained in accordance with this literature, GIB Aqualine® tiled or vinyl covered systems have a serviceable life of at least 15 years. They comply with the requirements of NZBC Clause B2 (Durability) for use in wet areas directly exposed to liquid water, e.g. showers, showers over baths and splash-backs.

When used as a general wet area lining and maintained under normal dry internal conditions, GIB Aqualine® systems have a serviceable life of at least 50 years and comply with NZBC Clause B2 (Durability) for use within toilets, kitchens, bathrooms and laundries not directly exposed to liquid water.

Spread of Fire – Clause C3

GIB® Fire Rated Systems provide passive fire protection in accordance with the requirements of NZBC Clause C3 (Spread of Fire). When GIB Aqualine® is substituted into fire rated systems in place of the equivalent thickness GIB Fyrelite®, the Fire Resistance Rating (FRR) of that system will be maintained.

COMPLIANCE WITH THE NEW ZEALAND BUILDING CODE (NZBC) *continued***Internal Moisture – Clause E3**

When installed in accordance with this literature, tiled or vinyl covered GIB Aqualine® systems may be used in areas directly exposed to liquid water, such as showers, to provide an impervious and easily cleaned wall surface. These systems comply with the requirements of NZBC Clause E3 (Internal Moisture).

Hazardous Building Materials – Clause F2

At no stage during handling, installation, or serviceable life does GIB Aqualine® constitute a health hazard. It therefore meets the provisions of NZBC Clause F2 (Hazardous Building Materials). Dust resulting from the sanding of stopping compounds may be a respiratory irritant and the use of a suitable facemask is recommended.

Ventilation – Clause G4

NZBC Clause G4 (Ventilation) requires buildings to have a means of collecting or otherwise removing steam generated from laundering, utensil washing, bathing or showering. To prolong the life of interior linings and surface finishes and to minimise the risk of moisture related problems such as condensation and mould growth, adequate heating and mechanical ventilation must be provided in kitchens, bathrooms and laundries.

Airborne and Impact Sound – Clause G6

GIB® Noise Control Systems can be used to provide ratings for Sound Transmission Class (STC) and Impact Insulation Class (IIC) in accordance with the requirements of NZBC Clause G6 (Airborne and Impact Sound). When GIB Aqualine® is substituted into GIB® Noise Control systems in place of the equivalent thickness GIB® Standard plasterboard or GIB Fyrelite®, the STC and IIC rating of that system will be maintained. When GIB Aqualine® is substituted in place of the equivalent thickness GIB Noiseline®, a small performance loss may occur. For further information contact the GIB® Helpline 0800 100 442.

LIMITATIONS

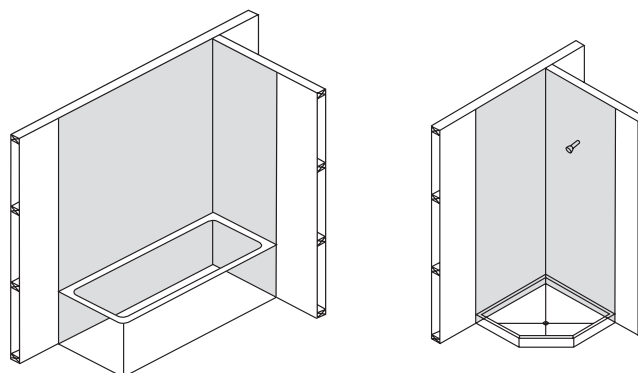
- GIB Aqualine® must not be used for bracing purposes in shower cubicles or above baths (see Bracing in Wet Areas below)
- Do not use GIB Aqualine® where it may be exposed for extended periods to humidities of 90% RH and above. Such areas include group shower or steam rooms as well as moisture and chlorine rich environments such as indoor swimming pools
- GIB Aqualine® must not be directly applied to solid plaster (gypsum or cement), wood based sheet linings or similar materials, masonry or concrete. GIB Aqualine® may only be applied to these materials where timber strapping or steel furring channels are installed
- GIB Aqualine® must not be installed over a vapour barrier or a wall acting as a vapour barrier
- Cracked or damaged sheets must never be used
- GIB Aqualine® must not be used in external applications
- GIB® plasterboard must not be exposed to temperatures in excess of 52°C for prolonged periods. Heat-generating devices may include halogen lighting, cooking elements, radiant heating, solid fuel exhausts and fire surrounds. Consult the appliance manufacturer for installation details.

BRACING IN WET AREAS

Bracing elements are required to have a durability of 50 years. GIB® bracing elements are not to be located in shower cubicles or behind baths because of durability requirements, the likelihood of renovation, and practical issues associated with fixing bracing elements to perimeter framing members.

Otherwise, GIB® Bracing Systems can be used in water-splash areas as defined by NZBC Clause E3/AS1, provided these are maintained impervious for the life of the building.

GIB Aqualine® can be used in place of GIB® Standard plasterboard in GIB® bracing elements. GIB Aqualine® can be used in place of GIB Braceline® in GIB® bracing elements 900mm or longer, provided the perimeter of the element is fixed with GIB Braceline® Nails or GIB Braceline® screws at 100mm centres, using the GIB Braceline® corner fixing pattern.



No bracing in the shaded areas.

NEW ZEALAND BUILDING CODE

E3.3.4 requires impervious and easily cleaned surfaces to all surfaces adjacent to sanitary fixtures or laundering facilities.

E3.3.5 requires that surfaces of building elements likely to be splashed or contaminated in the course of the intended use of the building must also be impervious and easily cleaned.

E3.3.6 requires that surfaces of building elements likely to be splashed must be constructed in a way that prevents water from penetrating behind linings or into concealed spaces (e.g. wall cavities).

Walls in wet areas therefore need to be addressed according to whether they fall within the scope of one of the following descriptions:

1. Wall surface likely to be splashed
2. Shower walls. Although not a requirement of NZBC it is highly recommended that the wall surfaces within 150mm of the top edge of a bath, and the vertical faces immediately under the edge of a bath, are treated in the same way as for a shower wall.

WALL SURFACES IN AREAS LIKELY TO BE SPLASHED

Suitable linings include:

- a. Integrally waterproof sheet material (e.g. polyvinylchloride) with sealed joints
- b. Ceramic or stone tiles having 6% maximum water absorption, waterproof grouted joints, and bedded with an adhesive specified by the tile manufacturer as being suitable for the tiles, substrate material and the environment of use
- c. Cement based solid plaster or concrete having a steel trowel or polished finish (semi-gloss or gloss paint must be used if a paint finish is required)
- d. Cork tile or sheet sealed with waterproof applied coatings
- e. Monolithic applied coatings having a polished, non-absorbent finish (e.g. terrazzo)
- f. Sheet linings finished with vinyl coated wallpaper, or semi-gloss or gloss coating
- g. Water resistant sheet linings finished with decorative high pressure laminate or factory applied polyurethane or resin
- h. Modular or multiple lining units which are themselves *impervious* and easily cleaned, and are installed with *impervious* joints
- i. Timber or timber-based products such as particleboard sealed with waterproof applied coatings.

NB: Floor surfaces and floor/wall junctions are required by E3 to be impervious.

SURFACES IN SHOWERS AND AROUND BATHS

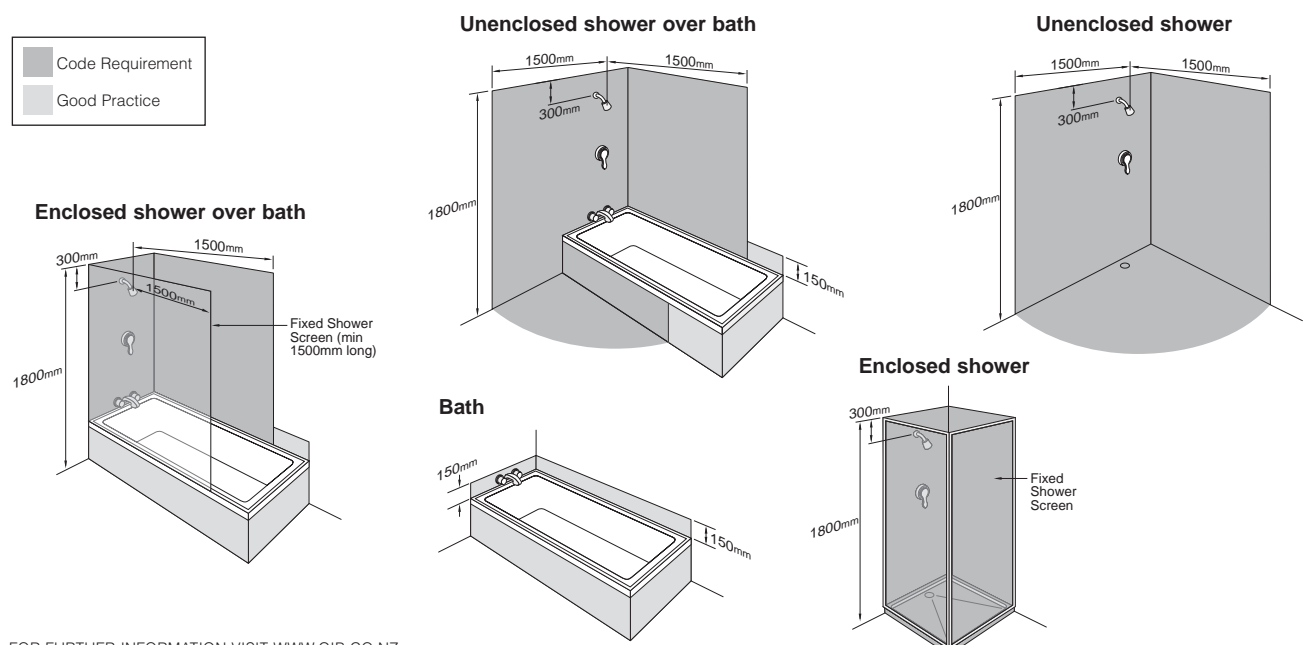
Suitable linings include all of the above, but **NOT including items (d) and (f) from the above list.**

Note that a waterproof membrane complying with AS/NZS 4858: 2004 **MUST** be applied to all lining materials used under ceramic tiles in these areas.

The waterproof membrane must extend to a 1500mm horizontal radius from a shower rose unless the shower is contained within a fixed enclosure. A shower curtain does not constitute a fixed enclosure.

Particleboard manufacturers recommend that in wet areas, panels should be protected with a suitable wet area membrane or an integrally waterproof sheet material. Some local authorities call for this treatment on all timber based floors. Local requirements should be checked before proceeding.

Dark grey shaded areas in the diagrams below represent the minimum extent of wall surfaces requiring impervious sheet materials or waterproof membranes prior to tiling. Light grey shaded areas represent good practice.





WALL SURFACES SURROUNDING COOKTOPS

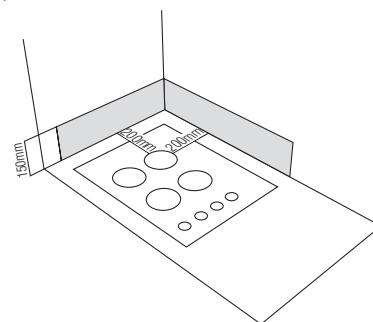
The protection of combustible surfaces surrounding gas cooking appliances is covered by NZS 5261. Consult the current version of this standard to ensure compliance.

However, as a guide the following options are acceptable for wall surfaces within 200mm of the periphery of a gas element to a height of 150mm above the element for the full dimension (width and depth) of the cooktop surface area:

- 5mm ceramic tiles on GIB® plasterboard
- 5mm toughened glass on GIB® plasterboard
- or any system that can be demonstrated to meet the requirements of Clause 2.6.2.6 of NZS5261.

Because of the moisture generated by cooking, it is highly recommended that GIB Aqualine® is used in kitchen areas.

GIB® plasterboard products must not be exposed to temperatures in excess of 52°C for sustained periods. Check with the appliance manufacturer that this requirement will be met. However, it would be unusual for surfaces outside 200mm to exceed 52°C for sustained periods.



PENETRATIONS AND SEALANTS

As leaks and water ingress typically occur at junctions between building elements and at penetrations, it is essential that particular attention is given to these details at the time of installation. Lack of attention to detail can result in water damage that could remain undetected for a long time.

- Ensure that all cut-outs for pipe penetrations are made neatly, and slightly oversize, with a hole saw. These penetrations should be of a diameter no more than 12mm greater than that of the pipe
- Sealants should be of a mould inhibiting type and be neutral cure. Neutral cure silicones will generally meet these requirements
- Surfaces should be dry and free from dust before application, a minimum of a 4mm joint width provided and the depth should not exceed the width
- Gun a bead of silicone sealant to the full depth of the GIB Aqualine® in the following locations:
 - Around all tap/pipe bodies
 - The gap between the bath rim and the bottom edge of the GIB Aqualine®
 - Between the upstand of preformed shower bases and the bottom edge of the lining
 - Where an impervious junction is required at the floor/wall line, carefully seal the gap between the bottom edge of the board and the finished floor. Leave a 5-10mm gap at the bottom of the GIB Aqualine® wall lining for this purpose, ensuring the gap is free from dirt and dust
- Do not locate shower heads or taps on fire rated or intertenancy walls. Should this be unavoidable then refer to the publication *Penetrations in GIB® Fire Rated Systems*. Always use tested and approved proprietary solutions.

WATERPROOF MEMBRANES

- A waterproof membrane must be applied to **all** lining materials used as a substrate for ceramic tiles in a shower or shower over bath situation
- The wall surface in a shower or shower over bath situation is not complete and ready for tiling until coated with a waterproof membrane over the lining and the jointed areas shown shaded on page 6
- Only in-situ waterproofing materials which are manufactured to AS/NZS 4858:2004 "Wet Area Membranes" are recommended and applied to manufacturer's recommendations. Typically, these types of membranes are not suitable for paint and wallpaper finishes
- Waterproof membranes must be fully cured and dry prior to application of tiling adhesives
- Embed reinforcing mats in the membrane at all internal corners of the shower (including floor/wall junctions)
- Preformed sheet membranes are also available and may be more suitable where curing times or specialist skills are an issue
- The details shown in this technical literature are generic in nature. For accurate detailing, follow the specifications provided by the supplier of the proprietary waterproof membrane.

TILING

GIB Aqualine® is suitable as a substrate for tiling up to the following weights:

- 10mm GIB Aqualine® up to 20kg/m²
- 13mm GIB Aqualine® up to 32kg/m².

Note: Most ceramic and porcelain tiles weigh less than 20kg/m².

For further information on tiling consult the BRANZ *Good Practice Guide – Tiling*.



FLEXIBLE SHEET VINYL – SHOWERS AND OTHER WET AREAS

- GIB Aqualine® is a suitable substrate for flexible vinyl wall finishes in wet areas of residential, commercial or institutional buildings
- Framing requirements and installation procedures for the GIB Aqualine® substrate shall be as per page 10 or 11, except that the lining gap at the floor should be reduced to 5mm when a pencil cove detail is used
- The installation of galvanised steel reinforcing angles (32 x 32 x 0.55mm) behind internal GIB Aqualine® corners is recommended for sheet vinyl applications in showers or shower over bath situations (see illustration page 14)
- The GIB Aqualine® lining must be jointed and stopped to a paint quality finish (Level 4) – trowel marks can telegraph through even a commercial grade 2mm vinyl
- A commercial grade vinyl is recommended for the wall finish in commercial or institutional bathrooms and showers
- In areas directly exposed to liquid water, all joints in flexible sheet vinyl must be heat welded
- Installation of the flexible vinyl must be carried out strictly in accordance with the specifications provided by the suppliers/manufacturers of the vinyl.

RIGID SHEET SHOWER LININGS

- The manufacturers/suppliers of thin (usually 2-3mm) and rigid acrylic shower linings commonly recommend direct adhesive fixing to wall linings using solvent-based adhesives
- Water temperature changes will cause movement of the thin acrylic sheet, which in turn will stress the adhesive and wall lining substrate
- **Do not preseal or paint** areas which are to be covered by the rigid shower linings
- The wall surface must be free of dust before installation of the lining
- Suppliers of rigid sheet acrylic shower linings recommend a minimum of 24 hours for the adhesive to cure fully prior to the shower being put into service
- Care must be taken to ensure that rooms are adequately ventilated and the adhesive is fully cured before the shower is used
- Consult the manufacturer/supplier of the shower lining for full installation details.

RENOVATIONS

Bathrooms, kitchens and laundries are the most renovated rooms in the house, partly due to fashion considerations and partly because of damage sustained by ingress of water and moisture within those spaces.

In most cases when renovating these rooms it is often easier and more cost-effective to remove the existing linings and replace them with GIB Aqualine®. This allows for a completely new start in the room and offers sound substrates for new surfaces such as tiling and painting, where otherwise flaking paint or damaged plasterboard may compromise good and sound finish or practice. At the very least re-lining will:

- Allow for inspection of framing where damage may have occurred and provide the opportunity to repair such damage
- Allow plumbing and electrics to be checked and altered or replaced where required
- Provide the opportunity to install thermal and acoustic insulation and water resistant linings where appropriate
- Make the job easier.

MAINTENANCE

Lack of maintenance is frequently the cause of premature and often very expensive failure of components and building elements within wet areas.

It is important to regularly inspect and repair any potential problem before it becomes a major problem and expensive to reinstate. Good maintenance should include:

- Ongoing ventilation. At the very least, good passive ventilation (e.g. window vents); but good active ventilation (e.g. extraction fans) of an appropriate size for the room is recommended
- Impervious coatings and surfaces should be checked for wear and damage and maintained and recoated before ingress of water to the substrate occurs
- Regular cleaning with appropriate cleaners so that build-up of matter, such as mould, is well controlled
- Sealants at junctions and penetrations should be checked for adhesion on a regular basis and replaced where adhesion failure to substrates occurs
- Where pipe leaks have become evident, however small, they should be repaired promptly and any area around such leaks dried out completely before any other repairs are carried out.



High-rise and commercial wet areas can generally be divided into four separate categories:

HIGH-RISE APARTMENTS AND INTERTENANCY

Wet areas in apartment complexes are generally covered by Clause E3 of the NZBC and will have the same requirements as shown for residential applications. However, apartment buildings will also involve intertenancy walls requiring noise control and fire resistance.

Generally, noise control and fire resistance are the first consideration and then the water resistance is added to those systems.

For noise control, GIB Aqualine® can substitute for the equivalent thickness GIB® Standard plasterboard or GIB Fyrelite®.

For fire resistance, GIB Aqualine® can substitute for GIB Fyrelite® of equivalent thickness.

In all cases the prescribed noise control or fire resistance system specifications must be followed completely as presented in the GIB® publications *GIB® Noise Control Systems* and *GIB® Fire Rated Systems*.

Refer to typical details on page 25.

The NZBC for intertenancy calls for special consideration to be given to preventing water from travelling from one tenancy to another. This calls for a waterproof membrane to all wet area floors with upstands to walls and the inclusion of floor wastes.

It is important to avoid penetrations such as taps, shower roses, etc. in intertenancy walls as this will compromise fire and noise ratings.

OFFICE, WORKPLACE AND SCHOOLS

These wet areas are generally no different in requirements to those shown in this publication or those of high-rise apartments, and are treated in the same manner.

As there is often a higher impact requirement in commercial applications, 13mm GIB Aqualine® is the minimum thickness recommended.

These areas are often finished in sheet vinyl or ceramic tiles and GIB Aqualine® is an ideal substrate, particularly in the case of sheet vinyl where a high quality finish is required to minimise telegraphing of imperfections in the substrate.

HEALTHCARE AND HOSPITALS

This industry will generally have special requirements for wet areas. GIB Aqualine® will generally satisfy specific design needs in healthcare facilities and in particular is an ideal substrate for the preferred finish of sheet vinyl.

PUBLIC AMENITIES AND SPORTS CLUBS

Public amenities and sports clubs often have a high demand for impact resistance, therefore 13mm GIB Aqualine® should be used, and suitable impact resistant wall coverings considered, such as heavy duty sheet vinyl or ceramic tiles over waterproof membrane to 1200mm high.

Also full consideration should be given to the usage of the amenity and whether high pressure or chemical cleaners will be used or if the amenity may be subject to vandalism.

Because of extreme humidity and presence of chemicals, GIB Aqualine® is not suitable for enclosed swimming pool areas.

Contact the GIB® Helpline on 0800 100 442 for further assistance.



If bracing, noise control or fire rating considerations exist, consult the relevant GIB® technical publication, e.g. *GIB® Fire Rated Systems*, *GIB® Noise Control Systems*, *GIB® Bracing Systems*, for the appropriate information.

Wall Framing

Framing dimensions must comply with the requirements of NZS 3604:1999.

- The moisture content of timber framing shall be 18% or less at the time of lining
- Studs shall be spaced at 600mm centres maximum for both 10mm and 13mm GIB® plasterboard
- Nogs to be evenly spaced with a maximum spacing of 1350mm. Alternatively, nogs may be staggered 150mm maximum either side of a horizontal joint line
- Nogs are not required behind horizontal joints except in shower situations or specific fire or noise control systems.

Fasteners

- 10mm GIB Aqualine® – minimum 25mm x 6g GIB® Grabber® High Thread Drywall Screws or 30mm x 2.8mm GIB® Nails
- 13mm GIB Aqualine® – minimum 32mm x 6g GIB® Grabber® High Thread Drywall Screws or 30mm x 2.8mm GIB® Nails.

Fastener Centres

- 300mm centres to top and bottom plates and to perimeter studs
- Single fasteners to each stud where the horizontal joint crosses the studs
- Place fasteners 12mm from sheet edges
- Daubs of GIBFix® adhesive at 300mm centres to intermediate studs
- Do not place adhesive at sheet edges or under fasteners. Sheet edges at door or window openings can be adhesive fixed unless forming part of the perimeter of a bracing element.

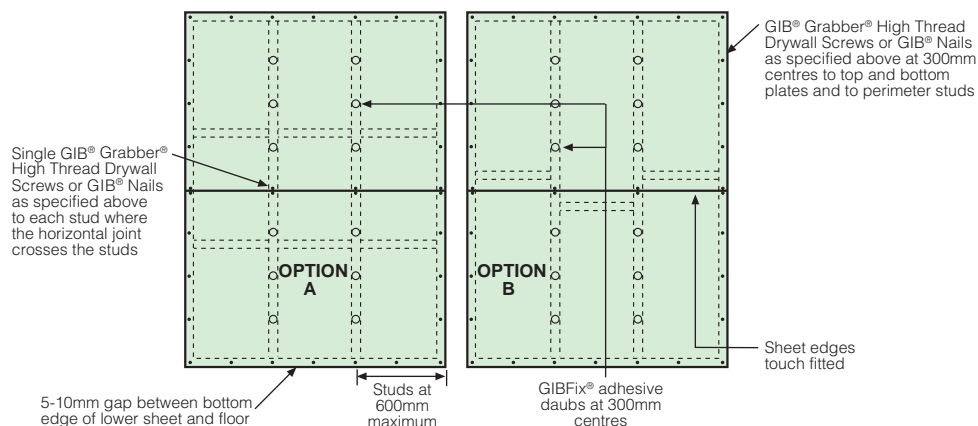
Lining

- Install the sheets leaving a 5-10mm gap at the floor line to allow for movement of the framing members and to allow for cleaning dirt and rubbish before sealing
- Sheets to be touch fitted.

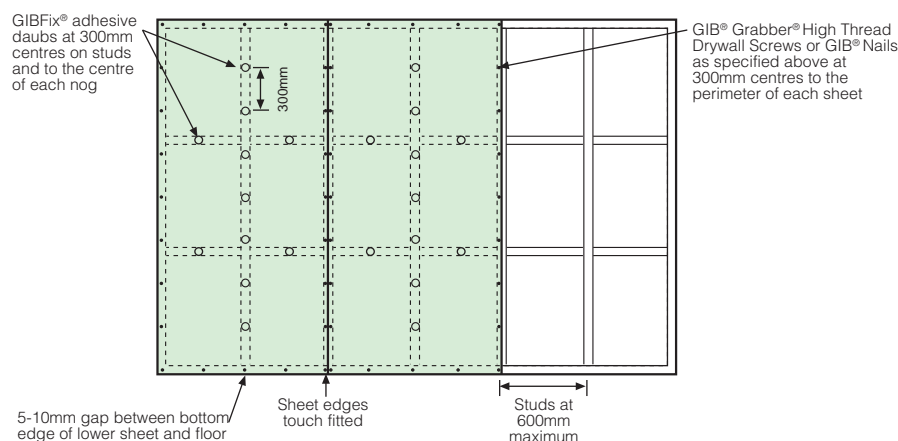
Jointing

- Jointing shall be carried out in accordance with the instructions in the *GIB® Site Guide*; GIB® AquaMix is recommended for the first two coats.

Fastening the Linings – Horizontal Fixing Only



Fastening the Linings – Vertical Fixing Only





The minimum sheet thickness for fixing on light gauge steel framing is 13mm GIB® plasterboard.

Steel framing for residential construction is by specific design.

If noise control or fire rating considerations exist, consult the relevant GIB® technical publication (e.g. *GIB® Fire Rated Systems* or *GIB® Noise Control Systems*) for the appropriate information.

Wall Framing

- Steel stud dimensions to be minimum 63 x 34 x 0.55mm nominal with a 6mm return
- Steel channel dimensions to be minimum 63 x 30 x 0.55mm nominal
- Studs shall be spaced at 600mm centres maximum
- Ensure that the studs are placed with the open side facing in the same direction (see *GIB® Site Guide*).

Fasteners

- 25mm x 6g GIB® Grabber® Self Tapping Drywall Screws.

Fastener Centres

- 300mm centres to top and bottom channels and to end studs
- Single screws to each stud where the horizontal joint crosses the studs
- Place fasteners 12mm from sheet edges
- Daubs of GIBFix® All-Bond adhesive OR screws at 300mm centres to intermediate studs
- Do not place adhesive at sheet edges or under fasteners. Sheet edges at door or window openings can be adhesive fixed.

Lining

- Lay the sheets, leaving a 5-10mm gap at the floor line.

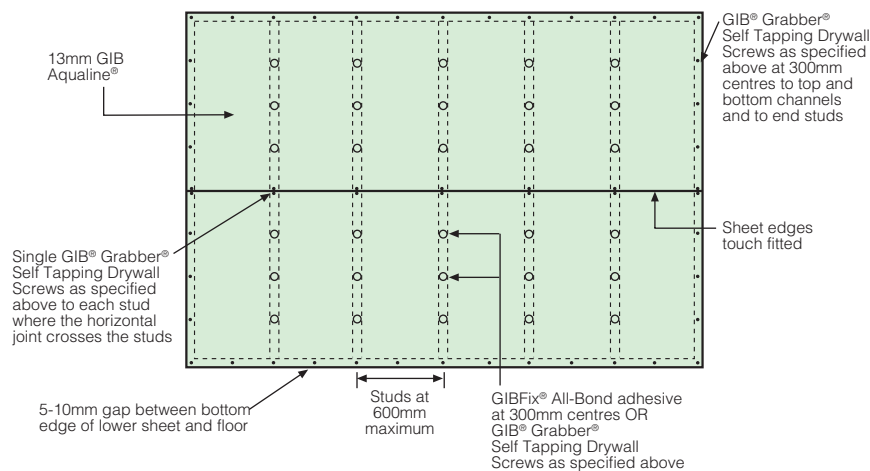
Note: If friction fitted steel studs have been used, sheets must be fitted hard to the floor. Ensure floor is cured and dry

- Sheets to be touch fitted.

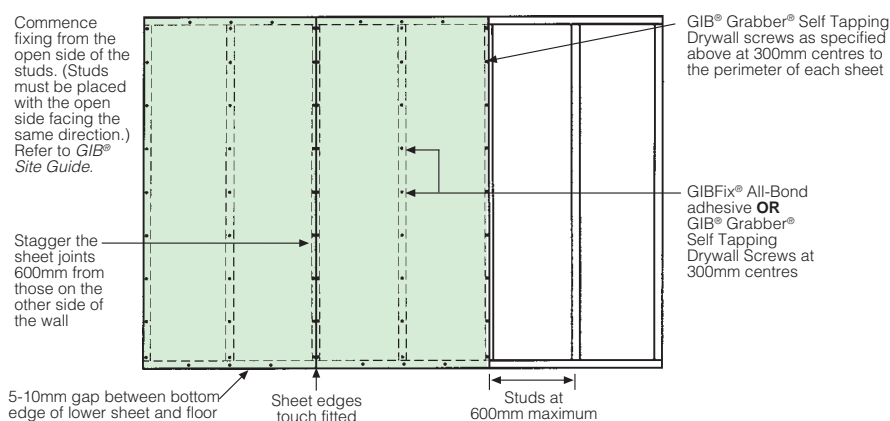
Jointing

- Jointing shall be carried out in accordance with the instructions in the *GIB® Site Guide*. GIB® AquaMix is recommended for the first two coats.

Fastening and Jointing the Linings – Horizontal Fixing



Fastening and Jointing the Linings – Vertical Fixing





Important: See page 6 and 7 for waterproof membrane requirements.

Wall Framing

Framing dimensions and spacing must comply with the requirements of NZS 3604:1999 or relevant NZ Standard.

- Prior to lining in tiled areas (shower cubicles and shower over bath only) the internal corners shall be reinforced with a minimum 32 x 32 x 0.55mm galvanised metal angle. Each side of the angle shall be fastened to the framing with 30mm galvanised clouts at 300mm centres
- Steel stud systems do not generally require nogs except as below:
 - Adjacent to each pipe penetration and behind sink and tub flashings
 - Between all studs above bath flanges and preformed shower bases
- For impact protection in shower cubicles or shower over bath situations it is important that all sheet joints are made on solid framing. This may require either vertical fixing of the GIB Aqualine® or the installation of some additional nogs.

Fasteners

- For 10mm GIB Aqualine® use minimum 25mm x 6g GIB® Grabber® Drywall Screws
- For 13mm GIB Aqualine® use minimum 32mm x 6g GIB® Grabber® Drywall Screws.

Fastener Centres

- GIB® Grabber® Drywall Screws at 100mm centres to perimeter of wall and to all intermediate studs
- Adhesive is not to be used in place of mechanical fastenings.

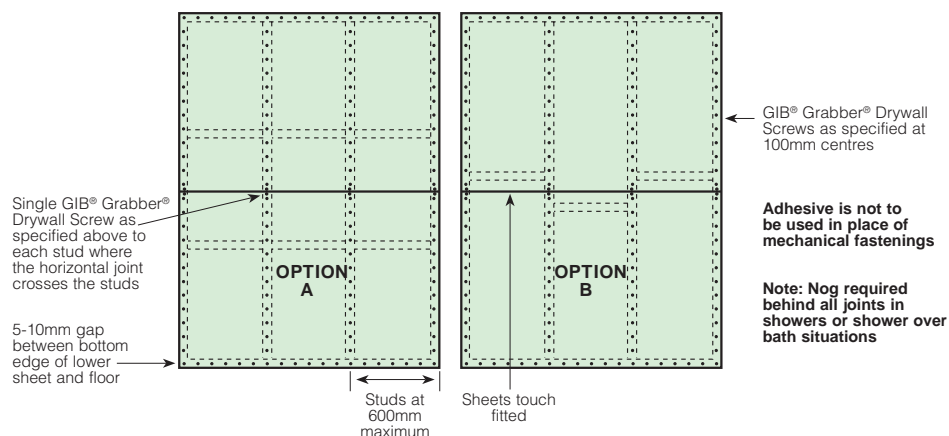
Lining

- 10mm or 13mm GIB Aqualine® is suitable for use on timber framing and for tile weights up to 20kg/m²
- 13mm GIB Aqualine® must be used for tile weights between 20 and 32kg/m² and when light steel framing has been used
- GIB Aqualine® may be fixed vertically or horizontally
- Provide a 5-10mm gap at the wall/floor junction
- Provide a 5-10mm gap between the bottom edge of the GIB Aqualine® and any bath rim or preformed shower base to allow for placement of sealant
- GIB Aqualine® sheets shall be touch fitted
- Where the framing or fastener centres required for tiled areas are closer than those specified for GIB® Fire Rated and GIB® Noise Control Systems, the tiling specification shall prevail. Where relevant, check that fastener lengths comply with the requirements of GIB® Fire Rated Systems or GIB® Noise Control Systems.

Jointing

- Jointing shall be carried out in accordance with instructions in the *GIB® Site Guide*
- Water resistant GIB® AquaMix is recommended for the first two coats
- No top coat is required.

Fastening the Linings – Horizontal Fixing in Tiled Areas



Note:

GIB Aqualine® is suitable for tiling to full height of walls, but if a wall is to be partially tiled (i.e. half high), only the area of wall under the tiles needs to be fixed as above. The remainder of the wall may be fixed as for non-tiled area (see page 10 & 11).



Ceiling Framing

Framing dimensions and spacing must comply with the requirements of NZS 3604:1999 or relevant NZ Standard. If bracing, noise control, fire rating considerations exist consult the relevant GIB® publication for appropriate information.

Fasteners

- Steel battens – 25mm x 6g GIB® Grabber® Self Tapping Drywall screws
- Timber battens or Joists – 32mm x 6g GIB® Grabber High Thread Drywall screws.

Adhesives

- Steel battens – GIBFix® All-Bond
- Timber battens – GIBFix® Wood Bond (not suitable for LOSP treated timber).

Fasteners Centres

- Single screws to the edges and centre of the sheets across each batten
- Screws to be 12mm from sheet edges
- Daubs of adhesive at 200mm centres between the screws
- Do not place adhesive at sheet edges or under fasteners, this may lead to screw or nail pops.

Lining

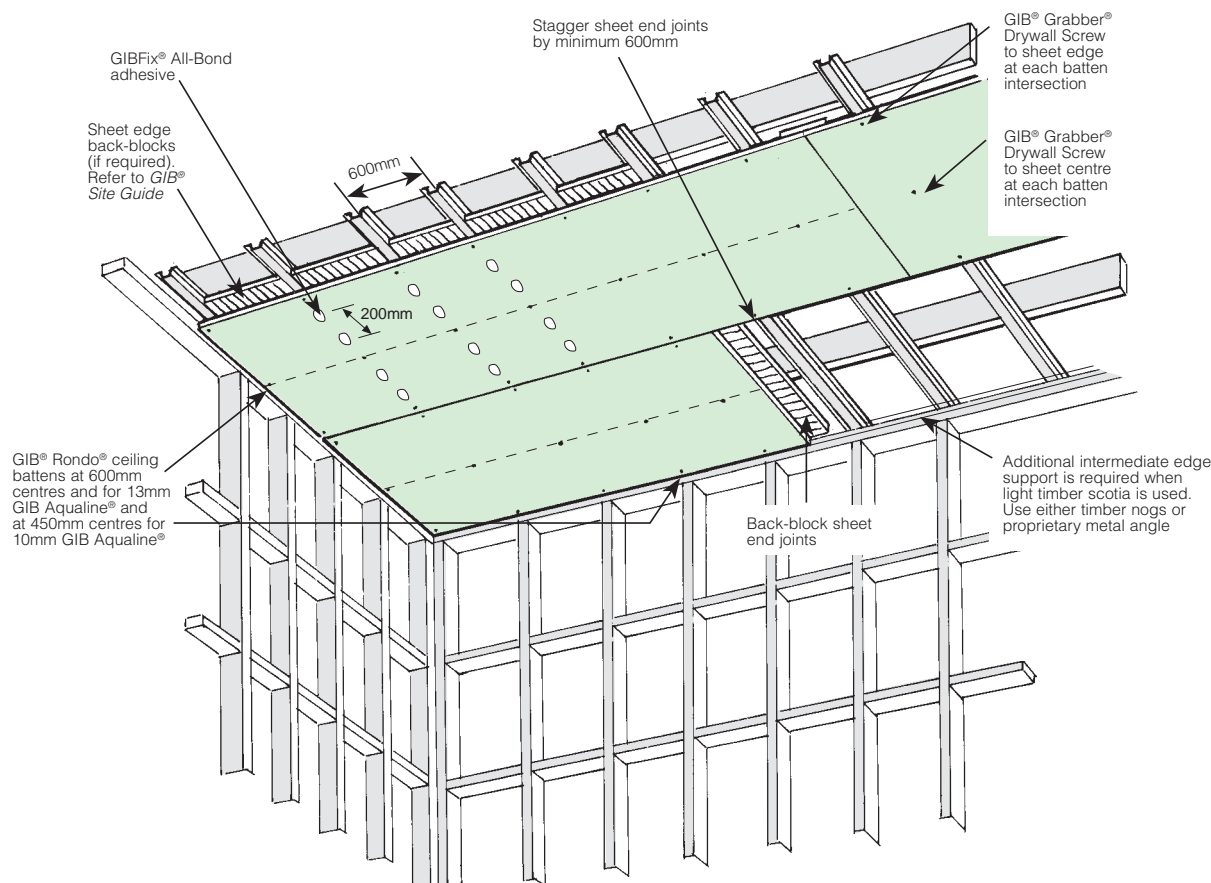
- The lining shall be fixed at right angles to the battens or joists
- Commence fixing from the centre of the sheets outwards
- Sheets to be touch fitted
- Use long length sheets to minimise sheet end butt joints
- Back-block sheet end butt joints
- See GIB® Site Guide for sheet edge backblocking requirements.

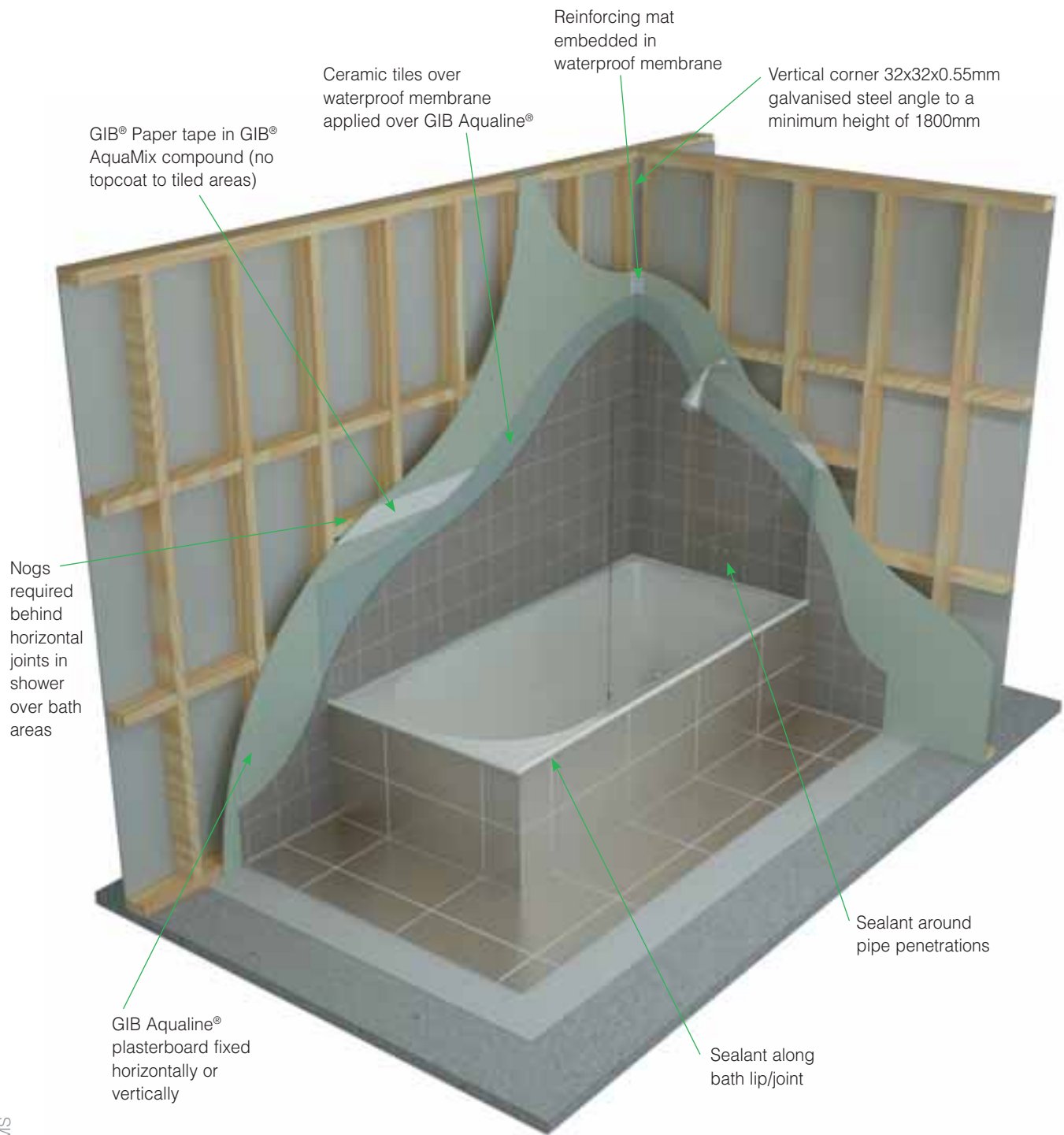
Batten Spacings

- 13mm GIB Aqualine® plasterboard – 600mm centres max
- 10mm GIB Aqualine® plasterboard – 450mm centres max.

Jointing

- All sheet joints must be paper tape reinforced and stopped in accordance with instructions in the *GIB® Site Guide*. Water resistant GIB® AquaMix is recommended for the first two coats.
- Do not fix tiles to GIB® plasterboard ceilings.





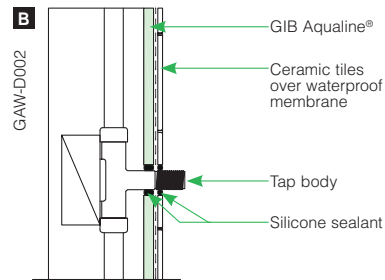
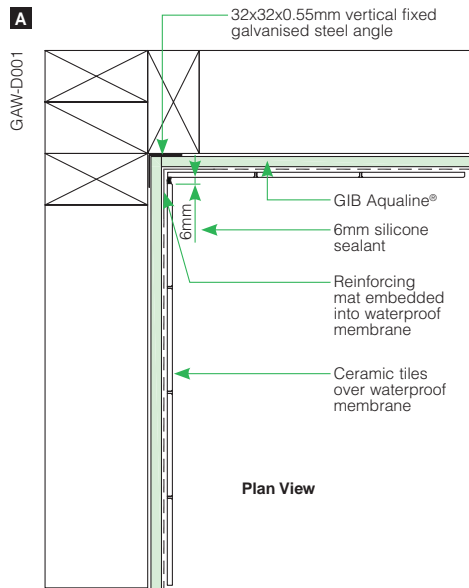
Run a bead of silicone sealant around the mixer unit on the tiles extending below the bottom of the pipe aperture.

For typical details, see the following pages.

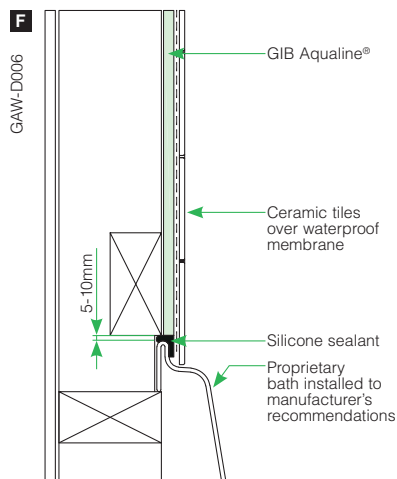
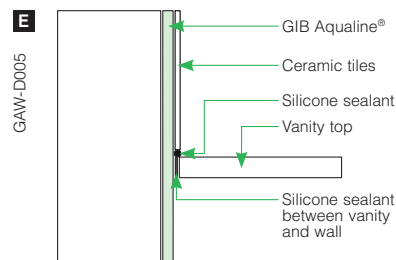
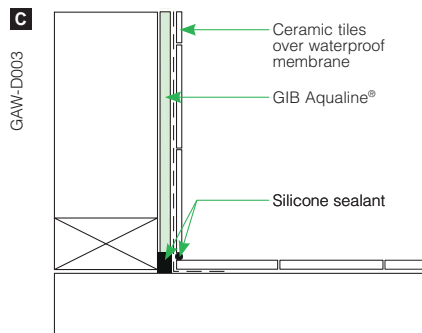
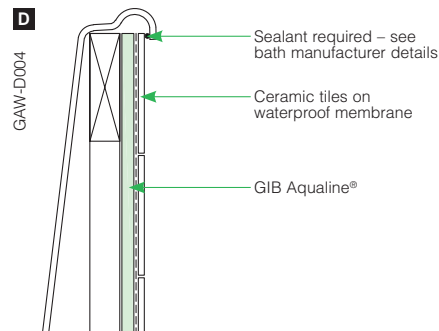


Shower Over Bath – Tiled Walls

MARCH 2007



Note:
Where impact noise from pipes is an issue, fix all pipes on resilient brackets.

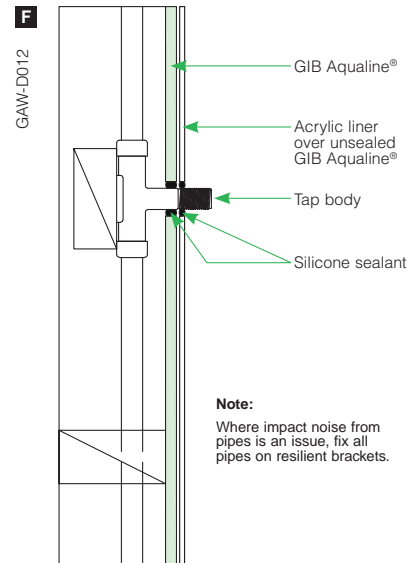
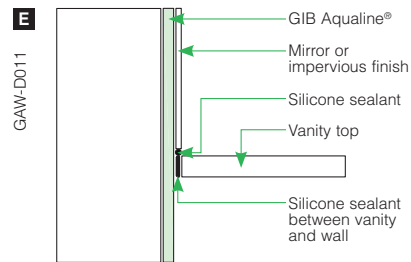
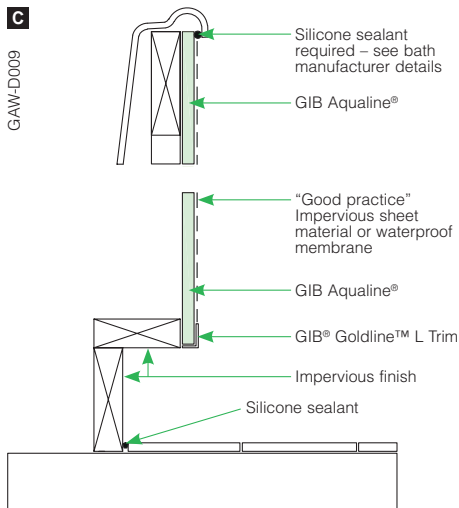
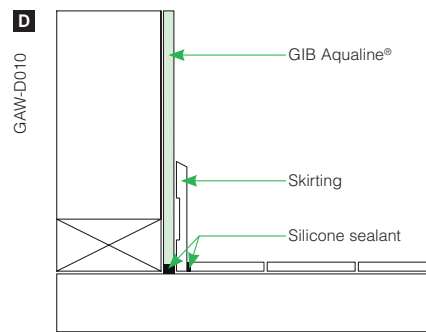
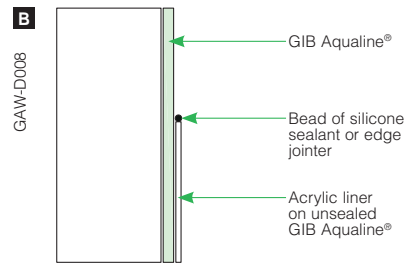
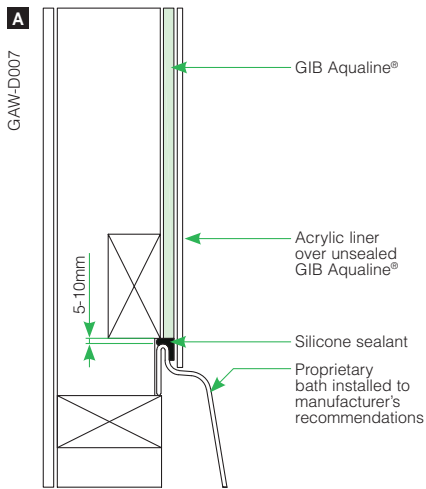


GIB AQUALINE® WET AREA SYSTEMS – TYPICAL DETAILS



Shower Over Bath – Acrylic Liner

MARCH 2007

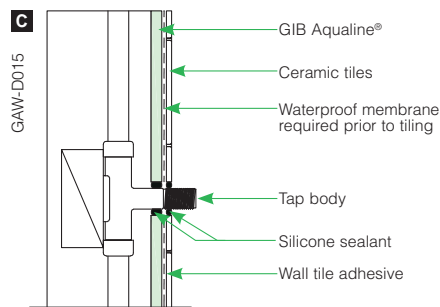
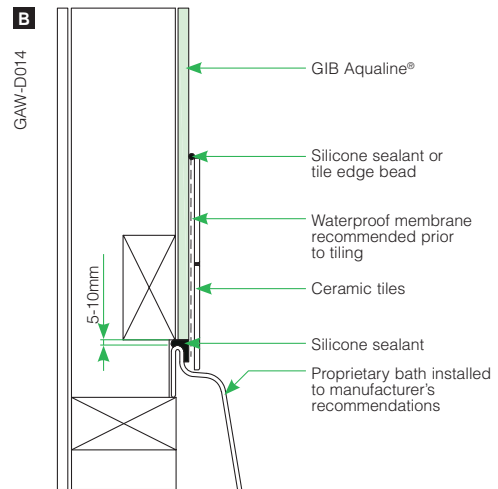
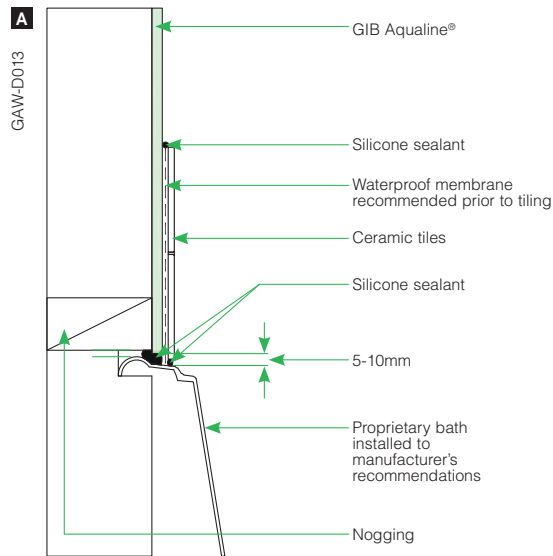


GIB AQUALINE® WET AREA SYSTEMS – TYPICAL DETAILS

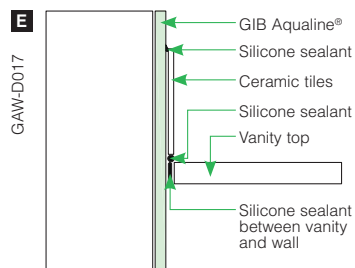
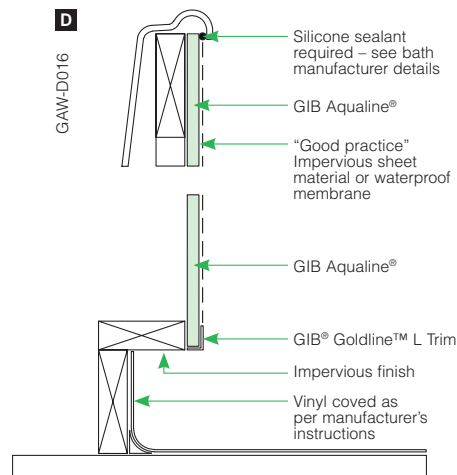


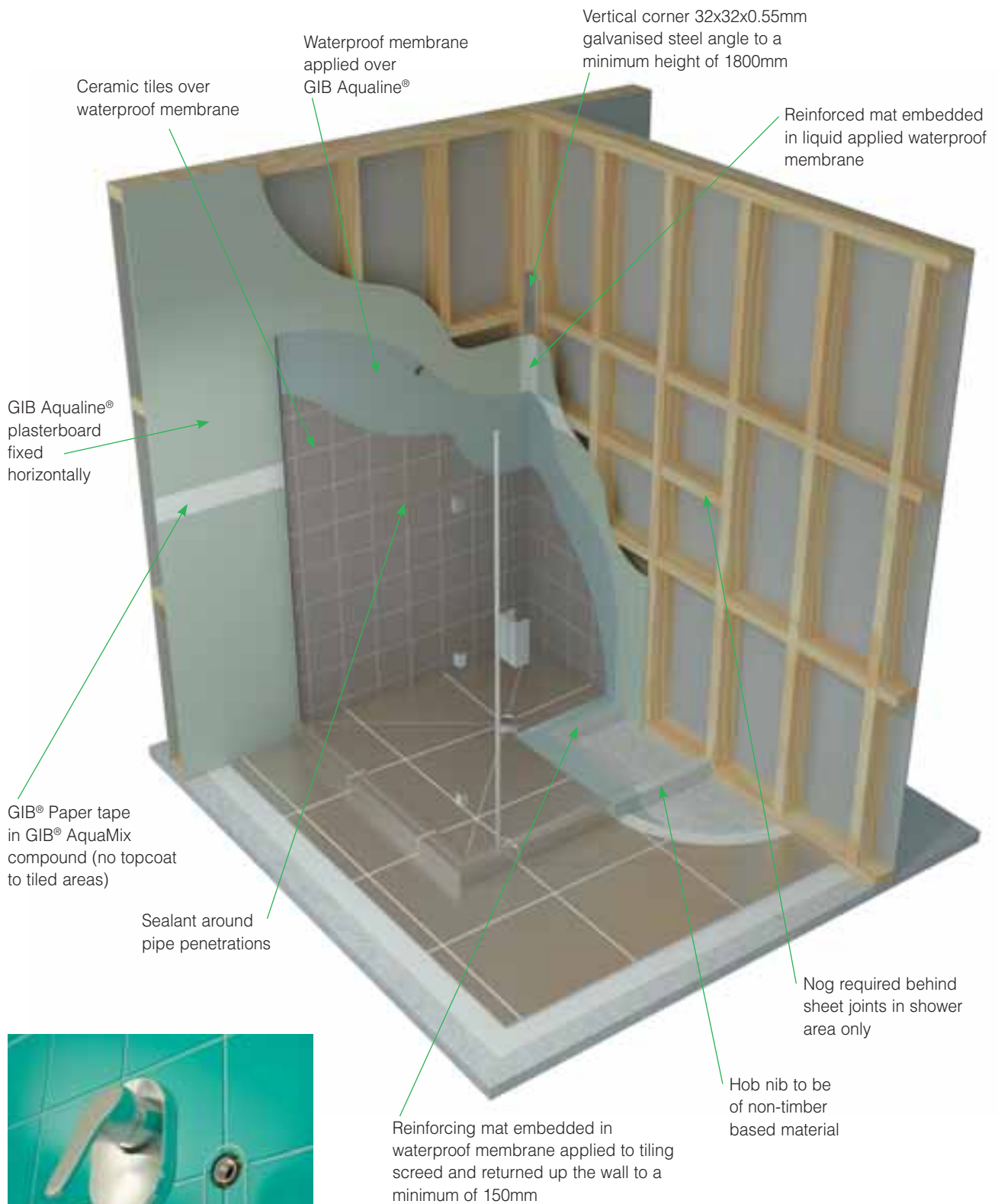
Bath – Tiled Upstand

MARCH 2007



Note:
Where impact noise from pipes is an issue, fix all pipes on resilient brackets.





Run a bead of silicone sealant around the mixer unit on the tiles extending below the bottom of the pipe aperture.

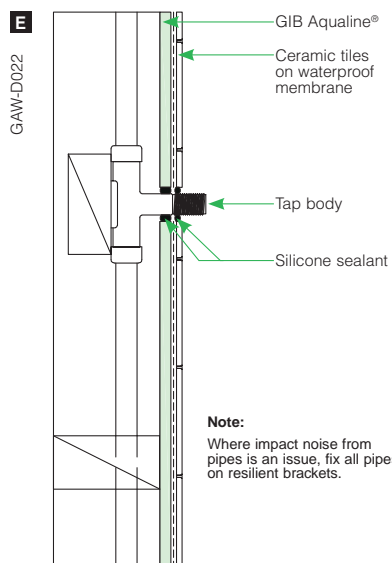
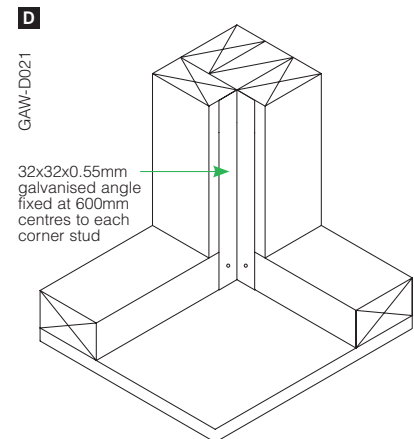
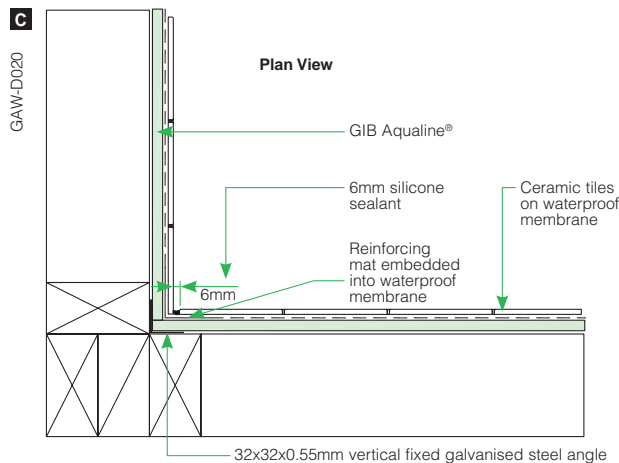
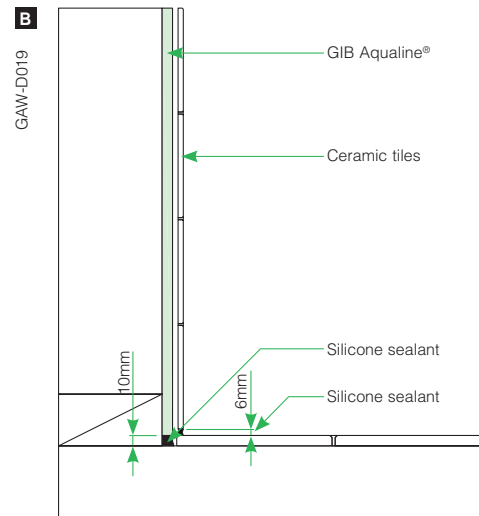
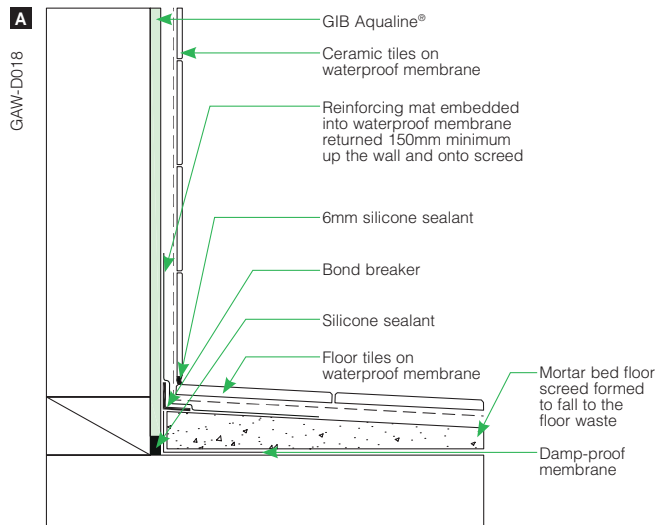
For typical details, see the following pages.

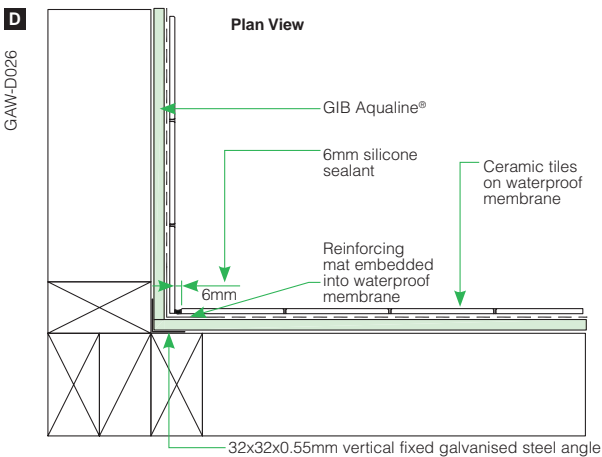
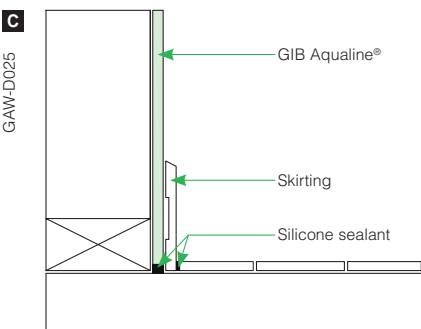
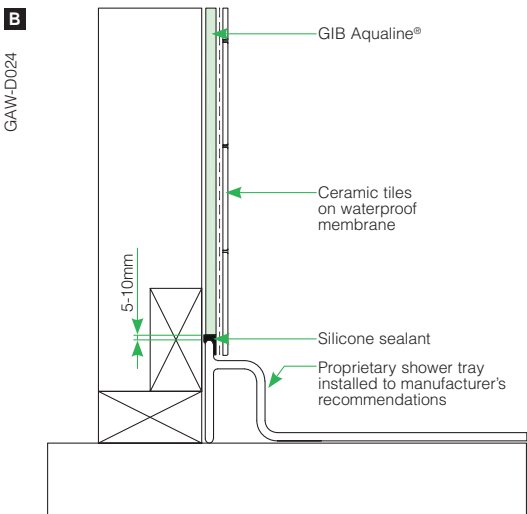
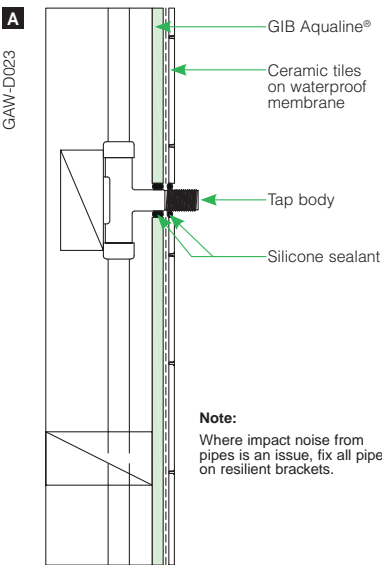
GIB AQUALINE® WET AREA SYSTEMS – TYPICAL DETAILS



Shower – Tiled Walls and Base

MARCH 2007

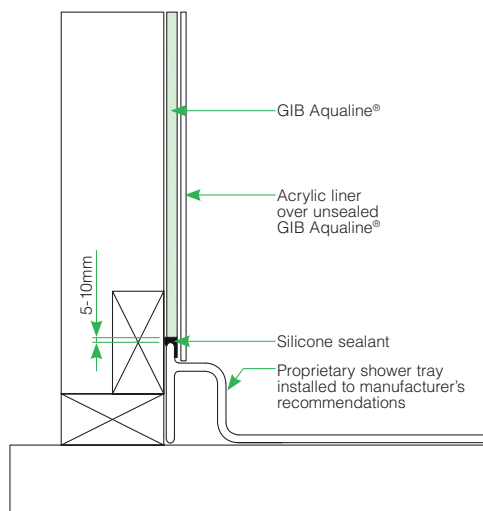






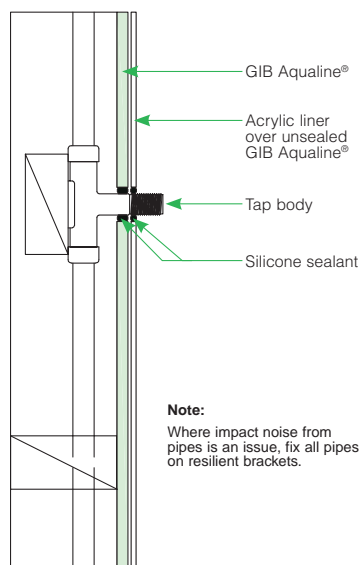
A

GAW-D027



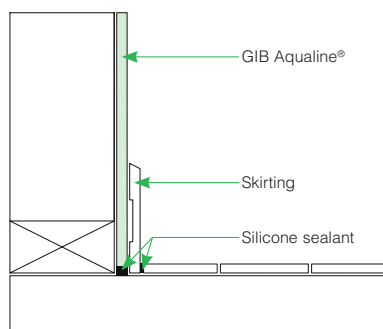
B

GAW-D028



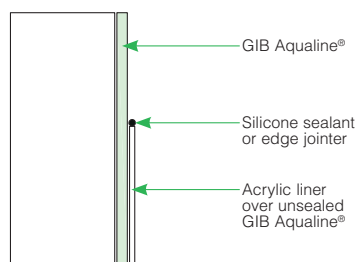
C

GAW-D029



D

GAW-D030



GIB AQUALINE® WET AREA SYSTEMS – TYPICAL DETAILS

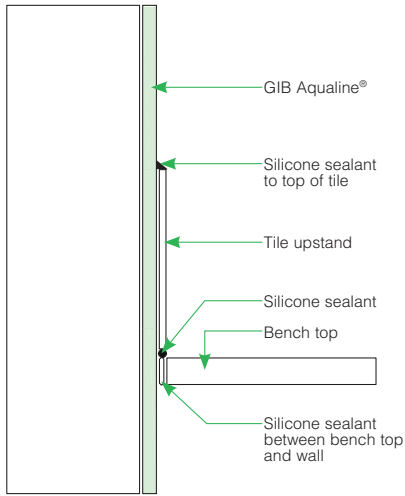


Kitchen and Laundry

MARCH 2007

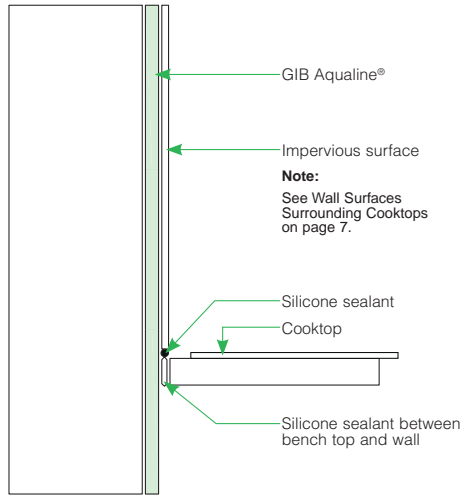
A

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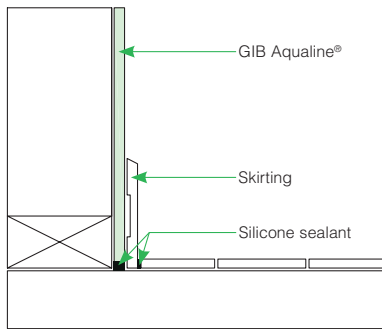
B

GAW-D032



C

GAW-D033



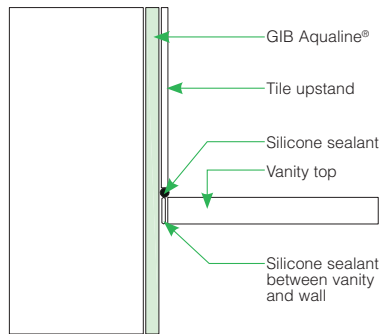
GIB AQUALINE® WET AREA SYSTEMS – TYPICAL DETAILS



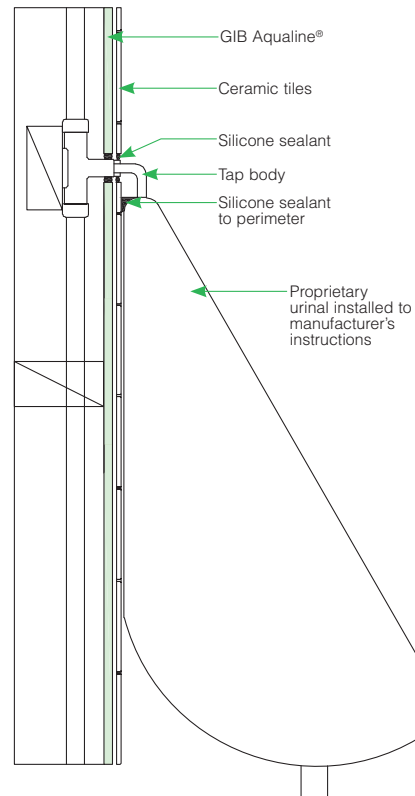
Office, Workplace or School Bathroom

MARCH 2007

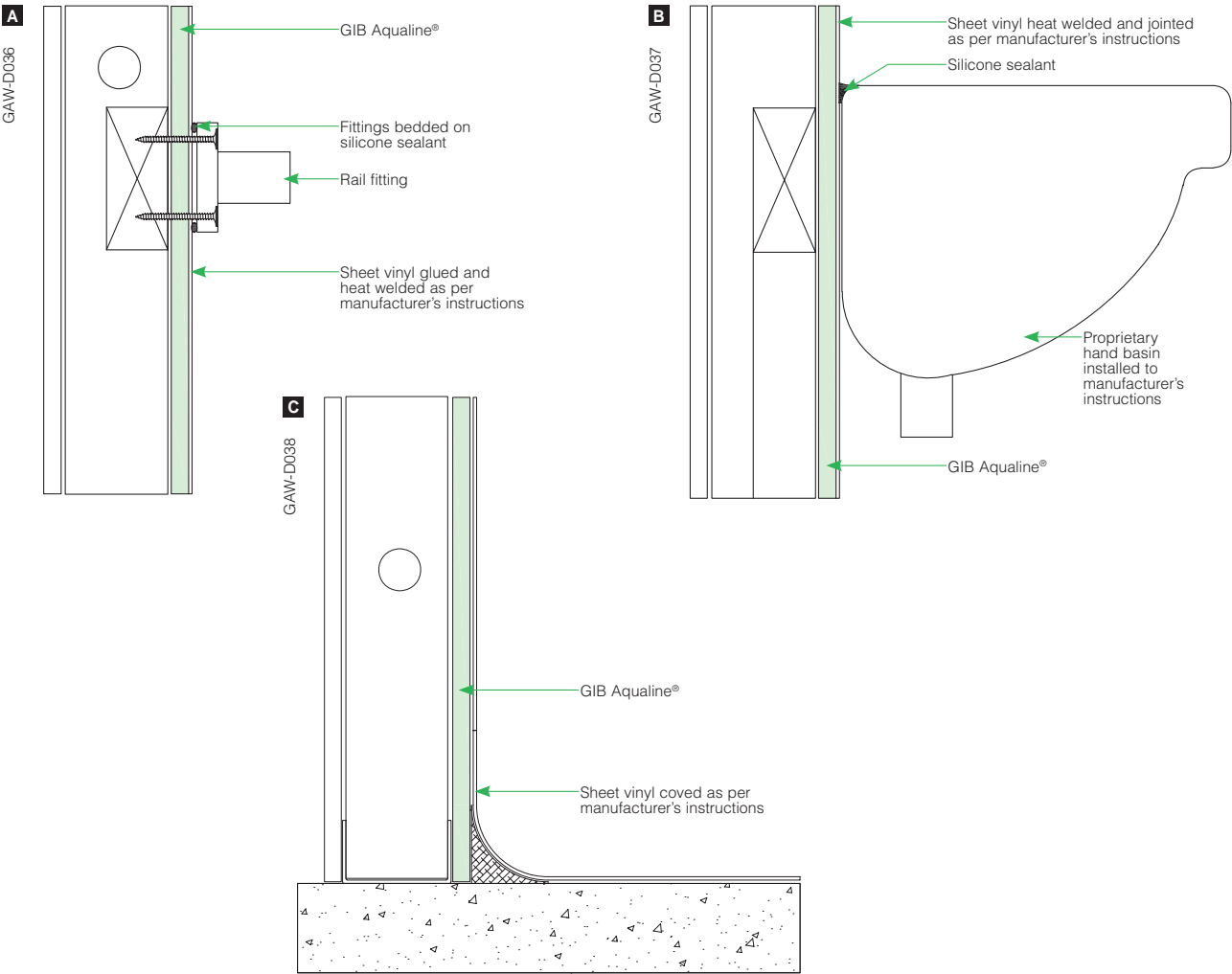
A
GAW-D034



B
GAW-D035

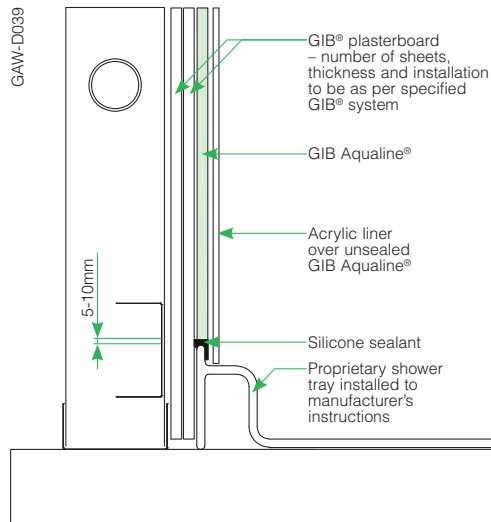


GIB AQUALINE® WET AREA SYSTEMS

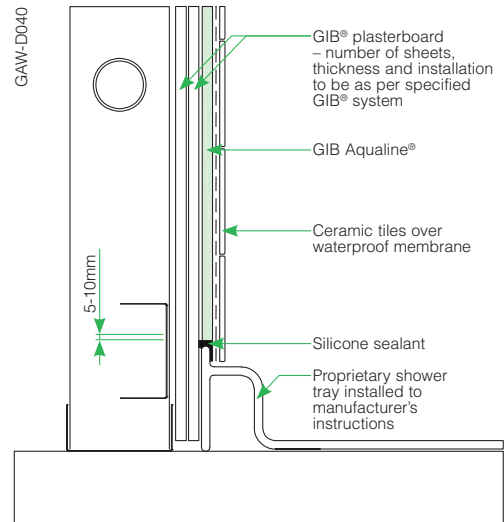




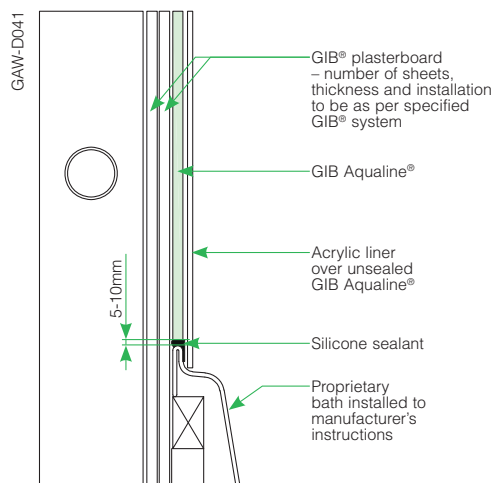
Shower – Acrylic Liner



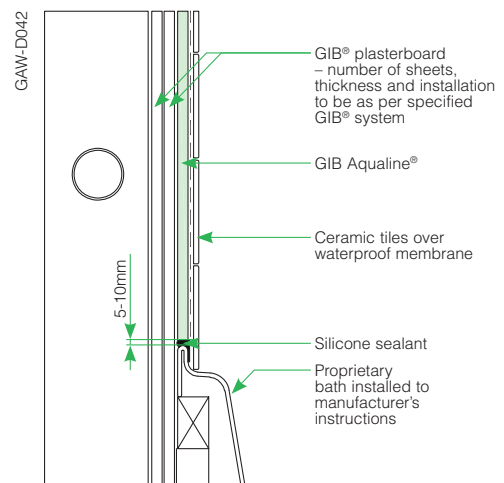
Shower – Tiled Walls



Shower Over Bath – Acrylic Liner



Shower Over Bath – Tiled Walls



GIB Aqualine® Fire Resistance and Noise Control Performance

When GIB Aqualine® is substituted into GIB® Fire Rated systems in place of the equivalent thickness GIB Fyrelite®, the Fire Resistance Rating (FRR) of that system will be maintained.

When GIB Aqualine® is substituted into GIB® Noise Control systems in place of the equivalent thickness GIB® Standard plasterboard or GIB Fyrelite®, the STC and IIC rating of that system will be maintained. When GIB Aqualine® is substituted in place of the equivalent thickness GIB Noiseline®, a small performance loss may occur. For further information contact the GIB® Helpline on 0800 100 442.



Specification and Installation Checklist

MARCH 2007

Contract ID	
Site Address	
Client Name	
Designer	
Builder	
Plasterboard Installer	
Plasterboard Supplier	
Tiler	
Shower Installer	

DESIGNER	YES	NO	CHECKED BY	DATE
GIB Aqualine® specified for wet areas and appropriate details included on plans?				
Are tiled areas clearly shown on plans?				
Is area requiring waterproof membrane clearly shown on plan?				
Is the waterproof membrane required to be installed by a licensed applicator? If so, is this noted on the documentation?				
No bracing behind shower or bath?				
BUILDER	YES	NO	CHECKED BY	DATE
Galvanised steel angle installed to the internal corners of tiled shower?				
All sheet joints in showers to be made on solid timber. This may require some additional dwangs for horizontal board installation.				
PLASTERBOARD INSTALLER	YES	NO	CHECKED BY	DATE
10mm GIB Aqualine® for tiles up to 20kg per m²?				
13mm GIB Aqualine® for tiles up to 32kg per m²?				
GIB Aqualine® mechanically fastened at 100mm centres when tiles are to be installed?				
All junctions between GIB Aqualine® and walls, floors, baths, showers and other elements are correctly sealed with appropriate sealant?				
Pipe penetrations sealed?				
PLASTERBOARD STOPPER	YES	NO	CHECKED BY	DATE
Air drying compound (e.g. GIB ProMix® or GIB Plus 4®) not to be used on areas to be tiled.				
Recommended that GIB® AquaMix is used in wet areas.				
TILER	YES	NO	CHECKED BY	DATE
Waterproof membrane applied to shower areas prior to tiling?				
SHOWER INSTALLER	YES	NO	CHECKED BY	DATE
GIB Aqualine® walls must not be sealed or painted under where acrylic linings are to be installed.				
Ensure GIB Aqualine® is free from dust before installation of acrylic liners.				
Sealant applied to top edge of acrylic shower linings?				
BUILDER/PLUMBER	YES	NO	CHECKED BY	DATE
Sealant applied under penetration face covers?				

HowTO install this AluSealed® Single sliding door unit



Before you start:

READ this HowTO CAREFULLY!

(It could save you
lots of work!)

Other CS Cavity Sliders fitted with aluminium
jambes are covered by this HowTO:

EasyOpen® WC	(EO)
SofStop®	(SF)*
SoundStop®	(SS)*
Servery™	(SERV)
Hi-ImpactJambes™	(HI)

* Extra data sheets may be required for these units.

Keep this HowTO handy.
You may need it later on.

Another quality product from:



WHAT YOU NEED TO KNOW FIRST.

Construction of the wall.

The wall referred to in these instructions is ex 100mm x 50mm wooden framework. In reality this may mean a 94mm x 47mm or 90mm x 45mm wooden framework. Although not shown, the unit covered in this HowTO may also be fitted into other types of wall materials (steelstud, concrete, brick, etc.).

For concrete or masonry type walls:
fix a 100mm x 50mm timber fixing plate into the opening on both sides and under the head.
Fix these in place with ø10mm x 98mm long countersunk masonry anchors at 400mm centres.

Lintel or trimmer sizes.

CS Cavity Sliders are non-loadbearing units. They require the lintel (or trimmer, ceiling joist or structural component) directly above the track to span the full trim size opening width. Timber lintels sized from NZS3604 are acceptable if the weight of the door leaf/leaves is less than 75kg/m total door width. If heavier, specific design is required for all other kinds of structural components and for the timber lintels.

The hole in the wall.

Calculation of how big the hole in the wall framing should be to fit in this unit:

CS AluSealed Single unit

Height = door leaf height + 95mm (Also EO, SERV, SS, HI)

Height = door leaf height + 105mm (SF Only)

Width = (door leaf width x 2) + 30mm (Also SERV, SF, SS, HI)

Width = (door leaf width x 2) - 70mm (for EO only)

Standard clearances under the door.

With this CS AluSealed unit sitting hard on top of the concrete or timber floor, the clearance under the door leaf ranges between 22 - 30mm (adjustable). The majority of these standard clearances is taken up by the floor covering (e.g. carpet, tiles etc.).

Modified clearances under the door.

If you require **more** than 30mm clearance under the door: pack the CS AluSealed unit off the floor by the extra amount you need.

If you need **less** than 22mm clearance under the door leaf (e.g. for polished timber floors) there are three options to do this:

- A CS FOR DOORS can supply special seals that can be fitted to the bottom of the door leaf.
- B* A door leaf up to 15mm taller can be fitted.
- C* The whole cavity can be made up to 15mm shorter.
(*B & C are only available when pre-ordered.)

Contamination of the top track.

Never drill, nail or screw through the centre section of the track. Make sure no dirt, grit or aluminium swarf gets into the track. This could impair the smooth running of the carriages.

Fixing cavity slider to the floor

Installing the cavity slider 100% plumb and level will **NOT** guarantee a correctly sliding door. If any of the wall, lintel, floor and door are not plumb and straight this can cause the door to slide incorrectly into the pocket. It is for this reason that the skirting block fixing (found at the base of the cavity slider behind the split jambes) is only secured once you have ensured door is running parallel to the cavity pocket.

NOW FOR THE INSTALLATION ITSELF.

1 Remove packaging and check components.

Lay the CS AluSealed unit flat on the ground in front of the door opening. Remove the transportation cleat (if still fitted) from the bottom plate assembly. (Take out the two screws and the three staples.)

Check for any obvious product defects.

Lay the unit on its back and sight the gap to check for normal clearances (drawing T).

If anything looks out of specification or you are unsure, contact CS before beginning your install.

2 Fit the door leaf (if not already fitted). Refer to 'Fitting your own door', overleaf).

3 Fit the closing jamb to the unit (U & W).

Ensure the closing jamb plate is fitted to the top of the closing jamb as shown (drawing W) with the bent lug towards the face side of the closing jamb. Fit the closing jamb using 2 screws 8 gauge x 25mm long, as supplied.

For NoClosingJamb (NCJ) detail option ignore this (refer to the Additional HowTO Information sheet).

4 Place the whole unit into the framed opening in the wall (drawing U).

Check that the jack studs on both sides of the door opening are plumb in both directions.

5 Fix the aluminium back stud.

Plumb-up the two aluminium split jambs (drawing U). Use a level!

While keeping the split jambs plumb, pack behind the aluminium back stud as shown.

Screw the aluminium back stud including the packing to the 100mm x 50mm jack stud through the pre-punched holes.

Timber studs: use 8 gauge x 29mm wood screws.

Steel studs: 8 gauge x 29mm self-tapping screws (For NCJ detail option the track should butt into the finished wall lining. Refer to the Additional HowTO Information sheet).

6 Level the track (drawing W).

The track must be fitted level and straight.

The track for all units with doors over 910mm wide must be fixed to the lintel at 600mm centres through the aluminium flanges on both sides of the track (drawing W). Fit the first screws 50mm back from the closing jamb end of the track.

For **timber** lintels: Use 8 gauge screws penetrating the lintel by at least 25mm.

For **light steel** lintels (under 2mm wall thickness): Use 8 gauge self-tapping screws which penetrate the lintel by at least 5mm.

For **heavy steel** lintels:

Use M5 machine bolts and nuts.

For **Full-Height** (FH) detail option:

The bottom of the track should finish flush with the underside of the finished ceiling (refer to the Additional HowTO Information sheet).

7 Fix the closing jamb (if required) (drawing U). Plumb closing jamb. Use a level!

Pack and screw to the jack stud through the pre-drilled holes in the centre of the closing jamb.

First: fix the top of the closing jamb (drawing U).

Second: fix the bottom of the closing jamb.

7 For **timber**: use 8 gauge x 50mm wood screws For **steel**: use 8 gauge self tapping screws.

Ensure that the distances between the closing jamb and the split jamb are the same.

The distance at the bottom must never be more than the distance at the top.

Measure this carefully!

Fix between the top and bottom. Use a straight edge to make sure that the closing jamb is straight.

Aluminium plugs are supplied to cover the fixing holes. Put these in only when you are satisfied with the complete installation!

8 Fix the bottom plate assembly (drawing X).

The door must slide parallel with the bottom plate assembly (see the 2 sets of black A-A arrows).

If not, gently tap the front of the assembly to the left or right until it does.

The door should now slide smoothly and fit into the recess in the closing jamb, leaving parallel gaps on either side between the door leaf and the closing jamb.

Fix the skirting block fixing to the floor only when the cavity pocket has been adjusted so that the **door closes neatly into the closing jamb and slides parallel to the bottom plate of the cavity slider.**

Fix the bottom plate assembly to the floor as follows:

■ To **concrete** floors: Fix with ø8mm x 90mm masonry anchors through the pre-drilled holes in the skirting fixing blocks of the bottom plate. (See the red stamped arrow on the timber).

■ To **timber** floors: Fix the bottom plate assembly with ø3.15mm x 75mm nails on either side in the centre of the skirting fixing block thickness. (See the red stamped ⊕ on the timber). Pre-drill ø3mm holes for these nails.

9 Adjust the door height (drawing V). Use the small end of the spanner supplied to rotate the hexagonal nut at the bottom of the carriage hanger shaft. Adjust the doors for plumb.

To **raise** door: Rotate spanner from **left to right**.

To **lower** door: Rotate spanner from **right to left**.

Note: The top of the hanger shaft screws into a self-locking nut. If the hexagonal nut is turned downwards too far, the shaft will become loose from the self-locking nut. If the turning resistance suddenly feels much easier, you have gone too far.

10 Fit the head jambs (drawing W).

Before fitting head jambs, check that you have the desired clearance under the door and that the door is plumb (instruction 9).

Slide the head jambs into place between the vertical jambs. (For NCJ refer to the Additional HowTO Information sheet).

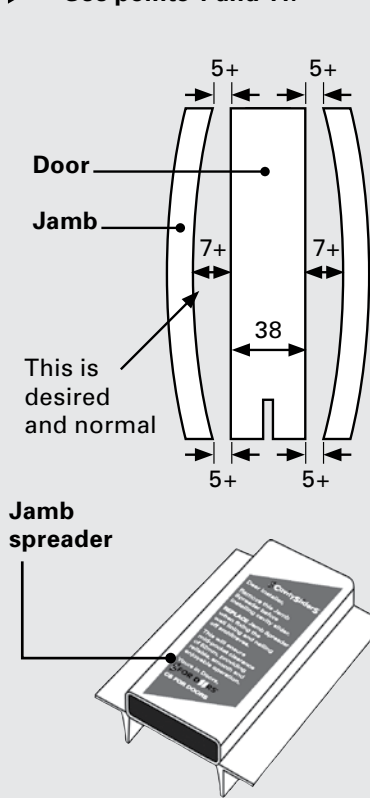
'Flush up' the joints. Then screw them into place with the 8 gauge x 19mm long hex head screws (as supplied) through both ends at the top of the head jambs.

For doors wider than 1000mm, screw fixing with 4 gauge x 10mm long pan pozi screws may be required. Fix these through the small flange of the head jamb that rests on the underside of the track. NOTE: These screws are **NOT** required for CS SofStop units.

Go to page **4** (overleaf) →

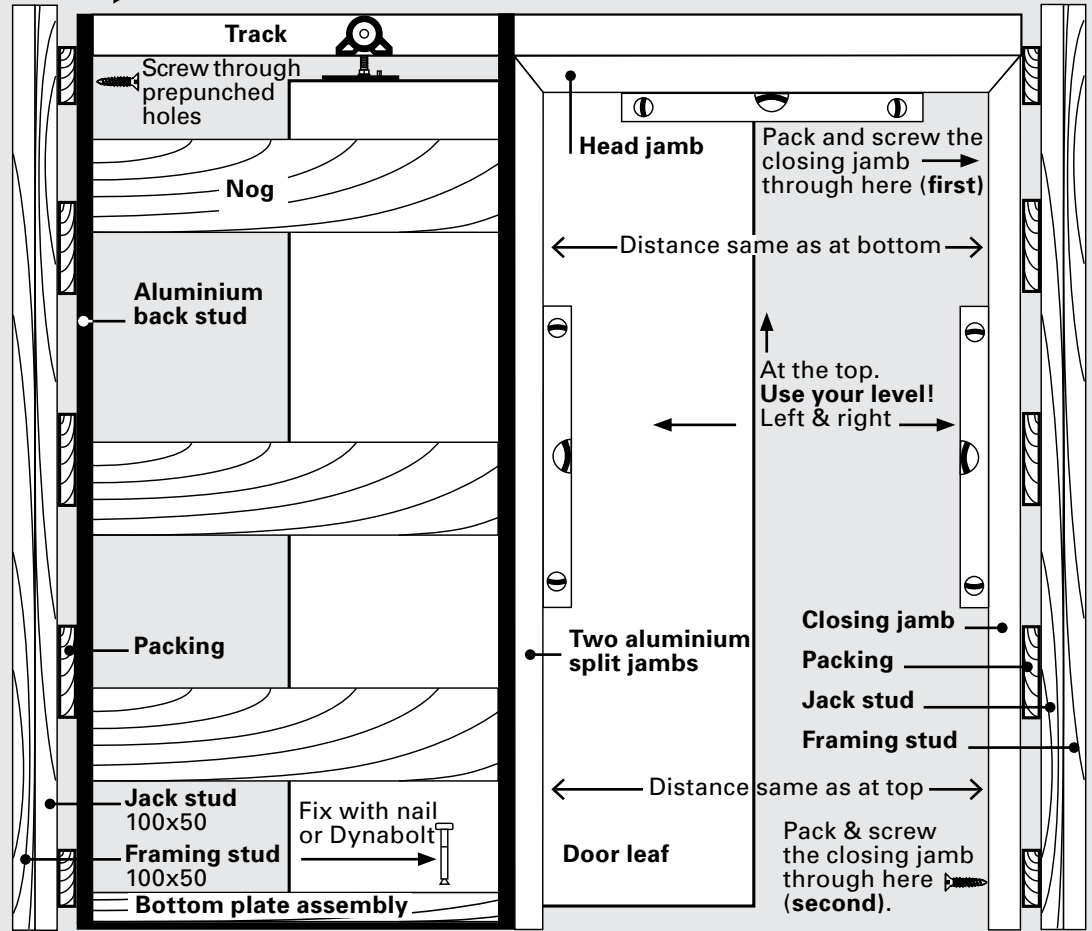
T JAMB CLEARANCE

See points 1 and 11.



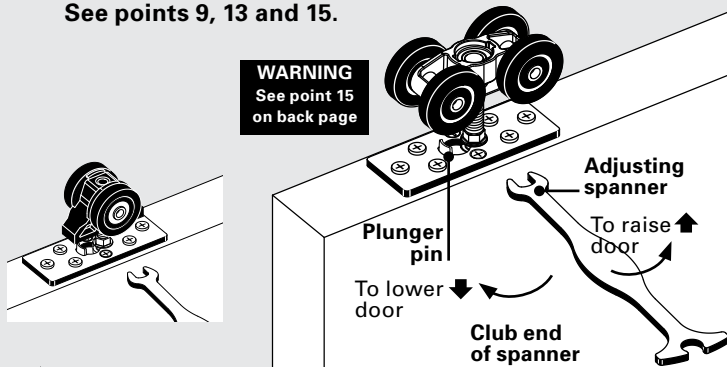
U ELEVATION

See points 3, 4, 5, 7.



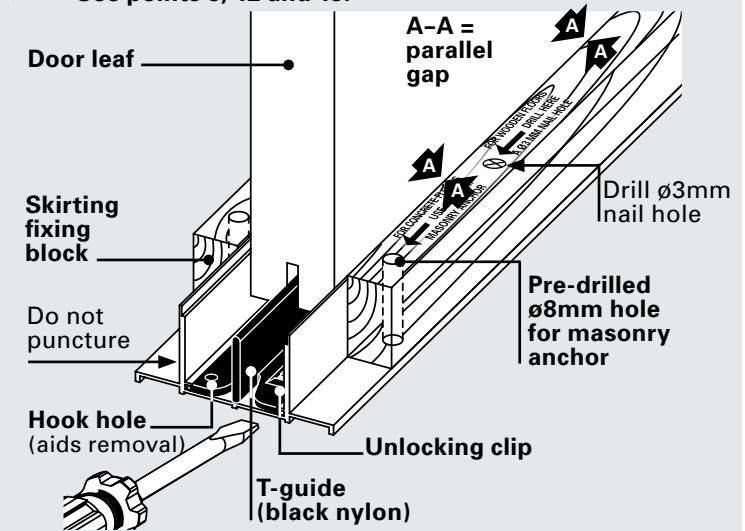
V ADJUSTING & REMOVING CarriSnap™ CARRIAGES

See points 9, 13 and 15.



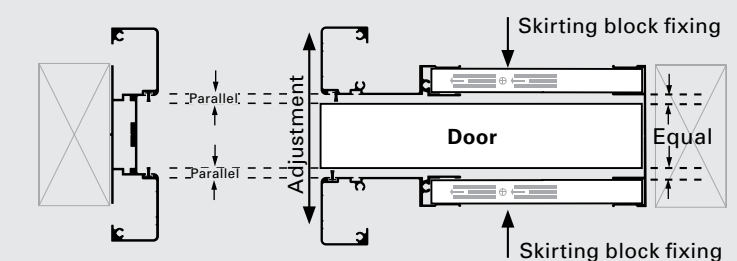
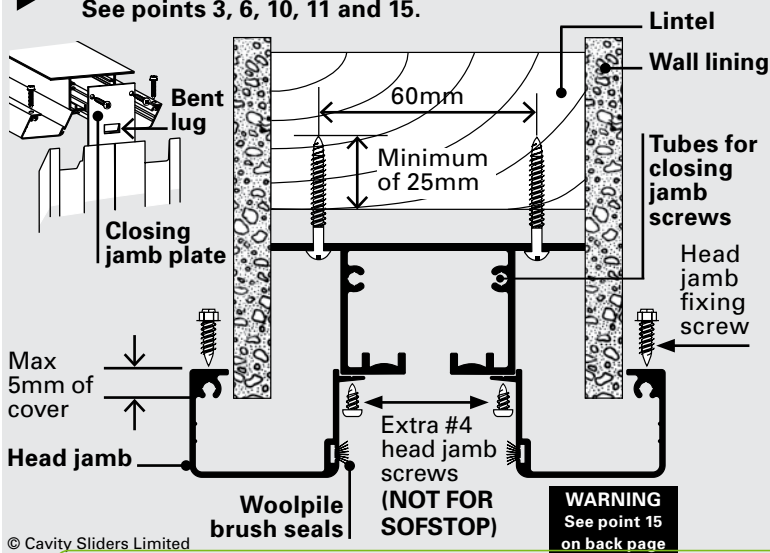
X BOTTOM PLATE ASSEMBLY

See points 8, 12 and 13.



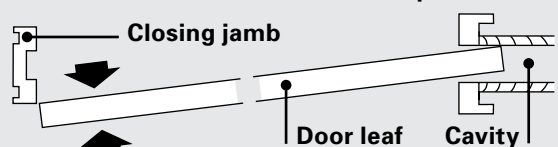
W TRACK CROSS SECTIONS

See points 3, 6, 10, 11 and 15.



Y DOOR REMOVAL

See point 13.



- 10 For Serveries units (SERV) the sill (not included unless asked for) should be fitted neatly between the vertical jambs.

FINISHING THE INSTALLATION.

11 Fixing the wall linings.

Where possible, the supplied 'jamb spreader' (drawing T) should be inserted into the cavity slider opening prior to fixing wall linings and architraves.

Wherever possible, linings should only be glued on. Use short drywall screws to hold linings in place until glue is dry. For 13mm linings use maximum 28mm long drywall screws. We recommend sealing the inside of the plasterboard linings prior to fixing.

Note: When fixing wall linings above the head jambs do not allow the linings to finish lower than 5mm below the top of the head jamb (drawing W).

12 If fitting skirtings (drawing X).

When you fix the skirtings, make sure that you do **not** puncture the aluminium extrusion of the bottom plate assembly.

The maximum length of the panel pins are the combined thicknesses of the skirting and the wall lining **plus** 17mm.

Do not hammer too hard against the bottom plate. This may damage the channel through which the door leaf runs.

13 Removing the door leaf (drawing V & Y).

Begin by removing the head jamb from one side (if fitted).

Fit the club end of the adjusting spanner over the hexagonal nut at the bottom of the hanger pin (drawing V).

Use the extended part of the spanner to press down the plunger pin that protrudes up from the mounting plate. Once this plunger is fully depressed, slide the spanner sideways towards the plunger pin.

The whole carriage (including the shaft) will now disengage from the mounting plate.

It is not always easy to slide the spanner sideways. You may need to relieve the door's weight by putting a wedge between door and floor.

If you need to remove the T-guide: lift the unlocking clip (drawing X) and pull the black nylon T-guide forward. Use a hook to aid removal if required.

To remove the carriages: Slide them out of the notched end of the track.

14 Fitting your own door (drawing Z).

- At the bottom of the door leaf cut a groove to the dimension and tolerance shown (drawing Z). Make it central to the door thickness and absolutely straight.
- Drill mounting plate holes to the correct size and depth as marked (drawing Z).
- Fix both mounting plates to the door. Make sure they are placed exactly in the centre of the door thickness.
- Load the carriages through the notched end of the track.
- Position the door underneath the carriages. Raise the door up so that the round head of the wheel hanger shaft lines up with the keyhole shaped hole in the mounting plate (drawing Z).

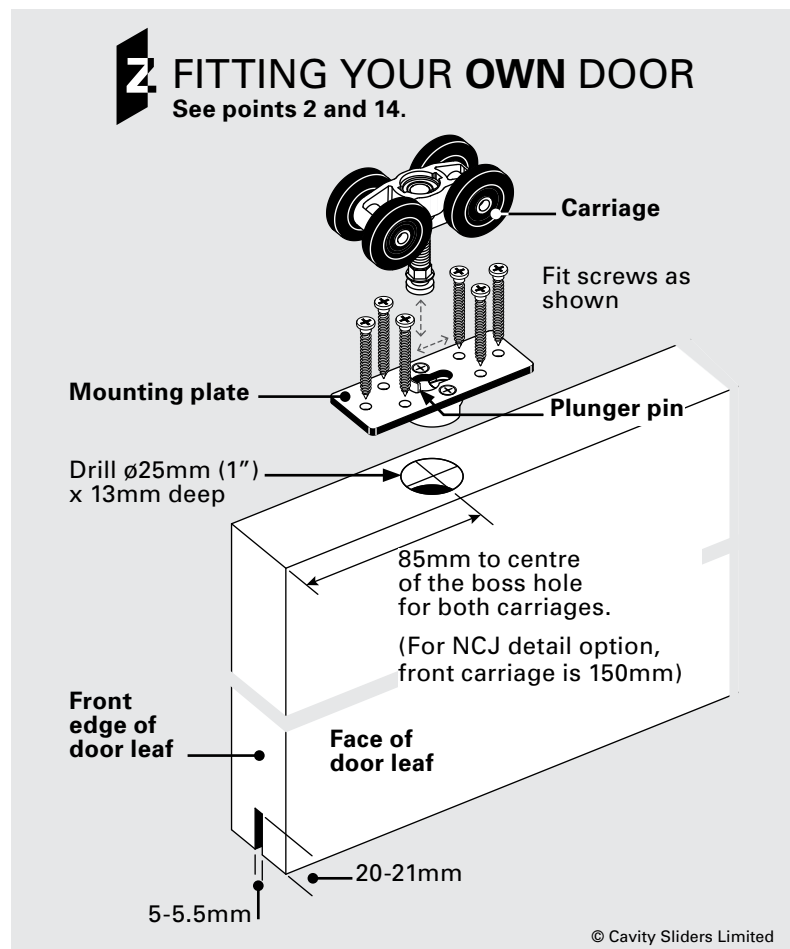
Go to page **5** →

- Depress the plunger using the wheel hanger shaft head and slide sideways until it snaps into locked position. Repeat for the other carriage.

15 **WARNING** (drawing V and W).

CS Cavity Sliders require the track running surface to be clean and free of any contamination or damage. For smooth reliable service, the tyres on the carriage should not be chipped, dented or have swarf embedded in the tyre.

Please take extra care with the carriages to avoid any damage during the installation process.



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HowTO install this AluSealed® Bi-Parting sliding door unit



Before you start:

READ this HowTO CAREFULLY!

(It could save you
lots of work!)

Other CS units fitted with aluminium jambs
are covered by this HowTO:

EasyOpen® WC	(EO)
SofStop®	(SF)*
SoundStop®	(SS)*
Servery™	(SERV)
Hi-ImpactJambs™	(HI)

* Extra data sheets may be required for these units.

Keep this HowTO handy.
You may need it later on.

Another quality product from:



WHAT YOU NEED TO KNOW FIRST.

Construction of the wall.

The wall referred to in these instructions is ex 100mm x 50mm wooden framework. In reality this may mean a 94mm x 47mm or 90mm x 45mm wooden framework. Although not shown, the unit covered in this HowTO may also be fitted into other types of wall materials (steelstud, concrete, brick, etc.).

For concrete or masonry type walls:

fix a 100mm x 50mm timber fixing plate into the opening on both sides and under the head.

Fix these in place with ø10mm x 98mm long countersunk masonry anchors at 400mm centres.

Lintel or trimmer sizes.

CS Cavity Sliders are non-loadbearing units.

They require the lintel (or trimmer, ceiling joist or structural component) directly above the track to span the full trim size opening width.

Timber lintels sized from NZS3604 are acceptable if the weight of the door leaf/leaves is less than 75kg/m of total door width. If heavier, specific design is required for all other kinds of structural components and for the timber lintels.

The hole in the wall.

Calculation of how big the opening in the framing should be:

CS AluSealed Bi-Parting unit

Height = door leaf height + 95mm (also EO, SERV, SS, HI)

Height = door leaf height + 105mm (SF Only)

Width = (door leaf width x 4) + 10mm (also SERV, SF, SS, HI)

Width = (door leaf width x 4) - 190mm (for EO only)

Standard clearances under the door.

With this CS AluSealed unit sitting hard on top of the concrete or timber floor, the clearance under the door leaves ranges between 22 - 30mm (adjustable). The majority of these standard clearances is taken up by the floor covering (e.g. carpet, tiles etc.).

Modified clearances under the doors.

If you require **more** than 30mm clearance under the doors: pack the CS AluSealed unit off the floor by the extra amount you need.

If you need **less** than 22mm clearance under the doors (e.g. for polished timber floors) there are three options to do this:

- A CS FOR DOORS can supply special seals that can be fitted to the bottom of the doors.
- B* Door leaves up to 15mm taller can be fitted.
- C* The cavity pockets can be made up to 15mm shorter. (*B & C are only available when pre-ordered.)

Contamination of the top track.

Never drill, nail or screw through the centre section of the track. Make sure no dirt, grit or aluminium swarf gets into the track. This could impair the smooth running of the carriages.

Fixing cavity slider to the floor

Installing the cavity slider 100% plumb and level will **NOT** guarantee a correctly sliding door.

Wall, lintel, floor and door can all be out of plumb and straightness a small fraction, and this can cause the door to slide incorrectly into the cavity pocket. It is for this reason that the skirting block fixing (found at the base of the cavity slider behind the split jambs) is only secured once you have ensured door is running parallel to the cavity pocket.

Go to page **3** (overleaf) →

NOW FOR THE INSTALLATION ITSELF.

1 Remove packaging and check components.

Lay the units flat on the ground in front of the door opening.

Remove the transportation cleat (if still fitted) from the bottom plate assembly. (Take out the two screws and the three staples.)

Check for any obvious product defects.

Lay each unit on its back and sight the gap to check for normal clearances (drawing V).

If anything looks out of specification or you are unsure, contact CS before beginning your install.

2 Fit the door leaves (if not already fitted).

Refer to 'Fitting your own doors' (Page 4, instruction 12, drawing Z).

3 Place both units as a pair into the framed opening in the wall.

Ensure that the tracks are connected neatly together with alignment pins provided (drawing Y). These fit into the track screw tubes.

Check that the jack studs on both sides of the door opening are plumb in both directions.

4 Fix the aluminium back studs.

Plumb-up the two aluminium split jambs (drawing U). Use a level!

While keeping the aluminium split jambs plumb, pack behind the aluminium back studs as shown. Screw the aluminium back studs including the packing to the 100mm x 50mm jack stud through the pre-punched holes.

Timber studs: use 8 gauge x 29mm wood screws.

Steel studs: 8 gauge x 29mm self-tapping screws.

5 Level the tracks (drawing U and Y).

The tracks must be fitted level and straight.

The tracks must be fixed to the lintel at 600mm centres through the aluminium flanges on both sides, starting 50mm back from the track meeting point. The screw heads must pull hard up under the aluminium flanges (drawing Y).

For **timber** lintels: Use 8 gauge screws penetrating the lintel by at least 25mm.

For **light steel** lintels (under 2mm wall thickness): Use 8 gauge self-tapping screws which penetrate the lintel by at least 5mm.

For **heavy steel** lintels:

Use M5 machine bolts and nuts.

For **Full-Height** (FH) detail option:

The bottom of the track should finish flush with the underside of the finished ceiling (refer to the Additional HowTO Information sheet).

6 Fix the bottom plate assembly

(drawing W). The doors must slide parallel with the bottom plate assembly (see the 2 sets of black A-A arrows). If not, gently tap the front of the assembly to the left or right until they do.

The doors should now slide smoothly and butt neatly together when both doors are closed.

Fix the skirting block fixing to the floor only when the cavity pocket has been adjusted so that the **door closes neatly into the closing jamb and slides parallel to the bottom plate of the cavity slider.**

6 Fix the bottom plate assembly to the floor as follows:

To concrete floors:

Fix with ø8mm x 90mm masonry anchors through the pre-drilled holes in the skirting fixing blocks of the bottom plate.

(See the red stamped arrow on the timber).

To timber floors:

Fix the bottom plate assembly with ø3.15mm x 75mm nails on either side in the centre of the skirting fixing block thickness.

(See the red stamped ⊕ on the timber).

Pre-drill ø3mm holes for these nails.

7 Adjust the door heights (drawing X).

Use the small end of the spanner supplied to rotate the hexagonal nut at the bottom of the carriage hanger shaft.

Adjust the doors for plumb, making sure they butt neatly together when closed (no gaps).

To **raise** door: Rotate spanner from **left to right**.

To **lower** door: Rotate spanner from **right to left**.

Note: The top of the hanger shaft screws into a self-locking nut. If the hexagonal nut is turned downwards too far, the shaft will become loose from the self-locking nut. If the turning resistance suddenly feels much easier, you have gone too far. With the head jambs not yet fitted, now is a good time to adjust where the doors stop.

The black plastic stop fitted to the mount plate is what contacts the track stop.

Using a 4mm Allen key, loosen the track stops and push them towards the cavity pockets. Gently slide each door towards the centre closed position (where the tracks meet) and then open again. Lock the track stops in place and test that the doors finish where you need them to stop.

8 Fit the head jambs (drawing Y).

Before fitting head jambs, check that you have the desired clearance under the door and that the door is plumb (instruction 7). Slide the head jambs into place between the vertical jambs.

'Flush up' the joints. Then screw them into place with the 8 gauge x 19mm long hex head screws (as supplied) through both ends at the top of the head jambs.

For doors wider than 1000mm, screw fixing with 4 gauge x 10mm long pan pozi screws may be required. Fix these through the small flange of the head jamb that rests on the underside of the track.

NOTE: These screws are not required for CS SofStop units.

For Serveries units (SERV) the sill (not included unless asked for) should be fitted neatly between the vertical jambs.

FINISHING THE INSTALLATION.

9 Fixing the wall linings.

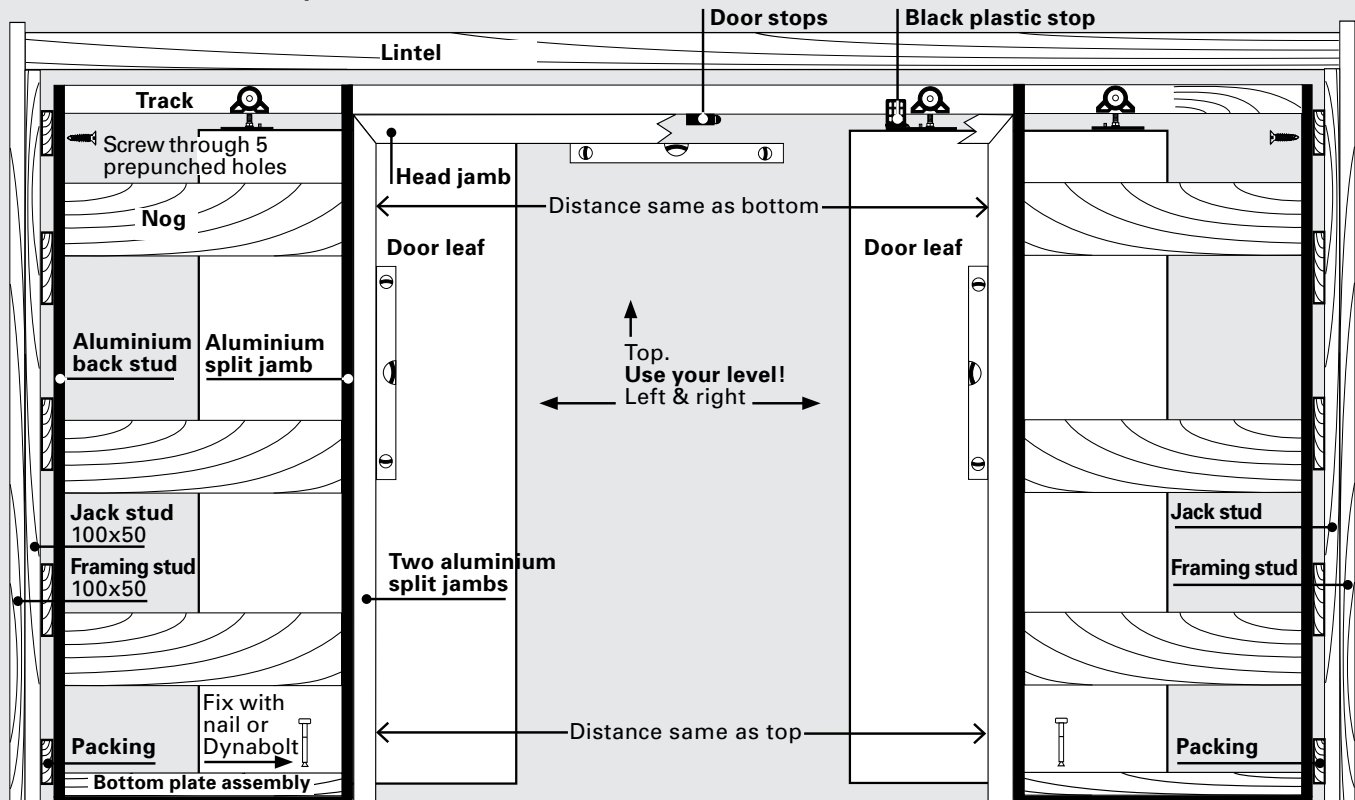
Where possible, the supplied 'jamb spreader' should be inserted into the cavity slider opening prior to fixing wall linings and architraves (drawing V).

Wherever possible, linings should only be glued on. Use short drywall screws to hold linings in place until glue is dry.

Go to page **4** (overleaf) ➔



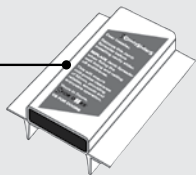
U ELEVATION See points 4 and 5.



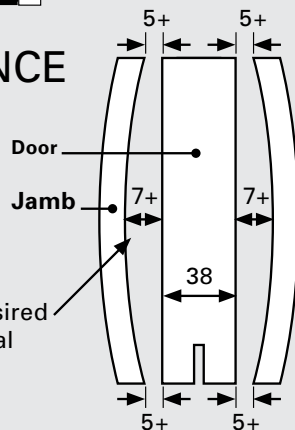
V JAMB CLEARANCE

See points 1 and 9.

Jamb spreader



This is desired and normal

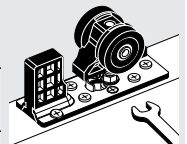
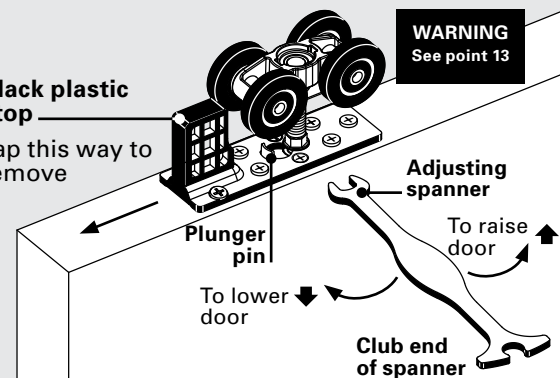


X ADJUSTING & REMOVING CarriSnap™ CARRIAGES

See points 7, 11 & 13.

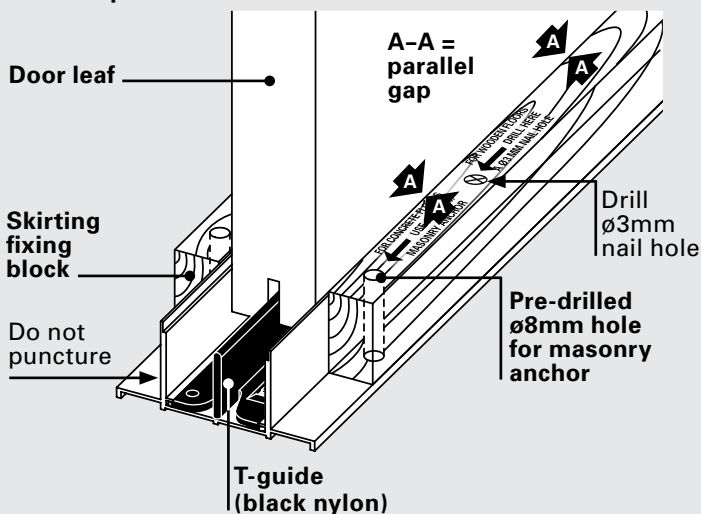
Black plastic stop

Tap this way to remove



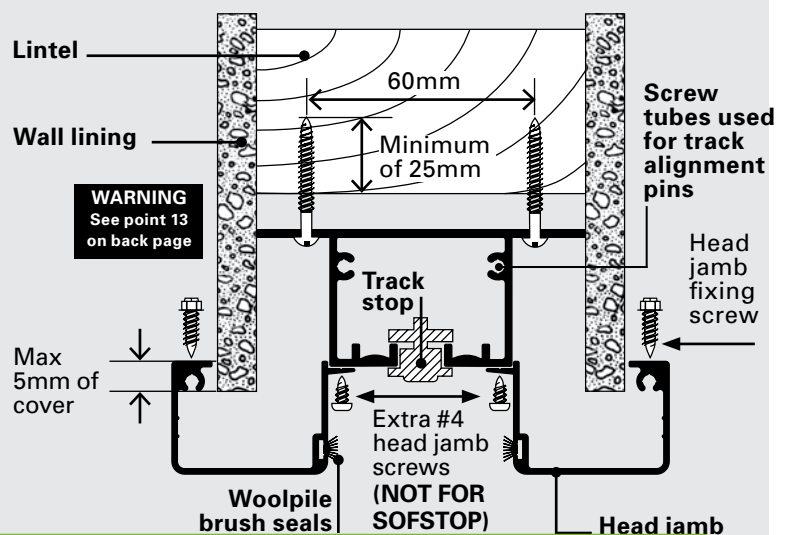
W BOTTOM PLATE ASSEMBLY

See points 6 & 10.



Y TRACK CROSS SECTION

See points 3, 5, 8, 9 and 13.



- 9 For 13mm linings use maximum 28mm long drywall screws.
We recommend sealing the inside of the linings prior to fixing.

Note: When fixing wall linings above the head jams do not allow the linings to finish lower than 5mm below the top of the head jamb (drawing Y).

10 If fitting skirtings (drawing W).

When you fix the skirtings, make sure that you do **not** puncture the aluminium extrusion of the bottom plate assembly.

The maximum length of the panel pins are the combined thicknesses of the skirting and the wall lining **plus** 17mm.

Do not hammer too hard against the bottom plate. This may damage the channel through which the door leaf runs.

11 Removing the door leaves (drawing X).

Begin by removing the head jamb from one side (if fitted).

Fit the club end of the adjusting spanner over the hexagonal nut at the bottom of the hanger pin (drawing W).

Use the extended part of the spanner to press down the plunger pin that protrudes up from the mounting plate. Once this plunger is fully depressed, slide the spanner sideways towards the plunger pin.

The whole carriage (including the shaft) will now disengage from the mounting plate.

It is not always easy to slide the spanner sideways. You may need to relieve the door's weight by putting a wedge between door and floor.

Do the same with the other carriages.

Finally, remove the black plastic stop that is tightly fitted into the mounting plate at the front of each door leaf. Remove this by tapping it out in the direction shown using a hammer and drift (drawing X).

If you want to take the carriages out: Slide them towards the centre of the opening.

Use a 4mm Allen key to remove the track stops fitted in the middle where the doors meet.

12 Fitting your own doors (drawing Z).

At the bottom of the door leaf cut a groove to the dimension and tolerance shown (drawing Z). Make it central to the door thickness and absolutely straight.

Drill mounting plate holes to the correct size and depth as marked (drawing Z).

Fix both mounting plates to the door. The larger of the two mounting plates (the one with the black plastic stop) fits closest to the leading edge of the door. Make sure the black plastic stop is facing the leading edge of the door.

Remove the track stops from the centre of each track (drawing Y) by loosening the two stainless steel cap screws.

Slide the stops to the centre of the track where they will drop out through the carriage access slot.

Load the carriages into the track through the notch in the track.

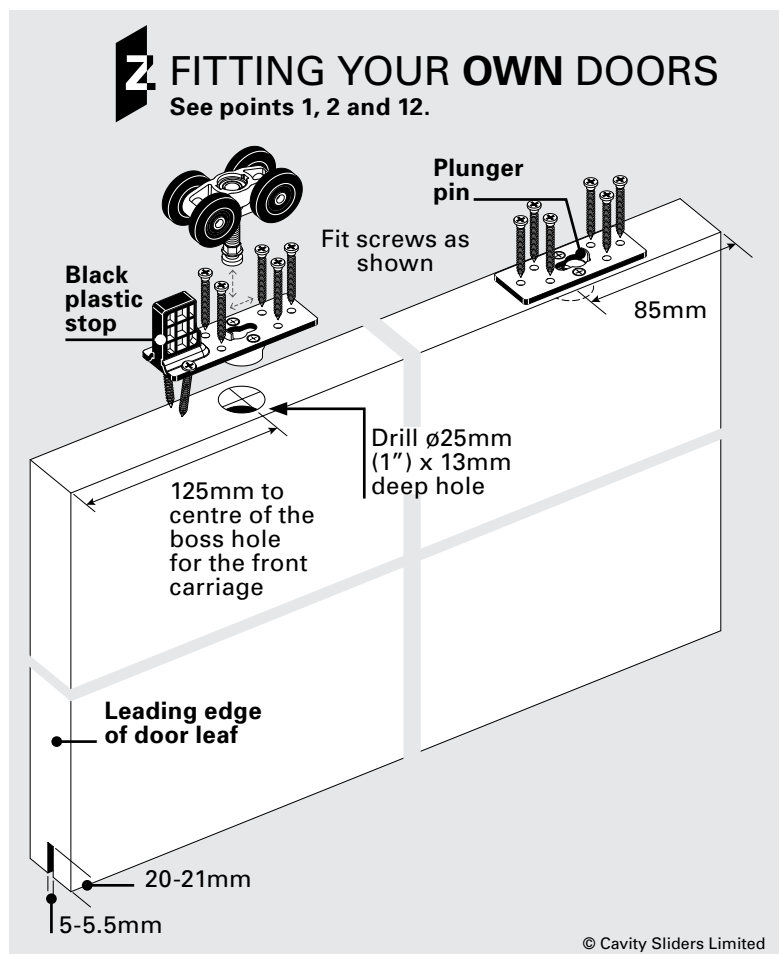
Position the door underneath the carriages.

- 12 Raise the door up so that the round head of the wheel hanger shaft lines up with the keyhole shaped hole in the mounting plate (drawing Z).
Depress the plunger using the wheel hanger shaft head and slide sideways until it snaps into locked position. Repeat for the other carriages.
Re-fit the track stops to the tracks with each rubber buffer part pointing towards the cavity pocket. Temporarily tighten the cap screws.
Continue at instruction 3 on page 3.

13 **WARNING** (drawing X and Y).

CS Cavity Sliders require the track running surface to be clean and free of any contamination or damage. For smooth reliable service, the tyres on the carriage should not be chipped, dented or have swarf embedded in the tyre.

Please ensure you take extra care with the carriages to avoid any damage during the installation process.



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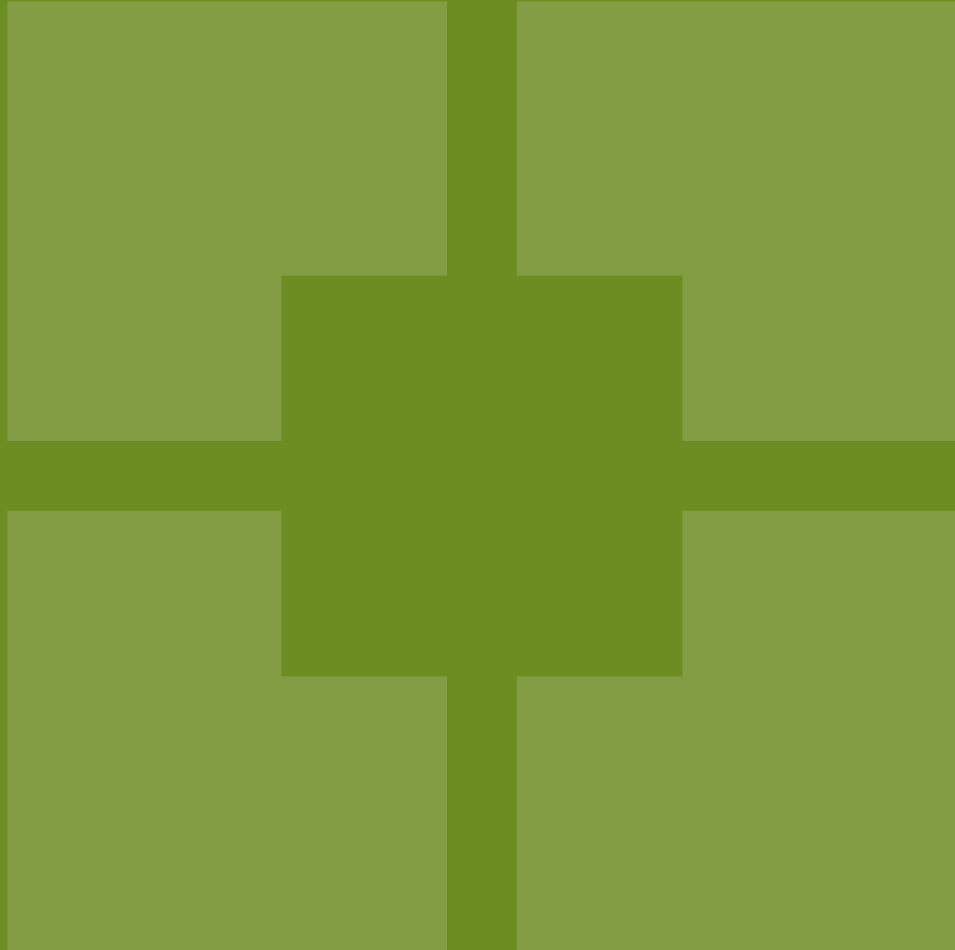


Solar Gard® Ecolux™

Feel Good Inside™

Get comfortable with the window
film that does it all.





Eco

Sustainable
Energy savings
Cost-effective



Luxury

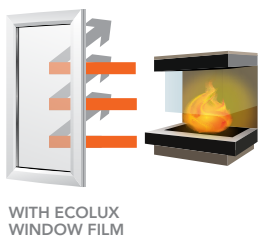
Maximum comfort
Highest quality
Superior performance

Ecolux, the next generation in low-emissivity window film from Solar Gard.

Benefits enjoyed with Ecolux dual-action state-of-the-art technology

SUMMER BENEFITS

On warm days solar heat is rejected, requiring less cooling to maintain a comfortable environment and save energy.



WINTER BENEFITS

During winter, heat is reflected back into the room, requiring less heating to maintain a comfortable environment and save energy.



Year-round comfort and energy savings.

The ultimate in energy-efficient window film from Solar Gard

This state of the art Low Emissivity (often referred to as Low-E) film offers year round energy savings and comfort through its combination of superior solar control properties and unique coating.

Applied internally to glass, together these advanced technologies keep the sun and ambient heat out in summer, while the special Low-E coating for winter works to reflect the radiant heat back into the room.

Ultimately you'll be reducing energy usage and keeping cooling and heating costs down all year round.

Comfortable temperatures,
every day.



Without **Ecolux** window film



With **Ecolux** window film

Every window becomes an energy and cost saving system.

"Since Ecolux was installed on my poolside windows I have been coming home to a more noticeably comfortable house" reports Mark Gason of NSW. "I am using my heater less, notice a marked improvement in glare, and am impressed by the clarity of the film."

In addition to improved winter warmth Ecolux will reduce over half of the incoming summer heat. Ecolux equals comfortable temperatures, every day.

Installing Ecolux onto your existing glass can increase your insulation ability by 88%*. It's like double-glazed performance at a quarter of the price.

* 88% insulation improvement on single pane glass based on annual averaged R-Value calculation. Annual averaged U-Value calculation is 47% improvement.

R-value measures resistance to heat flow and is the standard insulation measurement for non-glazing building materials. U-value is the opposite and measures the amount of heat flow. (U-value is the standard measurement for glazing.)

THE IMPORTANCE OF COMFORT

Studies show that feeling comfortable at work or home can help us be more productive



Slightly lower-than-average room temperatures are associated with higher accuracy on simulated tasks and reduced sick leave.



Daylight and windows positively impact wellbeing and may help reduce stress.

"Indoor temperature, productivity," HVAC&R Research, 2007, 13(4), 623-633

Ecolux is the next generation of technically advanced window film with superior performance and energy savings. You will reap the benefits of insulation comparable to double-glazed windows, minus the enormous price tag. Plus it only takes minutes to be professionally installed!

Its state-of-the-art low-e technology is sophisticated, but what it does is simple. Dual-action Ecolux helps keep heat out in summer and reflects heat back into the room in winter.

With a Skin Protection Factor (SPF) of 700+, Ecolux applied to your windows provides the ideal solution for protecting your skin from the sun's damaging UVA and UVB rays.

Cooler in summer and warmer in winter.



Solar Gard® Ecolux™
Feel Good Inside.™

Benefits you can expect:

- Balanced summer and winter comfort
- Highest protection against harmful UV rays - 99% reduction or SPF 700+
- Significantly reduce interior furnishings from fading
- Maximise comfort zones (less hot or cold spots and more even temperatures)
- Maximise natural light

Ecolux snapshot:

Solar heat rejection	✓✓✓✓ Good
Room heat retention	✓✓✓✓✓ Excellent
See-through visibility	✓✓✓✓✓ Excellent
Glare reduction	✓ Low
Fade reduction	✓✓✓✓ Good
Skin cancer protection	✓✓✓✓✓ Excellent
Low 'mirror' appearance	✓✓✓✓✓ Excellent





Not too hot, not too cold,
but just right.

For over 40 years of innovation in window films and surface protection solutions, backed by over 350 years of Saint-Gobain's success in the glass and building materials industries, Solar Gard has been one of the most trusted and popular window film lines in the world. Sold through company-owned distribution centers and independent dealers and distributors, Solar Gard window films are installed on thousands of buildings and millions of vehicles worldwide.





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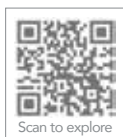
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Tel: 61 2 9838 8888
E-mail: info.aus@solargard.com

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About Solar Gard®

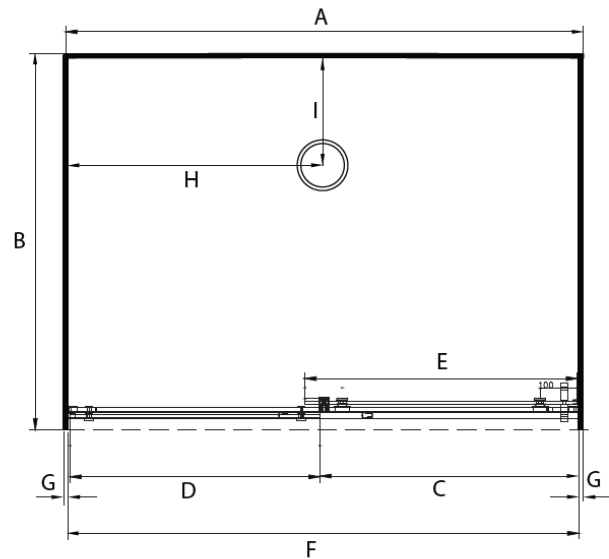
Solar Gard protects what matters most to you: your family, your home, your business, your car. Headquartered in San Diego, California, Solar Gard makes state-of-the-art window films and protective coatings for the architecture and automotive markets. Solar Gard is a division of Saint-Gobain Performance Plastics, as subsidiary of Saint-Gobain, the world leader in habitat and construction markets. Our proven carbon-negative solutions positively impact lives and reduce global greenhouse gas emissions. Solar Gard products are sold in more than 90 countries under the Solar Gard, Quantum, and Solar Gard Armorcoat brands.

LUXURY BLACK EDITION ALCOVE SHOWERS



Pictured Above - Stellar Luxury 1x12x1 Alcove Black Door
Flat Wall Right Hand
SKU 318638

Note the shower will be
left handed



DESCRIPTION

The Stellar Luxury BLACK EDITION Range of Alcove Showers can be purchased as a complete Shower Cubicle including Acrylic Tray, Wall Liner and Door pack.

The Door Pack can also be purchased as an individual item for a tiled floor and wall installation.

SEE TILE SHOWER LAYOUT FOR SETOUT DIMENSIONS

The door is reversible - and closes to the finished wall.

FEATURES

- BLACK Extrusions and Hardware
- Low profile tray with 40mm upstand
- 2000mm high glass 8mm Safety Glass
- Total OVERALL height 2060mm
- Door closes to finished wall
- Minimalistic extrusion allows adjustment to wall and floor
- No silicone joints required for glass
- High quality stainless / alloy fittings

LEGEND

Dimension	Description	Shower Size			
		1200x800	1200x900	1200x1000	1400x1000
A	Tray Width External Dimension	1200mm	1200mm	1200mm	1400mm
B	Tray Depth External Dimension	800mm	900mm	1000mm	1000mm
C	Door Opening Dimension +/- 10mm	580mm	580mm	580mm	680mm
D	Return Panel Dimension	570mm	570mm	570mm	670mm
E	Door Panel Dimension	630mm	630mm	630mm	730mm
F	Dimension between Wall Liner inner faces	1175mm	1175mm	1175mm	1275mm
G	Gib Board Liner Thickness +/-1.5mm	12.5mm	12.5mm	12.5mm	12.5mm

ORDERING CODES

Product Description	SKU CODE			
	1200 x 800	1200 x 900	1200 x 1000	1400 x 1000
Complete Cubicle Black Flat Wall Left Hand Opening Door	318641	318643	318637	318639
Complete Cubicle Black Flat Wall Right Hand Opening Door	318642	318644	318638	318640
Tray Only Centre Rear Waste	TFS8X12X8ALCRCW	TFS9X12X9ALCRCW	TFS1X12X1ALCRCW	TFS1X14X1ALCRCW
Liner Only Flat Wall 2000mm High 3 sided White	LB8X12X8FW3S2M	LB9X12X9FW3S2M	LB1X12X1FW3S2M	LB1X14X1ALCRCW
Door / Return Pack 2000mm High Black Left Hand Opening Door	D1200BLLH2M	D1200BLLH2M	D1200BLLH2M	D1400BLLH2M
Door / Return Pack 2000mm High Black Right Hand Opening Door	D1200BLRH2M	D1200BLRH2M	D1200BLRH2M	D1400BLRH2M

WARRANTY INFORMATION

All bathroomware products supplied by Nouera Shower Systems carry our Quality Assurance and Product Warranty. We use the highest quality materials available and manufacture these in accordance with New Zealand specifications and requirements to ensure that all products are fit for the intended purpose for which they are designed. Our customers peace of mind is of paramount importance to us.

Warranty Periods

Baths	10 years
Showers	10 years
Black Coating on Framework	5 years

Warranty Exclusions

The product must be installed according to the instructions supplied.
The water supply temperature applied to the product must not exceed 55 degrees Celsius.
Commercial applications are restricted to a 2 year warranty on all products.



CLEANING AND MAINTENANCE

Bathroom products are used often and the following is our suggestion on how to clean and care for them.

Shower Wall

We use Durosan premium quality sanitaryware grade Acrylic. It is, by design, very robust and chemical resistant. A soft damp cloth with non-abrasive cleaners should be used. Use only non-abrasive cleaners that are recommended for acrylic products.

Shower Tray and Bath

We manufacture our Shower Trays and Baths using a Solid Acrylic Surface. Most other shower trays are manufactured using a veneer acrylic surface. The great advantage is that small scratches can be removed easily by using fine cutting compound. Again, the same basic cleaning methods as the wall are recommended.

Shower Doors and Glass

All glass is compliant to AS/NZS 2208. We suggest that the glass surfaces are wiped down or squeegeed following use to remove excess water. For best results use a trusted glass cleaner.

Metal Framework

Should be cleaned using a soft damp cloth with non-abrasive cleaner. Note that on round showers, the bottom rollers are easy release for ease of cleaning. If chemical spray cleaners are used, avoid direct contact with the rollers and guides and ensure the shower is rinsed off to avoid residue build up.

Weather Seals and Drip Strips

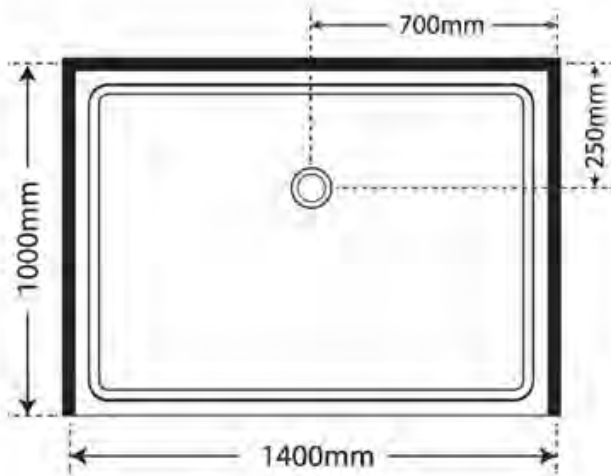
Can be removed if required for cleaning, and can be replaced when they no longer look their best. Refer to the spare parts and accessories section of our website for more details.


Note - If the Glass has been treated follow specific cleaning instructions from the system provider.

Search for products, departments or inspiration 

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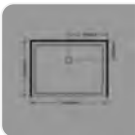
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(https://assets.mitre10.co.nz/sys-master/productimages/nz/0/1103/20240/0021400/310037xlg.jpg)



(https://asset:

Nouera Stellar Luxury 2000 Frameless Shower - Alcove
Left-Hand Fixed 1000 x 1400 x 1000mm Black

\$2,489
each

SKU: 318639 M: SL1X14X1BLFWLH

★★★★★ 5.0 (1) [Write a review](#)

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Available on orders \$50 to \$1500.
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ADD TO CART

 **SAVE TO WISHLIST**

Product details



Specifications



SKU	318639
Brand Name	Nouera
Colour	Black
Door Type	Single metal roller doors
Door opening	Left-hand opening door
European Liner	Yes
Flat Wall	Yes
Glass Thickness(mm)	8
Model Number	SL1X14X1BLFWLH
Product Height(mm)	2060
Product Length(mm)	1000
Product Width(mm)	1400
Safety Glass	Yes
Safety glass thickness(mm)	8.00
Shower style	Square shower

Sliding Door	Yes
Sub-Brand	Stellar
Tray upstand size(mm)	40.00
Wall liner type	Flat wall liner
Warranty Years	10 Years Warranty, 5 Year Warranty on Black Coating
Waste Included	No
Waste Position	Rear-centre 700 x 250mm

Reviews (0)

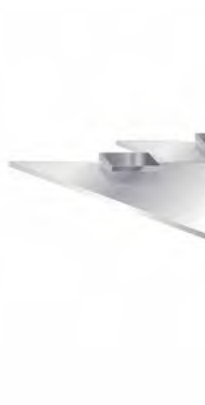


Customers also bought



Nouveau Toilet Suite
375mm, L: 675mm Wh
★★★★★ 1.6 (7)

\$344 each



Nouera Stellar Triang
(2 Pack) 300 x 300mm
★★★★★ 5.0 (1)

\$79 each



Aquaknight Easy Cl
Bottom Exit 90mm Bl

\$89 each



EcoPine Radiata Splay
Round Top H: 18mm, l

\$37⁹⁸ each



Hume FLUSH PANEL INTERIOR DOORS
1980 x 760mm, 35mm Thick
★★★★★ 4.8 (6)

\$52⁶¹ each

(/shop/nouveau-toilet-/shop/nouera-stellar-t(/shop/aquaknight-eas(/shop/non-branded-e(/shop/hume-flush-panel-interior-door
375mm-l-675mm-whitshelves-2-pack-300-x-3waste-bottom-exit-90rnlaved-architrave-round1980-x-760mm-35mm-thick/n/437450'

Easy As Guide (View All Guides) (/guides-and-advice)



How to install a shower enclosure

[View guide \(/guides-and-advice/guide/how-to-install-a-shower-enclosure\)](/guides-and-advice/guide/how-to-install-a-shower-enclosure)

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EXCLUSIVE
Nouera E-Line Round Shower 1000 x 1000mm White

SKU: 158997 M: SR1000ELINEWHFW

★★★★★ [Write a review](#)

\$943
each

after **payA7**
4 interest free payments of **\$ 235.75**
(Afterpay currently available online only) [More info](#)

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ADD TO CART

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Product details



Specifications



SKU	158997
Brand Name	Nouera
Colour	White
Door Type	Double roller doors
Door opening	Both
Double Rollers	Yes
European Liner	Yes
Flat Wall	Yes
Glass Thickness(mm)	6
Model Number	SR1000ELINEWHFW
Product Height(mm)	1970
Product Length(mm)	1000
Product Width(mm)	1000
Safety Glass	Yes
Safety glass thickness(mm)	6.00

Shower style	Round shower
Sub-Brand	E-Line
Tray upstand size(mm)	40.00
Wall liner type	Flat wall liner
Waste Included	No
Waste Position	Corner 250mm x 250mm

Delivery & Returns


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Reviews

()

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Nouveau E-Line Easy Clean Waste
★★★★★ 5.0 (3)

\$29⁹⁹ each


</shop/nouveau-e-line-easy-clean-waste/p/244380>



Fabia Thin Butler Floor 900mm W

\$499 each


</shop/fabia-thin-butler-floor-900mm-white/p/169375>



Sika Showerbond 320 ml Green
★★★★★ 5.0 (1)

\$8³⁷ each

</shop/sika-showerbond-320-ml-green/p/370951>

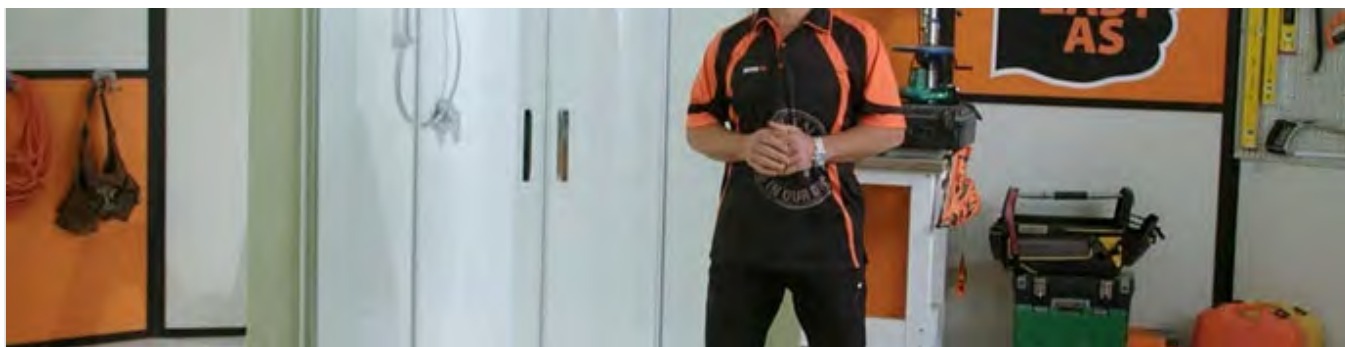


Aquaknight Shower Waste 90mm Chrome
★★★★☆ 3.0 (2)

\$61⁹⁸ each

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**A GUIDE TO
SELECTING THE RIGHT FAN**

MANROSE®

BATHROOM EXTRACTOR FAN: SELECTION GUIDE FAN REGULATIONS

WHAT THE LAW STATES

New Zealand Building Code G4 Ventilation (summarised):

“Buildings shall have a means of collecting or otherwise removing: cooking fumes and odours; steam from laundering, utensil washing, bathing and showering; odours from sanitary and waste storage spaces; poisonous or flammable fumes and gases”.

- Natural Ventilation for the above is acceptable as long as opening windows in each room have an area of 5% or more of the floor area of the room.
- For internal rooms without natural ventilation, mechanical ventilation (extraction fans) must be installed to extract the air at given rates. Residential requirements are listed below.
- Where fans are used to remove moisture and other contaminants from kitchens, bathrooms and laundries in housing, the exhaust air must be ducted to the outside at the flow rates mentioned below.
- Extraction of wet rooms (e.g. bathroom, toilet, laundry) must be kept separate from kitchen extraction.

MOISTURE AND CONDENSATION

Factors that affect condensation and moisture include:

- Bathroom size and materials used on the floor, walls, and ceiling
- Size and type of shower and showerhead
- Cold surfaces such glass, mirrors, tiles, wet-wall linings, cold uninsulated ceiling linings, etc.
- Cold air sources (i.e. an open window)
- Water pressure

INDUSTRY RECOMMENDATIONS

- The mentioned flow rates below are minimum allowable. In general these would not be enough to overcome excessive moisture and condensation problems encountered in modern homes.
- The ventilation industry has a “Recommended Air-Changes per Hour” approach solution. i.e. An air flow rate sufficient to remove/replace the total volume of air in a given room a specified number of times each hour.
- Obviously fans will not necessarily be left running for an hour - a fact which is taken into consideration in the formula.



Bathrooms

*25 l/s



Laundries

*20l/s



Toilets

*25 l/s

* minimum flow rates are of a fan installed with ducting and grilles, measured at the inlet grille with an anemometer.

TIPS FOR REDUCING CONDENSATION AND AIDING EXTRACTION

The following tips will ensure that the system is able to run as efficiently as possible:

- **Keep windows closed (specifically in winter):** cold outside air mixing with warm inside air will cause an increase in condensation.
- **Ensuring sufficient makeup air:** in order for the fan to function efficiently, fresh air is needed to replace the extracted air. A 20mm gap under the door, or a door grille, will provide sufficient makeup air during a shower.
- **Heating:** using a bathroom heater to warm the room before a shower will assist in reducing condensation.
- **Post shower:** after a shower, keep the fan running for at least 5 minutes, and also keep the bathroom door open to aid extraction.

EXTRACTION SELECTION

CHOOSING A FAN

- AIR CHANGES PER HOUR (ACH)**

The number of times the total room volume of air is changed each hour. Refer to the table below for the recommended Air Changes Per Hour based on the room type.

Application Description	Air Changes Per Hour
Bathrooms	11 - 15
Toilets	6 - 10
Laundries - (with ducted drier)	6 - 10
Laundries - (without ducted drier)	10 - 30

Always use the higher number (15 for bathrooms, 10 for toilets) when calculating the fan requirements.

Note:
Fan performance is tested under free-air confitions, unless otherwise stated. Free-air testing does not include ducting, grilles or a bathroom environment.

- WORKING OUT THE RIGHT FAN FOR THE JOB**

- Calculate the room volume in metres (L x W x H).
e.g. bathroom of 2m x 3m x 2.4m = 14.4 m³
- Multiply the room volume by the recommended air changes per hour for that room. Always use the higher limit
e.g. bathroom of 14.4 m³ x 15 ACH = 216 m³/hr.
- The result is the minimum fan performance required in cubic metres per hour.
e.g. a fan capable of at least 216 m³/hr for above bathroom

Select a fan with a higher performance than this figure.

If you know the Litres/Second (l/s):
l/s x 3.6 = m³/hr. (e.g. 25 l/s x 3.6 = 90m³/hr).

If you know the Cubic Metres/Hour (m³/hr):
m³/hr ÷ 3.6 = l/s. (e.g. 200m³/hr ÷ 3.6 = 55.55 l/s).

- FAN PERFORMANCE**

The following factors may affect the extraction performance of a fan, resulting in a pressure drop of the system:

- Type of grilles:** the more open the grille, the less the air restriction
- Type of ducting:** rigid ducting allows air to pass through more efficiently
- Length of ducting:** the longer the ducting, the more the pressure drop (approx. 1Pa/m)
- Installation of ducting:** compressing the ducting to pass through joists and timber can restrict airflow. Wrinkled ducting causes turbulence and reduces airflow.
- Number of duct bends:** sharp bends greatly restrict air flow

Note:
Stated extraction rates are “free air” values and do not account for grille type or duct run restrictions.

EXTRACTION SELECTION

WET AREA ZONE GUIDE

When considering where in the room to place an extractor fan, you must consider the wet areas.

Zone 1: This is the zone directly within the shower or bath up to 2.25 metres above the floor and 150mm around the bath/shower cubicle. An SELV fan or an inline fan kit will be required in this zone.

For example if a fan is mounted directly over the bath or shower it must be a low voltage fan (SELV).

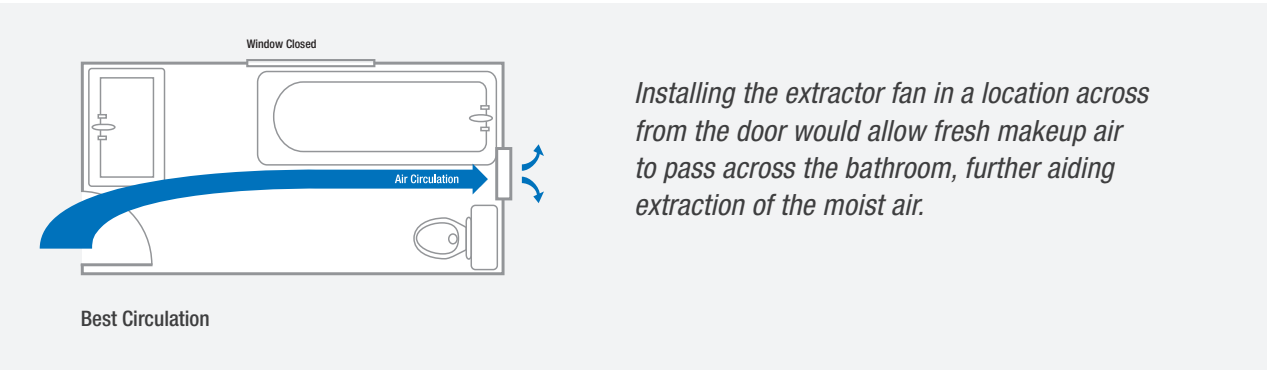
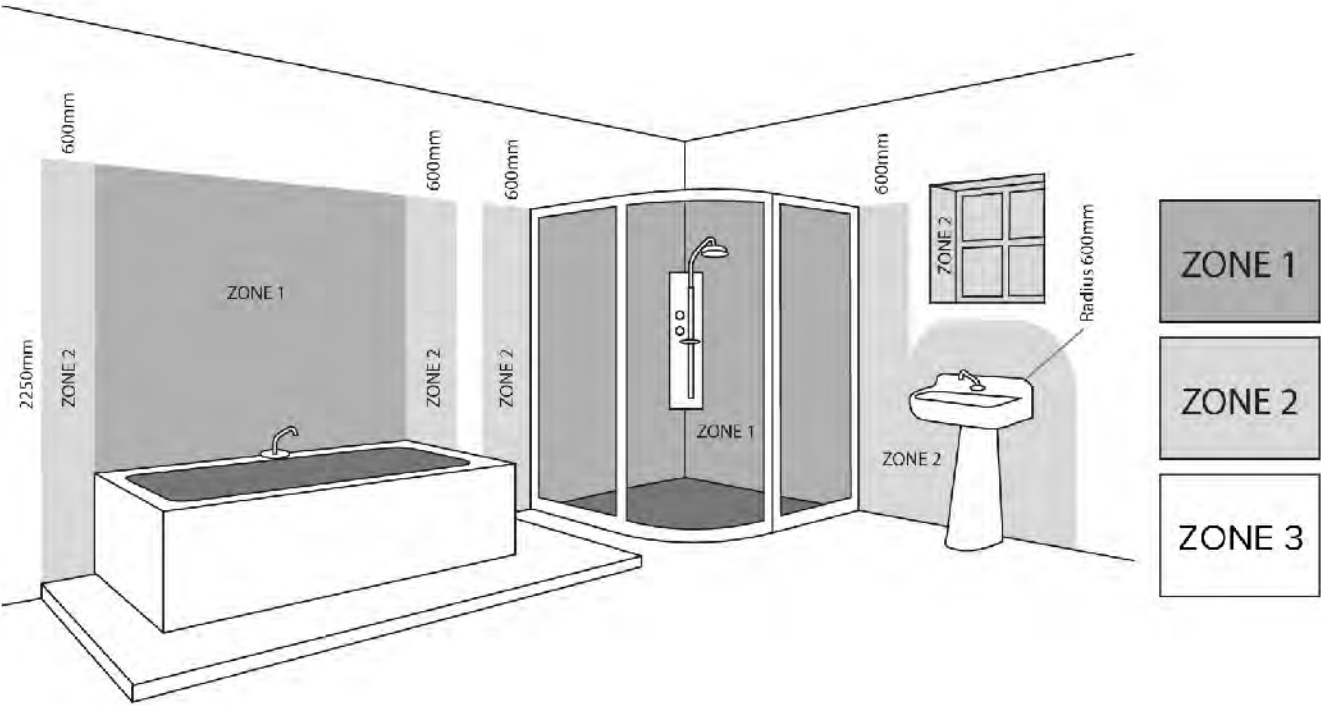
Zone 2: This zone is 0.6 metres horizontally outside of zone 1 and up to 2.25 metres above the floor.

Zone 3: The outer layer is zone 3, which is 2.4 metres horizontally outside of zone 2 and 2.25 metres above the floor.

Zone 1: Requires an SELV Fan or an Inline fan kit.

Zone 2: Any fan model can be used.

Zone 3: Any fan model can be used.



Select the model that exhausts the closest to your requirements.

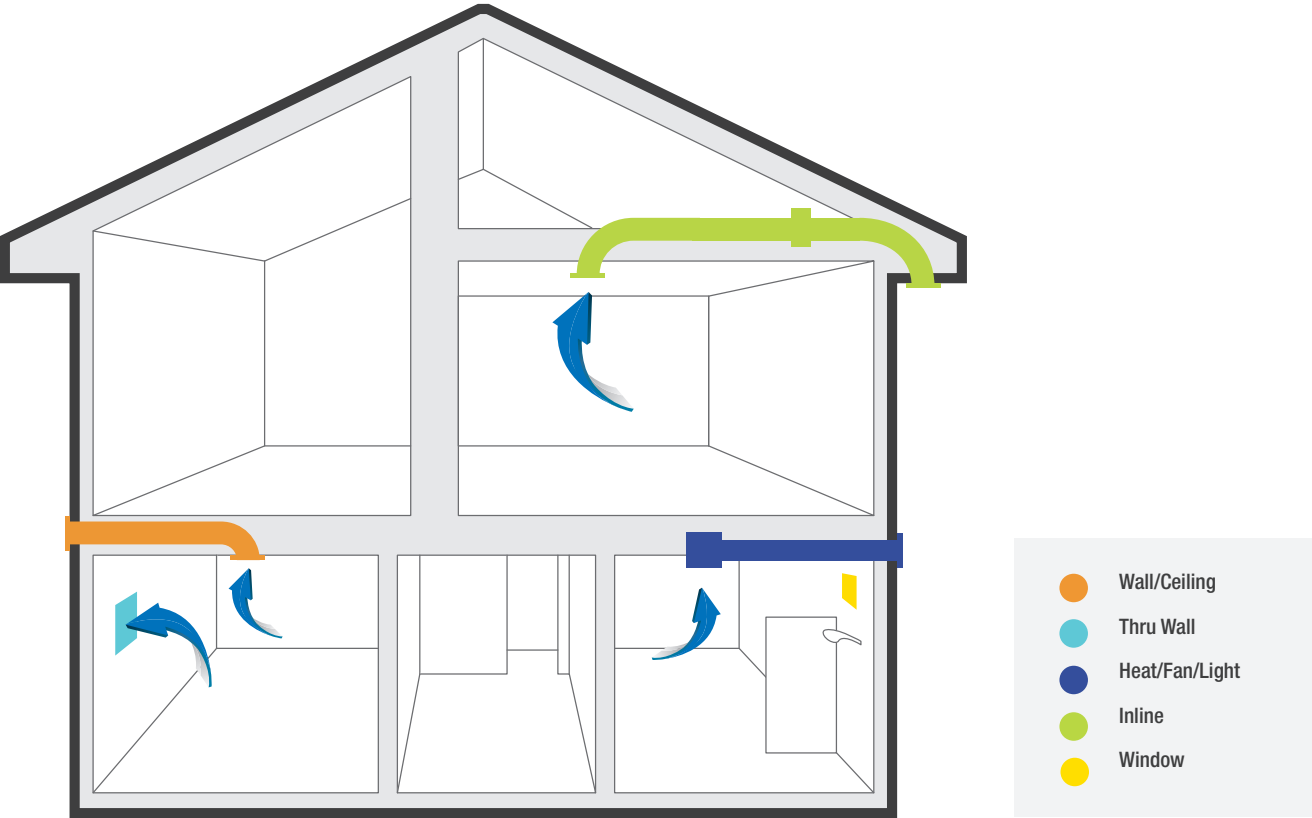
If the performance required falls between two fans, it is recommended you select the one handling the most air, as grille type and duct run length will reduce the stated ‘free air’ performance.

EXTRACTION SELECTION

FAN TYPES

Location of your extraction fan will depend on the physical constraints of your room. The wet area zone guide (shown on the previous page) will help you decide the most suitable physical installation to meet your requirements. Within the various mounting options there are other features available, such as:

- **TIMER** (maintain fan operation for a set time after the room is vacated).
- **PULLCORD** (switch at fan, instead of wall switch control).
- **AUTO-SHUTTER** (electrically operated shutters inside the fan - closed when the fan is not running to stop draughts).



Ceiling Mounted Fan

Designed for low-pitch roofs or between floors, where there is no ceiling access. Also available with heat lamps & lighting.

Thru Wall Fan Kit

Used where the bathroom is on an external wall, or there is no ceiling space for an inline fan.

Window Mounted Fan

Used in situations where an existing window fan is being replaced, or where there is no available external wall space and no ceiling space access.

Inline Mounted Fan Kit

Most common bathroom installation, the fan is mounted in the ceiling space with the grille directly above the source of the steam.

Generally this type of installation is quieter as the fan is not directly in the room.

Thru Roof Kit

Used where there is limited access to the roof space, or where there is no soffit available. Thru Roof Kits can be used with any extraction fan, or use a Thru Roof Fan Kit with the fan mounted within the cowl.

extraction selection guide

MANROSE®



MANROSE BATHROOM FANS

www.simx.co.nz

“proven reliable solutions”

Choose the right fan

Extraction fans should preferably be placed as close as possible to the steam source (e.g. over or near the shower). In-line fans are the most common solution as the grille can be placed directly above the steam source. Work through the steps below to identify the right fan for your application.

1. Calculate your room size

Calculate the volume of your room in cubic metres (m³). E.g: 2.8m x 2.6m x 2.4m = 17.47m³.

m

x

m

x

m

=

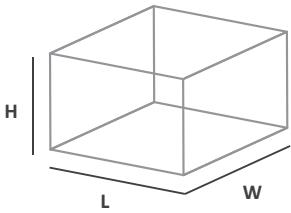
m³

Length (L)

Width (W)

Height (H)

Room Size (H)



2. Identify your extraction requirements

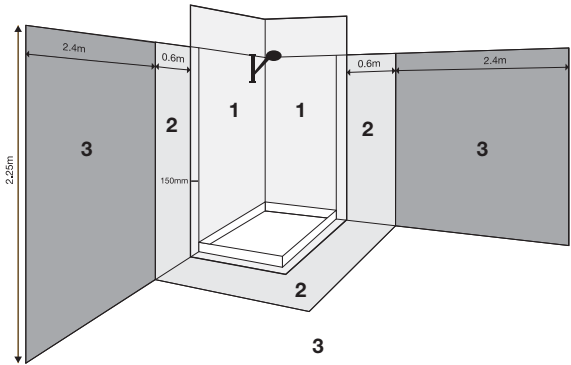
Air Changes Per Hour - ACH - is the term used to describe an airflow rate sufficient to remove/replace the total volume of air in a given room at a specified number of times each hour. Using the table below, multiply your calculated room size by the applicable ACH to identify the Performance required for your fan.

Room	Max. Room Area		ACH*	
Toilets , Laundries (no Dryer), Cellars, Offices	5 m²	m³ x	6 to 10	= m³ /hr
Ensuites, Showers, Bathrooms	15 m²		11 to 15	
Kitchens, Laundries (with Dryer)	20 m²		15 to 20	

3. Consider your location

When considering where in the room to place an extractor fan, you must consider the wet areas. In New Zealand, the height of Zone 1 is 2.25m or, the height of the fixed plumbing connection, whichever is higher. Refer to the zones in the adjacent chart and diagram to identify if the location of your fan requires a Low Voltage or In-line Fan.

Zone 1	Requires a Low Voltage or In-line Fan
Zone 2	Any model fan can be used
Zone 3	Any model fan can be used

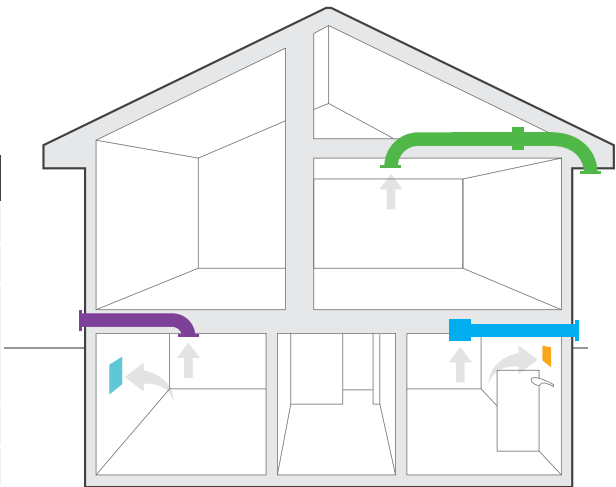


4. Select a fan type

From the list below select a fan type, then see the following sections to identify the model you require. Ensure the model you select has a performance (m³/h) greater than the performance calculated in Step 2.

Fan type	Application	Key
In-Line Fan Kits	Zone 1 wet areas	Green
Wall/Ceiling Fans & Kits	Wall and ceiling	Purple
Heat/Fan/Light Kits	Ceiling, multi-function	Blue
Designer Heat/Fan/LED Kits	Ceiling, multi-function, designer	
Extract-a-Lite & Extract-a-LED Kits	Zone 1 wet areas, integrated light	
Thru Wall Kits	Wall	Teal
Safety Extra Low Voltage (SELV)	Zone 1 wet areas	Orange

Window Fans are also available



Standard models are listed here. Please visit our website for the full range of available Timer, Pull Cord, PIR and Low Voltage options.
For Specialised Fans please see Manrose Intellivent on the back page of this guide.

Wall/Ceiling Fans and Kits

These axial fans are designed for wall or ceiling mount, and to be easy to install, efficient to operate and have been upgraded with ball bearing motors to prolong the life of the motor. Pro-Series models feature a low profile design for an unobtrusive installation.

Pro-Series shower fan kit models are now supplied with a weatherproof cowl.



• FAN0621



• FAN0609



• FAN0589



• FAN0120



• FAN0121

Duct Size	Fan Type	Model	Performance	Fan Model (CS = Circular)	Wall/Ceiling Order Code	Application Key	Thru Wall Kit Order Code	Application Key
Pro-Series								
150mm	Axial	Standard	364m³/hr, 101 l/s	XFLP150SS	FAN0594		FAN0621	
150mm	Axial	Standard	364m³/hr, 101 l/s	XFLP150CS	FAN0609		-	
125mm	Axial	Standard	130m³/hr, 36 l/s	XFLP125SS	FAN0589		FAN0614	
125mm	Axial	Standard	130m³/hr, 36 l/s	XFLP125CS	FAN0604		-	
Classic								
150mm	Axial	Standard	364m³/hr, 101 l/s	XF150S	FAN0120		FAN0135	
150mm	Axial	Standard (Auto Shutter)	364m³/hr, 101 l/s	XF150A	FAN0121		FAN0136	
125mm	Axial	Standard	130m³/hr, 36 l/s	XF125S	FAN0072		FAN0080	
100mm	Axial	Standard	85m³/hr, 23 l/s	XF100S	FAN0046		FAN0053	

Safety Extra Low Voltage (SELV) Fan and Kits

These SELV axial fans are designed for wall or ceiling mounting in damp areas, zones 1, 2 and 3. The axial fans incorporate a 12 VAC motor and all fans and kits come with a SELV 12 VAC isolating transformer.

Duct Size	Fan Type	Model	Performance	Fan Model Square	Square Fan/Kit Order Code	Fan Model Circular	Circular Fan/Kit Order Code	Application Key
Pro-Series								
150mm	Axial	Standard / SELV	364m³/hr, 101 l/s	XFLP150SLV	FAN5892	XFLP150CLV	FAN5891	
150mm	Axial	Standard / SELV	364m³/hr, 101 l/s	XPLP150SLV	FAN5894	XPLP150CLV	FAN5893	
125mm	Axial	Standard / SELV	130m³/hr, 36 l/s	XFLP125SLV	FAN5886	XFLP125CLV	FAN5885	
125mm	Axial	Standard / SELV	130m³/hr, 36 l/s	XPLP125SLV	FAN5887	XPLP125CLV	FAN5888	
Classic								
150mm	Axial	Standard / SELV	364m³/hr, 101 l/s	XP150LV	-	XP150LV	FAN5895	
150mm	Axial	Standard / SELV	364m³/hr, 101 l/s	XF150LV	FAN5896	XF150LV	-	
150mm	Axial	Standard / Auto / SELV	364m³/hr, 101 l/s	WF150APLV	FAN5897	WF150APLV	-	
125mm	Axial	Standard / SELV	130m³/hr, 36 l/s	XP125LV	-	XP125LV	FAN5889	
125mm	Axial	Standard / SELV	130m³/hr, 36 l/s	XF125LV	FAN5890	XF125LV	-	
100mm	Axial	Standard / SELV	85m³/hr, 23 l/s	XP100LV	-	XP100LV	FAN5882	
100mm	Axial	Standard / SELV	85m³/hr, 23 l/s	XF100LV	FAN5883	XF100LV	-	
100mm	Axial	Pull Cord / SELV	85m³/hr, 23 l/s	WF100PLV	FAN5884	WF100PLV	-	

Timer models are also available. Please visit our website for the full range of Manrose fans, kits and accessories.

Heat Fan Light Kits

Our multi-function Heat 'n Vent heat/fan/light units are designed to be easily installed into confined spaces. Classic models are suited to smaller bathrooms and ensuites, Pro-Series models have higher performance and feature swivel Halogen lights and a unique anti condensate feature. All systems come with duct, grille and wall switch.



• FAN0995



• FAN0940



• FAN2162



• FAN2200 (Light Only Model)

Duct Size	Fan Type	Fan Model	Performance	Fan Code	Application Key
Pro-Series					
125mm	Centrifugal	Pro-Series Heat 'n Vent 4	60 l/s, 216m³/hr	FAN0995	
125mm	Centrifugal	Pro-Series Heat 'n Vent 2	50 l/s, 180m³/hr	FAN0940	
Classic					
100mm	Centrifugal	Heat 'n Vent 2	35 l/s, 126m³/hr	FAN2162	
100mm	N/A	2 Heat 'n Light	N/A	FAN2200	

Manrose Heat Fan Light units have been tested to the Downlight standard AS/NZS60598.2.2 Amendment A and they are all classified as CA135.

In-Line Fan Kits

These systems are designed so the interior grille can be mounted directly above your steam source, i.e shower or bath. Upgraded shower fan kits are now supplied with a choice of grilles in the Pro-Series models, and with a stylish circular interior grille in the Classic models.



• FAN2051



• FAN0618



• FAN0101



• FAN0064

Duct Size	Fan Type	Fan Model	Performance	Fan Code	Application Key
Pro-Series					
150mm	Mixflow	MFLP150S	560m³/hr, 156 l/s	FAN2051	
150mm	Axial Hyper	SFLP150S	394m³/hr, 109 l/s	FAN0618	
125mm	Mixflow	MFLP125S	320m³/hr, 89 l/s	FAN2050	
125mm	Centrifugal	SFLP125S	140m³/hr, 39 l/s	FAN0616	
100mm	Mixflow	MFLP100S	250m³/hr, 69 l/s	FAN2049	
Classic					
150mm	Axial Hyper	SF150	394m³/hr, 109 l/s	FAN0101	
125mm	Axial	SF125S	130m³/hr, 36 l/s	FAN0064	
100mm	Centrifugal	SF200S	110m³/hr, 31 l/s	FAN0328	
100mm	Axial	SF100S	85m³/hr, 23 l/s	FAN0017	



Includes 2 options of exterior grille



Includes 2 options of low profile interior grilles



Includes a circular interior grille

Designer Heat Fan Light

These Designer series units are designed to add functionality with flair to your bathroom. Systems feature low profile designs and supplementary LED lighting. All systems come with duct, grille and wall switch.

Heat Fan Light



• FAN4463 LED HFL2

• FAN4465 LED HFL4

Heater Fan Light



• FAN6577 PANEL

• FAN5876 HALO

• FAN5875 PTC*

* PTC is perfect for light/warmth over basin/dry off area. We recommend using a dedicated extraction fan above the shower for a complete steam extraction solution.

Duct Size	Fan Type	Fan Model	Performance	Wattage	Heat	Fan Code	Application Key
Designer							
150mm	Centrifugal	LED HFL 2 - White	310m³/hr, 86 l/s	550 - 610W	2 x 275W Lamp	FAN4463	
150mm	Centrifugal	LED HFL 2 - Silver	310m³/hr, 86 l/s	550 - 610W	2 x 275W Lamp	FAN4464	
150mm	Centrifugal	LED HFL 4 - White	310m³/hr, 86 l/s	1080 - 1180W	4 x 275W Lamp	FAN4465	
150mm	Centrifugal	LED HFL 4 - Silver	310m³/hr, 86 l/s	1080 - 1180W	4 x 275W Lamp	FAN4466	
150mm	Centrifugal	Heater FL - PANEL	248m³/hr, 69 l/s	1100W	1 x 1000W Halogen	FAN6577	
150mm	Centrifugal	Heater FL - HALO	248m³/hr, 69 l/s	1100W	1 x 1000W Halogen	FAN5876	
100mm	Centrifugal	Heater FL - PTC	79m³/hr, 22 l/s*	2250W	PTC (Positive Temperature Coefficient)	FAN5875	

Extract-a-Lite Kits - Halogen and LED

These kits are designed to add light directly above your steam source, i.e shower or bath. Available in halogen or LED, the ProSeries range also offers greater performance and enhanced style.



• FAN2033



• FAN5899



• FAN0803



• FAN5369

Duct Size	Fan Type	Model	Performance	Fan Model Halogen	Order Code Halogen	Fan Model LED	Order Code LED	Application Key
Pro-Series								
150mm	Axial Hyper	Standard	394m³/hr, 109 l/s	ELLP150WS - White	FAN2033	LED-ELLP150WS - White	FAN5375	
150mm	Axial Hyper	Standard	394m³/hr, 109 l/s	ELLP150SS - Silver	FAN2034	LED-ELLP150SS - Silver	FAN5376	
150mm	Axial Hyper	Standard	394m³/hr, 109 l/s	-	-	LED-ELLPS150WS - White SQ	FAN5899	
125mm	Centrifugal	Standard	140m³/hr, 39 l/s	ELLP125WS - White	FAN2029	LED-ELLP125WS - White	FAN5379	
125mm	Centrifugal	Standard	140m³/hr, 39 l/s	ELLP125SS - Silver	FAN2030	LED-ELLP125SS - Silver	FAN5380	
Classic								
150mm	Axial Hyper	Standard	394m³/hr, 109 l/s	EL150S - White	FAN0803	LED-EL150S - White	FAN5369	
125mm	Axial	Standard	130m³/hr, 36 l/s	EL125S - White	FAN2037	LED-EL125S - White	FAN5371	
100mm	Centrifugal	Standard	110m³/hr, 31 l/s	EL100S - White	FAN0420	LEDEL100S - White	FAN5373	

All kits include ducting, grille, tape and accessories for installation. Switches are not included unless stated.

Intellivent

Intellivent® 2.0 - Intelligent humidity management.

Intellivent® Celsius - Intelligent thru-wall heat transfer.

Super quiet (21 dB), super efficient (5W).

Low pressure continuous background ventilation.

Performance: 134m³/hr, 37 l/s.



Designer			
Duct Size	Fan Model	Switching Method	Fan Code
100/125mm	Intellivent 2.0	Auto Humidity	FAN5901
100/125mm	Intellivent Celsius	Auto Temperature	FAN6051

Ducting

ALUDUCT - Aluminium Flexible Duct x 3m

100mm	125mm	150mm
DCT0328	DCT0329	DCT0330

Aluminium foil laminated onto polyester film.

Temperature range: -10°C to 80°C.

UNILOK - FR1 Ducting

200mm	250mm	300mm
DCT1276	DCT1277	DCT1278

A UV resilient fire retardant 100µm black low density polyethylene material mechanically locked into an outer metal helix with a copper coated spring steel wire. Temperature range: -10°C to 80°C.

PVC Flexible Duct x 1m

100mm	125mm	150mm
DCT0936	DCT0937	DCT0938

Spiral wire reinforced PVC film construction. Properties include: fire retardant, non collapsing, non rotting, vapour-proof. Temperature range: 6°C to 50°C.

SEMIDUCT - Semi-Rigid Duct x 3m

100mm	125mm	150mm
DCT0114	DCT0115	DCT0116

Flexible but strong, spiral wound with continuous seam. Light yet self-supporting over long lengths. Temperature range: -30°C to 250°C.

Wall/Ceiling grilles

Eggcrate Grilles White

100mm	125mm	150mm
DCT0375	DCT0472	DCT0473

Low Profile Grilles White

100mm	125mm	150mm
DCT1089	DCT1090	DCT1067

Also available in satin silver & chrome.

Fixed Louvre Grilles White

100mm	125mm	150mm
DCT0025	DCT0041	DCT0063

Also available in grey & terracotta.

Wall/Ceiling grilles cont.

Gravity Shutter Grilles White

100mm	125mm	150mm
DCT0029	DCT0044	DCT0066

Also available in grey & terracotta.

Weatherproof Cows (Includes Flap And Bird Mesh)

100mm	125mm	150mm
DCT0018	DCT1030	DCT1031

Circular Extraction Grilles

100mm	125mm	150mm
DCT2185	DCT2186	DCT2187

Accessory components

Back Draught Shutters

100mm	125mm	150mm
FAN0213	DCT0036	DCT0511

Duct Connectors

100mm PVC	125mm Metal	150mm Metal
DCT0159	DCT0037	DCT0059

Fan Timer

Time Air	FAN0372
----------	---------

Fixed fan timer that will automatically switch the appliance off after approximately 7 minutes.

Fully Adjustable Run-On Timer

Run-On Timer	FAN2444
--------------	---------

An easy to install Run-on Timer which can be fitted to most 'STANDARD' fans. Adjustable from 1 second to 90 minutes. Also includes a delay switch from 1 second to 5 minutes.

SELV Isolating Transformer 12VAC

SELV Transformer	FAN0436
------------------	---------

240VAC to 12VAC Safe Extra Low Voltage (SELV) transformer designed exclusively for low voltage fan applications.

Door Grille

Door Vent	FAN0159
-----------	---------

Fit to internal doors to allow make-up or replacement air into the room. 455mm x 90mm x 33mm (min) door thickness.

Duct Fasteners

Duct Strap 100mm diameter	FAN0274
Duct Strap 125mm diameter	FAN0281
Duct Strap 150mm diameter	FAN0282
Duct Tape 48mm x 5m	DCT0173
Duct Tape 48mm x 30m	DCT0807
Duct Tape AS4254 48mm x 60m	DCT1132



For the full range of Manrose Fans, Hand Dryers, Ducting, Grilles and Accessories visit our website: www.simx.co.nz | www.manrose.co.nz
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We reserve the right to alter technical specifications without notice.
PUB0076 Iss:21 08/17

Dealers Details

low profile ducting

MANROSE®



LOW PROFILE DUCTING RANGE
www.simx.co.nz

“ducting solutions to suit every application”

Modular Flat Channel Ventilation Systems



The Manrose range of low profile modular ducting systems include the most comprehensive range of flat channel ducting, connectors, reducers and accessories, offering you reliable ducting solutions to suit every application.

Designed with significant advantages over conventional round systems, low profile ducting is easily concealed when installed along the top of wall units.

It can also be fitted in ceiling voids and cavity walls, providing versatility whilst remaining unobtrusive. All Manrose system parts and channels are made from flame-retardant material.

Four Low Profile System Sizes

- **110mm x 54mm:** (equivalent to 100mm round diameter). Suitable for applications requiring low extraction rates, such as ventilation of laundries and toilets. With a 5300mm² cross-section it provides efficient ducting for short, straight runs connecting to a 100mm round spigot.
- **204mm x 60mm:** (equivalent to 125mm round diameter). Suitable for ducting of range hoods with 100, 125 or 150mm round exhaust spigots. The flat channel cross section of 11200mm² increases efficiency.
- **220mm x 90mm:** (equivalent to 150mm round diameter). Suitable for high performance extraction or supply. The flat channel cross section of 18576mm² makes it highly efficient and higher extraction rates are achieved.
- **300 x 25mm:** For applications where space is very limited.



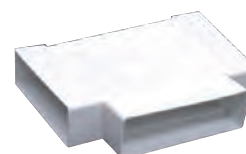
FLAT CHANNEL 1.5M LONG

	Size (mm)	Order Code
■	110 x 54	DCT0013
■	204 x 60	DCT0519
■	220 x 90	DCT1443
■	300 x 25	DCT1460



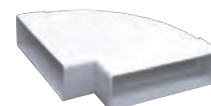
HORIZONTAL T-PIECE CONNECTOR

	Size (mm)	Order Code
■	110 x 54	DCT1479
■	204 x 60	DCT1114



HORIZONTAL 90° BEND

	Size (mm)	Order Code
■	110 x 54	DCT0125
■	204 x 60	DCT0524
■	220 x 90	DCT1448
■	300 x 25	DCT2097



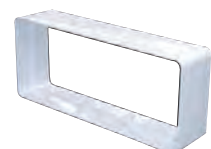
HORIZONTAL 45° BEND

	Size (mm)	Order Code
■	300 x 25	DCT2098



CONNECTOR

	Size (mm)	Order Code
■	110 x 54	DCT0014
■	204 x 60	DCT0520
■	220 x 90	DCT1442
■	300 x 25	DCT1459



ADJUSTABLE HORIZONTAL BEND

	Size (mm)	Order Code
■	204 x 60	DCT1480

Cut to required angle



VERTICAL 90° BEND

	Size (mm)	Order Code
■	110 x 54	DCT0126
■	204 x 60	DCT0525
■	220 x 90	DCT1447
■	300 x 25	DCT2099



VERTICAL 45° BEND

	Size (mm)	Order Code
■	300 x 25	DCT1455



LOW PROFILE DUCTING RANGE

“ducting solutions to suit every application”

Manrose Low Profile Ducting Range



ELBOW BEND (RECT:100mm RND)

Size (mm)	Order Code
110 x 54	DCT0124 (m)
110 x 54	DCT0015 (f)
204 x 60	DCT0521
220 x 90	DCT1444*
300 x 25	DCT2095

(m) = male (f) = female



ELBOW BEND (RECT:125mm RND)

Size (mm)	Order Code
204 x 60	DCT0522
220 x 90	DCT1440*
300 x 25	DCT2096

*Rotating offset spigot



ELBOW BEND (RECT:150mm RND)

Size (mm)	Order Code
204 x 60	DCT0523
220 x 90	DCT1441*

*Rotating offset spigot



DOUBLE AIRBRICK

Size (mm)	Order Code
232 x 137	DCT1450



DOUBLE AIRBRICK ADAPTOR

Size (mm)	Order Code
220 x 90:232 x 138	DCT1451



AIRBRICK INSERT (204 x 60mm)

Horizontal

Size (mm)	Order Code
204 x 60	DCT0137

Duct connector requires the following reducer or connector.

- 110 x 54mm requires Reducer DCT0136
- 204 x 60mm requires Connector DCT0520

Vertical

Size (mm)	Order Code
204 x 60	DCT1414

Comes complete with duct connection as pictured.



SHORT ADAPTOR (RECT:150mm RND)

Size (mm)	Order Code
110 x 54	DCT0131 (m)
110 x 54	DCT0127 (f)

(m) = male (f) = female



ADAPTOR (RECT: RND)

Size (mm)	Order Code
110 x 54:100mm	DCT1482
204 x 60:125mm	DCT0526
220 x 90:150mm	DCT1446
300 x 25:100mm	DCT1461



WALL PLATE (RECT)

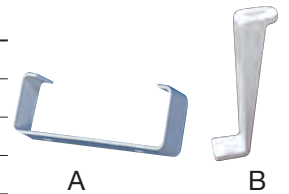
Size (mm)	Order Code
110 x 54	DCT0016
204 x 60	DCT0528



FLAT CHANNEL CLIPS

Size (mm)	Order Code
A: 110 x 54	DCT0134
A: 204 x 60	DCT0527
B: 220 x 90	DCT1445*
B: 300 x 25	DCT1458*

*Two clips are required to secure ducting



FLAT CHANNEL REDUCER

To fit 204 x 60mm flat channel or airbrick

Size (mm)	Order Code
110 x 54	DCT0136
204 x 60	DCT1452
300 x 25	DCT1456



DOUBLE AIRBRICK REDUCER

Connects Double Airbrick (DCT1450) to 100, 125 & 150mm round

Size (mm)	Order Code
235 x 140	DCT1453



LOW PROFILE DUCTING RANGE

MANROSE Proven Reliable Solutions

Round Ducting And Accessories

ALUDUCT - ALUMINISED FLEXIBLE DUCT

Spiral wire reinforced laminate construction. Properties include: vapour-proof, fire resistant, aluminium/polyester laminate, silver finish, non collapsing, non rotting, retains extended length. Temp. range -30°C to 140°C.

Size (mm)	Length (m)	Order Code
Ø 100	1.5	DCT0357
Ø 125	1.5	DCT0358
Ø 150	1.5	DCT0359

Size (mm)	Length (m)	Order Code
Ø 100	3	DCT0328
Ø 125	3	DCT0329
Ø 150	3	DCT0330

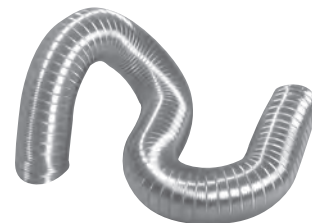


SEMIDUCT - SEMI-RIGID DUCT

Flexible but strong corrugated aluminium, silver finish, spiral wound with a unique interlocked and knurled continuous seam. Light yet self-supporting over long lengths. Temperature range: -30°C to 250°C.

Size (mm)	Length (m)	Order Code
Ø 100	1.5	DCT0333
Ø 125	1.5	DCT0334
Ø 150	1.5	DCT0335

Size (mm)	Length (m)	Order Code
Ø 100	3	DCT0114
Ø 125	3	DCT0115
Ø 150	3	DCT0116



All ducting complies with NZ Building Code fire rating requirements.

WHITE FINISH SOLID TUBE GALVANISED

Size (mm)	Order Code
Ø 100 x 0.9m	DCT0151
Ø 125 x 0.9m	DCT0146
Ø 150 x 0.9m	DCT0147



WHITE FINISH SOLID TUBE PLASTIC

Size (mm)	Order Code
Ø 100 x 1m	DCT1424
Ø 125 x 1m	DCT1425
Ø 150 x 1m	DCT1426
Ø 150 x 2.5m	DCT3527
Ø 150 x 5m	DCT3530



STRAIGHT DUCT CONNECTOR

Size (mm)	Order Code
Ø 100	DCT0159 (PVC)
Ø 125	DCT0037 (GALV)
Ø 150	DCT0059 (GALV)
Ø 150	DCT3528 (PVC)



LOW PROFILE EXTERNAL GRILLE

Size (mm)	Order Code
Ø 100	DCT2200
Ø 125	DCT2201
Ø 150	DCT2202



STANDARD EXTERNAL GRILLE

Size (mm)	Order Code
Ø 100	DCT2206



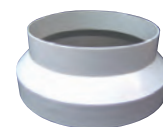
WALL PLATE (RND)

Size (mm)	Order Code
Ø 100	DCT0148
Ø 125	DCT0149
Ø 150	DCT0150



REDUCING CONNECTOR

Size (mm)	Order Code
Ø 125: 100	DCT2067
Ø 150: 125	DCT2066



For the full range of **MANROSE** Fans, Ducting, Grilles and Accessories visit our websites.
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We reserve the right to alter specifications without notice.

Dealer details:

rangehood & dryer ducting

MANROSE®



KITCHEN & LAUNDRY EXTRACTION
www.simx.co.nz | www.manrose.com.au

“proven reliable solutions”

for the Kitchen

Extraction of cooking fumes at their source is essential for moisture and odour reduction in the home. To help achieve this all kitchen rangehoods should be ducted outside.

Manrose Kitchen Rangehood Ducting Kits are designed to extract fumes efficiently and will fit most rangehoods. They can be easily installed by the home handyman or a qualified tradesperson.

RANGEHOOD DUCTING KITS

There are three ducting options available for the kitchen rangehood, through an adjacent wall, through the soffit (under the eave) or up through the roof with rangehood noise reduction in mind.

THRU WALL

Duct Size	Description	Order Code
125mm	Rear Vent Gravity Grille	DCT1162
150mm	Top & Rear Vent Weatherproof Cowl	DCT2592

For added weather protection use the weatherproof cowl as included in DCT2592

SOFFIT

Duct Size	Description	Order Code
150mm	Thru Soffit	DCT1161
150mm	Thru Soffit - Galv Tube	DCT1259
150mm	Thru Soffit - Semi Rigid	DCT2323

THRU ROOF

Duct Size	Description	Order Code
150mm	Thru Roof - Iron	DCT2324
150mm	Thru Roof - Tiled	DCT2325



DCT2592



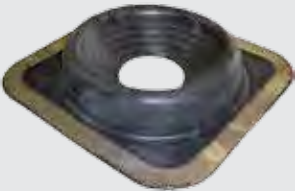
DCT2323



DCT2325



THRU-ROOF Flashing Options



For Iron Roof



Tiled Roof

for the Laundry

Dryer Ducting Kits effectively remove the moist warm air generated from clothes dryers and expel it directly outside. This process eliminates the build up of dampness, helping to keep your home dry and free from condensation.

- Designed for today’s modern & classic dryers.
- Ducting Kit suits dryers with a 100mm outlet.
- The square to round elbow will fit snugly onto most 100mm dryer outlets.
- Easily installed in confined spaces.
- 2 Year Warranty.

INVERTED & WALL MOUNTED DRYER DUCTING KIT

Duct Size	Model No.	Description	Order Code
100mm	DKSD100	Soffit Ducted	DCT1263

CLASSIC THRU WALL FAN KIT

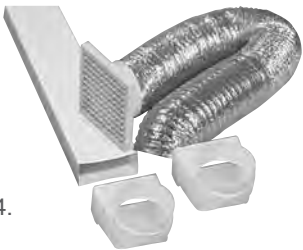
Duct Size	Model No.	Performance	Order Code
100mm	XP100S	85m ³ /hr, 23l/s	FAN0053
125mm	XP125S	130m ³ /hr, 36l/s	FAN0080
150mm	XP150S	364m ³ /hr , 101l/s	FAN0135

PRO SERIES THRU WALL FAN KIT

Duct Size	Model No.	Performance	Order Code
125mm	XPLP125SS	130m ³ /hr, 36l/s	FAN0614
150mm	XPLP150SS	364m ³ /hr , 101l/s	FAN0621

DRYER DUCTING KIT SOFFIT DUCTED

For soffit ducted free standing dryers extra rectangular ducting and a connector will be required.
Order Codes: DCT0013 & DCT0014.



MANROSE THRU WALL FAN KITS

- Thru wall ventilation kits are ideally suited to ventilate laundry areas where utilities are adjacent to exterior walls.
- Classic Shower Fan Kit models are now supplied with a weatherproof cowl.



MANROSE
CLASSIC SERIES

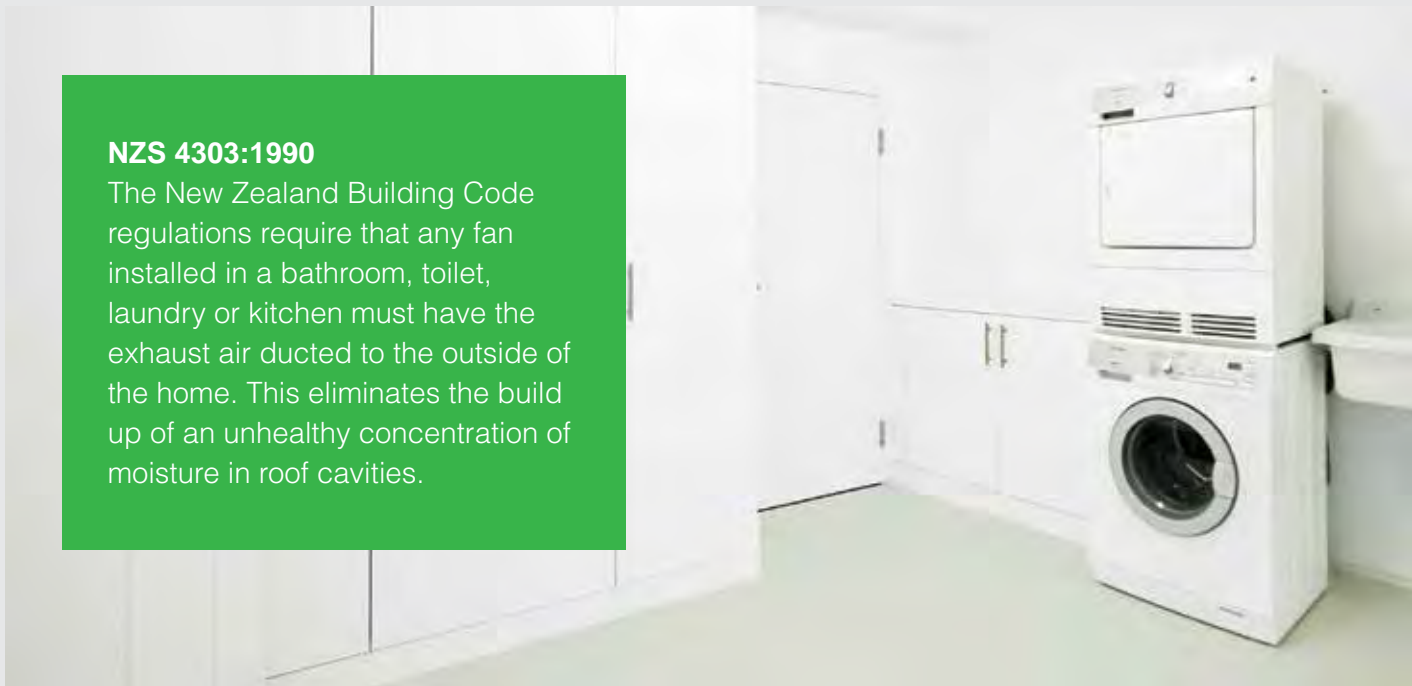
- Thru wall kit includes fan, ducting and grille.
- Fully Building Code compliant.
- 5 Year Warranty.
- Pro Series Shower Fan Kit models are now supplied with a weatherproof cowl.



MANROSE
PRO-SERIES

NZS 4303:1990

The New Zealand Building Code regulations require that any fan installed in a bathroom, toilet, laundry or kitchen must have the exhaust air ducted to the outside of the home. This eliminates the build up of an unhealthy concentration of moisture in roof cavities.




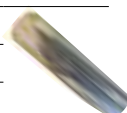



DUCTING KIT CONTENT

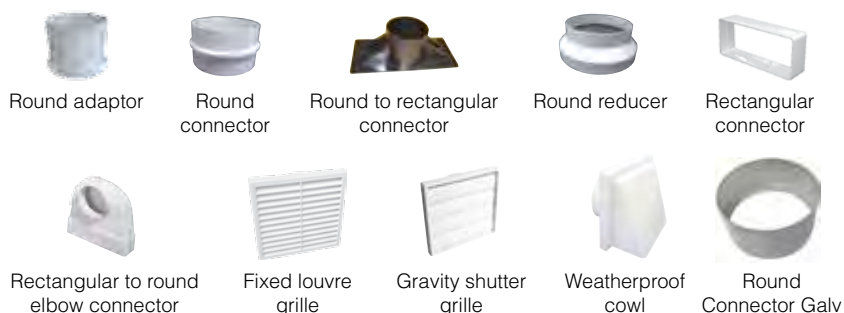
	Thru Wall Rear Vent	Thru Wall Rear/Top	Soffit Kit	Soffit Kit Galv Tube	Soffit Kit Semi-Rigid	Thru Roof 125 Iron	Thru Roof 150 Iron	Thru Roof Tiled	Dryer Soffit Kit
Semi Rigid Duct - 400mm length	✓								
Semi Rigid Duct - 1.5m length		✓							
Semi Rigid Duct - 3m length					✓		✓	✓	
Solid Tube - Galvanised 900m length				✓			✓	✓	
Flexible Aluminium - 3m length		✓	✓	✓	✓	✓			✓
Flat Channel Ducting - 0.75m length									✓
White Eggcrate Grille					✓				✓
White Gravity Grille	✓	✓							
White Fixed Louvre Grille			✓	✓					
White Weatherproof Cowl		✓							
2 x Rec to Round 90 Elbows									✓
150:125 Reducer		✓			✓	✓	✓	✓	
150mm Connector		✓			✓		✓	✓	
Thru Roof Cowl						✓	✓	✓	
Flashing - Dektile						✓	✓		
Flashing - Lead								✓	
Duct Tape	✓	✓	✓	✓	✓	✓	✓	✓	✓

COMPONENTS LIST

MANROSE DUCTING

Type	Diameter (mm)	Length (m)	Order Code	
Aluduct Aluminium Flexible	100	1	DCT0357	
Aluduct Aluminium Flexible	125	1	DCT0358	
Aluduct Aluminium Flexible	150	1	DCT0359	
Semi Rigid	100	1.5	DCT0333	
Semi Rigid	125	1.5	DCT0334	
Semi Rigid	150	1.5	DCT0335	
Low Profile Flat Channel	110 x 54	1.5	DCT0013	
Low Profile Flat Channel	204 x 60	1.5	DCT0519	
Low Profile Flat Channel	220 x 90	1.5	DCT1443	
Low Profile Flat Channel	300 x 25	1.5	DCT1460	
Galvanised Solid Tube	100	0.9	DCT0151	
Galvanised Solid Tube	125	0.9	DCT0152	
Galvanised Solid Tube	150	0.9	DCT0153	
White Finish PVC Tube	100	1	DCT1424	
White Finish PVC Tube	125	1	DCT1425	
White Finish PVC Tube	150	1	DCT1426	

All ducting complies with NZ Building Code fire rating requirements.



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MANROSE CONNECTORS & ADAPTORS

Type	Size (mm)	Order Code
Round Adaptor	125	DCT0448
Rect : Round Adaptor	335 x 155 : 125	DCT1360
Round Connector	100	DCT0159
Round Connector	125	DCT0037
Round Connector Galv	150	DCT0059
Round Reducer	150 : 125	DCT2066
Round Reducer	150 : 100	DCT2122
Rectangular Connector	110 x 54	DCT0014
Rect : Round Elbow Connector	110 x 54 : 100	DCT0124

MANROSE WALL/CEILING GRILLES

Type	Size (mm)	Order Code
White Fixed Louvre	100	DCT0025
White Fixed Louvre	125	DCT0041
White Fixed Louvre	150	DCT0063
White Gravity Shutter	100	DCT0029
White Gravity Shutter	125	DCT0044
White Gravity Shutter	150	DCT0066
White Weatherproof Cowl	100	DCT0018
White Weatherproof Cowl	125	DCT1030
White Weatherproof Cowl	150	DCT1031

Dealer details:

Building Code Clause(s).....B1 & B2.....

PRODUCER STATEMENT – PS1 – DESIGN

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

ISSUED BY:.....MIKE WILTON CONSULTING LTD.....
(Design Firm)

TO: DOMINIC LOWE
(Owner/Developer)

TO BE SUPPLIED TO:.....CHCH CITY COUNCIL
.....
(Building Consent Authority)

IN RESPECT OF:...NEW GARAGE FOUNDATIONS & STRUCTURE & ROOF TRUSSES...
(Description of Building Work)

AT: 164 QUEENSPARK DR, CHCH.....
(Address)

We have been engaged by the owner/developer referred to above to provide Construction of new sleepout, and garage, Construction Supervision.(Prepour inspection of Garage Floor & Foundation pre line of new walls, Lintel Beams for Garage & Trusses for Garage),... services in respect of the requirements of
(Extent of Engagement)

Clause(s)B1 & B2.....of the Building Code for
All ☒ or Part only ☐ (as specified in the attachment to this statement), of the proposed building work.

The design carried out by us has been prepared in accordance with:

Compliance Documents issued by the Ministry of Business, Innovation & Employment...B1/AS1.....or
(verification method / acceptable solution)
☒ Alternative solution as per the attached schedule...AS/NZS 1170.0, AS/NZS 1170.1, AS4100 and
AS/NZS 4600.....

The proposed building work covered by this producer statement is described on the drawings titled 164 QUEENSPARK DR, CHCH

DWGS BY OTHERS

together with the specification, and other documents set out in the schedule attached to this statement.

On behalf of the Design Firm, and subject to:

- (i) Site verification of the following design assumptions
- (ii) All proprietary products meeting their performance specification requirements;
- (1) Structural design loads are based on a 25 year design life and Importance Level 1 structure as defined in AS/NZS 1170.0.2004 clause 3.3
- (2) Bearing Capacity By MWC – Ultimate Bearing Capacity 200Kpa from 0.1 to 1.2mBGL

I **believe on reasonable grounds** that a) the building, if constructed in accordance with the drawings, specifications, and other documents provided or listed in the attached schedule, will comply with the relevant provisions of the Building Code and that b), the persons who have undertaken the design have the necessary competency to do so. I also recommend the following level of construction monitoring/observation:

☐ CM1 ☒ CM2 ☐ CM3 ☐ CM4 ☐ CM5 (Engineering Categories) or ☐ as per agreement with owner/developer (Architectural)


I, Adrian James Collis... am: ☒ CPEng160987.....#

(Name of Design Professional)

☐ Reg Arch#

I am a Member of : ☒ IPENZ ☐ NZIA and hold the following qualifications:...BE Civil, M.Eng St
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 ...  ON BEHALF OF MIKE WILTON CONSULTING LTD
(Design Firm)



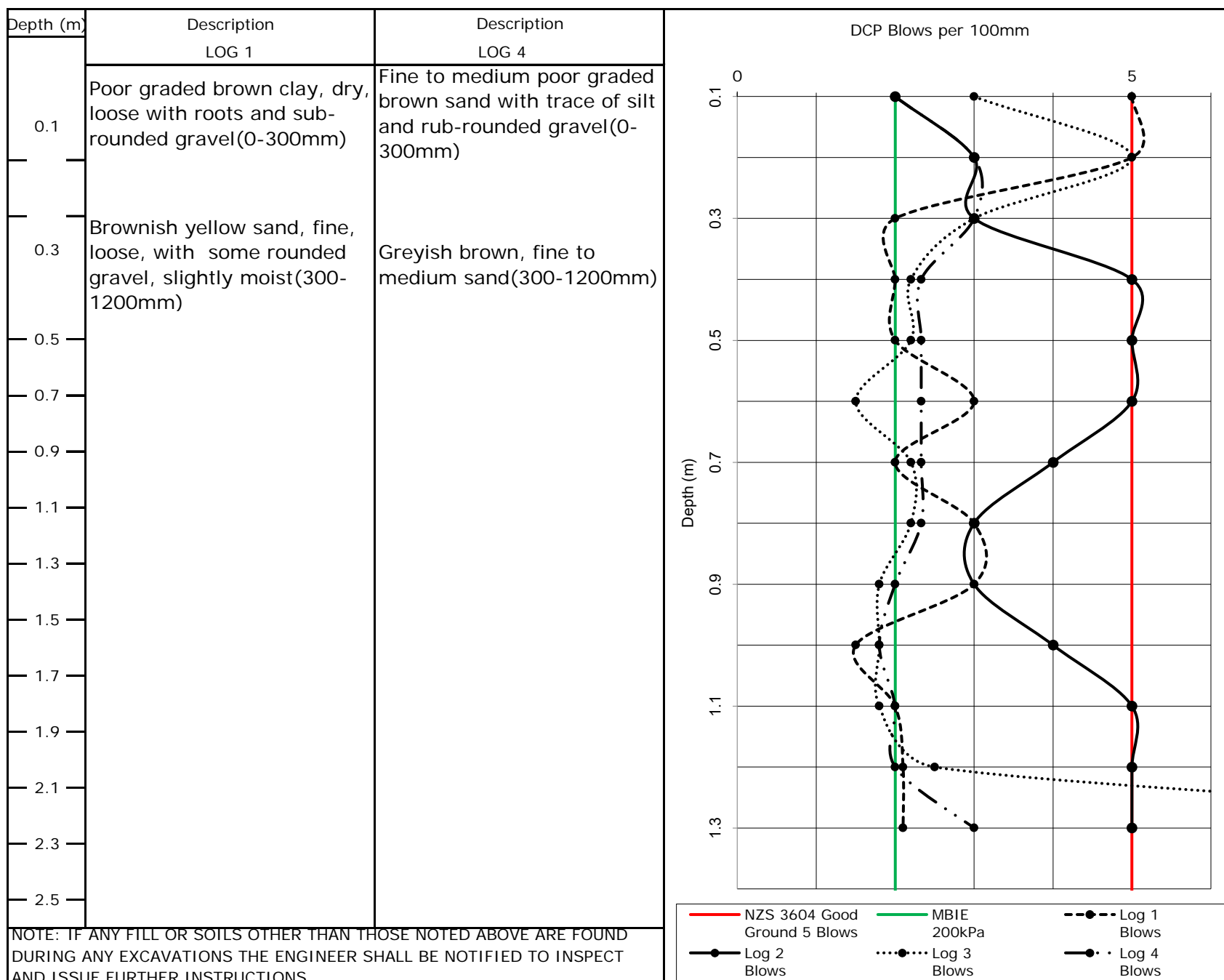
Date 9th October, 2020 (signature)

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

This form is to accompany **Form 2 of the Building (Forms) Regulations 2004** for the application of a Building Consent.

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

Client: Domonic Lowe	JOB NO	19174	DATE	12/12/2019
Project: 19174-164 Queenspark Drive	LOG	1 to 4	PAGE	1 of 1
Note:	LOT		BY	HL





2/170

166



2

1

4

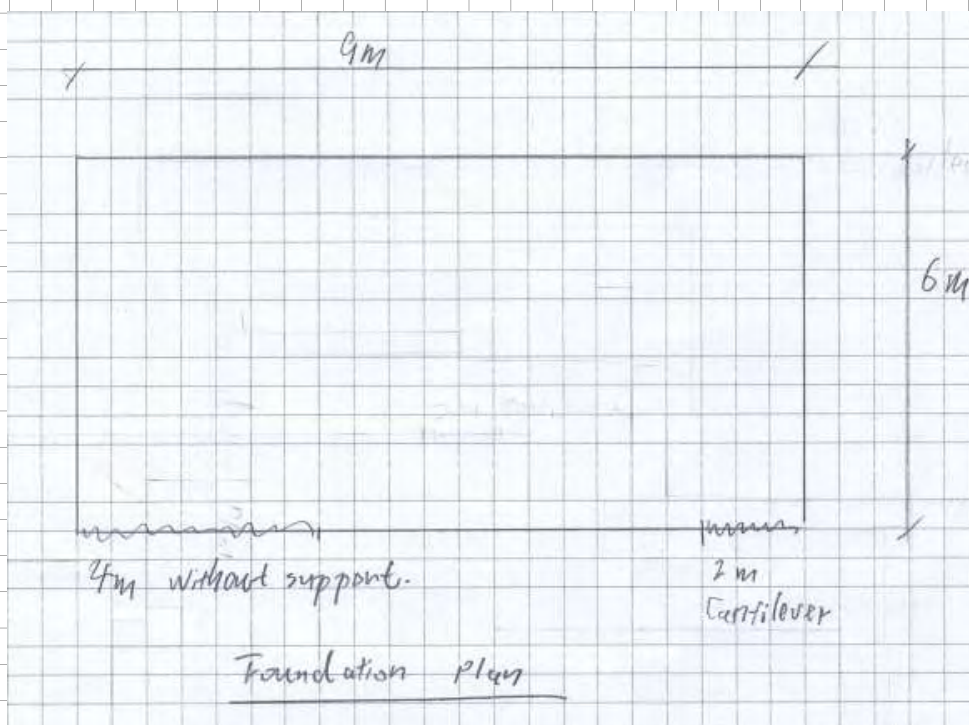
164

3

162

SOIL TEST LOCATION
PLAN

Client: Domonic Lowe		Date: Feb-20
Project/Job: 164 Queenspark Drive, CHCH	Job No: 19174	Sheet No: 0
Subject: Foundation Design		By: MW & FX



Client:	Domonic Lowe	Date:	Feb-20
Project/Job:	164 Queenspark Drive, CHCH	Job No:	19174
Subject:	Foundation Design	Sheet No:	1
		By:	MW & FX

Loss of support (4m) under edge beam

roof load width =	3.00 m		
height of wall =	2.4 m		
floor load width =	m	First Floor =	0 m
thickness of slab =	0.225 m		
depth of footing =	0.325 m		
unit volume of rib =	0 m ³ /m		
load width of slab =	m		
length of beam =	4 m		
load width of ceiling =	0 m		
weight of timber floor (mid-floor) =	0.38 x 0	=	0 kN/m
weight of external wall =	0.50 x 2.4	=	1.20 kN/m
weight of roof =	0.45 x 3.00	=	1.35 kN/m
weight of slab =	24 x 0.225 x 0	=	0.00 kN/m
weight of edge beam =	24 x 0.1 x 0.3	=	0.72 kN/m
live load =	2.5 x 2	=	5.00 kN/m
weight of ceiling =	0.2 x 0	=	0.00 kN/m

deflection check

Ig	1.24E+09 mm ⁴
c	182.9 mm
yt	142.1 mm
fc	25 MPa
Fr	3 Mpa
Mcr-	26.25 kNm
Mcr+	20.39 kNm
Ec =	23.5 GPa

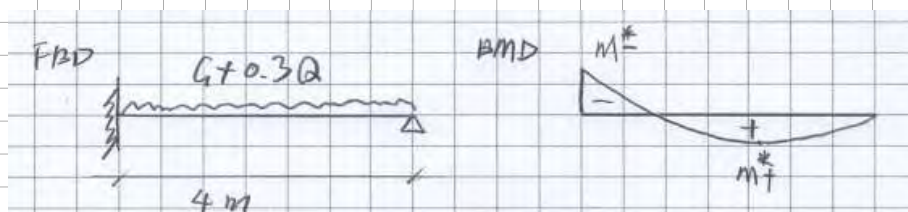
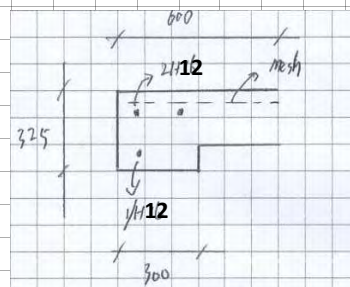
load combination = G+0.3Q

G+0.3Q = 4.77 kN/m

M*₋ = wL²/8 = 9.54 kNm

M*₊ = wL²*9/128 = 5.366 kNm

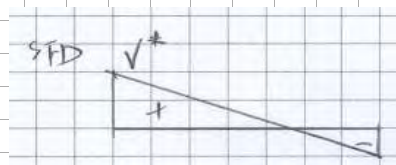
Δ = wL⁴/(185EIg) 2.26E-04 m



< Mcr-
< Mcr+
ok

Client:	Domonic Lowe		Date:	Feb-20
Project/Job:	164 Queenspark Drive, CHCH	Job No:	19174	Sheet No: 2
Subject:	Foundation Design		By:	MW & FX

Strength check				
1.2G+1.5Q =		11.42 kN/m		
M* =	wL ² /8 =	22.85 kNm		
Area of mesh =		77.55 mm ²		
As =		226.2 mm ²		2/H12 @ top
d =		275 mm		
fc =		25 Mpa		
fs =		500 Mpa		
b =		300 mm		
a =	Afs/(0.85bfc)	23.82 mm		
ΦMn =	0.85*A*fs*(d-a/2)	33.96 kNm		ok
M*+ =	wL ² *9/128 =	12.85 kNm		
As =		113.1 mm ²		H12 @ bottom
d =		250 mm		
a =	Afs/(0.85bfc)=	8.87 mm		
ΦMn =	0.85*A*fs*(d-a/2)=	11.8 kNm		
As =		47.75 mm ²		SE72 Mesh
d =		150 mm		in the middle
a =	Afs/(0.85bfc)=	3.745 mm		
ΦMn =	0.85*A*fs*(d-a/2)=	3.006 kNm		
Total ΦMn =	11.8 + 3.01 =	14.81 kNm		ok
Shear check				
V* =	5/8*w*L =	28.56 kN		
ρ =	As/bd =	0.004		
Ka =		1		9.3.9.3.4, NZS3101
Kd =		1		9.3.9.3.4, NZS3101
ΦVc =	0.75*(0.07+10*ρ)*SQRT(fc)*Ka*Kd*b*d/1000 =	33 kN		Ok



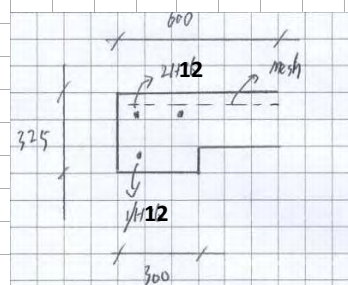
Client:	Domonic Lowe		Date:	Feb-20
Project/Job:	164 Queenspark Drive, CHCH	Job No:	19174	Sheet No: 3
Subject:	Foundation Design		By:	MW & FX

Edge Beam Cantilever(2m)

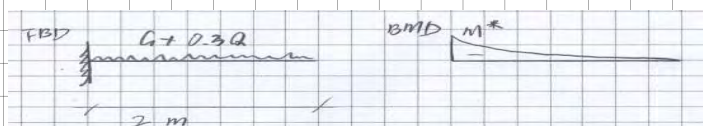
roof load width =	3.00 m				
height of wall =	2.4 m				
floor load width =	m	First Floor =	0 m		
thickness of slab =	0.225 m				
depth of footing =	0.325 m				
unit volume of rib =	m ³ /m				
load width of slab =	m				
length of beam =	2 m				
load width of ceiling =	0 m				
weight of ceiling =	0.2 x	0		=	0 kN/m
weight of external wall =	0.50 x	2.4		=	1.20 kN/m
weight of roof =	0.45 x	3.00		=	1.35 kN/m
weight of slab =	24 x	0.225 x	0	=	0.00 kN/m
weight of edge beam =	24 x	0.1 x	0.3	=	0.72 kN/m
live load =	2.5 x	1		=	2.50 kN/m
weight of timber floor (mid-floor) =	0.38 x	0		=	0 kN/m

deflection check

Ig	1.24E+09 mm ⁴
c	182.9 mm
yt	142.1 mm
fc	25 MPa
Fr	3 Mpa
Mcr	26.25 kNm
Ec =	23.5 GPa
load combination = G+0.3Q	
G+0.3Q =	4.02 kN/m
M* = wL ² /2 =	8.04 kNm
Δ = wL ⁴ /(8EIg)	2.75E-04 m



< Mcr
ok



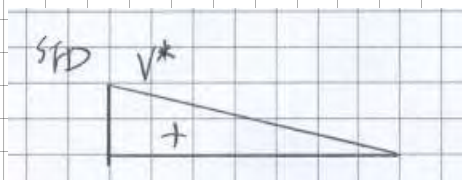
Client:	Domonic Lowe		Date:	Feb-20
Project/Job:	164 Queenspark Drive, CHCH	Job No:	19174	Sheet No: 4
Subject:	Foundation Design		By:	MW & FX

Strength check

$1.2G + 1.5Q =$		7.674 kN/m	
$M^* =$	$wL^2/2 =$	15.35 kNm	
Area of mesh =		63.45 mm ²	
$A_s =$		201.1 mm ²	2/H12 @ top
$d =$		275 mm	
$f_c =$		25 Mpa	
$f_s =$		500 Mpa	
$b =$		300 mm	
$a =$	$A_f s / (0.85 b f_c)$	20.75 mm	
$\Phi M_n =$	$0.85 A^* f_s (d - a/2)$	29.75 kNm	ok

Shear check

$V^* =$	$w^* L =$	15.35 kN	ok
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Client:	Domonic Lowe	Date:	Feb-20
Project/Job:	164 Queenspark Drive, CHCH	Job No:	19174
Subject:	Foundation Design	Sheet No:	5
		By:	MW & FX

Loss of support (4m) under slab

roof load width =	0.00 m		
height of wall =	0 m		
floor load width =	m	First Floor =	0 m
thickness of slab =	0.225 m		
depth of footing =	m		
unit volumn of rib =	0 m ³ /m		
load width of slab =	m		
length of beam =	4 m		
load width of ceiling =	0 m		

weight of timber floor (mid-floor) =	0.38 x	0	=	0 kN/m
weight of external wall =	0.50 x	0	=	0.00 kN/m
weight of roof =	0.45 x	0.00	=	0.00 kN/m
weight of slab =	24 x	0.225 x	1	= 5.40 kN/m
weight of edge beam =	0 x	0.1 x	0.3	= 0.00 kN/m
live load =	2.5 x	1	=	2.50 kN/m
weight of ceiling =	0.2 x	0	=	0.00 kN/m

deflection check

Ig	9.49E+08 mm ⁴
c	112.5 mm
yt	112.5 mm
fc	25 MPa
Fr	3 Mpa
Mcr-	25.31 kNm
Mcr+	25.31 kNm
Ec =	23.5 GPa

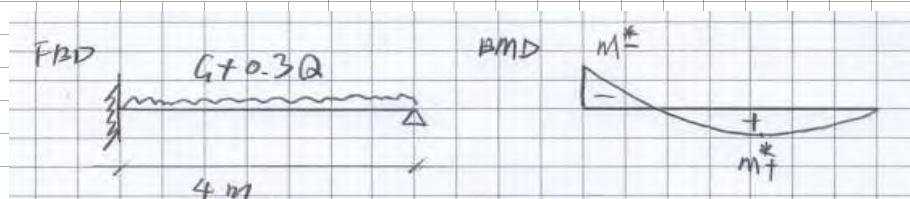
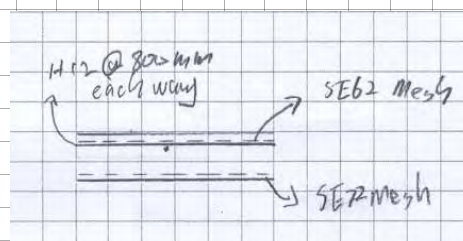
load combination = G+0.3Q

G+0.3Q = 6.15 kN/m

M*- = $wL^2/8 = 12.3$ kNm

M*+ = $wL^2*9/128 = 6.919$ kNm

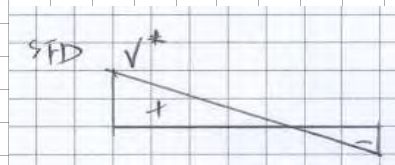
$\Delta = wL^4/(185EIg) = 3.82E-04$ m



< Mcr-
< Mcr+
ok

Client:	Domonic Lowe		Date:	Feb-20
Project/Job:	164 Queenspark Drive, CHCH	Job No:	19174	Sheet No: 6
Subject:	Foundation Design		By:	MW & FX

Strength check				
1.2G+1.5Q =		10.23 kN/m		
M*- =	wL^2/8 =	20.46 kNm		
Area of mesh =		146 mm^2		SE62 500E
As =		226.2 mm^2		H12 @ 800
d =		175 mm		
fc =		25 Mpa		
fs =		500 Mpa		
b =		1000 mm		
a =	Afs/(0.85bfc)	8.758 mm		
ΦMn =	0.85*A*fs*(d-a/2)	26.99 kNm		ok
M*+ =	wL^2*9/128 =	11.51 kNm		
As =		191 mm^2		SE72 500E
d =		150 mm		
a =	Afs/(0.85bfc)=	4.494 mm		
ΦMn =	0.85*A*fs*(d-a/2)+	11.99 kNm		ok
Shear check				
V* =	5/8*w*L =	25.58 kN		
ρ =	As/bd =	0.002		
Ka =		1		9.3.9.3.4, NZS3101
Kd =		1		9.3.9.3.4, NZS3101
ΦVc =	0.75*(0.07+10*ρ)*SQRT(fc)*Ka*Kd*b*d/1000 =	59.89 kN		Ok





This building has been releveled and the structure and levels have been inspected by engineers Mike Wilton consulting limited in way of PS4. Deborah Wilson architectural designer and technician inspected the building on 22/09/2020 after the relevel.

Roof:

Corrugated roof and flashings and Solatube look sound on the outside and inspection of ceilings did not show water damage. The roof insulation will be checked and topped up if needed when alterations and new heat ducting and wiring is done. Down pipes need to be reconnected into existing Stormwater drains.



Flashing cap over brick and windows looks sound with no signs of moisture on the inside walls and no sign of mould or dampness.



Windows were checked and open and close freely.



Cladding is brick veneer it looks sound but need some mortar repairs due to historic damage. Existing windows and doors are sound and open freely some windows will need to be replaced to allow for adequate ventilation to new habitable spaces and a new door for egress from new lounge and new laundry.

The Sewage pipes need to be reconnected once new plumbing is in place. And new gully traps as required. Ground clearance of 150mm to unfinished ground and 100mm to paving around building and foot paths need to be established.

An addition was done in 2007 and has fire rated walls this may have been part of the requirements for a commercial property, the minimum set back from boundary is 1.77m this is more than adequate for a domestic house.



Pads for post at entry terrace needs to be rebuilt as instructed by engineer.



Shiplap weatherboards look sound but need restaining.

The internal linings are sound with only a few damaged panels of GIB. Once the new rooms have been reconfigured the walls will be braced.

The existing walls are insulated with pink batts some of the lining has been removed so this could be inspected.

The concrete slab has been releveled and structurally repaired, some small repairs to surface is required for floor finishes. New carpet and vinyl will be laid once the building work is finished.

Glazing the extension built in 2007 is fully glazed with double glazing, and all new windows and doors will be double glazed. The Bay window is single glazed and will have a low E film applied to the inside windows to reduce heat loss.

There will be a new heat pump ducted in roof space to provide cost effective heating.

This building is more than adequate as a house once altered, its located in a residential community and has the right setbacks from internal and road boundary's.

It will have sufficient light and ventilation to habitual space and it is well insulated.

And has enough parking and outdoor area which will be landscaped, with direct access off the new lounge.

Form 2A

Memorandum from licensed building practitioner: Certificate of design work

Section 30C or 45, 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: 164 Queenspark Drive

Suburb: Parklands

Town/City: Christchurch

Postcode: 8083

THE OWNER(S)

Name(s): Dominic Andrew Lowe
Priscilla Angella Lowe

Mailing address: As above

Suburb:

PO Box/Private Bag:

Town/City:

Postcode:

Phone number: 027641 1073

Email address: dominic.lowe@extra.co.nz

BASIS FOR PROVIDING THIS MEMORANDUM

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

- ☐ **sole** designer of all of the RBW design outlined in this memorandum – I carried out all of the RBW design 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

IDENTIFICATION OF DESIGN WORK THAT IS RESTRICTED BUILDING WORK (RBW)

I Deborah Ann Wilson carried out / supervised the following design work that is restricted building work

PRIMARY STRUCTURE: B1

Design work that is RBW	Description of RBW	Carried out or supervised	Reference to plans and specifications
Tick <input checked="" type="checkbox"/> if included. 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
All RBW design work relating to B1 <input checked="" type="checkbox"/>		<input type="radio"/> Carried out <input type="radio"/> Supervised	
Foundations and subfloor framing <input checked="" type="checkbox"/>	And new foundation to garage/ Plus PS1 from engineer	<input checked="" type="checkbox"/> Carried out <input checked="" type="checkbox"/> Supervised	A400

Design work that is RBW	Description of RBW	Carried out or supervised	Reference to plans and specifications
Tick <input checked="" type="checkbox"/> if included. 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
Walls <input checked="" type="checkbox"/>	Walls to new garage	<input checked="" type="checkbox"/> Carried out <input type="checkbox"/> Supervised	A301-A302 D400-D406
Roof <input checked="" type="checkbox"/>	garage roof	<input type="checkbox"/> Carried out <input type="checkbox"/> Supervised	A107,A301,A302 A404
Columns and beams <input checked="" type="checkbox"/>	Garage lintes by engineer house lintels for new openings	<input type="checkbox"/> Carried out <input type="checkbox"/> Supervised	A104,A107
Bracing <input checked="" type="checkbox"/>	bracing garage & house	<input type="checkbox"/> Carried out <input type="checkbox"/> Supervised	A105 & A107 and refer to calculations in Spec
Other <input type="checkbox"/>		<input type="checkbox"/> Carried out <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. 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
EXTERNAL MOISTURE MANAGEMENT SYSTEMS: E2			
All RBW design work relating to E2 <input checked="" type="checkbox"/>		<input type="radio"/> Carried out <input type="radio"/> Supervised	
Damp proofing <input checked="" type="checkbox"/>	new garage slab NZS3604	<input checked="" type="radio"/> Carried out <input type="radio"/> Supervised	D400
Roof cladding or roof cladding system <input checked="" type="checkbox"/>	garage roof E2/AS1 8.4.12 Flashing details	<input type="radio"/> Carried out <input type="radio"/> Supervised	A107, A202 A404
Ventilation system (for example, subfloor or cavity) <input type="radio"/>		<input type="radio"/> Carried out <input type="radio"/> Supervised	
Wall cladding or wall cladding system <input checked="" type="checkbox"/>	Garage Hardiflex and shadowclad House flashings around new doors/windows manufacturers	<input checked="" type="radio"/> Carried out <input type="radio"/> Supervised	A400 to A402 A407 to A409
Waterproofing <input type="radio"/>		<input type="radio"/> Carried out <input type="radio"/> Supervised	
Other <input type="radio"/>		<input type="radio"/> Carried out <input type="radio"/> 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. 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
FIRE SAFETY SYSTEMS: C1 - C6			
Emergency warning systems Evacuation and fire service operation systems <input checked="" type="checkbox"/> Suppression or control systems Other	Domestic smoke alarms to existing house	<input type="checkbox"/> Carried out <input checked="" type="checkbox"/> Supervised	A105
Note: The design of fire safety systems is only restricted building work when it involves small-to-medium apartment buildings as defined by the Building (Definition of Restricted Building Work) Order 2011.			

WAIVERS AND MODIFICATIONS	
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:	
Clause	Waiver/modification required
List relevant clause numbers of building code	Specify nature of waiver or modification of building code required

ISSUED 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: **Deborah Wilson**

LBP or Registration number: **BP117593**

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

Design Entity or Company (optional): **Contractor for Core Civil Solutions NZ LTD**

Mailing address (if different from below): **deborahwilsonnz@yahoo.co.nz**

Street address/Registered office: **1/7 Wanstead place, Woolston,**

Suburb: **Woolston,**

Town/City: **Christchurch**

PO Box/Private Bag:

Postcode: **8062**

Phone number:

Mobile: **0274143000**

After hours: **9:00am to 5:00pm**

Fax:

Email address: **deboarahwilsonnz@yahoo.co.nz**

Website:

DECLARATION

I, **Deborah Wilson** 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:

28 September 2020

Demand Calculation Sheet

Job Details

Name: Queenspark Drive Amended 30/10/2010 note little changes to demand
 Street and Number: 164
 Lot and DP Number:
 City/Town/District: Christchurch
 Designer: Deborah Wilson
 Company: Design by Deb Ltd
 Date: 13 November

Building Specification

Number of Storeys 1
 Floor Loading 2 kPa
 Foundation Type Slab

Single

Cladding Weight Light
 Roof Weight Light
 Room in Roof Space No
 Roof Pitch (degrees) 30
 Roof Height above Eaves (m) 2.2
 Building Height to Apex (m) 4.7
 Ground to Lower Floor (m) 0.25

Average Stud Height (m) 2.4
 Building Length (m) 9
 Building Width (m) 6
 Building Plan Area (m²) 54.7

Building Location

Wind Zone = Medium

Earthquake Zone 1

Soil Type D & E (Deep to Very Soft)
 Annual Prob. of Exceedance: 1 in 500 (Default)

Bracing Units required for Wind

	Along	Across
Single Level	254	338

Bracing Units required for Earthquake

	Along & Across
Single Level	144

Single Level Along Resistance Sheet

Job Name: Queenspark Drive

									Wind	EQ
									Demand	
									254	144
									Achieved	
Line	Element	Length (m)	Angle (degrees)	Stud Ht. (m)	Type	Supplier	Wind (BUs)	EQ (BUs)	314 124%	334 232%
a	1	1.20		2.4	RAB	RAB Board 6mm	102	109		
	2	1.20		2.4	RAB	RAB Board 6mm	80	85		
									182 OK	194 OK
b	1	0.60		2.4	RAB	RAB Board 6mm	51	55		
	2	1.20		2.4	RAB	RAB Board 6mm	80	85		
									131 OK	140 OK

Single Level Across Resistance Sheet

Job Name: Queenspark Drive

									Wind	EQ
									Demand	
									338	144
									Achieved	
Line	Element	Length (m)	Angle (degrees)	Stud Ht. (m)	Type	Supplier	Wind (BUs)	EQ (BUs)	467 138%	498 346%
m	1	1.20		2.4	RAB	RAB Board 6mm	80	85		
	2	1.20		2.4	RAB	RAB Board 6mm	80	85		
									161 OK	170 OK
n	1	0.60		2.4	RAB	RAB Board 6mm	51	55		
	2	0.60		2.4	RAB	RAB Board 6mm	51	55		
									102 OK	109 OK
o	1	1.20		2.4	RAB	RAB Board 6mm	102	109		
	2	1.20		2.4	RAB	RAB Board 6mm	102	109		
									204 OK	218 OK

Custom Wall Elements

Supplier	System	Min. Length m	Wind BUs/m	EQ BUs/m
RAB Board 6mm	RAB	0.4	85	91
RAB Board 6mm	RAB	1.2	67	71
Ecoply	EP1	0.4	80	95
Ecoply	EPBS	0.4	60	60

Demand Calculation Sheet

Job Details

Name: Queenspark Drive
 Street and Number: 164
 Lot and DP Number:
 City/Town/District: Christchurch
 Designer: Deborah Wilson
 Company: Design By Deb Limited
 Date: 22/7/2020 Amended 30/10/2010 note little changes to demand

Building Specification

Number of Storeys: 1
 Floor Loading: 2 kPa
 Foundation Type: Slab

Single
 Cladding Weight: Heavy
 Roof Weight: Light
 Room in Roof Space: 25 to 37.5%
 Roof Pitch (degrees): 26
 Roof Height above Eaves (m): 3.8
 Building Height to Apex (m): 6.4
 Ground to Lower Floor (m): 0.2

 Average Stud Height (m): 2.4
 Building Length (m): 19.580
 Building Width (m): 9.76
 Building Plan Area (m²): 157.9

Building Location

Wind Zone = Medium

Earthquake Zone 2

Soil Type: D & E (Deep to Very Soft)
 Annual Prob. of Exceedance: 1 in 500 (Default)

Bracing Units required for Wind

	Along	Across
Single Level	538	1346

Bracing Units required for Earthquake

	Along & Across
Single Level	1472

Single Level Along Resistance Sheet

Job Name: Queenspark Drive

									Wind	EQ
									Demand	
									538	1472
									Achieved	
Line	Element	Length (m)	Angle (degrees)	Stud Ht. (m)	Type	Supplier	Wind (BUs)	EQ (BUs)	1800 335%	1572 107%
a	1	2.30		2.4	GS1-N	GIB®	159	138		
	2	1.30		2.4	GS1-N	GIB®	90	78		
	3	1.00		2.4	GS1-N	GIB®	65	60		
	4	1.40		2.4	GS1-N	GIB®	97	84		
	5	0.40		2.4	GS1-N	GIB®	21	23		
									431 OK	383 OK
b	1	0.80		2.4	GS1-N	GIB®	49	47		
	2	2.40		2.4	GS1-N	GIB®	166	144		
	3	2.40		2.4	GS1-N	GIB®	166	144		
	4	2.40		2.4	GS1-N	GIB®	166	144		
	5	2.40		2.4	GS1-N	GIB®	166	144		
	6	2.40		2.4	BL1-H	GIB®	307	250		
									1018 OK	873 OK
c	1	1.00		2.4	GS1-N	GIB®	65	60		
	2	1.00		2.4	GS1-N	GIB®	65	60		
	3	0.60		2.4	GS1-N	GIB®	34	35		
	4	1.40		2.4	GS1-N	GIB®	97	84		
	5	1.30		2.4	GS1-N	GIB®	90	78		
									351 OK	316 OK

Single Level Across Resistance Sheet

Job Name: Queenspark Drive

									Wind	EQ
									Demand	
									1346	1472
									Achieved	
Line	Element	Length (m)	Angle (degrees)	Stud Ht. (m)	Type	Supplier	Wind (BUs)	EQ (BUs)	1702 126%	1478 100%
m	1	1.20		2.4	GS1-N	GIB®	83	72		
	2	1.20		2.4	BL1-H	GIB®	154	125		
									236 OK	197 OK
n	1	1.80		2.4	BL1-H	GIB®	230	187		
	2	0.60		2.4	BL1-H	GIB®	59	61		
									290 OK	248 OK
o	1	1.30		2.4	GS2-N	GIB®	127	112		
	2	1.80		2.4	BL1-H	GIB®	230	187		
	2	0.60		2.4	GS1-N	GIB®	34	35		
	3	0.60		2.4	GS1-N	GIB®	34	35		
									426 OK	369 OK
p	1	2.40		2.4	GS1-N	GIB®	166	144		
	2	2.40		2.4	GS1-N	GIB®	166	144		
	3	2.40		2.4	GS1-N	GIB®	166	144		
	4	1.10		2.4	GS1-N	GIB®	74	66		
									571 OK	498 OK
Q	1	1.00		2.4	GS1-N	GIB®	65	60		
	2	1.00		2.4	GS1-N	GIB®	65	60		
	3	0.80		2.4	GS1-N	GIB®	49	47		
									179 OK	166 OK



Custom Wall Elements

Supplier	System	Min. Length m	Wind BUs/m	EQ BUs/m
Existing unit	Type 2	1.0	62	62
Existing units	Type 10	0.6	83	83
Note old bracing units match would be				
Type 2	GS1			
Type 10	GS2			

Development Report

Application type	Residential detached dwelling
Application number	BCN/2020/10088
Applicant	Design By Deb Limited 1/7 Wanstead Place, Woolston, Christchurch 8062
Owner	D A Lowe and P A Lowe PO Box 38055, Parklands, Christchurch 8842
Issue date	9 October 2020
Location	164 Queenspark Drive Parklands Lot 4 DP 58227
Description	Alteration and change of use to dwelling - change to layout of dwelling and construction of detached garage and mudroom

Critical issues for this project

This summary highlights specific information required to progress an application through the various stages. Detail for these items will be found in corresponding sections of this document.

Resource consents and planning authorisations (including authorisations from Environment Canterbury) required before construction commences:

No critical issues have been identified in this category.

Information required before a building consent can be issued:

Clause	Section in this document
Sediment control: general building site	General advice on the project

Information required before a code compliance certificate can be issued:

Clause	Section in this document
Critical issue: Authorisations	Services

The following matters have been identified in respect of the above building project:

Planning

City or District Plan zone

This property is in the Residential Suburban zone in the Christchurch District Plan.

City or District Plan compliance

Permitted activity

- Based on the information submitted, the project for alterations and change of use from medical rooms to a dwelling, with changes to layout of dwelling and construction of detached garage and mudroom. These works comply with all relevant rules and is a permitted activity under the Christchurch District Plan. No resource consent is required.

Land characteristics and hazards

Development levels and flooding

Development levels

- **Recommended Finished Floor Level (Outbuilding):** It is noted that the garage (accessory building to principal use not intended for human habitation) is outside the scope of Building Code Clause E1.3.2 (*Performance E1.3.2 shall only apply to Housing, Communal Residential and Communal Non-Residential buildings*) however it is *recommended* that a minimum finished floor level of at least 13.07m RL in terms of Christchurch Drainage Datum be adopted to avoid potential inundation of the building. Where it is proposed to construct an outbuilding lower than the recommended level (and whether or not a notice under Section 73 of the Building Act is required) the outbuilding must comply with the following:
 - The structure will need to withstand a 1% AEP (100 year return period annual exceedance probability) event.
 - The durability of the floor and lower wall areas, at least up to the height of potential flood levels, must not be susceptible to damage in the event of flooding and must meet the Building Code (particularly B1.3.1 and 2). This can be met by a concrete nib wall up to the floor level stated above, or by unlined walls constructed of treated timber.
 - Power sockets must be above the recommended floor level stated above.
- **Floor Level Consideration Pursuant To District Plan:** This property is located within an area affected by rules/development standards in the District Plan which include floor level as an assessment matter and you are advised to refer to the planning section of this document for any implications of these matters in relation to your specific project. Min recommended level is 13.13m RL.
- **Building Location Certificate:** The Christchurch City Council requires that a Building Location Certificate (Form B-081) be completed for sites where minimum levels are set in relation to flood limitation or where durability must be assessed. A Registered Surveyor is required to specify levels in terms of a stated datum and origin point, to measure ground and foundation levels at critical points and to determine building setbacks from boundaries. This information, together with areas of departure from approved Building Consent and/or Resource Consent documentation, is to be submitted on the Certificate signed by the surveyor. The Building Location Certificate provides Council with an appropriate level of verification that the building has been located in compliance with the approved project documentation. The signed Certificate is to be provided to the Council's Code Compliance Assessor at such time as may be necessary to verify consent conditions.

The Building Location Certificate form (B-081) is available from the Council website at:

ccc.govt.nz/assets/documents/consents-and-licences/building-consents/b081buildinglocationcertificate.pdf.

- **Building Location Certificate Guidance:** Notes around the purpose and use of the Building Location Certificate are available from our website at: ccc.govt.nz/assets/documents/consents-and-licences/building-consents/b385-blcguidancenotes.pdf.
- **Origin of Levels:** The building site is located in an area where there is potential for flooding to occur. Before the Council can consider whether to issue a Building Consent you will need to provide existing ground levels (and proposed ground levels if filling is to take place) and proposed finished floor levels which are to be shown on the building consent plans in terms of *Christchurch Drainage Datum* (CDD) established by, or under direct supervision of, a Registered Surveyor using either:
 - A *Christchurch City Council* benchmark sourced from <https://canterburymaps.govt.nz>; or
 - A precise levelled benchmark from *LINZ Canterbury Earthquake Precise Levelling Height Dataset V1.1*. Note: Levels obtained from this dataset will need to be adjusted by +9.043m to bring them in terms of Christchurch Drainage Datum. The Canterbury Earthquake Precise Levelling Height Dataset V1.1 can be sourced from <https://www.linz.govt.nz/data/geodetic-system/standards-specifications-and-publications/published-papers-presentations>.

Ground conditions

Technical Category

- **TC3:** Liquefaction damage is possible in future large earthquakes. Deep geotechnical investigation (or assessment of existing information) may be required (depending on the degree of damage, and in particular for a rebuild) and depending on the geotechnical assessment, might require specific engineering input for foundations.
 - Options for new foundations: Three broad types of residential foundations have been established to meet the varying vertical settlement and lateral spreading requirements. These are:
 - deep piles
 - site ground improvements
 - surface structures with shallow foundations

Each has different capabilities to accommodate various levels of vertical settlement and lateral spreading, and requires different constraints with respect to the configuration and weights of superstructure. The overall process of selecting and documenting foundation systems and details for houses in TC3 is a specific engineering design process that requires Chartered Professional Engineering input. Depending on the assessed ground conditions and options selected by the engineer, some elements can be adopted and specified directly from the January 2013 MBIE guidance document *Guidance: Repairing and Rebuilding Houses Affected by the Canterbury Earthquakes* without further engineering design. These include Types 1 and 2 Site Ground Improvement methods (section 15.2) and the Type 1 and 2 Surface Structures (section 15.4).

- Options for foundation repairs: Refer to section 14 of the January 2013 MBIE guidance document *Guidance: Repairing and Rebuilding Houses Affected by the Canterbury Earthquakes*. Minor cracks (<5mm) in concrete floors and foundation beams can be repaired in accordance with Appendix A4 of those guidelines. No geotechnical investigation will be required in these cases.
- Superstructure repairs only with no foundation damage: If no foundation damage is present that requires repair and specific engineering design then superstructure repairs can proceed using guidance from Part A, section 7 of the January 2013 MBIE guidance document: *Guidance: Repairing and Rebuilding Houses Affected by the Canterbury Earthquakes*.

- **Geotechnical considerations:** The scope of a deep geotechnical investigation must be determined by the geotechnical professional responsible for giving advice on the property in question. The geotechnical professional must be either a CPEng geotechnical engineer or a PEngGeol engineering geologist with competence, suitable relevant training, and experience in foundation investigation and liquefaction assessment. Refer to Part C of the January 2013 MBIE guidance document *Guidance: Repairing and Rebuilding Houses Affected by the Canterbury Earthquakes*.

Services

Critical issue: Authorisations

- **Authorisation For The Discharge Of Stormwater:** Specialist input is required from the *Three Waters & Waste Unit*. The SI-SWATER procedure has been started in 'Connect'.

Reticulated systems

- **Water Related Services Pipework Within Private Property:** The laying of sewer, stormwater and water supply pipework within private land which will remain in private ownership requires a building consent, compliance with the New Zealand Building Code, and must be installed by a person holding an appropriate registration under the *Plumbers, Gasfitters And Drainlayers Act 2006*. Evidence of compliance is provided through the issue of a code compliance certificate upon completion of the works.
- **Protection Of Private Drainage Systems:** The private drainage systems must be protected in an approved manner where they could be damaged by vehicular traffic, impact, tree root penetration, or any other source.
- **Re-Use Of / Extensions To Existing Private Sanitary Sewer And Stormwater Systems:** The sanitary sewer and stormwater systems already serving the property may be re-used to serve the new proposal providing:
 - Any extensions to pipework must be laid at sufficient depth to ensure protection and that adequate fall is available to serve the furthestmost part of the site.
 - The existing private pipework within the private property is proven to be in a satisfactory condition. This may require CCTV inspection.
 - Any potential building connections must be able to meet the requirements of the New Zealand Building Code.
- **Interceptor / Silt Traps:** Where surface water drainage is proposed to connect directly to any open or piped stormwater system under the Council's control a master trap or silt trap, or similar device, situated in an approved position within the premises, will be required.

Roading and vehicle access

Temporary use of legal road

- An application is required where roadway, footpath or berm areas are required for development purposes. This includes areas used for waste skips, parking of contractors' vehicles, etc. Please note that use of this land without permission may result in an infringement notice being issued by our Parking Team which may include fines. Please contact the Road Amenity & Asset Protection Team on 941 8999.

Nuisance on the street

- An adequate supply of water shall be available at all times to ensure the site and truck loads are dampened down to **prevent dust and debris** being deposited on the footpath, roadway and adjoining properties. The footpath and roadway are to be cleaned down at regular intervals as required.

Development contributions

No additional demand on Council infrastructure

- **Development contribution assessment:** This development has been assessed for the requirement to pay development contributions, and has been found to **not** require a payment **at this time**. Development contribution requirements are as defined in Council's Development Contributions Policy established under the Local Government Act 2002. Full details of the policy are available from our website at www.ccc.govt.nz/consents-and-licences/development-contributions/.

General advice on the project

Asbestos in existing buildings

- If any asbestos is discovered during the proposed building work, the following steps are required to be taken:
 - Prior to removal, review current Regulations on removal of Asbestos on the Work Safe website: www.worksafe.govt.nz/worksafe/information-guidance/guidance-by-hazard-type/asbestos or please contact Work Safe New Zealand on 0800 030 040 for information on appropriate methods of handling asbestos.
 - Before any disposal of asbestos, please contact the Council's Hazardous Waste Advisory Service, Civic Offices, telephone 941 8999. This will ensure correct disposal in the City Council area at the land fill site.

Construction nuisance

- The project must comply with the Health Act 1956, Section 29. The premises should be constructed or demolished so as not to cause a nuisance in terms of the Act (i.e. dust).

The Resource Management Act 1991 places a general obligation on persons, including builders and demolition contractors to adopt the best practicable option to ensure that the emission of noise does not exceed a reasonable level.

Critical issue: Sediment control: general building site

- The building site has the potential to discharge sediment to the Council's stormwater drainage system and/or the local waterway. A stormwater and sediment management plan will need to be provided at the time of building consent application to demonstrate mitigation or avoidance of sediment discharge beyond the site boundaries.

For further information, "Best Practice Guidelines" can be found on the Environment Canterbury (ECan) website at esccanterbury.co.nz/sediment-control or contact the Council's Duty Building Consent Officer on telephone 941 8999.

Note: "Building work" includes siteworks. No site preparation that may cause uncontrolled discharge of stormwater and/or sediment is to be carried out until a building consent has been obtained and stormwater diversion and sediment fences are in place.

Evacuation scheme

- Provision for evacuation from the scene of a fire is likely to be required under Section 21B of the Fire Services Act 1975. The building owner of a relevant building must make an application for the approval of an evacuation scheme to the Fire Service (<https://onlineservices.fire.org.nz/Home/EvacuationSchemes>).

Access and facilities for disabled persons

- Buildings must comply with Section 118 of the Building Act 2004 and the provisions of the building code that relate to providing for persons with disabilities to have access to buildings and to facilities within buildings.

Building Consent Construction Documentation and Advice Notes

As at	12 November 2020
Project number	BCN/2020/10088
Description of consent	Alteration and change of use to dwelling - Change to layout of dwelling and construction of detached garage & mudroom
Site address	164 Queenspark Drive Parklands Lot 4 DP 58227

Construction documentation

Under Sections 90, 94, and 45a the following construction documentation is required to be provided for the Christchurch City Council to be satisfied, on reasonable grounds, to issue the code compliance certificate. These may include third-party inspections and certifications that have provisions that are endorsed on the building consent in relation to inspection during the carrying out of building work, and must be taken to include the provisions of Section 90 of the Building Act 2004.

Energy work certificates

- **Electrical:** Provide an electrical safety certificate.
- **Gas:** Provide a gas safety certificate.

Structure: inspections

- **Construction monitoring:** Provide all records of inspections and checks carried out, and a PS4 from your nominated structural consultant [MIKE WILTON CONSULTING LTD] stating that all the necessary aspects of their design has been incorporated into the building. This includes but is not limited to the following work:
- Pre-pour inspection of Garage Floor & Foundation
- Pre line of new walls, Lintel Beams for Garage & Trusses for Garage

Restricted Building Work

- **Restricted Building Work - Carpentry:** Provide Record(s) of Work on regulated form 6A.
- **Restricted Building Work - Foundation:** Provide Record(s) of Work on regulated form 6A.
- **Restricted Building Work - Roofing:** Provide Record(s) of Work on regulated form 6A.

Test reports and/or “as-builts”

- **Building location certificate:** Provide a B-081 certificate from a registered professional surveyor or a licenced cadastral surveyor for [floor level relative to a datum].
- **As-built truss layout:** Provide as-built truss plan and layout at time of pre roof inspection.
- **Water reticulation - pipework testing:** Provide completed form B-084.

- **Foulwater and stormwater drains layouts:** Provide as-laid drainage plan at time of drainage inspection.

Advice notes

Please read and follow the advice notes listed below. Failure to do so may create difficulties in obtaining a code compliance certificate.

- All building work must be carried out in accordance with the approved building consent documents. A full and current copy of the stamped documents must remain on site for reference at all times. This may include approved documents in digital format presented on an electronic device provided they are easily readable. For example documents presented on a smart phone screen would not be considered easily readable.
- A building consent lapses and is of no effect if the building work to which it relates does not commence within 12 months after the date of issue of the building consent. A building consent authority may allow a further period if an extension of time to start work is requested.
- An owner must apply for a code compliance certificate as soon as practicable after all building work to be carried out under a building consent is completed. If after two years there has been no application for a code compliance certificate, under Section 93(2)(b), a building consent authority, must decide whether it can issue a code compliance certificate. Council may need to carry out a building inspection to assist with this decision or extend its time to make this decision. At this time we will also invoice any accrued fees associated with the building work.
- If you wish to make changes to your building consent, you must apply for an amendment or a minor variation. An amendment or a minor variation must be granted before the building work is carried out. Refer to www.ccc.govt.nz/consents-and-licences/building-consents/building-consent/change-your-building-consent.
- **Further works may be discovered:** Further works may be discovered during the construction phase of this consent. This could be established from on-site investigations by the owner's consultant or from previously unknown damage being uncovered. These works are likely to be considered additional to or vary from those approved in the building consent. A minor variation or an amendment to the building consent must be applied for and granted prior to the commencement of the additional works.
- **Management plan for the control of stormwater and sediment:** The management plan for the control of stormwater and sediment during construction must be made known to the building contractor before any siteworks are carried out. Failure to comply with the management plan may lead to enforcement action being taken under the Building Act 2004.
- **Site Safety:** Ensure all appropriate site safety measures are provided throughout the contract works to comply with NZ Building Code Clause F5 and all Occupational Safety and Health requirements.



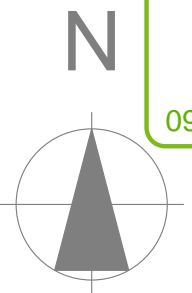
LEGAL & LAND INFORMATION

Lot 4 DP 58227
Site area 653m²
Living zone RS Residential suburban zone
Min set floor level is 50 year floor level is 13.7m RL
councils recommended level is F.F.L 13.13m which we are going with.
Wind region A Classification Med
Snow zone N4
Durability zone C
Earthquake zone 2 land type TC3
Hazard type LMA & Tsunami Evacuation zone
Existing building 152.2m²
Proposed new garage 54.0m²
Total building area 206.2m²
New site coverage 31.5% max site coverage is 35%

This is building was a commercial building / doctors surgery
The new owner wants to turn it into a house.

A100	LOCATION PLAN	
A101	SURVEY PLAN	
A102	PROPOSED SITE PLAN & SITE MANAGEMENT PLAN	Amended 16/06/2021
A103	EXISTING FLOOR PLAN & DEMO	
A104	PROPOSED HOUSE PLAN & PLUMBING	
A105	HOUSE ELECTRICAL PLAN & BRACING	
A106	PROPOSED GARAGE / LAUNDRY & FOUNDATION PLAN	Amended 16/06/2021
A107	GARAGE BRACING, PLUMBING ELECTRICAL & ROOF FRAMING & CATCHMENTS	
A200	HOUSE ELEVATIONS & LIGHT AND VENTILATION	
A201	HOUSE ELEVATIONS & LIGHT AND VENTILATION	
A202	PROPOSED ELEVATIONS GARAGE	Amended 16/06/2021
A300	CROSS SECTION A-A HOUSE	
A301	CROSS SECTION B-B GARAGE	Amended 16/06/2021
A302	CROSS SECTION C-C GARAGE	Amended 16/06/2021
A400	FOUNDATION & GARAGE DETAILS	
A401	SHADOWCLAD WINDOW DETAILS	
A402	SHADOWCLAD DETAILS	
A403	SHADOWCLAD FRAMING DETAILS	
A404	ROOF DETAILS	
A405	HARDIFLEX DETAILS	
A406	HARDIFLEX FRAMING DETAILS	
A407	STANDARD DOOR DETAILS	
A408	SLIDING DOOR DETAILS	
A409	WINDOW DETAILS	
A410	BATHROOM DETAILS	
A411	WINDOW & DOOR SCHEDUAL	
A412	FIRE RATED WALL	Amended 16/06/2021

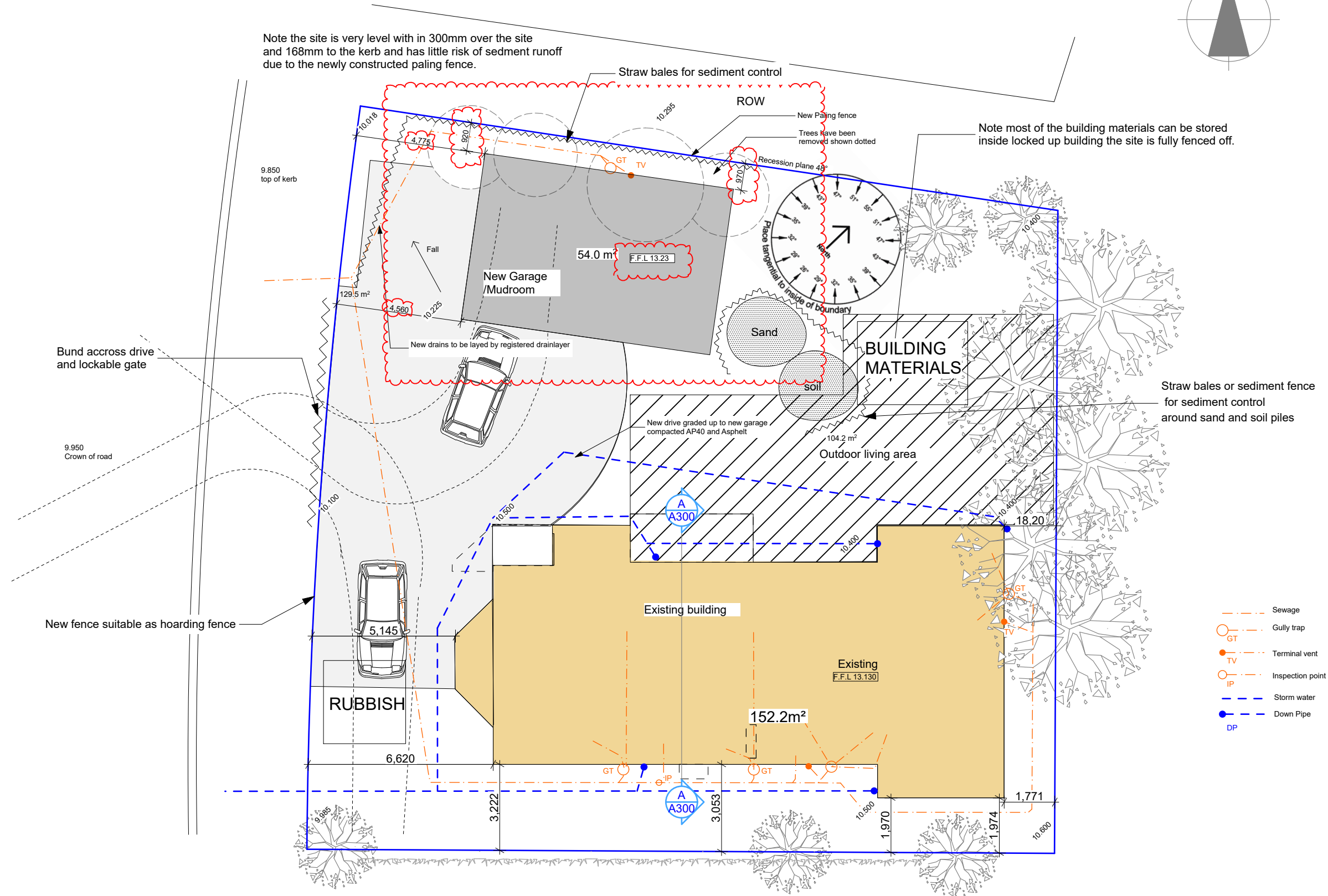
No	Date	boundary setback as clouded
R1	9/10/2020	sediment control fences
R2	30/10/2020	Finished floor levels

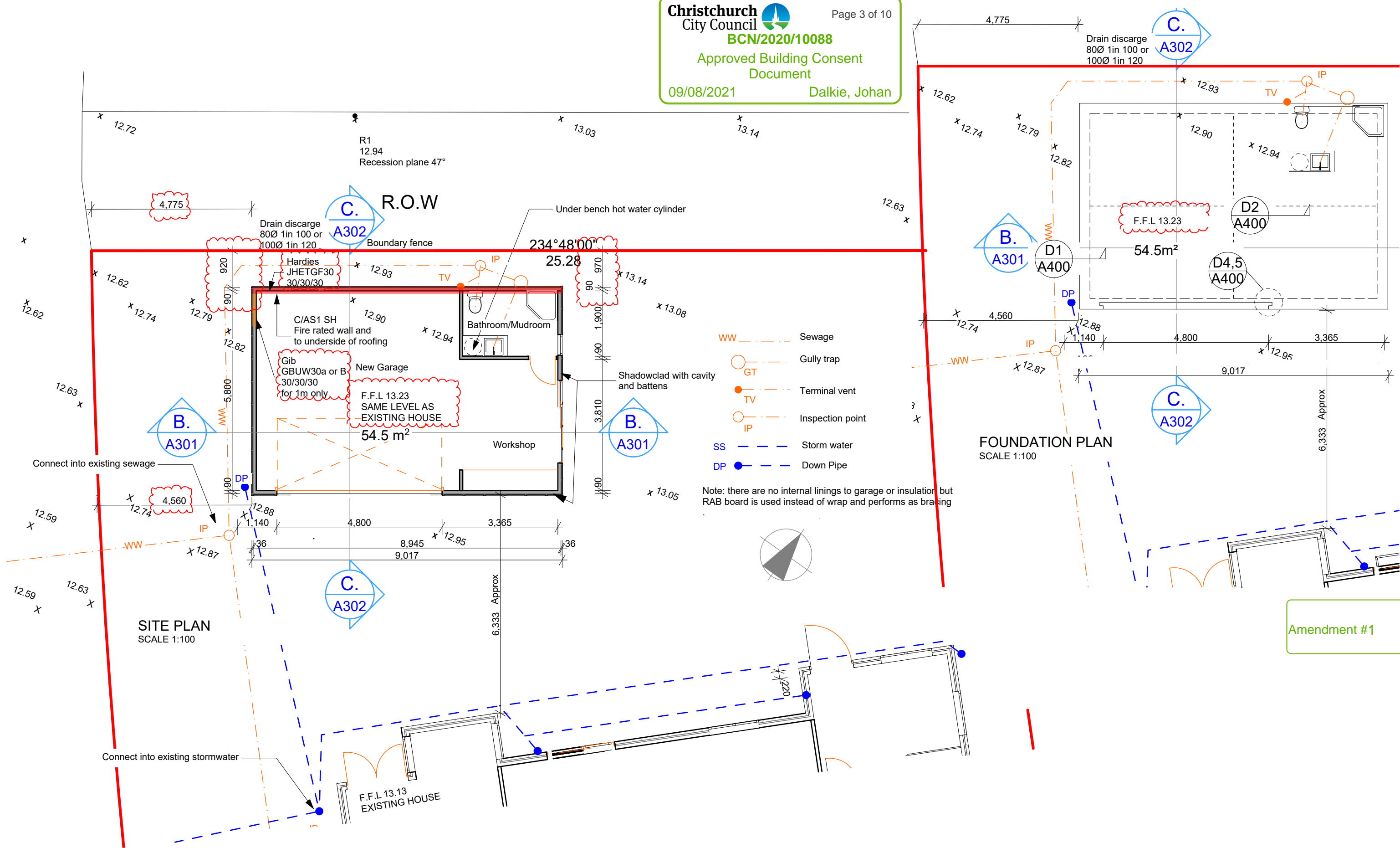


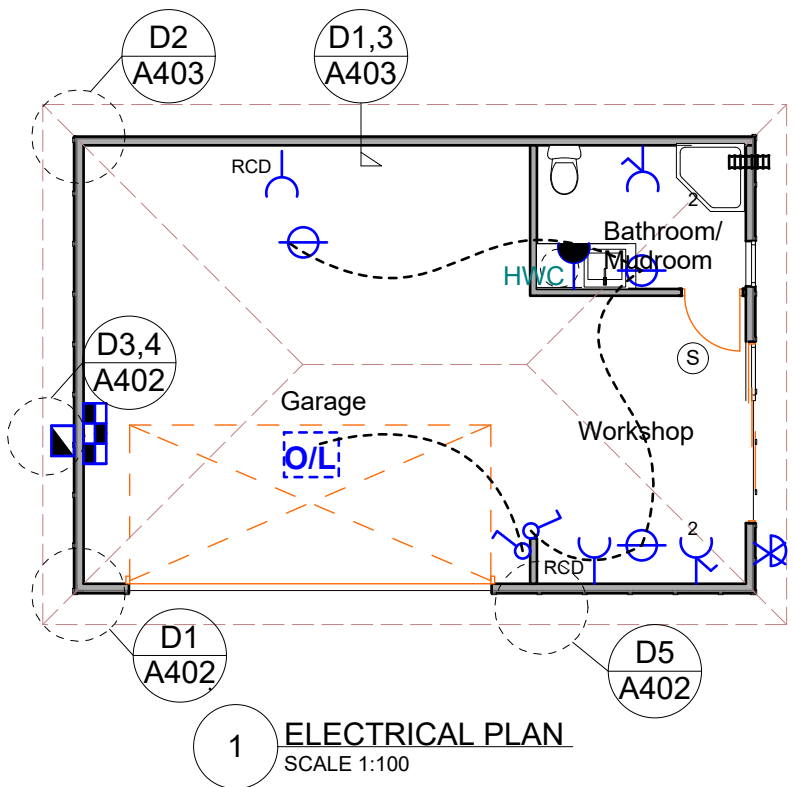
Note the site is very level with in 300mm over the site and 168mm to the kerb and has little risk of sediment runoff due to the newly constructed paling fence.

Note most of the building materials can be stored inside locked up building the site is fully fenced off.

Amendment #1



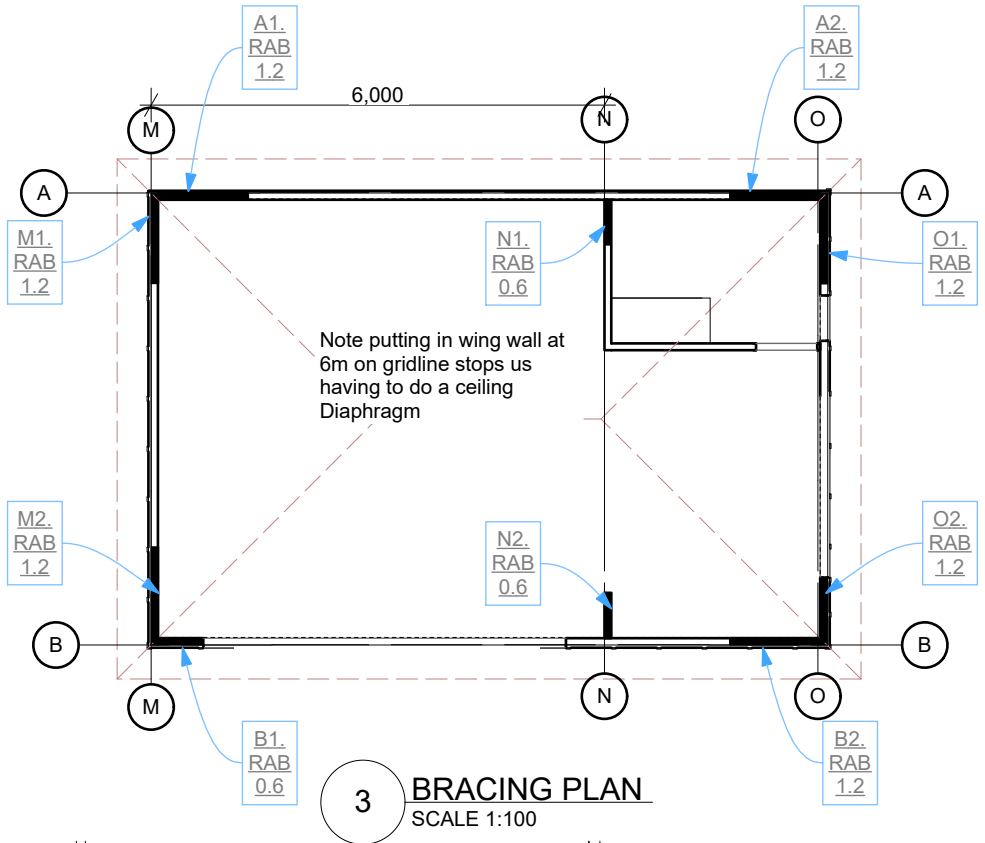
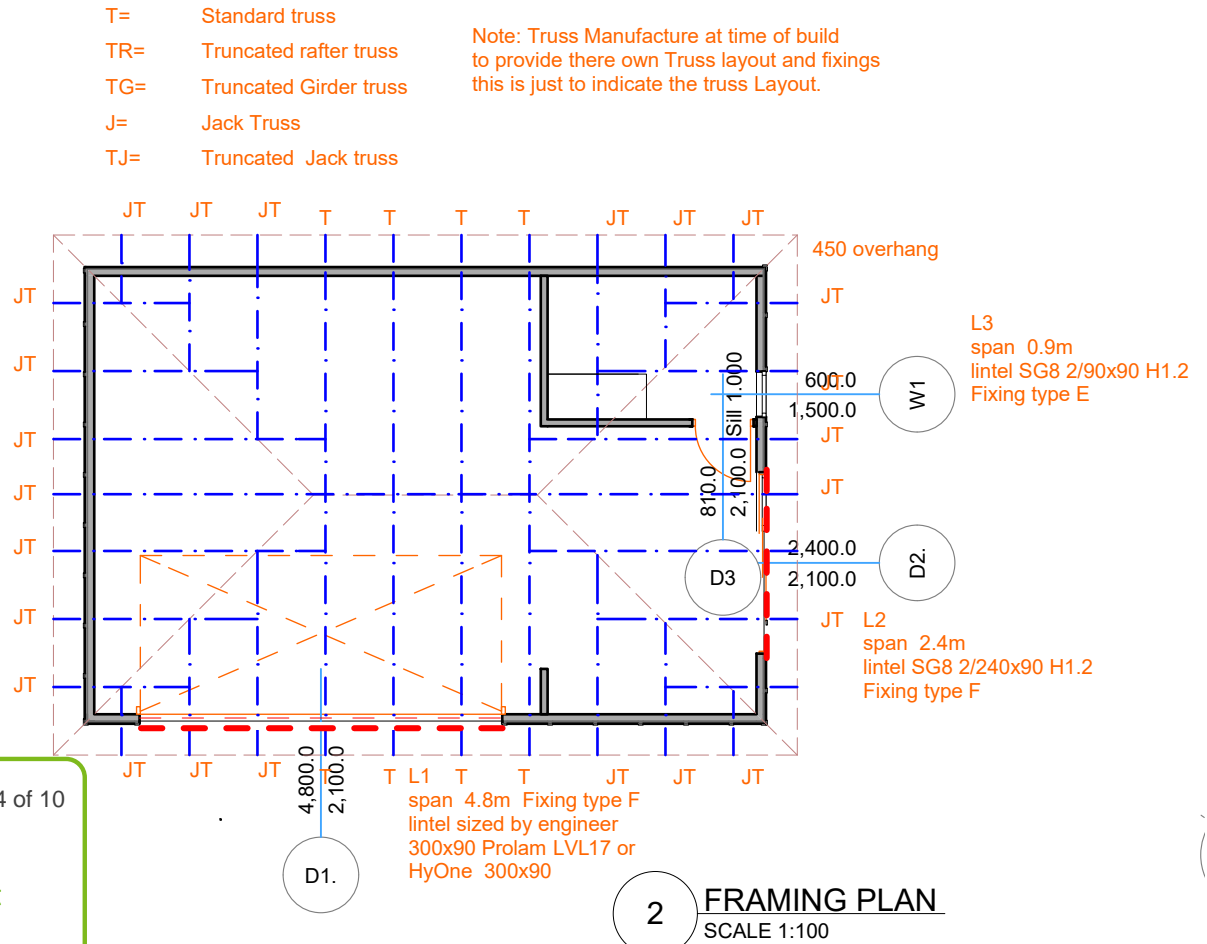




ELECTRICAL LEGEND STANDARD SYMBOLS			
	Light switch		Distribution Board Recessed Metal Cabinet (miniature circuit breakers)
	Power socket double		SMOKE ALARM
	Power socket with residual current device		H.W.C Hot water cylinder Under bench mini
	Power permanent		Garage door opener and light
	Metre Box		
	Light batten holder		
	Sensor light		
	outside wall light		

Christchurch City Council
 BCN/2020/10088
 Approved Building Consent Document
 09/08/2021 Dalkie, Johan

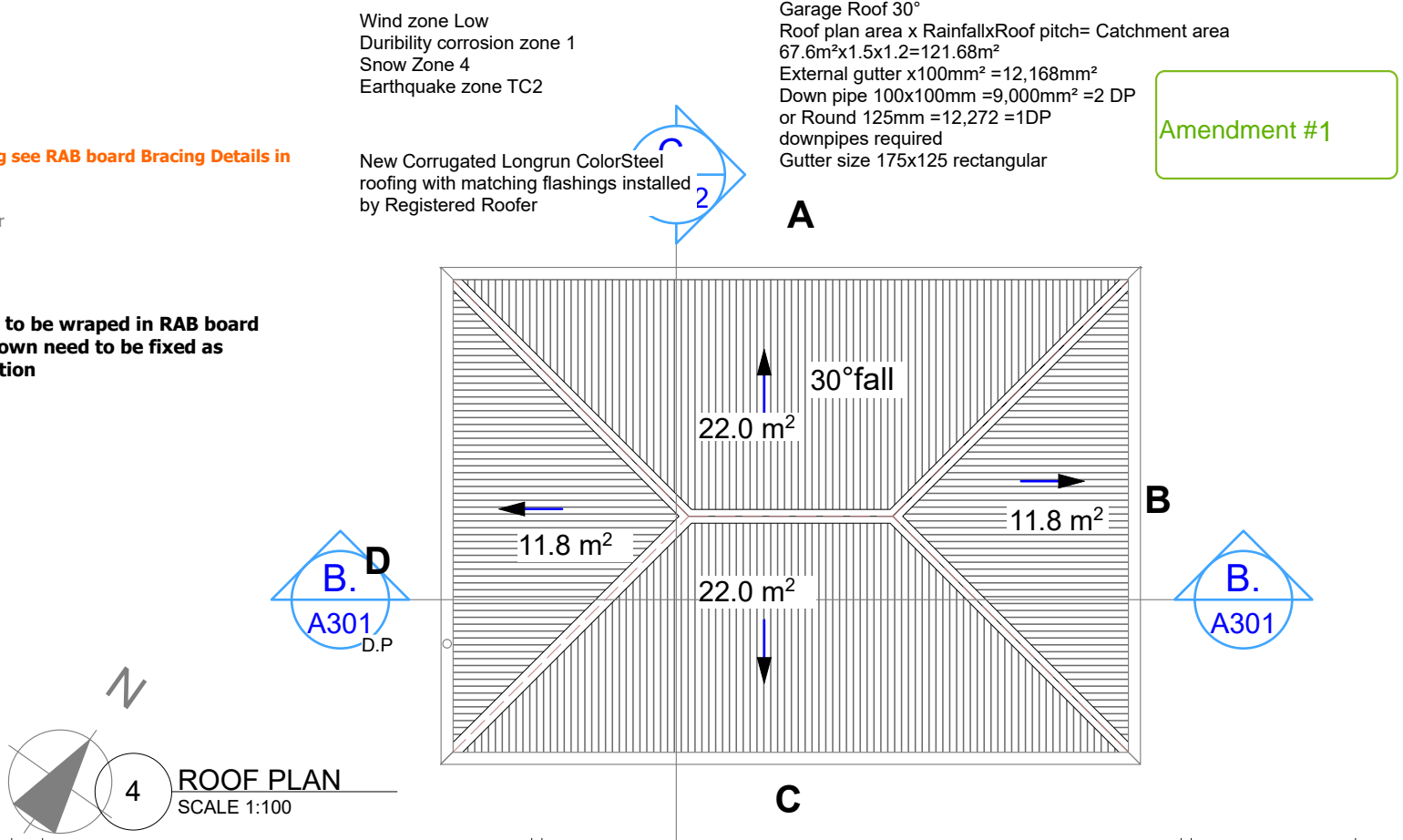
Page 4 of 10



Note: For all RAB fixing see RAB board Bracing Details in

Note: entire house is to be wrapped in RAB board but only the units shown need to be fixed as per bracing specification

Legend	
	B3.1.2
	B3.2.4
	B3.0.6
	B3.1.2
	B3.0.6
	B3.1.2
	B3.0.6
	B3.1.2
	B3.0.6
	B3.1.2
	B3.0.6



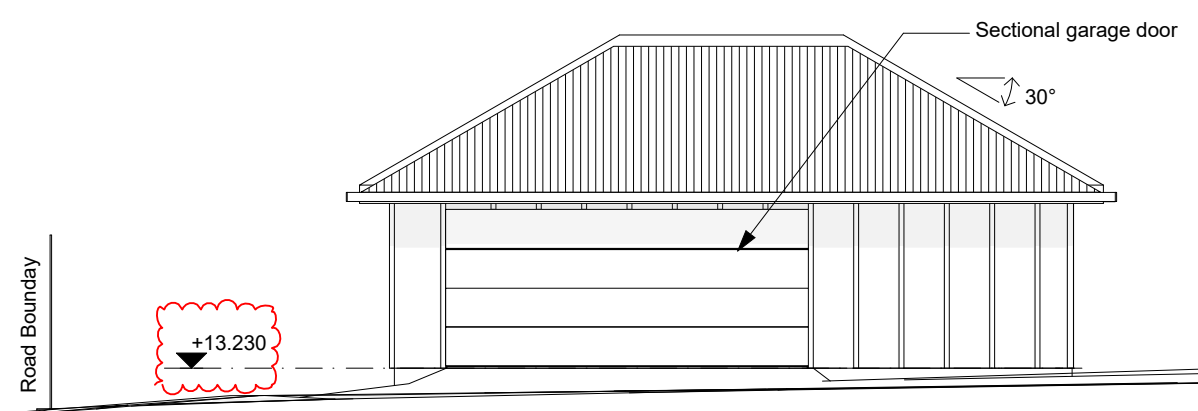
Deborah Wilson
 Design by Deb Ltd
 LBP-BP117593
 0274143000

ALTERATIONS
 164 Queenspark Drive, Parklands
 Christchurch 8083

No	Date

GARAGE BRACING, PLUMBING	
ELECTRICAL & ROOF FRAMING &	
CATCHMENTS	
Checked	
Date	16/06/2021
SCALE	1:100

Ref **R1903**
 Drawing No
A107



Risk Matrix-South
Shadowclad Ultra over cavity battens with battens over joins.

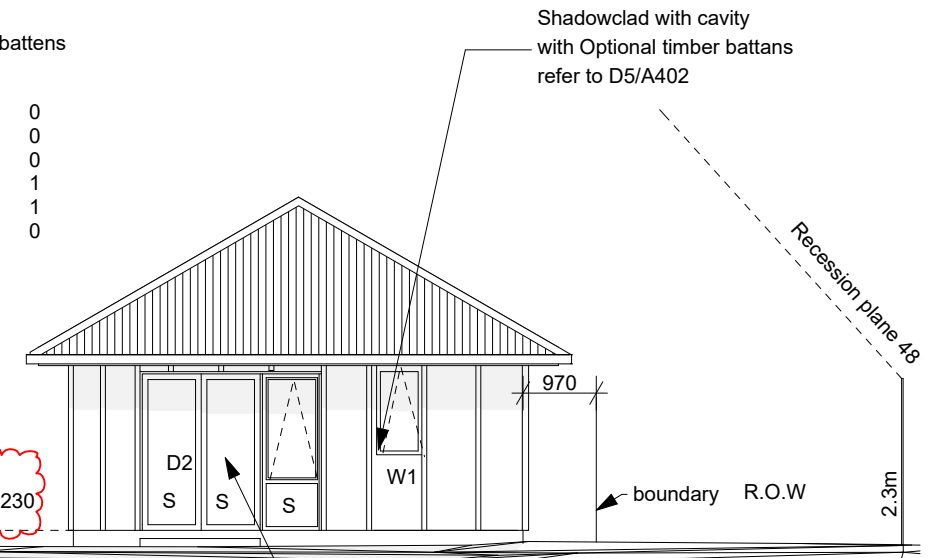
Wind zone	Low	0
Number of story's	Low	0
Roof/Wall design	Low	0
Eaves width	Med	1
Envelope	Med	1
Deck design	Low	0
Total.	2	

451mm min overhang of roof plus gutter

Risk Matrix-East
Shadowclad Ultra over cavity battens with battens over joins.

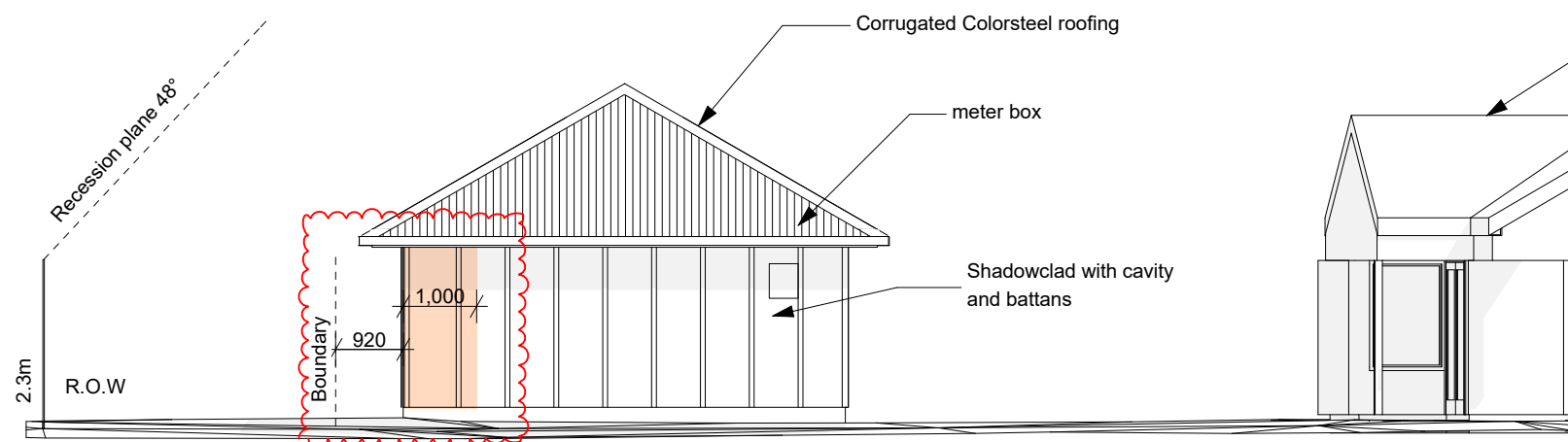
Wind zone	Low	0
Number of story's	Low	0
Roof/Wall design	Low	0
Eaves width	Med	1
Envelope	Med	1
Deck design	Low	0
Total.	2	

451mm min overhang of roof plus gutter



Shadowclad with cavity with Optional timber battens refer to D5/A402

Second hand windows and doors these can be single glazing as this is not a habited space. lower pains are to be safety class

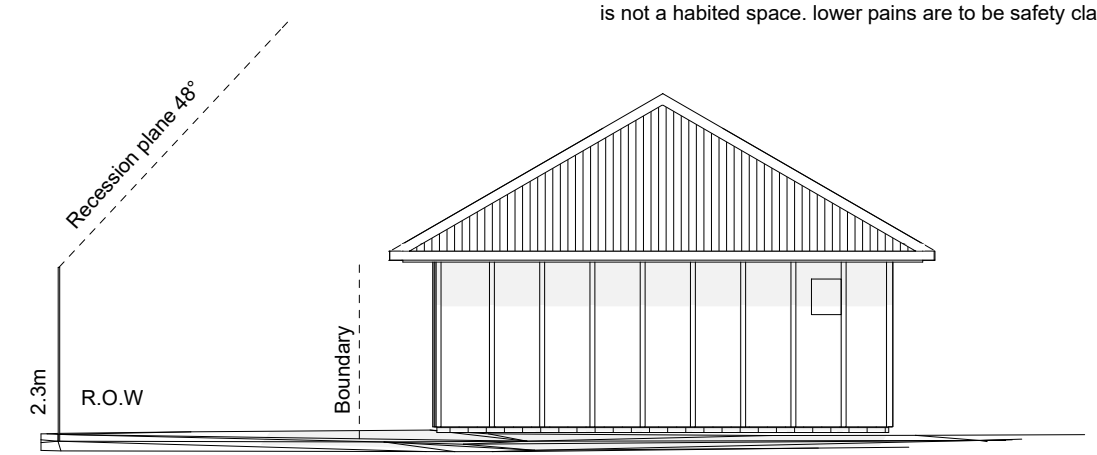


Risk Matrix-West

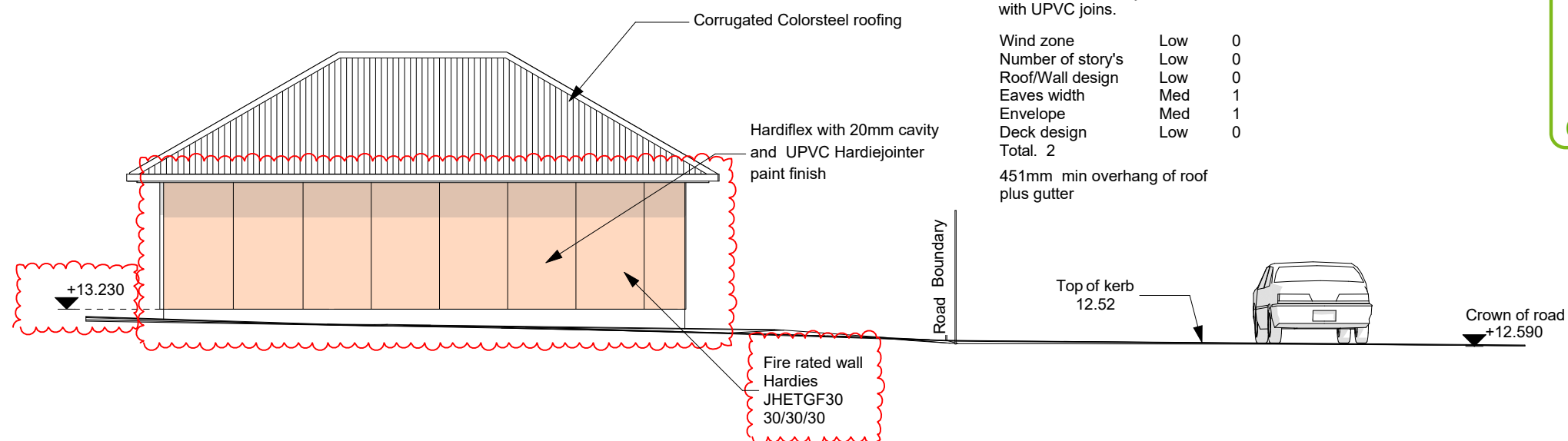
Shadowclad Ultra over cavity battens with battens over joins.

Wind zone	Low	0
Number of story's	Low	0
Roof/Wall design	Low	0
Eaves width	Med	1
Envelope	Med	1
Deck design	Low	0
Total.	2	

451mm min overhang of roof plus gutter



Amendment #1



Risk Matrix-West
Hardiflex over cavity battens with UPVC joins.

Wind zone	Low	0
Number of story's	Low	0
Roof/Wall design	Low	0
Eaves width	Med	1
Envelope	Med	1
Deck design	Low	0
Total.	2	

451mm min overhang of roof plus gutter

Christchurch City Council
BCN/2020/10088
Approved Building Consent Document
09/08/2021 Dalkie, Johan

Deborah Wilson
Design by Deb Ltd
LBP-BP117593
0274143000

ALTERATIONS
164 Queenspark Drive, Parklands
Christchurch 8083

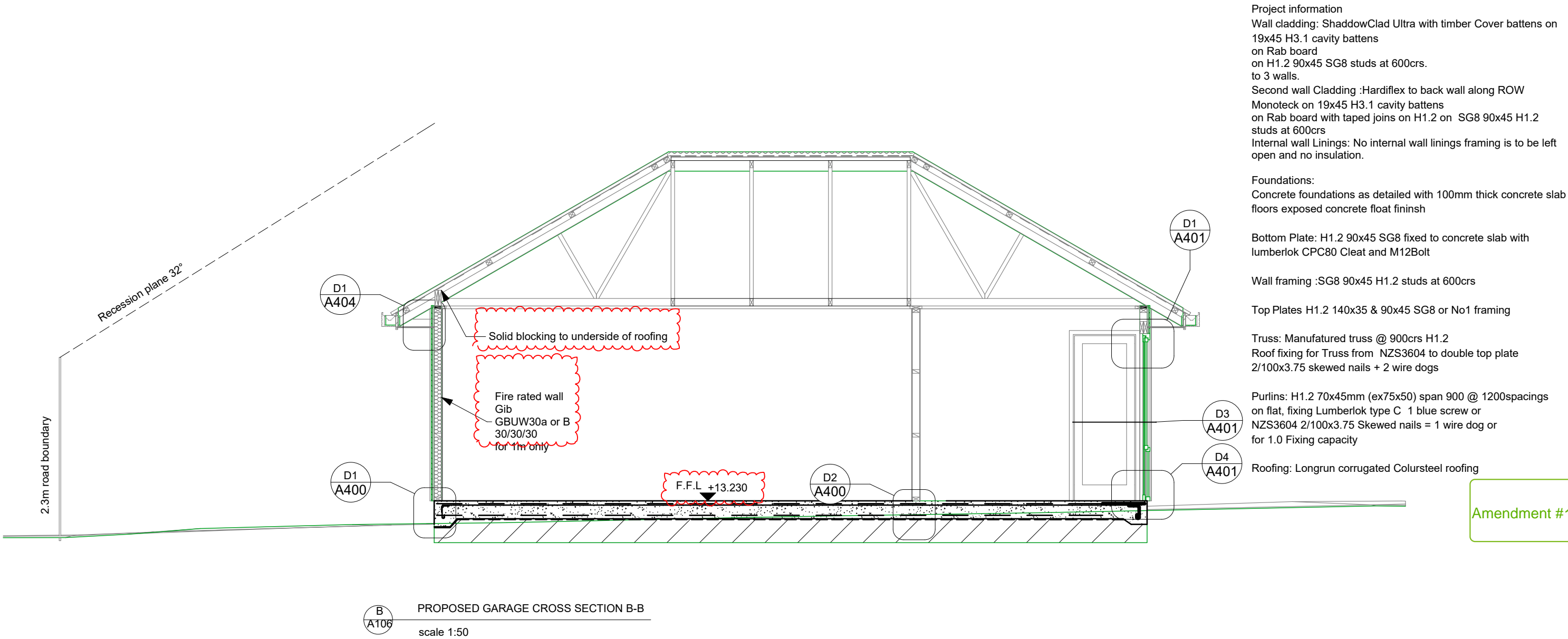
Amendments

No	Date
R1	16/06/2021
	Garage floor, fire walls,garage setback

Drawing

PROPOSED ELEVATIONS GARAGE	
Drawn	
Checked	
Date	9/08/2021
SCALE	1:100

Ref **R1903**
Drawing No
A202



Deborah Wilson
Design by Deb Ltd
LBP-BP117593
0274143000

ALTERATIONS
164 Queenspark Drive, Parklands
Christchurch 8083

Amendments	No	Date
	R1	16/06/2021

Drawing	PROPOSED GARAGE CROSS SECTION B-B		Ref R1903
	Drawn		
	Checked		
	Date	16/06/2021	
	SCALE		
			Drawing No A301

Project information
Wall cladding: ShaddowClad Ultra with timber Cover battens on 19x45 H3.1 cavity battens on Rab board on H1.2 90x45 SG8 studs at 600crs. to 3 walls.
Second wall Cladding :Hardiflex to back wall along ROW
Monotek on 19x45 H3.1 cavity battens on Rab board with taped joints on H1.2 on SG8 90x45 H1.2 studs at 600crs
Internal wall Linings: No internal wall linings framing is to be left open and no insulation.

Foundations:
Concrete foundations as detailed with 100mm thick concrete slab floors exposed concrete float finish

Bottom Plate: H1.2 90x45 SG8 fixed to concrete slab with lumberlok CPC80 Cleat and M12Bolt

Wall framing :SG8 90x45 H1.2 studs at 600crs

Top Plates H1.2 140x35 & 90x45 SG8 or No1 framing

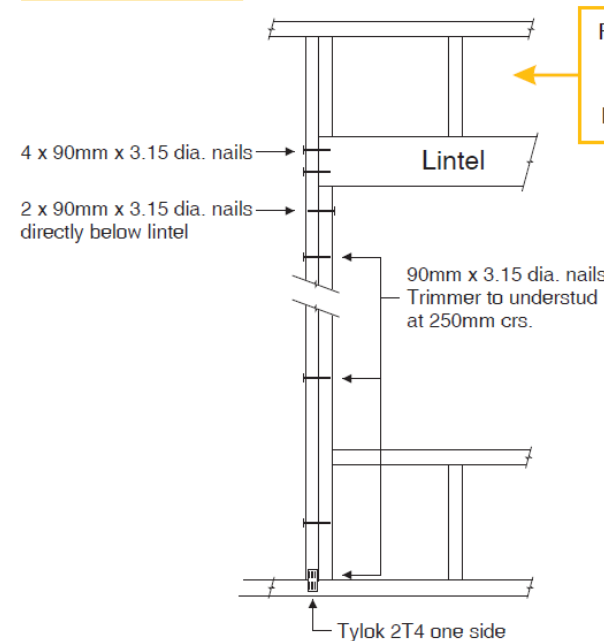
Truss: Manufactured truss @ 900crs H1.2
Roof fixing for Truss from NZS3604 to double top plate 2/100x3.75 skewed nails + 2 wire dogs

Purlins: H1.2 70x45mm (ex75x50) span 900 @ 1200spacings on flat, fixing Lumberlok type C 1 blue screw or NZS3604 2/100x3.75 Skewed nails = 1 wire dog or for 1.0 Fixing capacity

Roofing: Longrun corrugated Colursteel roofing

LINTEL FIXING OPTIONS

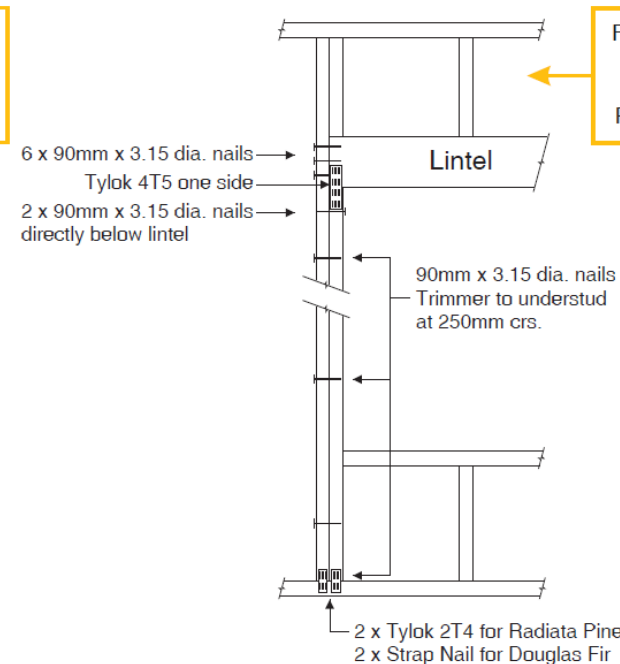
TYPE E
1.4kN



For fixing of jack studs to lintel & top plate, refer to Stud to Top Plate Fixing Schedule

Stud numbers indicative only. Refer Table 8.5 NZS 3604:2011

TYPE F
4.0kN



For fixing of jack studs to lintel & top plate, refer to Stud to Top Plate Fixing Schedule

Stud numbers indicative only. Refer Table 8.5 NZS 3604:2011

Christchurch City Council

BCN/2020/10088

Approved Building Consent Document

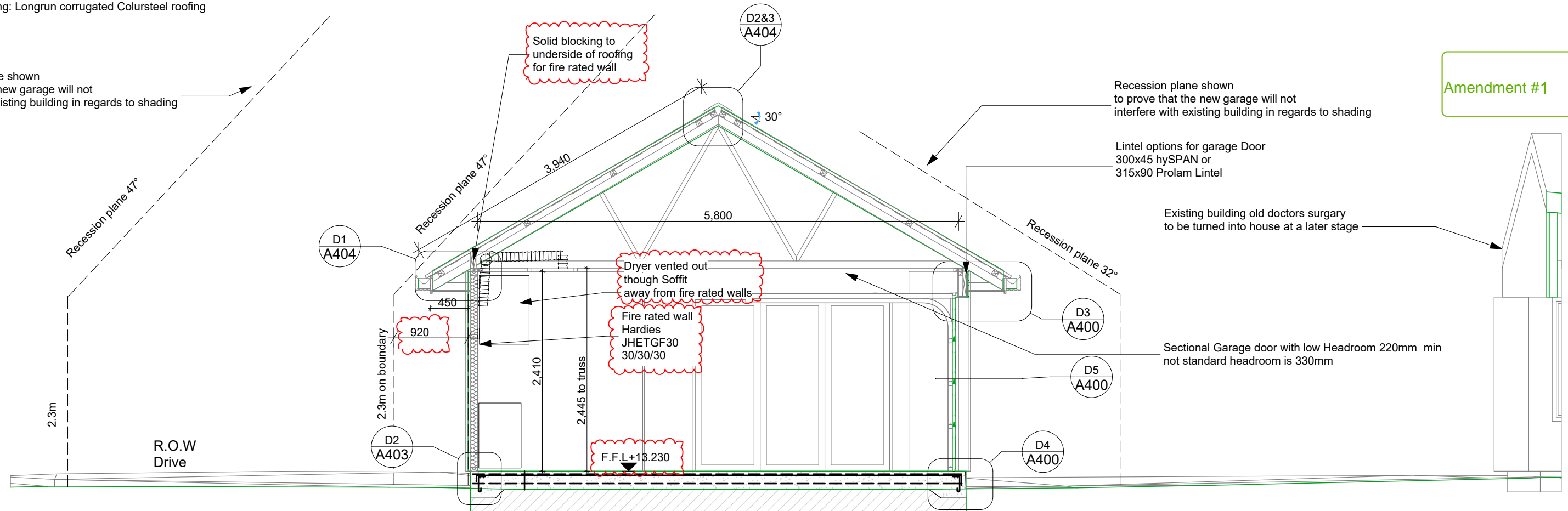
09/08/2021

Page 7 of 10

Dalkie, Johan



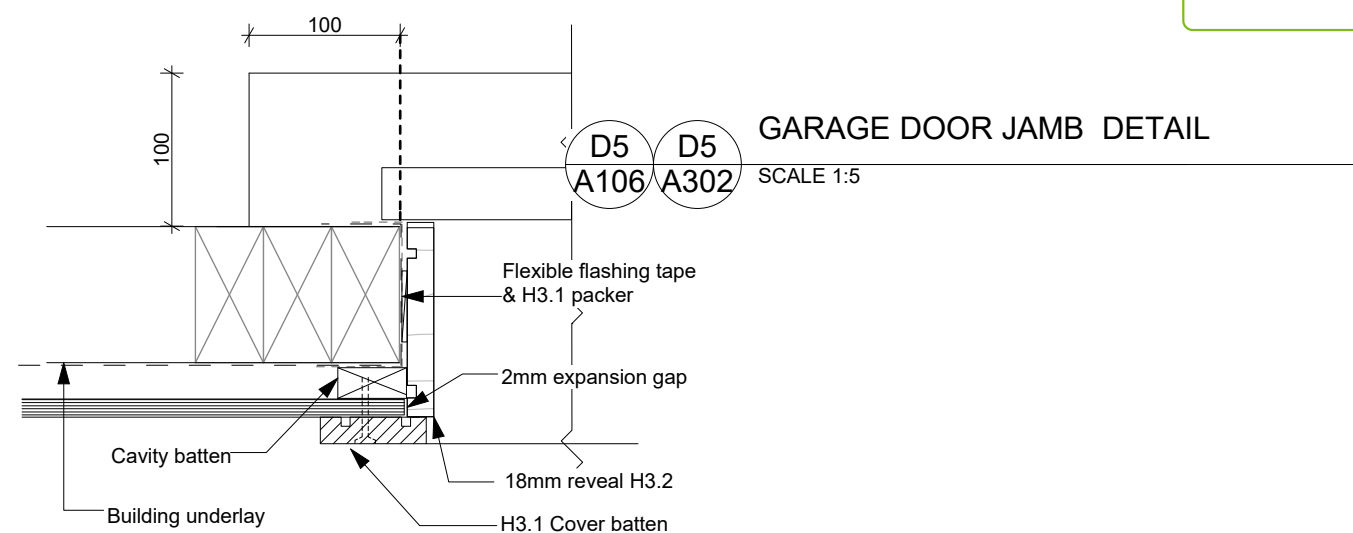
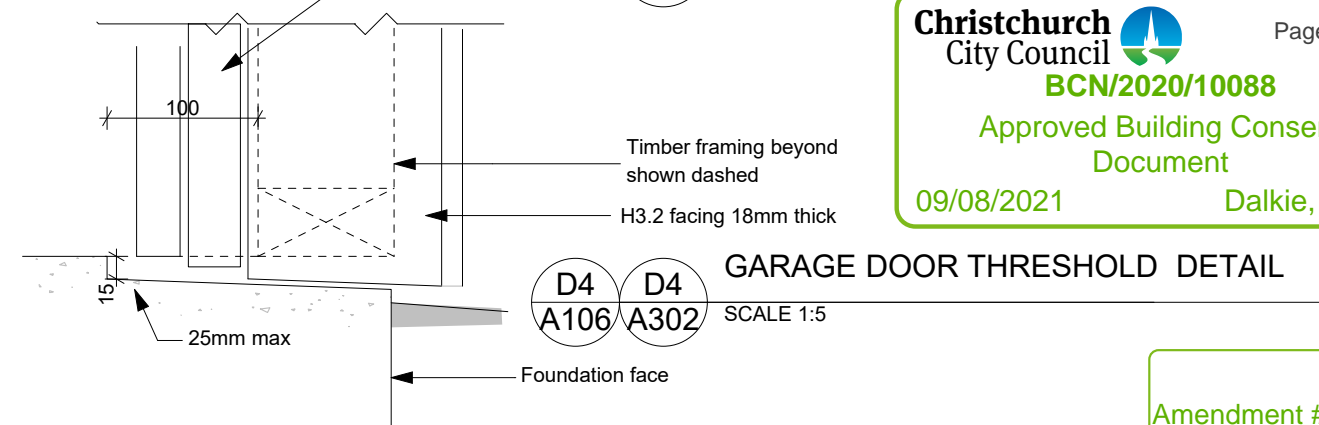
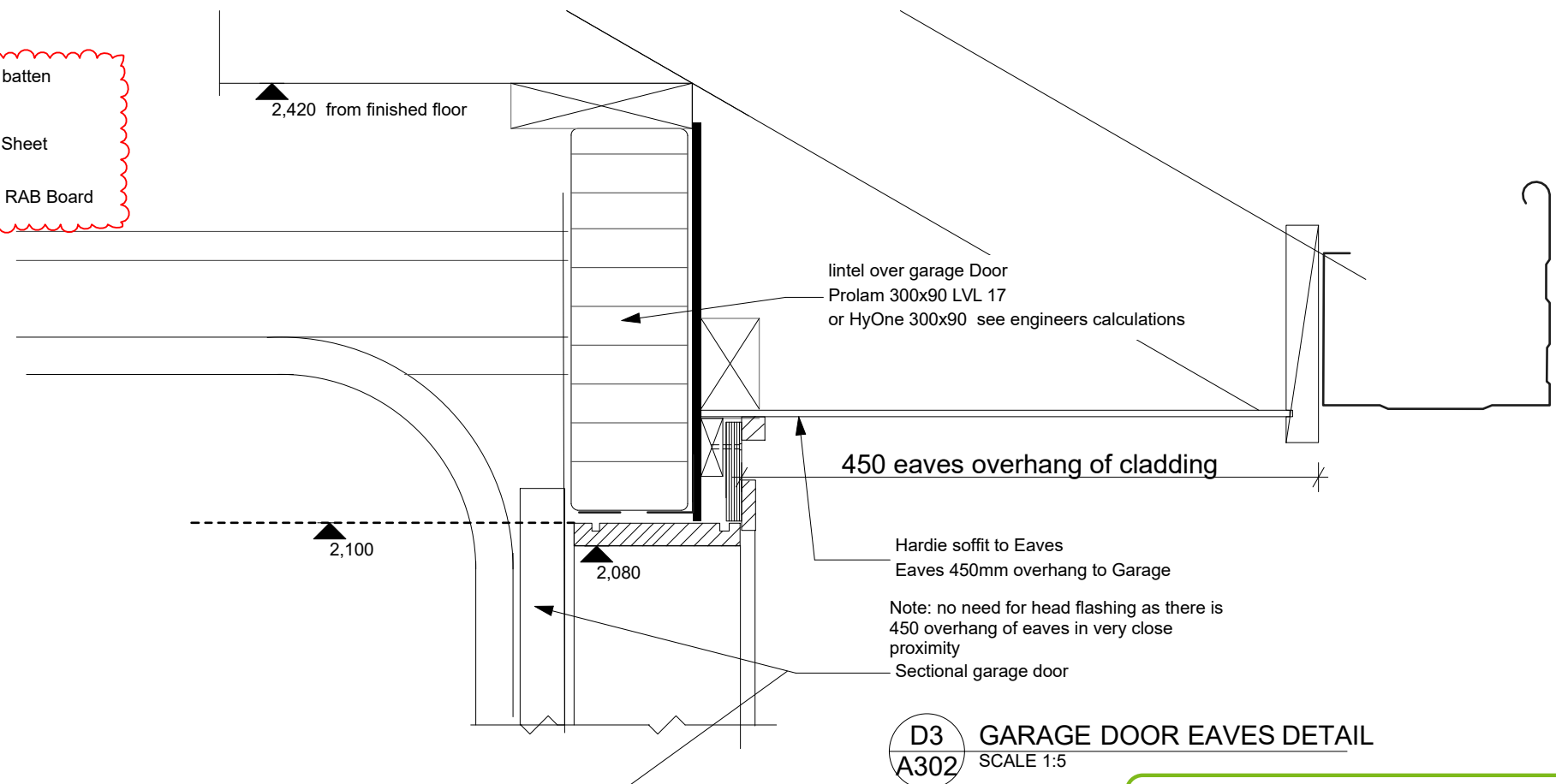
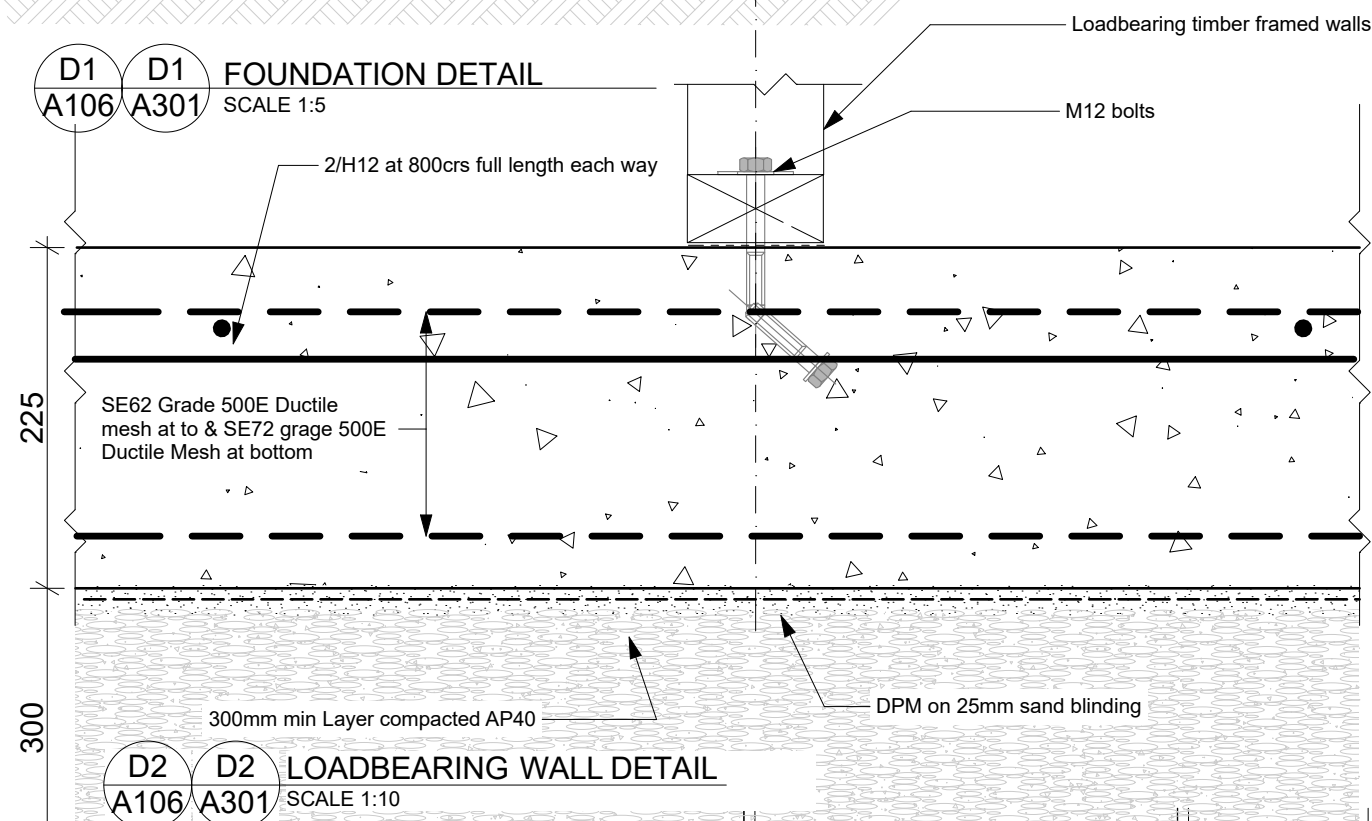
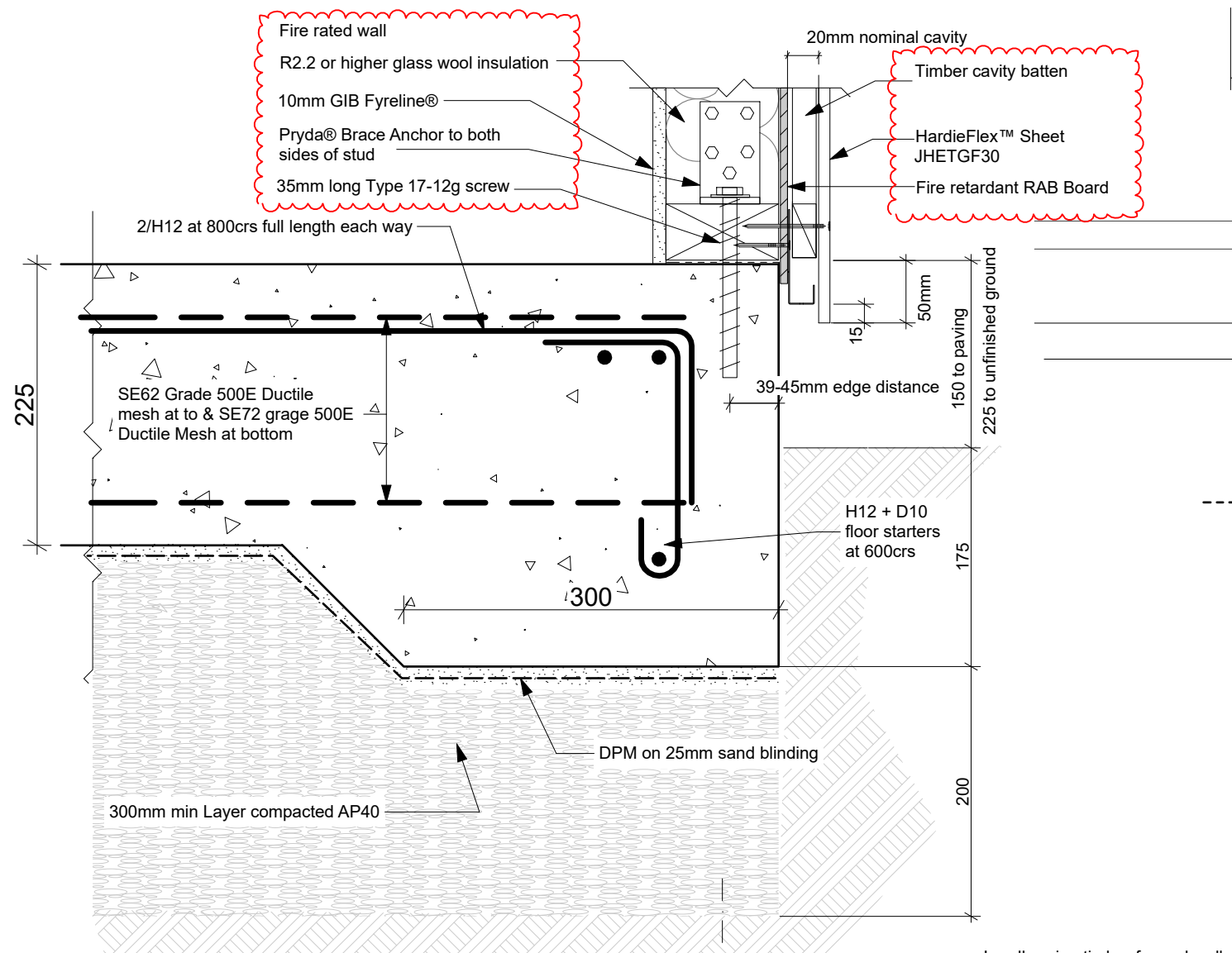
Recession plane shown to prove at the new garage will not interfere with existing building in regards to shading

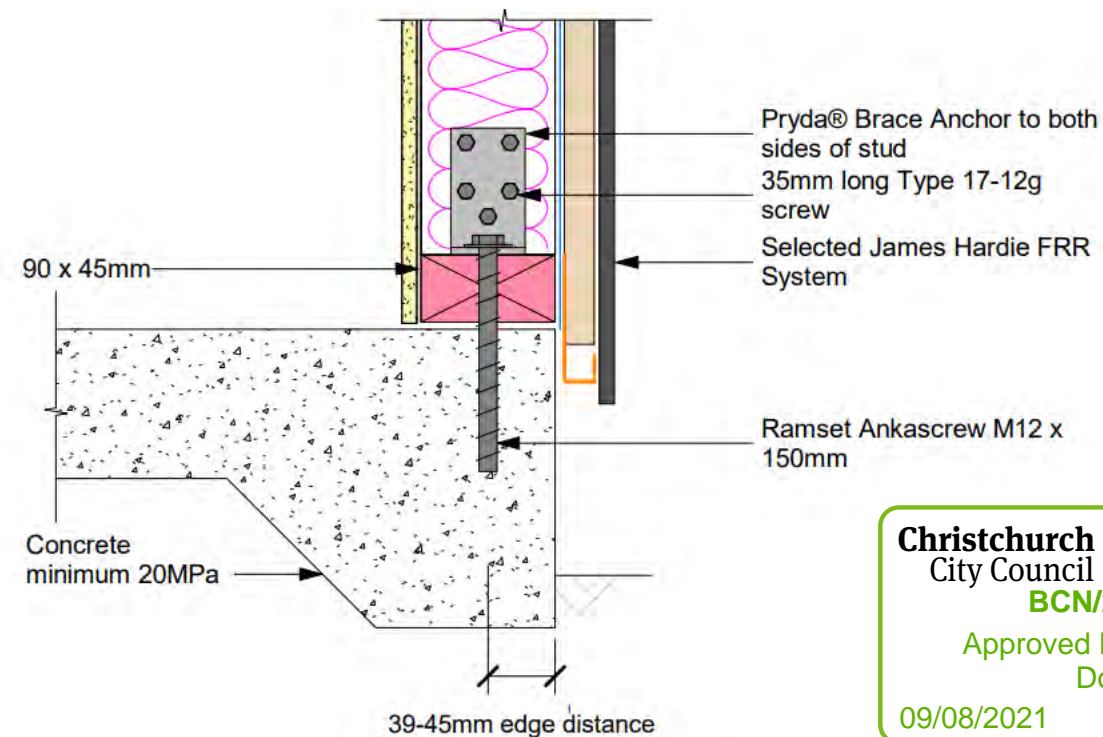


Amendment #1

C A106 PROPOSED GARAGE CROSS SECTION C-C scale 1:50

<div>Deborah Wilson</div> <div>Design by Deb Ltd LBP-BP117593</div> <div>0274143000</div>	<div>ALTERATIONS</div> <div>164 Queenspark Drive, Parklands Christchurch 8083</div>			Amendments	No	Date	Drawing	PROPOSED GARAGE CROSS SECTION C-C		Ref <div>R1903</div> <div>Drawing No A302</div>			
					R1	16/06/2021		Garage floor, fire wall	Drawn		Checked	SCALE 1:50	Date 16/06/2021



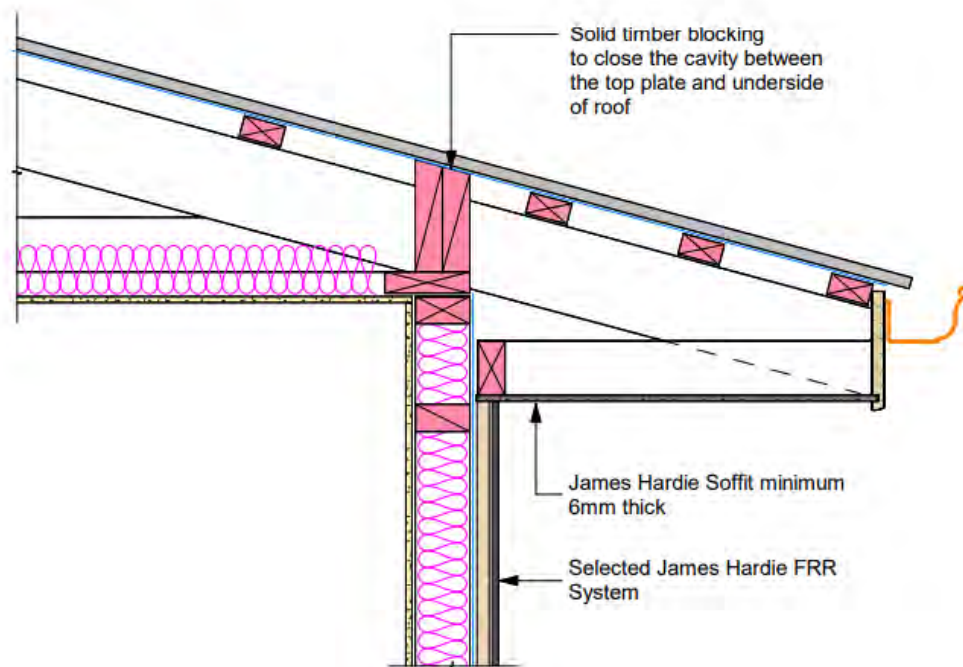


Christchurch City Council
BCN/2020/10088
Approved Building Consent Document
09/08/2021 Dalkie, Johan

Page 9 of 10

Wall height max (mm)	2400	3000	3000	3700
Stud bottom plate (mm)	90 x 45	90 x 45	140 x 45	140 x 45
Stud spacing max (mm)	400	300	600	400
Nog spacing max (mm)	800	800	800	800
Hold down brackets	Pryda® Brace / GIB Handibrac® Anchor both sides of stud			

For higher stud heights, please refer to James Hardie



One way FRR — timber or steel frame

Specification number	Performance	Specifications
GBUW 15	FRR 15/15/15	Lining 1 layer 13mm GIB® Standard one side LB/NLB Load bearing

FRAMING AND WALL HEIGHT

Timber or steel frame designed to meet durability and structural criteria for strength and serviceability under dead and live loads.

The width of framing supporting the linings shall be 35mm minimum.

The cavity depth shall be 90mm minimum.

Framing spacing shall be at 600mm centres maximum.

Timber frame height and dimensions as determined by NZS 3604 stud tables or specific design.

LINING (FIRE SIDE)

1 layer of 13mm GIB® Standard to one side of the frame.

Vertical or horizontal fixing permitted. Full height sheets shall be used where possible.

Sheets shall be touch fitted.

When sheet end butt joints are unavoidable, they shall be formed over framing.

All sheet joints must be formed over framing.

In steel-framed options, linings are installed hard to floor.

FASTENING THE LINING

Fasteners

Timber frame	Steel frame
32mm x 6g GIB® Grabber® High Thread Drywall Screws	32mm x 6g GIB® Grabber® Self Tapping Drywall Screws

Fastener centres

300mm centres up each stud.

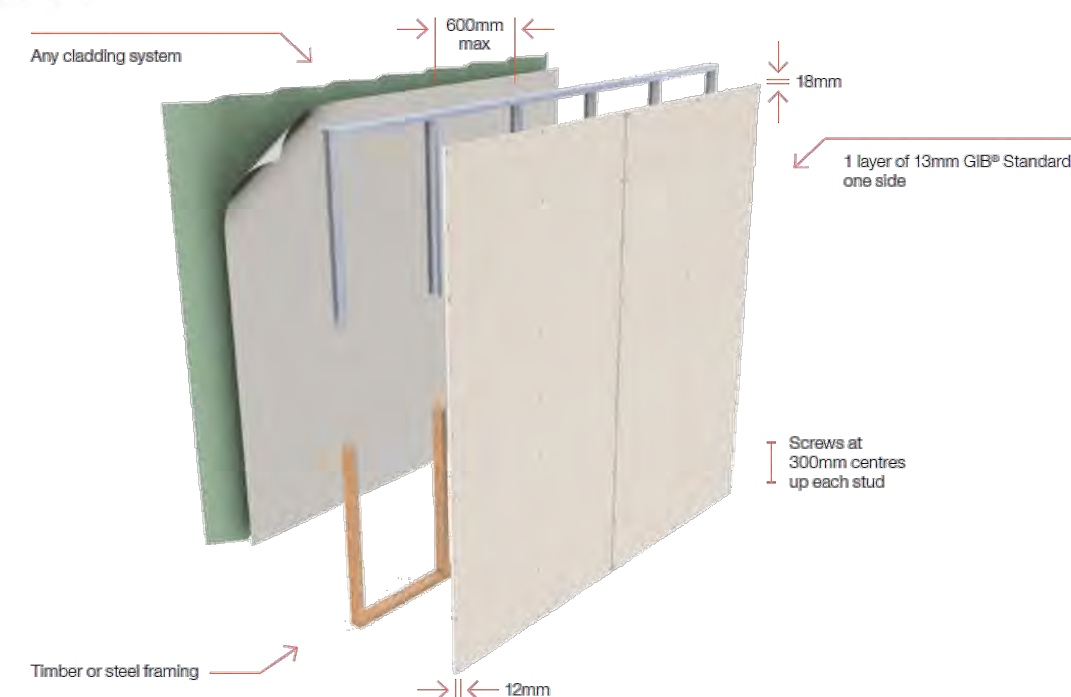
Place fasteners 12mm from longitudinal sheet edges and 18mm from sheet ends.

Place fasteners at 200mm centres along sheet end butt joints.

JOINTING

All screw heads stopped and all sheet joints tape reinforced and stopped in accordance with the publication entitled "GIB® Site Guide".

Amendment #1



Deborah Wilson
Design by Deb Ltd
LBP-BP117593
0274143000

ALTERATIONS
164 Queenspark Drive, Parklands
Christchurch 8083

Amendments	No	Date
	R1	16/06/2021 Garage fire walls

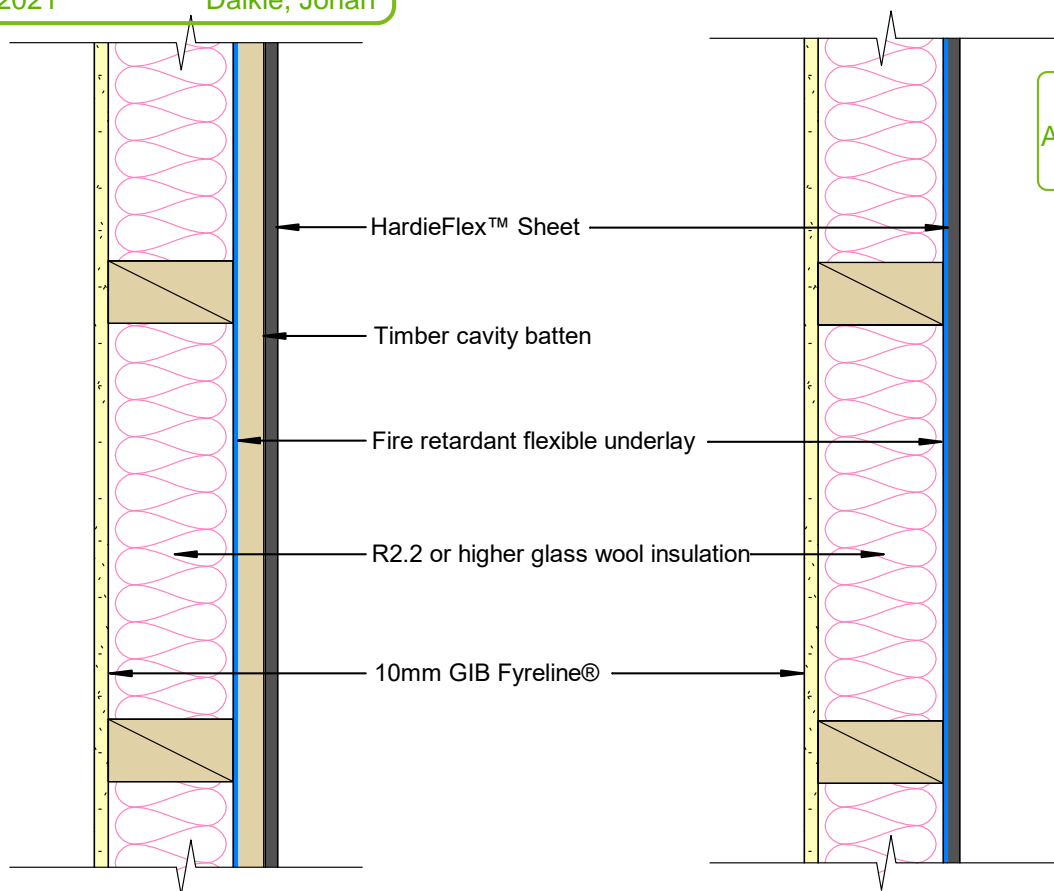
Drawing

Fire rated details	
Drawn	
Checked	
Date	16/06/2021
SCALE	

Ref **R1903**
Drawing No
D412

Cladding	HardieFlex™ Sheet	Lining	10mm GIB Fyrelime®
Framing	Timber framing to be in accordance with NZS 3604 or SED complying with AS/NZS 1170 and NZS 3603. Framing size 90 x 45mm minimum. Studs at 600mm centres and nogs at 800mm centres maximum	Insulation	Glass wool insulation 90mm thick, R2.2 or higher.
Cavity Batten	Timber cavity batten nominal 20mm	Underlay	A flexible underlay that complies with Table 23 of E2/AS1 and has a 'flammability index' not exceeding 5 can be used
Cladding Fixing	Direct Fix: 40 x 2.8mm fibre cement nail at 150mm centres to entire frame Cavity Fix: 60 x 3.15mm fibre cement nail at 150mm centres to entire frame	Lining Fixing	Fix GIB Fyrelime® with 41mm x 6g GIB® Grabber® High Thread Drywall Screws 300mm centre around the sheet perimeter and intermediate studs Fixing to be 12mm from bound sheet edges and 18mm from sheet ends

For further information refer to HardieFlex™ Sheet technical specification



Estimate of construction inspections

As at	9 August 2021
Project number	BCN/2020/10088
Description of consent	Alteration and change of use to dwelling - Change to layout of dwelling and construction of detached garage & mudroom
Site address	164 Queenspark Drive Parklands Lot 4 DP 58227

There are provisions that are endorsed on the building consent in relation to inspection during the carrying out of building work. These provisions must be taken to include the provisions of Section 90, Building Act 2004.

Amendments issued

BCN/2020/10088/A - Amendment 1 - Add fire rated walls to garage due to siting change - Issued 9 August 2021

Number of inspections allocated: 8

Inspections are required at the following stages of the building work. Please book an inspection with at least 3 working days' notice using the following inspection types. Note, depending on the extent of the building work and the order of construction some inspection types may be required on several occasions:

- **Foundation or Slab** – inspection before pour of concrete foundation footings or slab and including any sub-floor sanitary plumbing or drainage. Note, where construction monitoring is being undertaken by an owner's consultant or a building location/setout certificate is required, these records need to be available onsite for the inspector to review.
- **Pre Roof** – inspection before the structure is enclosed, including framing, connections and membrane substrates. Note, where a further stage of the building location certificate is required, this needs to be available onsite for the inspector to review.
- **Pre Cladding** – inspection before wall cladding is installed for cladding systems
- **Pre Line (Pre Line including Plumbing)** – inspection before enclosure with linings, including insulation and plumbing in place. Note, where construction monitoring is being undertaken by an owner's consultant, these records need to be available onsite for the inspector to review.
- **Drainage** - inspection of wastewater, stormwater or retaining wall drains before covering
- **Fire Resistant Lining – Amendment 1** – pre-stopping inspection of fire rated walls not included in construction monitoring by owner's consultant
- **Pre Stop (Pre Stopping) – Amendment 1** – pre-stopping inspection of sheet linings to bracing or sound rated elements
- **Final Inspection** – inspection at completion of all building work. Note, where construction monitoring has been undertaken by an owner's consultant, the inspection records and construction review statements need to be available onsite for the inspector to review.

The fees for the above inspections have been included in the overall building consent fees up to 1 hour per inspection. Where the actual time of an inspection exceeds 1 hour then additional inspection fees will be charged. These additional inspection fees will be based on the fee per inspection and charged in 15 minute increments.

Notes

- A copy of the approved plans must be kept on site.
- **To book an inspection:**
 - Phone: **03 941 8222**; or
 - Online: ccc.govt.nz/bookinspectionPlease book your inspections as early as is possible to ensure that an inspector is available.
- **To change or cancel your inspection:**
 - Phone: **03 941 8222**Cancellations must be made by 4pm the working day prior to your inspection taking place. The Council charges for cancellations made on the day for when the inspection is scheduled to take place.
- Additional inspections may be necessary, depending on the nature of the building work and the manner of construction, or as a result of non-complying or incomplete work. All additional inspections are charged at the rate applicable at the time (see link below) and are invoiced separately. Unused inspections will be refunded.
- Council may carry out an inspection approximately 24 months after your building consent was granted. The Building Act requires us to make a decision at this time whether to issue a code compliance certificate. The purpose of this inspection is to assess the building work to assist us in making a decision whether to issue a code compliance certificate.
- Audit inspections may also be carried out to ensure that relevant inspections by the owner's consultants have been carried out, and that a record of these inspections is kept on site.
- Further information on inspections is available on our website at ccc.govt.nz/inspections.
- You can submit construction documents via email to codecompliance@ccc.govt.nz.

Destructive investigations may be required if work is covered in prior to the Council's inspections taking place.

Building Consent Construction Documentation and Advice Notes

As at	9 August 2021
Project number	BCN/2020/10088
Description of consent	Alteration and change of use to dwelling - Change to layout of dwelling and construction of detached garage & mudroom
Site address	164 Queenspark Drive Parklands Lot 4 DP 58227

Amendments issued

BCN/2020/10088/A - Amendment 1 - Add fire rated walls to garage due to siting change - Issued 9 August 2021

Construction documentation

Under Sections 90, 94, and 45a the following construction documentation is required to be provided for the Christchurch City Council to be satisfied, on reasonable grounds, to issue the code compliance certificate. These may include third-party inspections and certifications that have provisions that are endorsed on the building consent in relation to inspection during the carrying out of building work, and must be taken to include the provisions of Section 90 of the Building Act 2004.

Energy work certificates

- **Electrical:** Provide an electrical safety certificate.
- **Gas:** Provide a gas safety certificate.

Structure: inspections

- **Construction monitoring:** Provide all records of inspections and checks carried out, and a PS4 from your nominated structural consultant [MIKE WILTON CONSULTING LTD] stating that all the necessary aspects of their design has been incorporated into the building. This includes but is not limited to the following work:
 - Pre-pour inspection of Garage Floor & Foundation
 - Pre line of new walls, Lintel Beams for Garage & Trusses for Garage

Restricted Building Work

- **Restricted Building Work - Carpentry:** Provide Record(s) of Work on regulated form 6A.
- **Restricted Building Work - Foundation:** Provide Record(s) of Work on regulated form 6A.
- **Restricted Building Work - Roofing:** Provide Record(s) of Work on regulated form 6A.

Test reports and/or “as-builts”

- **Building location certificate – Amendment 1:** Provide a B-081 certificate from a registered professional surveyor or a licenced cadastral surveyor for [building location relative to boundaries (Amendment 1) and floor level relative to a datum].
- **As-built truss layout:** Provide as-built truss plan and layout at time of pre roof inspection.
- **Water reticulation - pipework testing:** Provide completed form B-084.
- **Foulwater and stormwater drains layouts:** Provide as-laid drainage plan at time of drainage inspection.

Advice notes

Please read and follow the advice notes listed below. Failure to do so may create difficulties in obtaining a code compliance certificate.

- All building work must be carried out in accordance with the approved building consent documents. A full and current copy of the stamped documents must remain on site for reference at all times. This may include approved documents in digital format presented on an electronic device provided they are easily readable. For example documents presented on a smart phone screen would not be considered easily readable.
- A building consent lapses and is of no effect if the building work to which it relates does not commence within 12 months after the date of issue of the building consent. A building consent authority may allow a further period if an extension of time to start work is requested.
- An owner must apply for a code compliance certificate as soon as practicable after all building work to be carried out under a building consent is completed. If after two years there has been no application for a code compliance certificate, under Section 93(2)(b), a building consent authority, must decide whether it can issue a code compliance certificate. Council may need to carry out a building inspection to assist with this decision or extend its time to make this decision. At this time we will also invoice any accrued fees associated with the building work.
- If you wish to make changes to your building consent, you must apply for an amendment or a minor variation. An amendment or a minor variation must be granted before the building work is carried out. Refer to www.ccc.govt.nz/consents-and-licences/building-consents/building-consent/change-your-building-consent.
- **Further works may be discovered:** Further works may be discovered during the construction phase of this consent. This could be established from on-site investigations by the owner’s consultant or from previously unknown damage being uncovered. These works are likely to be considered additional to or vary from those approved in the building consent. A minor variation or an amendment to the building consent must be applied for and granted prior to the commencement of the additional works.
- **Erosion and sediment control plan:** The management plan for the control of erosion and sediment during construction must be made known to the building contractor before any siteworks are carried out. The objective of this plan is to control run-off to prevent muddy water flowing, or earth slipping, onto neighbouring properties, legal road (including kerb and channel). Muddy water is defined as being water with a total suspended solids (TSS) concentration of greater than 50mg/l. Failure to comply with the management plan may lead to enforcement action being taken under the Building Act 2004.
- **Site Safety:** Ensure all appropriate site safety measures are provided throughout the contract works to comply with NZ Building Code Clause F5 and all Occupational Safety and Health requirements.

- **Prevention of dust and debris:** An adequate supply of water shall be available at all times to enable the site and truck loads to be dampened down to prevent dust and debris being deposited on the footpath, roadway and adjoining properties. The footpath and roadway are to be kept clean using methods that minimise sediment from entering the stormwater system and waterways.

Code Compliance Certificate

Section 95, Building Act 2004

Form 7 – Building (Forms) Regulations 2004

Building consent number	BCN/2020/10088	Date issued	31 March 2023
The building			
Street address of building	164 Queenspark Drive Parklands	Location of building within site/block number	164 Queenspark Drive
Legal description of land where building is located	Lot 4 DP 58227		
Building name	old doctors surgery to be turned into house and ne	Level/unit number	
Year first constructed	1990	Current, lawfully established use	Housing - Dwelling alteration and change of use

The owner

Name of owner	D A Lowe and P A Lowe	Phone number	
Contact person		Landline	
Mailing address	PO Box 38055 Parklands Christchurch 8842	Mobile	
		Daytime	
Street address/ registered office	PO Box 38055 Parklands Christchurch 8842	After hours	
		Fax	
Email address	dominic.lowe@xtra.co.nz	Website	

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

Name	D A Lowe	Phone	
Contact person		Mobile	
Mailing address	PO Box 38055 Parklands Christchurch 8842	Fax	
		Email address	dominic.lowe@xtra.co.nz

Building work

Building consent number **BCN/2020/10088**

Alteration and change of use to dwelling - Change to layout of dwelling and construction of detached garage & mudroom

Issued by: Christchurch City Council

Code compliance

The Christchurch City Council is satisfied, on reasonable grounds, that the building work complies with the building consent.

A handwritten signature in black ink, appearing to read 'Rory Stewart', is positioned above the printed name.

Rory Stewart
Code Compliance Assessor
03 941 8151

On behalf of: Christchurch City Council

Date: 31 March 2023

PRODUCER STATEMENT – PS4 – CONSTRUCTION REVIEW

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

 ISSUED BY:.... MIKE WILTON CONSULTING LTD.....
 (Construction Review Firm)

TO:.... DOMINIC LOWE (Owner/Developer)

 TO BE SUPPLIED TO:.... CHRISTCHURCH CITY COUNCIL
 (Building Consent Authority)

IN RESPECT OF: : HOUSE RELEVELLING & FOUNDATION REPAIRS (Description of Building Work)

 AT: 164 QUEENSPARK DRIVE ,CHRISTCHURCH
 (Address)

 Town/City:....CHRISTCHURCH..... LOT..... DP..... SO.....
 (Address)

 We MIKE WILTON CONSULTING LTD have been engaged by DOMINIC LOWE
 (Construction Review Firm)

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

owner/developer... DOMINIC LOWE

 or ☐ other HOUSE RELEVELLING & FOUNDATION REPAIRS
 (Extent of Engagement)

in respect of clause(s)B1 & B2..... of the Building Code for the building work

 described in documents relating to Building Consent No. **2020/1259**..... And those relating to Building Consent

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

 Authorised instructions/variation(s) No. (copies attached)
 or by the attached Schedule ☐ have been issued during the course of the works.

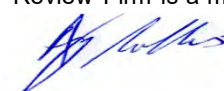
 On the basis of ☐ this review ☐ these review(s) and information supplied by the contractor during the course of the
 works and on behalf of the firm undertaking this Construction Review, I believe on reasonable grounds that
☒ All or ☐ Part only of the building works have been completed in accordance with the relevant requirements of the

 Building Consent and Building Consent Amendments identified above, with respect to Clause(s)
 B1,B2..... of the Building Code. I also believe on reasonable grounds that the persons who have
 undertaken this construction review have the necessary competency to do so.

 I, Adrian James Collis..... am: ☐ CPEng #160987 ☐ Reg Arch #
 (Name of Construction Review Professional)

 I am a Member of: ☒ ENGZ ☐ NZIA and hold the following qualifications: BE CIVIL, M.Eng.St.....
 The Construction Review Firm issuing this statement holds a current policy of Professional Indemnity Insurance no less than
 \$200,000*.

 The Construction Review Firm is a member of ACENZ: ☐

 SIGNED BY ... (Signature)..... Adrian Collis Name of Construction Review
 Professional)

 ON BEHALF OF MIKE WILTON CONSULTING LTD.....Date...12 May 2021.....
 (Construction Review Firm)

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

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

SITE INSTRUCTION and INSPECTION

Mike Wilton Consulting
34 Yaldhurst Road
P.O.Box 6160
Christchurch
Ph 343 1220

To	Dominic Lowe		
Job	164 Queenspark drive		
cc		Fax:	

Item	Site Instruction
	<ul style="list-style-type: none">• The Underpin pads are dug as per the requirement.• The Size of the underpins are as per requirement.• OK to proceed.

Engineer	Pawan Bhandari	
Signature	<i>Pawan</i>	
Received		Date: 2/06/2020
By		

SITE INSTRUCTION and INSPECTION


Mike Wilton Consulting
34 Yaldhurst Road
P.O.Box 6160
Christchurch
Ph 343 1220

Project No

BCN / 2020 / 1259

To	Dominic Lowe	dominic.lowe@xtra.co.nz
Job	164 Queenspark Drive Christchurch	Job 19174
cc		
cc		

Item	Instruction
1)	check of Remaining Underpin Pads to be dug. - All to correct size + depth - Ground OK - OK to Pour Concrete.

Engineer	Mike Wilton	10 June 20
Signature		
Received		Date:
By		

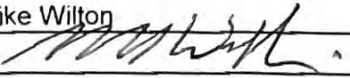
SITE INSTRUCTION and INSPECTION

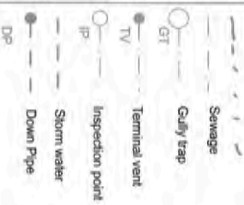
Mike Wilton Consulting
34 Yaldhurst Road
P.O.Box 6160
Christchurch
Ph 343 1220

Project No
BCN/2020/1259

To	Dominic Lowe	dominic.lowe@xtra.co.nz
Job	164 Queenspark Drive Christchurch	Job 19174
cc		
cc		

Item	Instruction
1)	<p>Final Inspection - Levels recorded + shown on attach plan</p> <p>VARIATION IN LEVELS - 30 to +8 Total VARIATION = 38mm < 50mm</p> <p>OK as within MBIE guidelines</p> <p>- Floors have been raised satisfactorily</p> <p>- Hole in slab - Reconcreted after lifting + grout holes infilled back to slab level.</p> <p>Minor remortaring of Brickwork carried out where required</p> <p>JOB COMPLETED SATISFACTORILY</p>

Engineer	Mike Wilton	2 Oct 2020
Signature		
Received		Date:
By		



Note: Plumber/drainlayer to cap of all plumbing units and Stormwater and Sewage drains before lift, and check falls of drains before void filling and flow before reconnecting

EXISTING FLOOR PLAN	
Drawing	
Checked	
Date	18/02/2020