

Inch Shed

Site Information

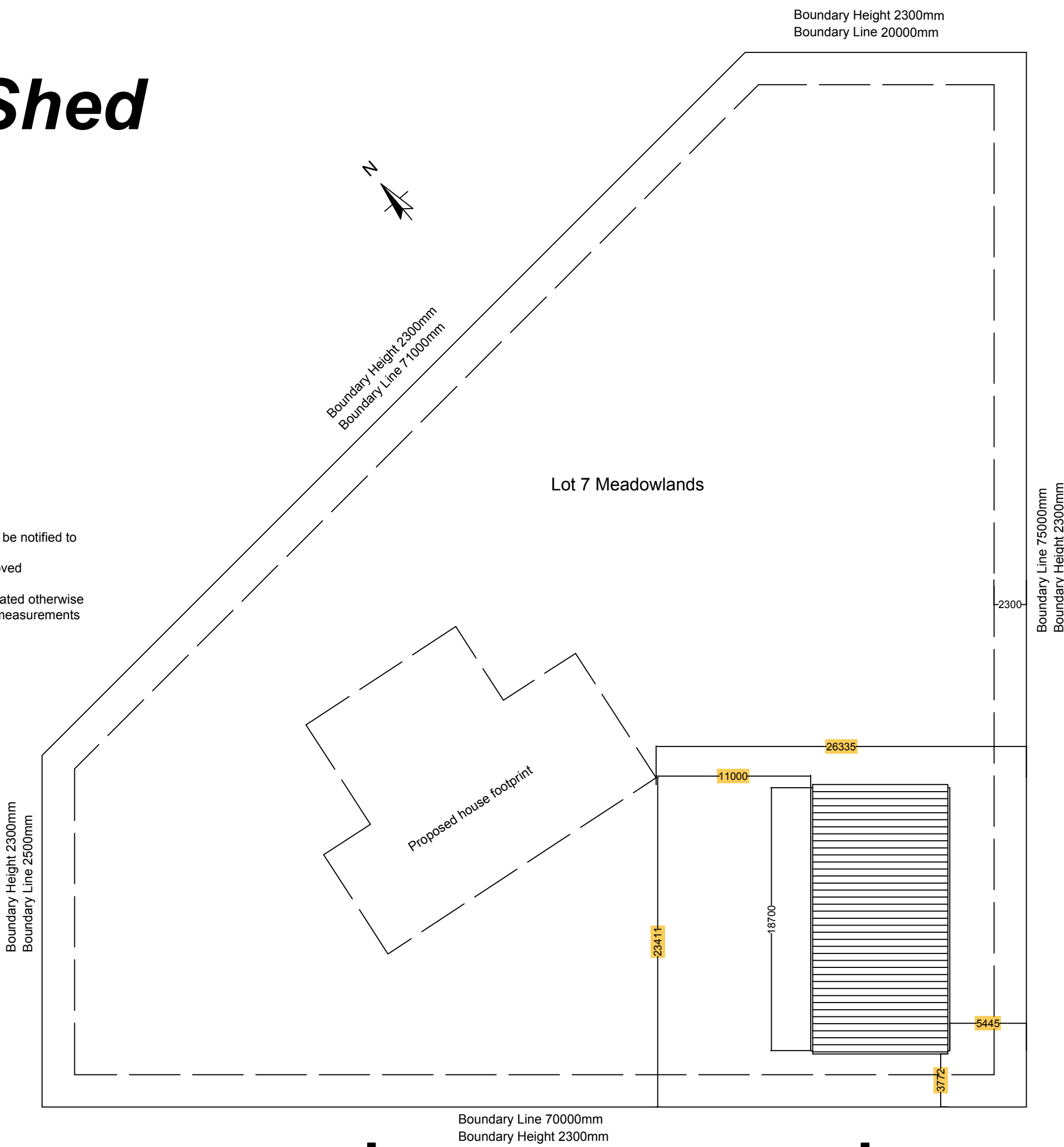
Location: Allenton, Ashburton
Address: Lot 7 Meadowlands Green

Function: Storage Shed

Wind Load is high
Earthquake Zone 1
Rainfall Range: 40 - 50
Wind Region: A
Wind Zone: High
Corrosion Zone: B
Climate Zone: 3
Residential Zone: B (4.9.2 Compliant)

Key Notes

Do not measure off pages
All dimensions to be checked on site
Any discrepancies between drawings to be notified to the architect
All work to comply with the NZBC Approved Documents
All measurements in mm units unless stated otherwise
House Footprint not specific to original measurements

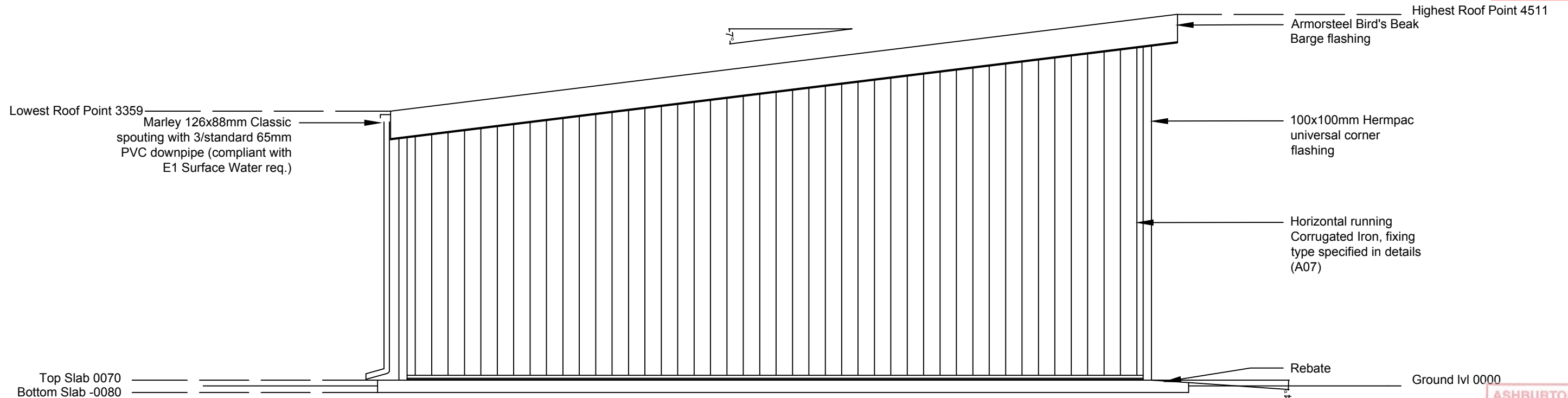


Site Plan
Scale 1 : 300

ASHBURTON DISTRICT COUNCIL

This proposal requires a resource consent
No building work is to be undertaken until the resource consent has been issued

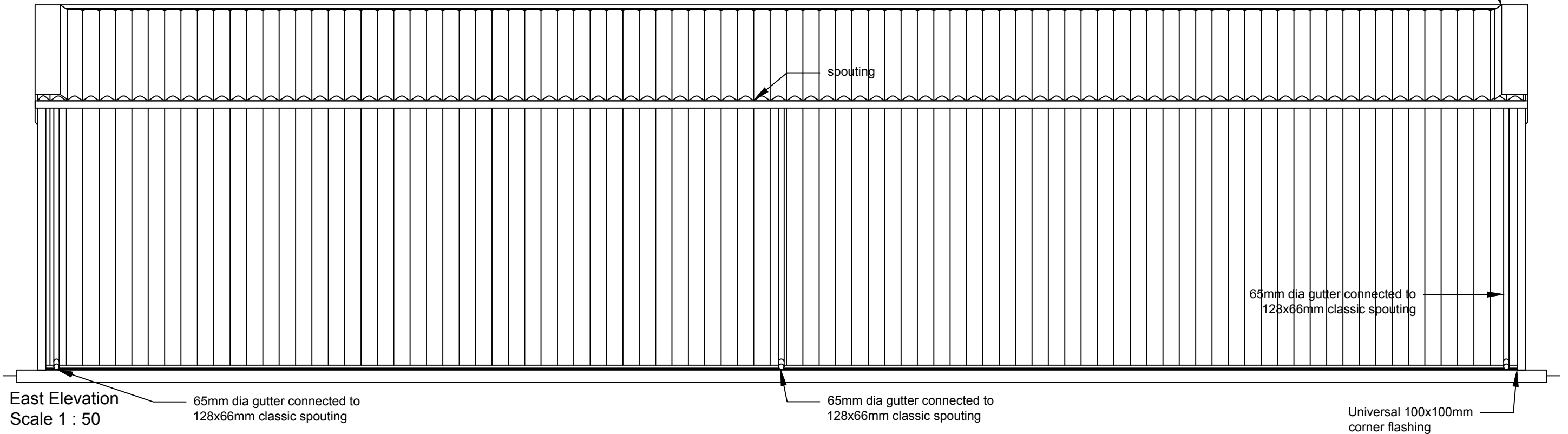
Drawing No: **A02**
Date: 23/04/2022



North Elevation
Scale 1 : 50

ASHBURTON DISTRICT COUNCIL

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East Elevation
Scale 1 : 50

Sheet Size: **A3**

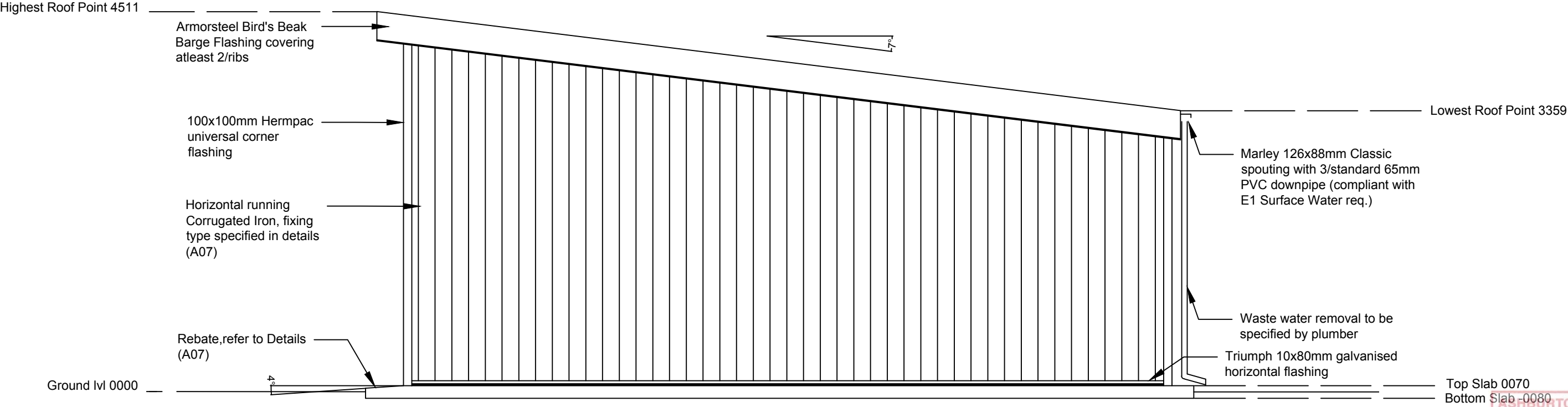
Address/
Location: Lot 7 Meadowlands Green, Ashburton

Inch Shed

Elevations 01

Author: Jorja Jones
Client Name: Sharon and Kelvin Inch

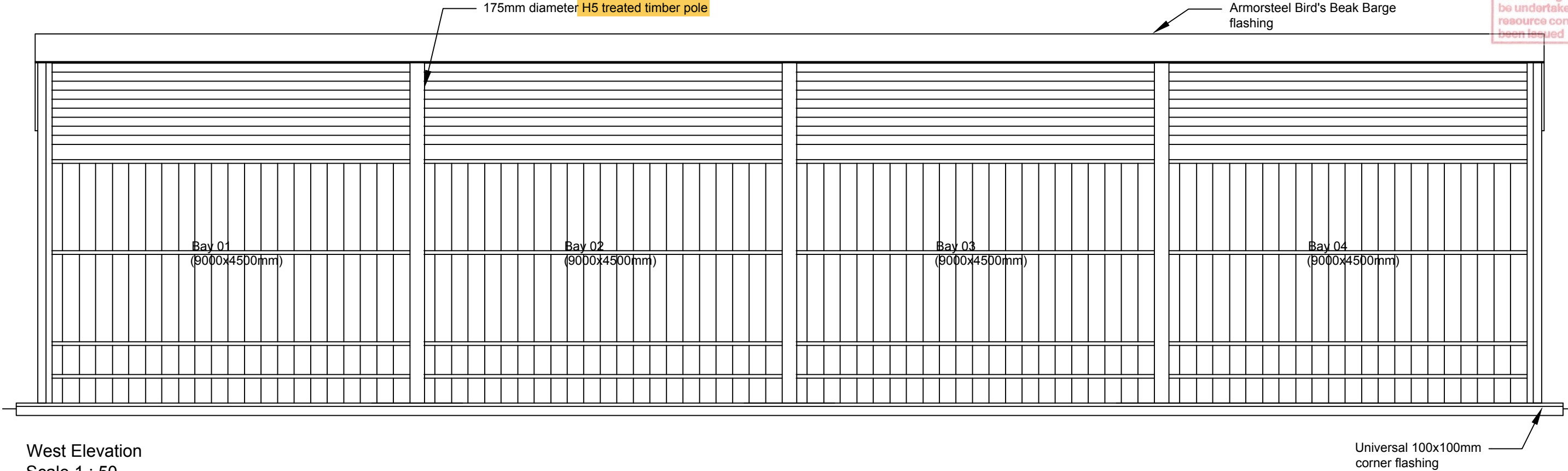
Drawing No: **A03**
Date: 23/04/2022



South Elevation
Scale 1 : 50

ASHBURTON DISTRICT COUNCIL

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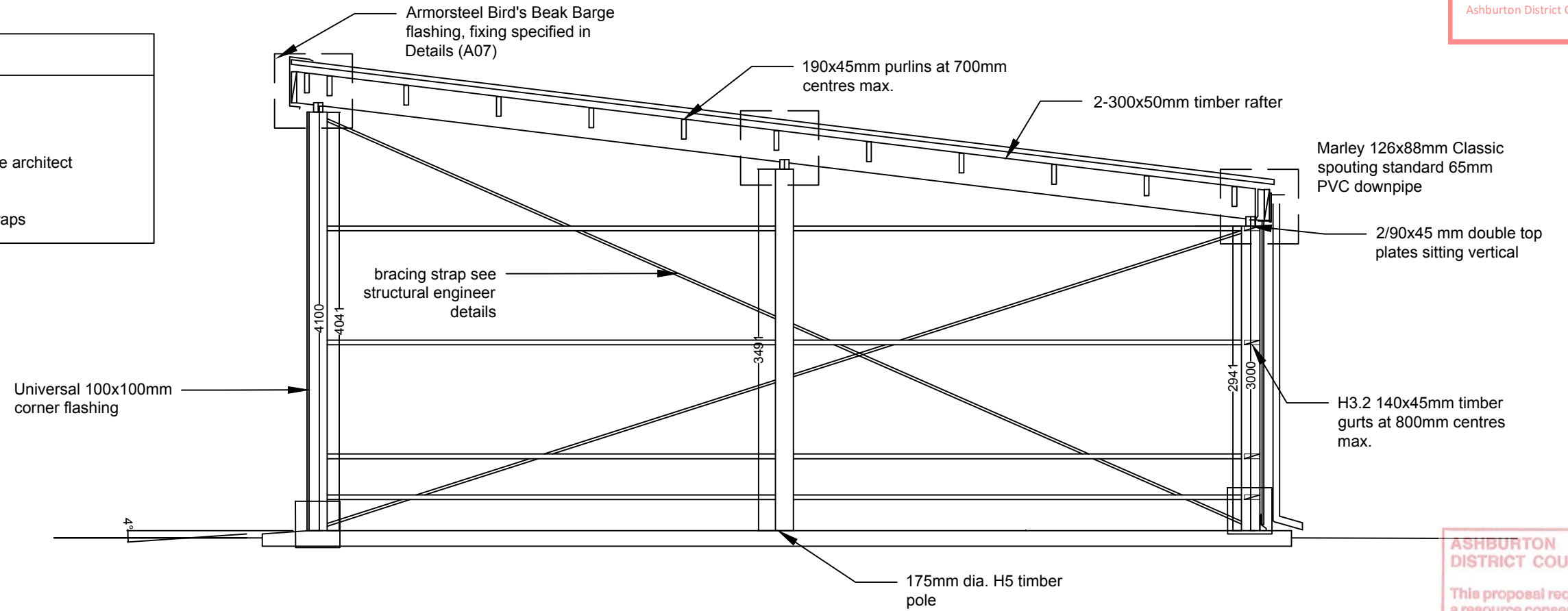


West Elevation
Scale 1 : 50

Key Notes

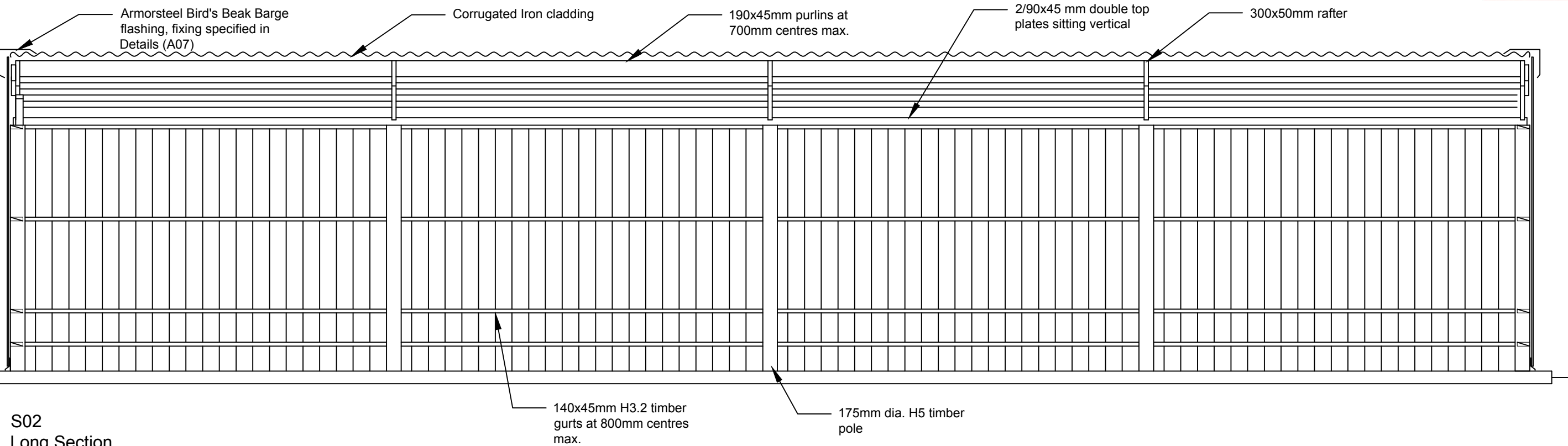
All timber has H3.2 treatment unless stated otherwise
Do not measure off pages
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All measurements in mm units unless stated otherwise
North, South walls all are secured with 25mm Bracing straps

S01
Cross Section
Scale 1 : 50



ASHBURTON DISTRICT COUNCIL

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S02
Long Section
Scale 1 : 50

Sheet Size: **A3**

Address/ Location: Lot 7 Meadowlands Green, Ashburton

Inch Shed

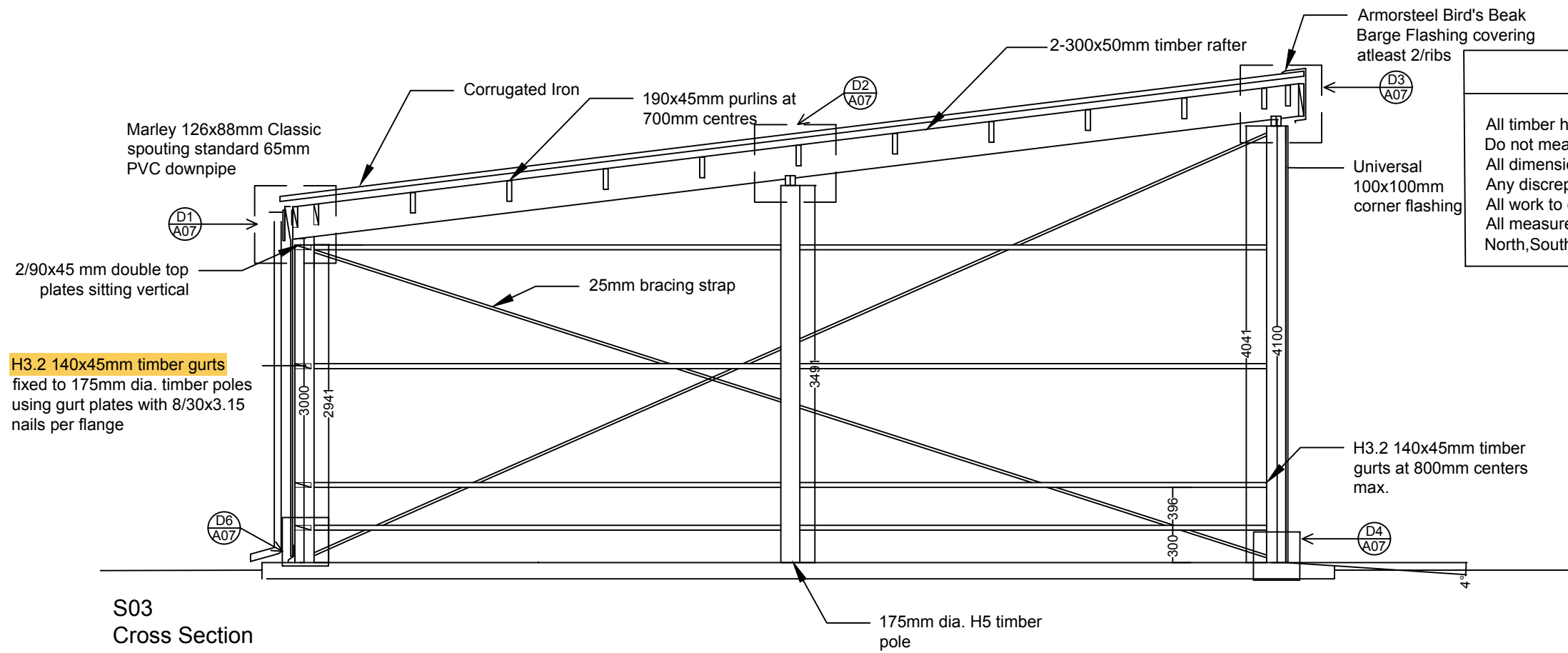
Sections 01

Author: Jorja Jones
Client Name: Sharon and Kelvin Inch

Drawing No: **A05**
Date: 23/04/2022

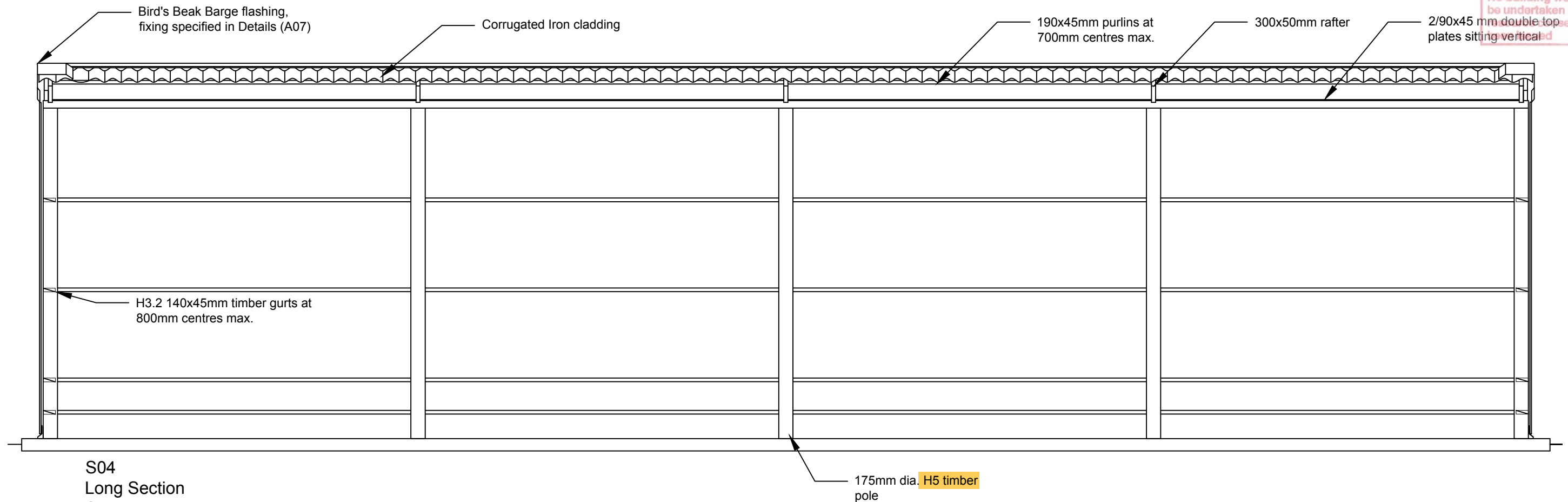
Key Notes

All timber has H3.2 treatment unless stated otherwise
Do not measure off pages
All dimensions to be checked on site
Any discrepancies between drawings to be notified to the architect
All work to comply with the NZBC Approved Documents
All measurements in mm units unless stated otherwise
North, South walls all have 25mm Bracing Straps



ASHBURTON DISTRICT COUNCIL

This proposal requires a resource consent
No building work is to be undertaken until the resource consent has been received



Sheet Size: A3

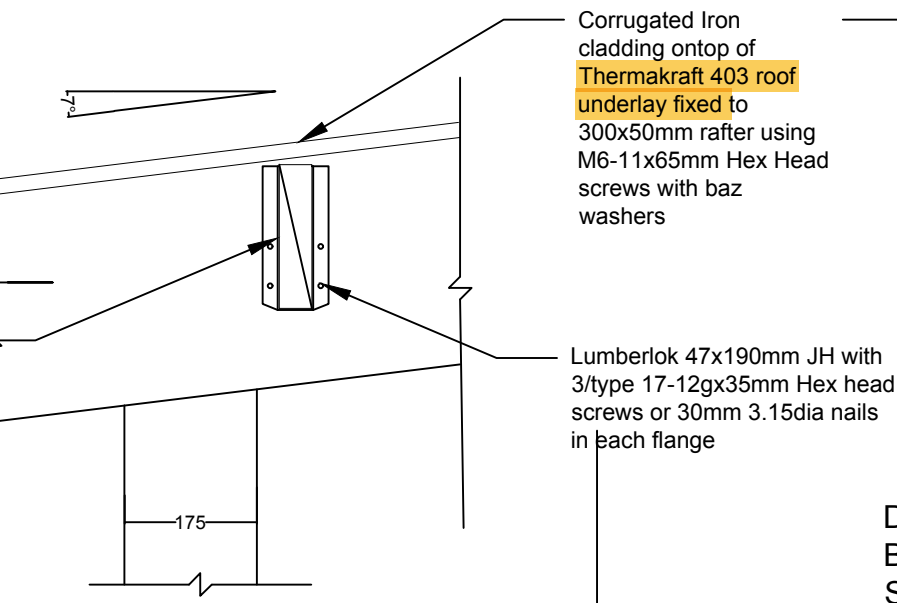
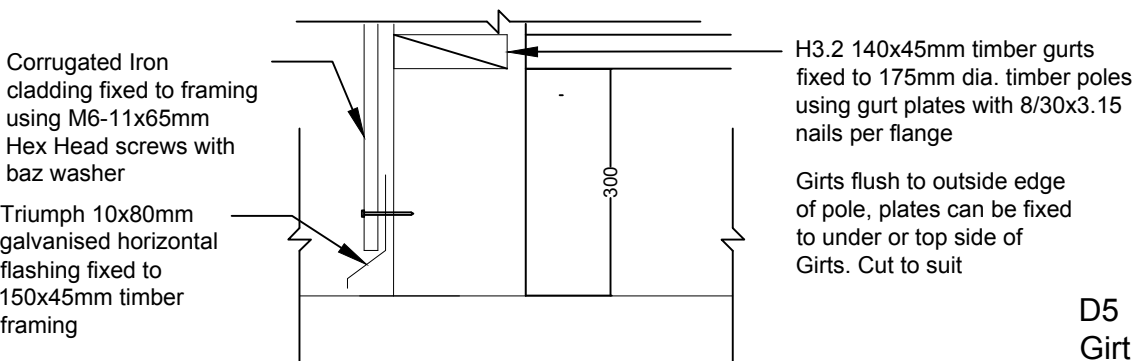
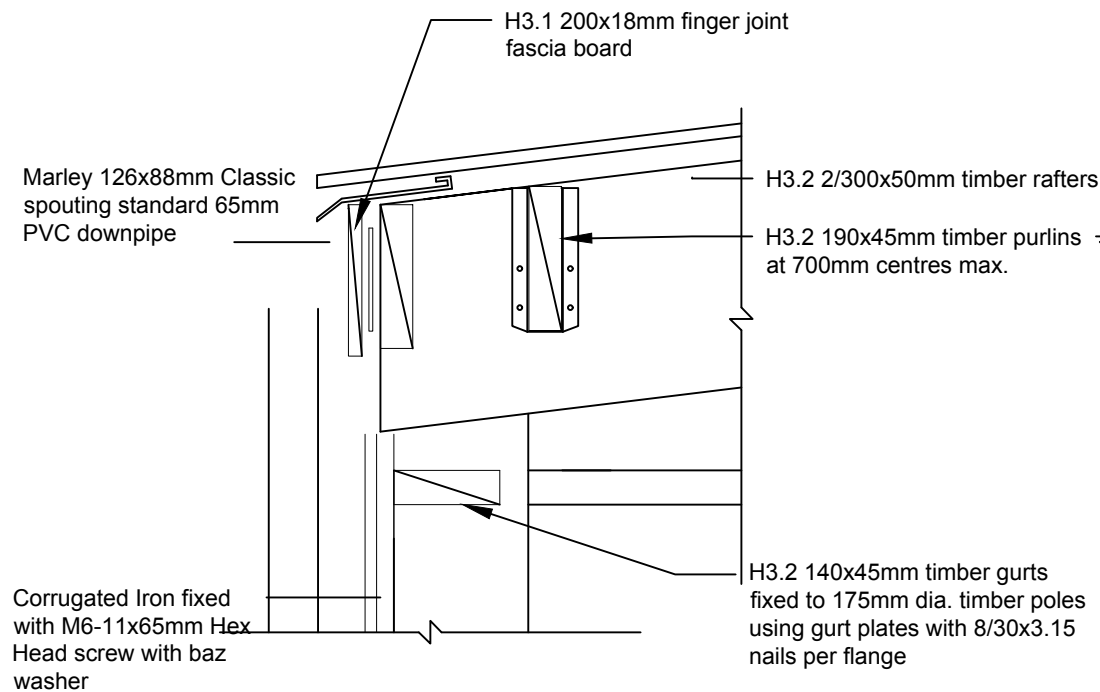
Address/ Location: Lot 7 Meadowlands Green, Ashburton

Inch Shed

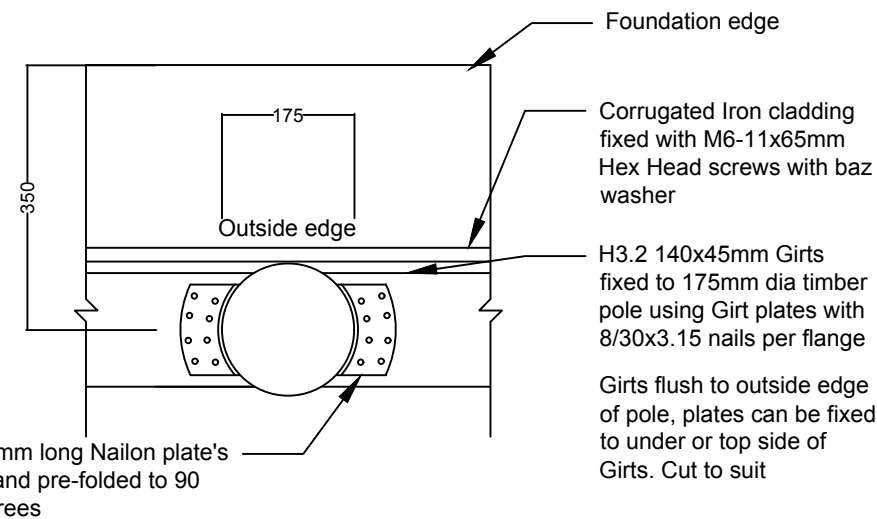
Section 02

Author: Jorja Jones
Client Name: Sharon and Kelvin Inch

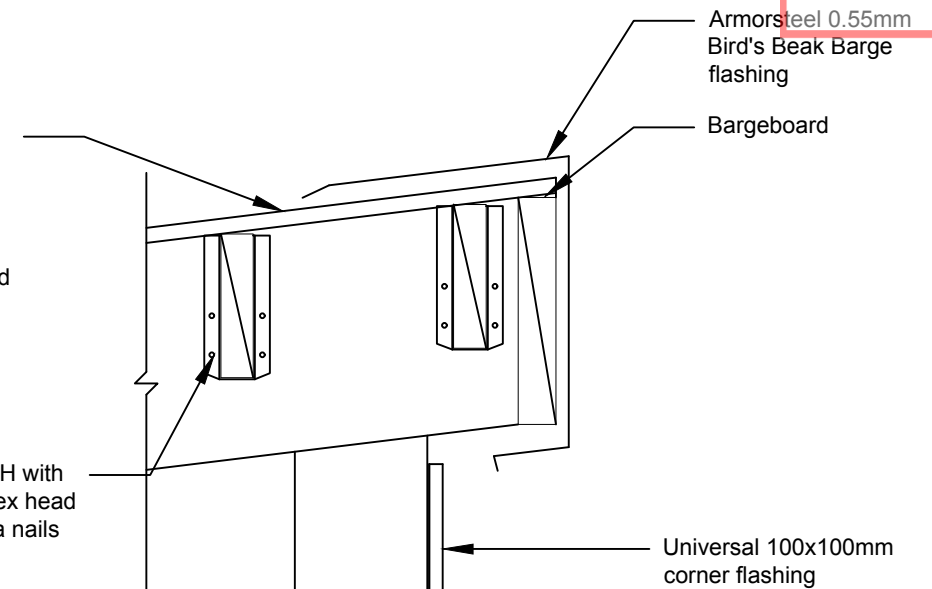
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Date: 23/04/2022



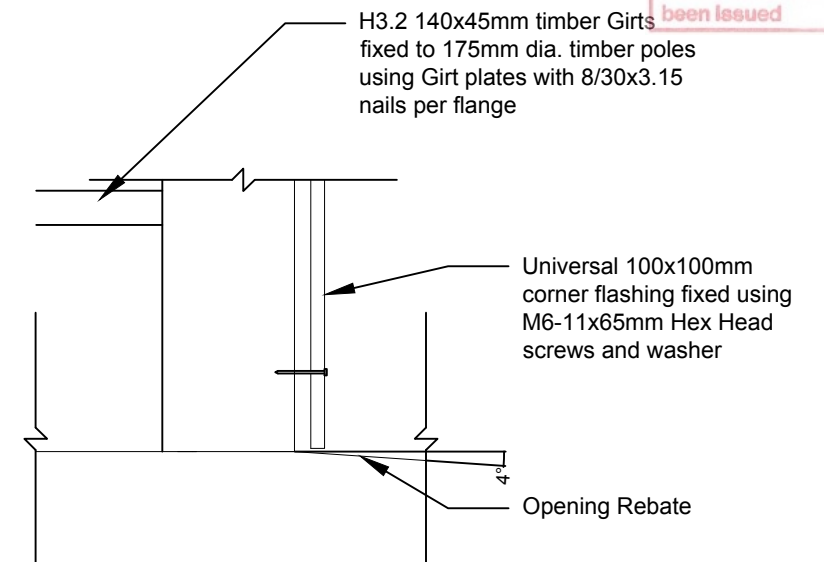
D2 Top Plate And Joist Connection Detail Scale 1 : 10



D5 Girt Connection Detail Scale 1 : 10



D3 Bird's Beak Barge Flashing Detail Scale 1 : 10



D4 Rebate Section Detail Scale 1 : 10

Key Notes

All timber has H3.2 treatment unless stated otherwise
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All measurements in mm units unless stated otherwise

ASHBURTON DISTRICT COUNCIL

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Sheet Size: **A3**

Address/ Location: Lot 7 Meadowlands Green, Ashburton

Inch Shed

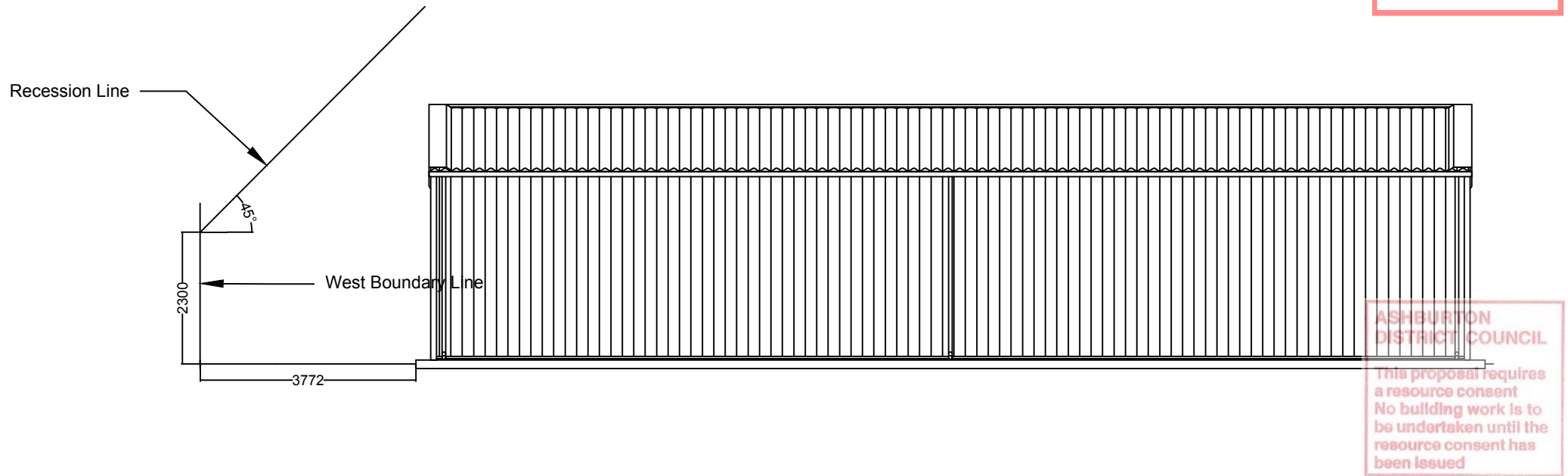
Details

Author: Jorja Jones
Client Name: Sharon and Kelvin Inch

Drawing No: **A07**
Date: 23/04/2022

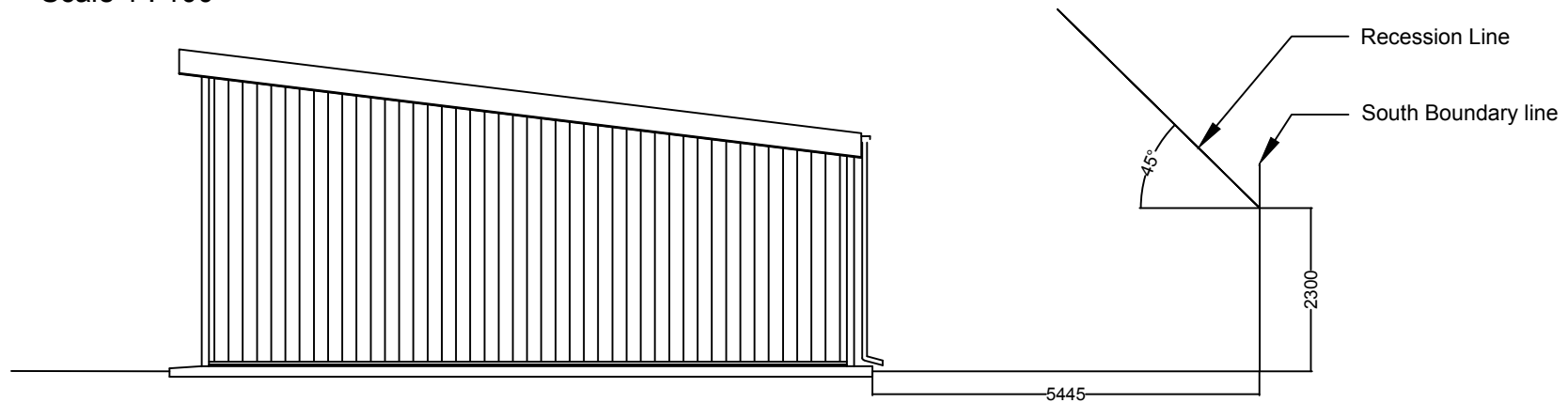
South Elevation - South Recession Line

Scale 1 : 100



West Elevation - West Recession Line

Scale 1 : 100



Sheet
Size: **A4**

Address/
Location: Lot 7 Meadowlands Green, Ashburton

Inch Shed

Compliant with 4.9.4

Recession Plane

Author: Jorja Jones
Client Name: Sharon and Kelvin Inch

Drawing No: **A08**
Date: 04/07/2023

INCH SHED

LOT 7 MEADOWLANDS GREEN, ALLENTON, ASHBURTON

STRUCTURAL DRAWINGS

Building Consent Design Issue B: 6.07.2023

ASHBURTON
DISTRICT COUNCIL

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a resource consent
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been issued



DRAWING INDEX

S1-PLANS

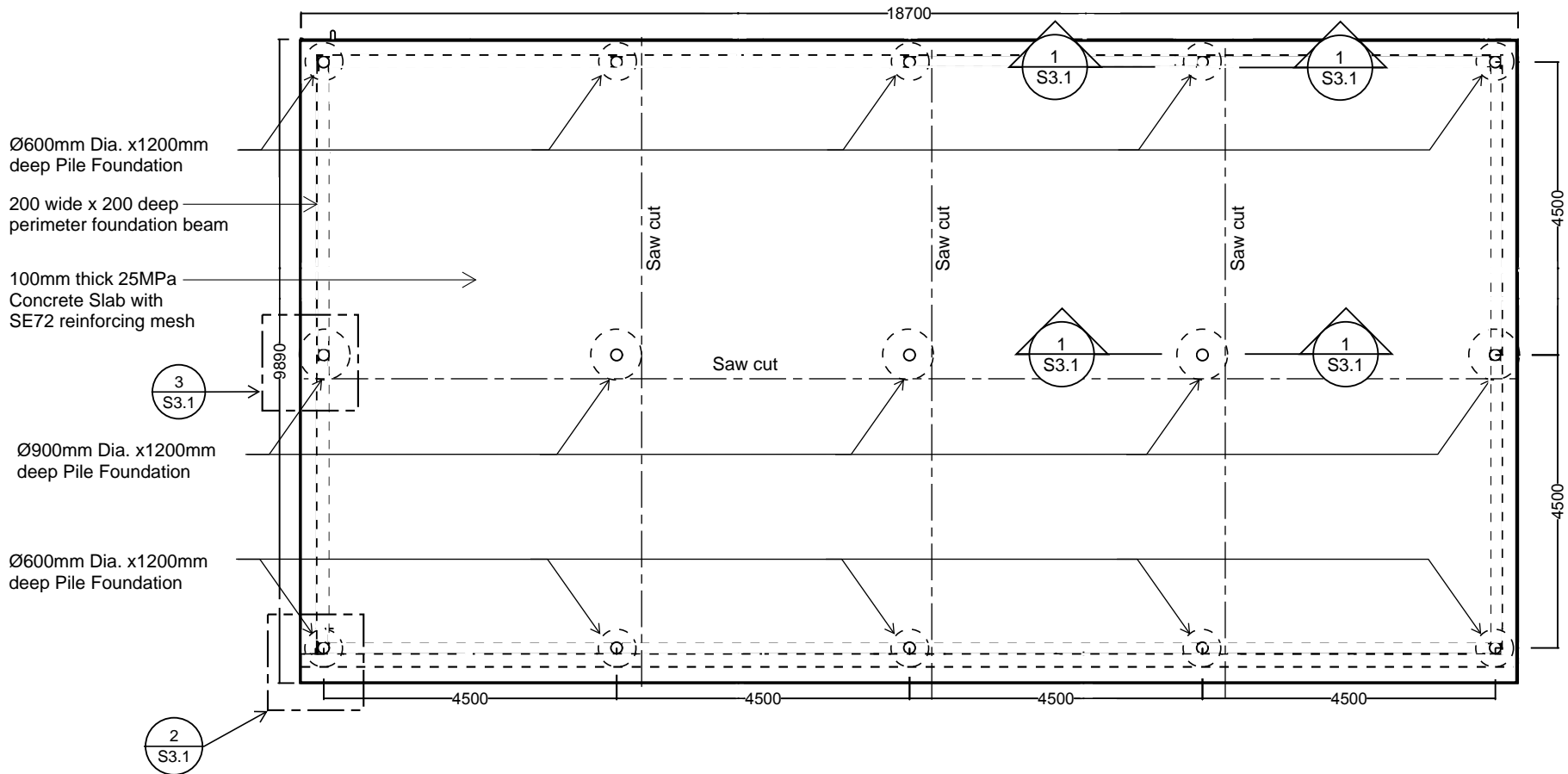
S1.1	FOUNDATION PLAN	1
S1.2	ROOF PLAN AND CROSS SECTION	1

S2-VIEWS

S2.1	BACK VIEW AND FRONT VIEW	1
------	--------------------------	---

S3-DETAILS

S3.1	FOUNDATION DETAILS	1
S3.2	FRAMING DETAILS	1



FOUNDATION PLAN
Scale 1:100

All timber has H3.2 treatment unless stated otherwise

Notes:

- Approved Building Consent
- All drawings to be read in conjunction with sheet: S0.02 STANDARD DETAILS

BC0174/23

Ashburton District Council

ASHBURTON DISTRICT COUNCIL

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B	06/07/2023	Building Consent
A	09/02/2023	Building Consent
Issue	Date	Description

TM Consultants Ltd
A 3 Dundale Street,
PO Box 8874,
Christchurch 8440,
New Zealand
P: 03 348 6086
F: 03 348 6085
E: info@tmco.co.nz

TMCO.CO.NZ CONSULTING ENGINEERS
STRUCTURAL MECHANICAL CIVIL HYDRAULIC ELECTRICAL FIRE

Architect

STRUCTURAL DRAWINGS

Job Title

INCH SHED
STRUCTURAL DRAWINGS
LOT 7 MEADOWLANDS GREEN,
ALLENTON, ASHBURTON

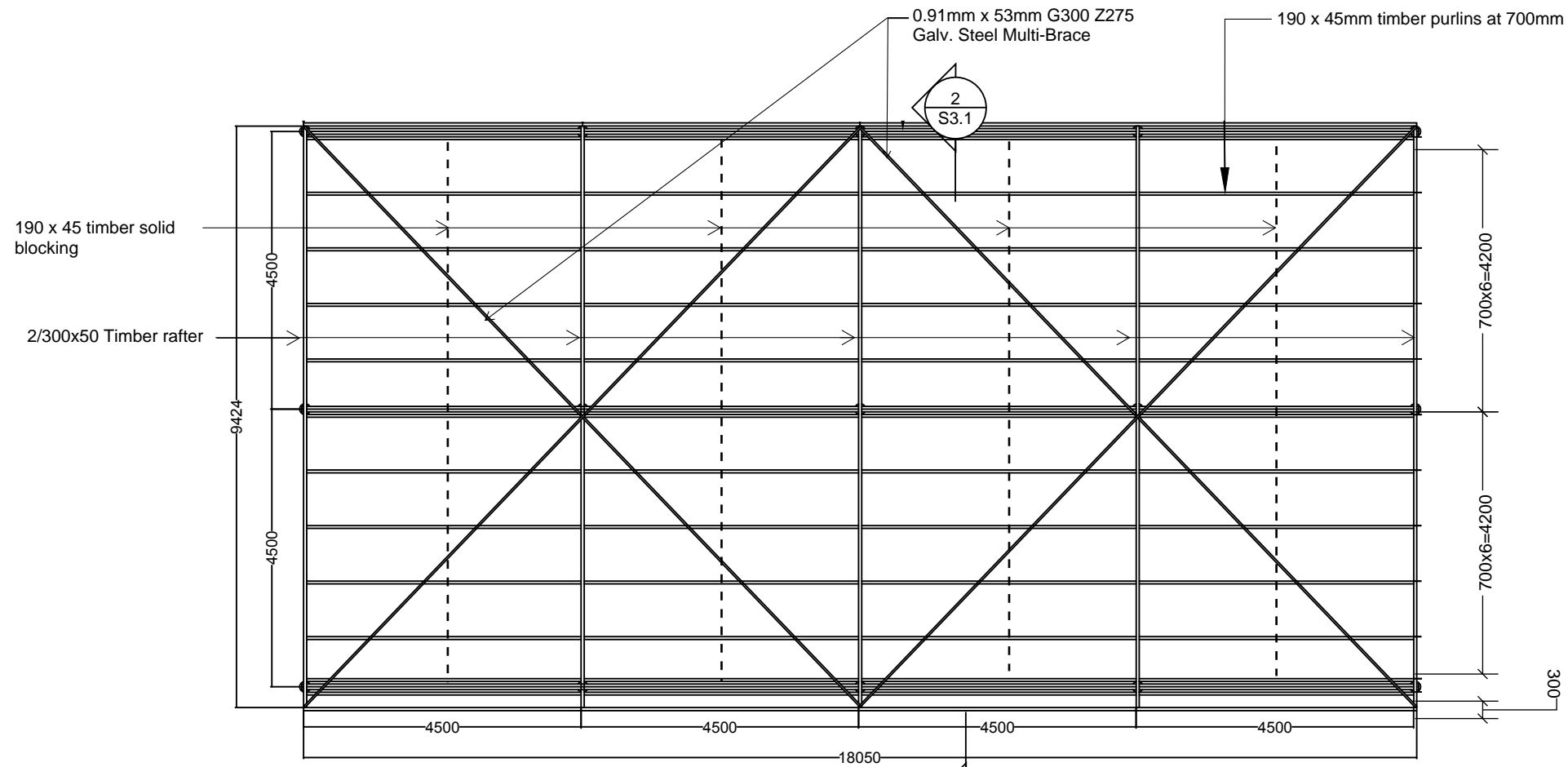
Drawing Name

FOUNDATION PLAN

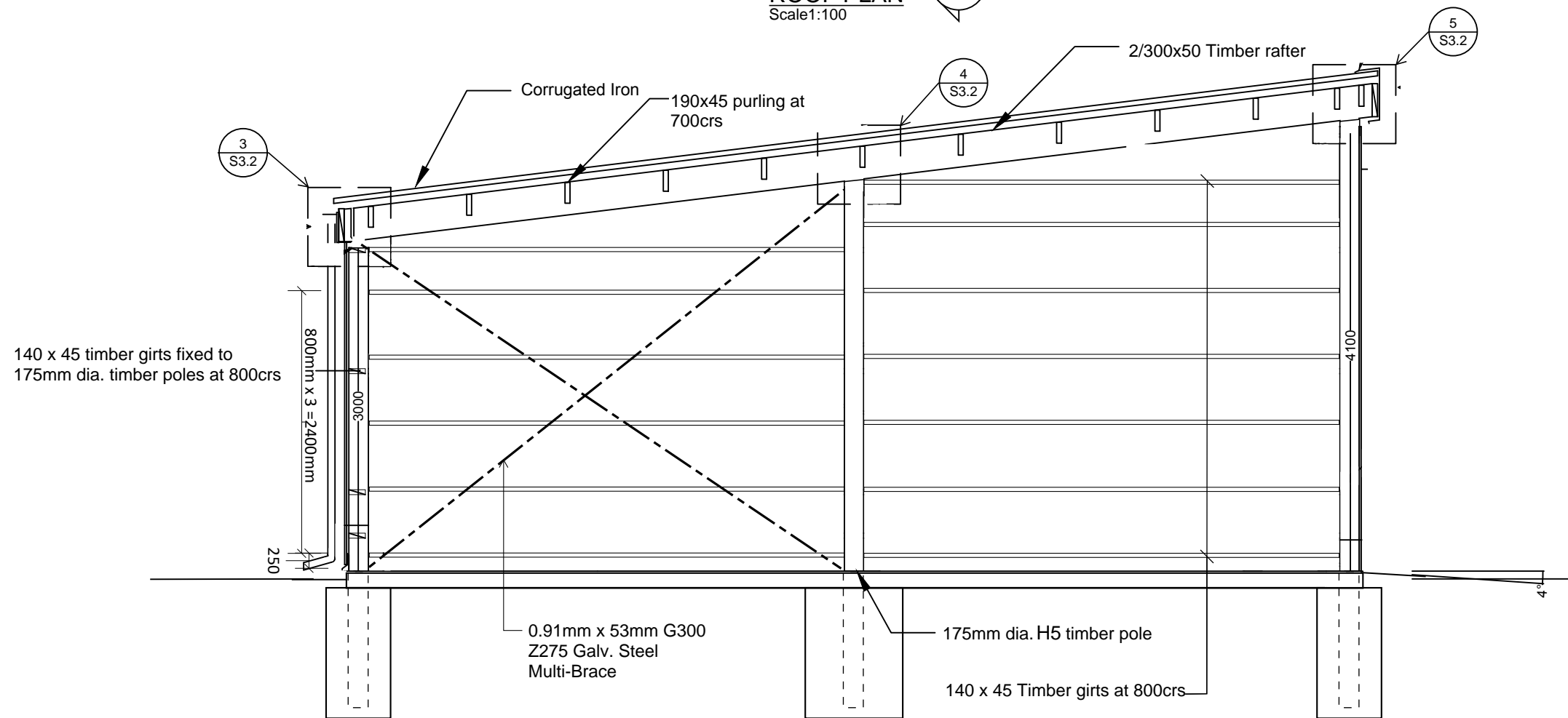
Engineer:	PVP	Director:	MBB
Digital Modeller:		DE Manager:	-
Drawing Scale: NTS			

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Sheet No:	Job No:	Issue:
S1.1	220529	B

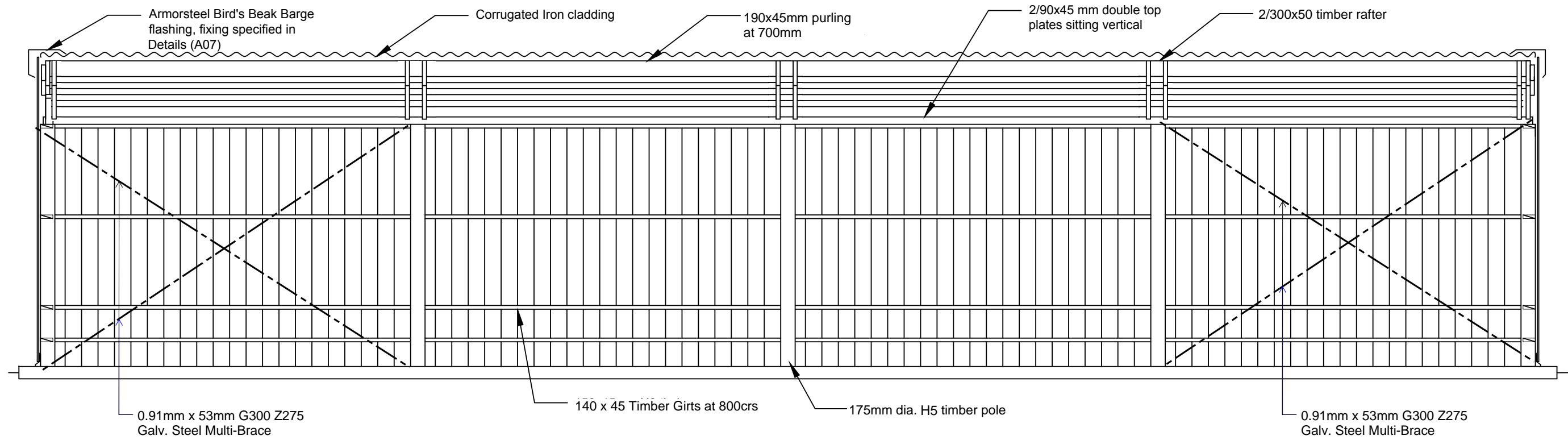


ROOF PLAN
Scale 1:100

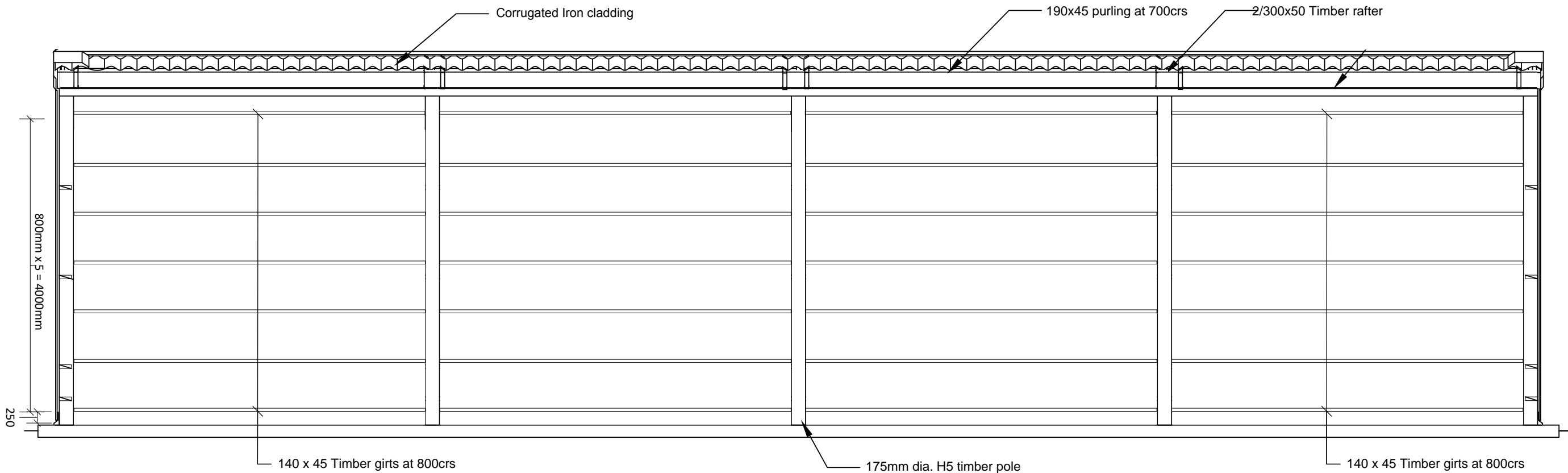


2 CROSS SECTION
Scale 1:50

All timber has H3.2 treatment unless
stated otherwise



BACK VIEW
Scale NTS



FRONT VIEW
Scale NTS

All timber has H3.2 treatment unless stated otherwise

Notes:
Approved Building Consent
All drawings to be read in conjunction with sheet:
S0.02 STANDARD DETAILS

BC0174/23

Ashburton District Council

ASHBURTON DISTRICT COUNCIL

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A	09/02/2023	Building Consent
Issue	Date	Description

TM Consultants Ltd
A 3 Sundale Street
PO Box 8874
Christchurch 8440
New Zealand
P: 03 348 6086
F: 03 348 6085
E: info@tmc.co.nz

TMCO.CO.NZ CONSULTING ENGINEERS
STRUCTURAL MECHANICAL CIVIL HYDRAULIC ELECTRICAL FIRE

Architect

STRUCTURAL DRAWINGS

Job Title

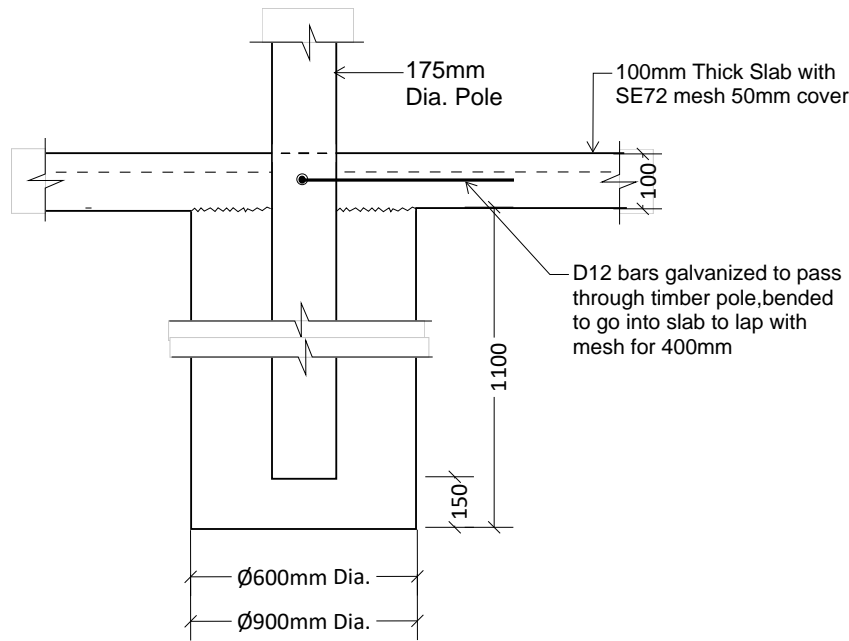
INCH SHED
STRUCTURAL DRAWINGS

LOT 7 MEADOWLANDS GREEN,
ALLENTON, ASHBURTON

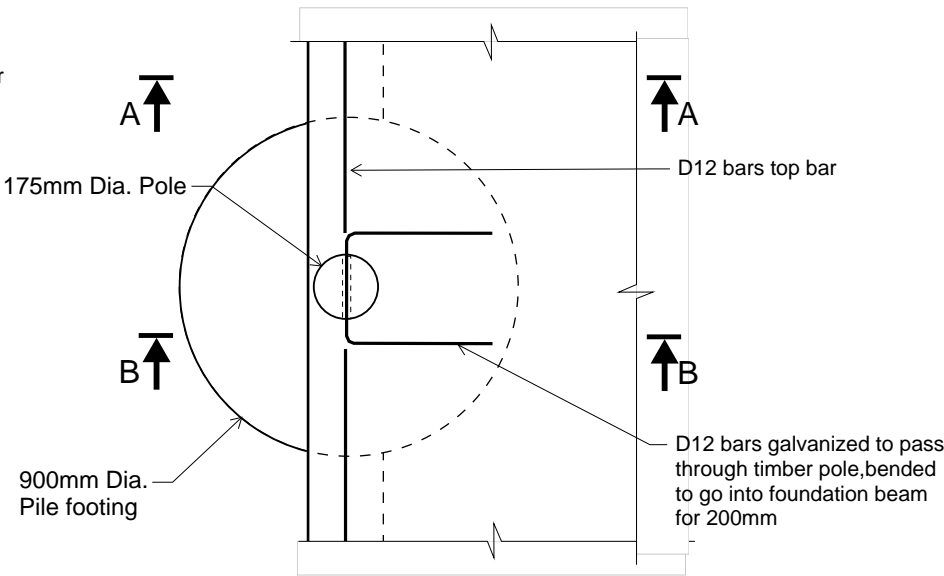
Drawing Name	BACK VIEW FRONT VIEW	
Engineer:	PVP	Director: MBB
Digital Modeller:	DE Manager: -	
Drawing Scale:	NTS	

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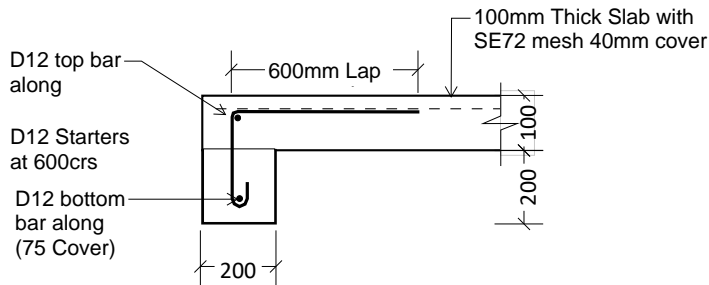
Sheet No:	Job No:	Issue:
S2.1	220529	B



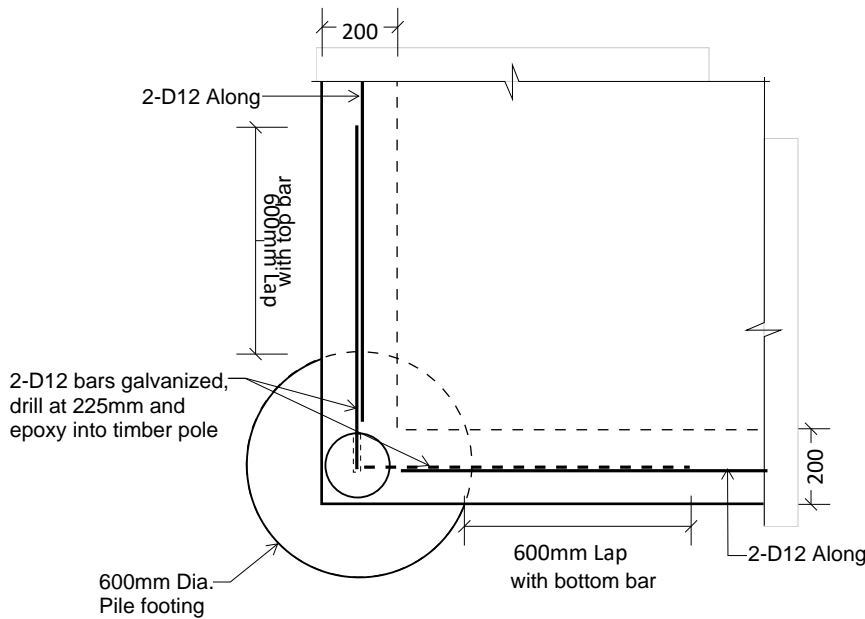
S1. TYPICAL MIDDLE ROW POST PILE TO SLAB CONNECTION
S1.1



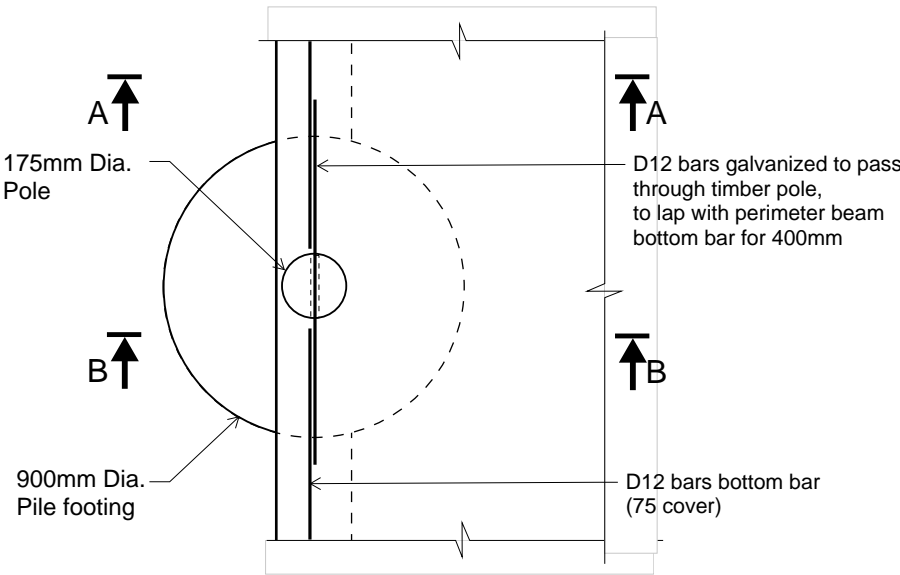
S2. MIDDLE ROW POST PILE TO SLAB CONNECTION
S2.1



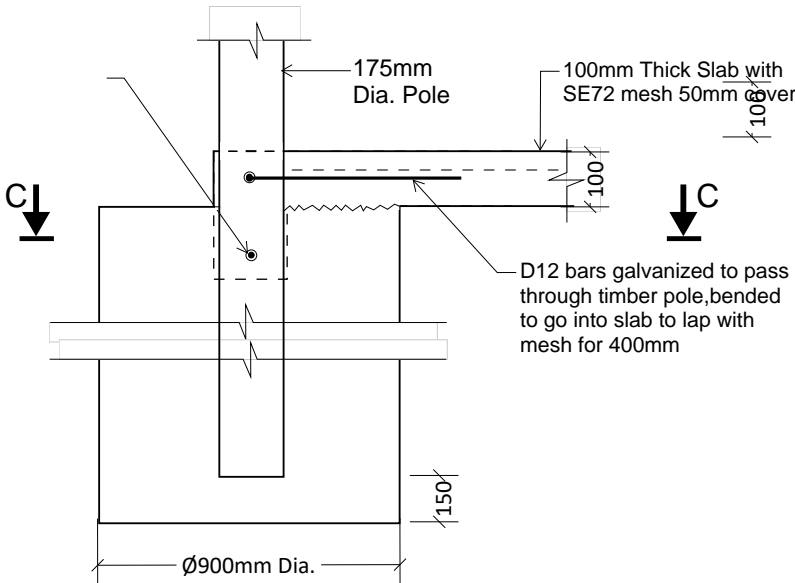
SECTION A-A



S3. FRONT/BACK ROW POST PILE TO SLAB CONNECTION
S3.1



SECTION C-C



SECTION B-B

NOTES:
Use Araldite K-80 for timber epoxy connection

Approved Building Consent
All drawings to be read in conjunction with sheet:
S3.02 STANDARD DETAILS

BC0174/23

Ashburton District Council

ASHBURTON
DISTRICT COUNCIL

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B 06/07/2023 Building Consent
A 09/02/2023 Building Consent
Issue Date Description

TM CONSULTANTS LTD
A 3 Dundas Street
PO Box 8874
Christchurch 8440
New Zealand
P: 03 348 6086
F: 03 348 6085
E: info@tmco.co.nz

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Architect

STRUCTURAL DRAWINGS

Job Title

INCH SHED

STRUCTURAL DRAWINGS

LOT 7 MEADOWLANDS GREEN,
ALLENTON, ASHBURTON

Drawing Name

FOUNDATION DETAILS

Engineer: PVP Director: MBB

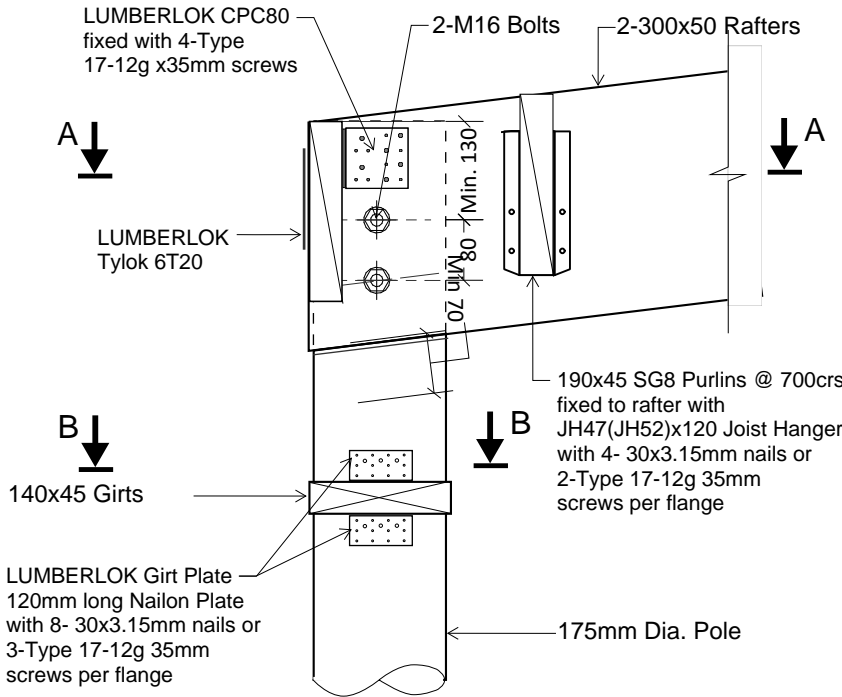
Digital Modeller: DE Manager: -

Drawing Scale: NTS

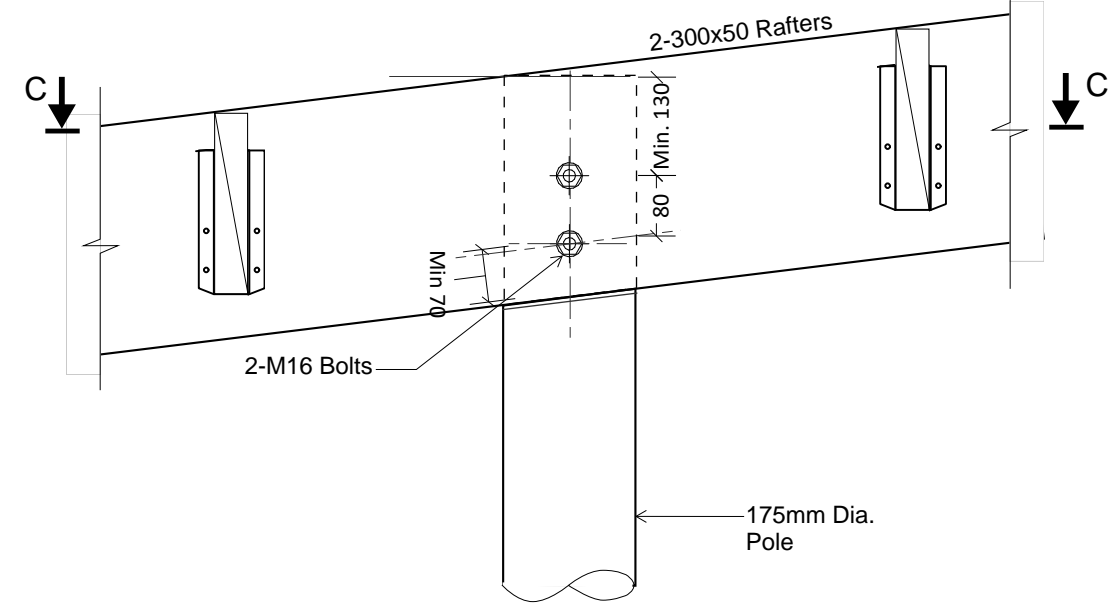
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Sheet No: Job No: Issue:

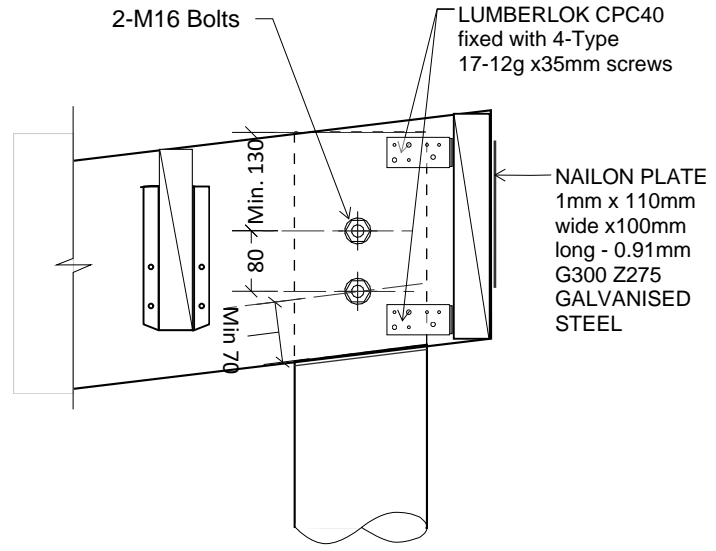
S3.1 220529 B



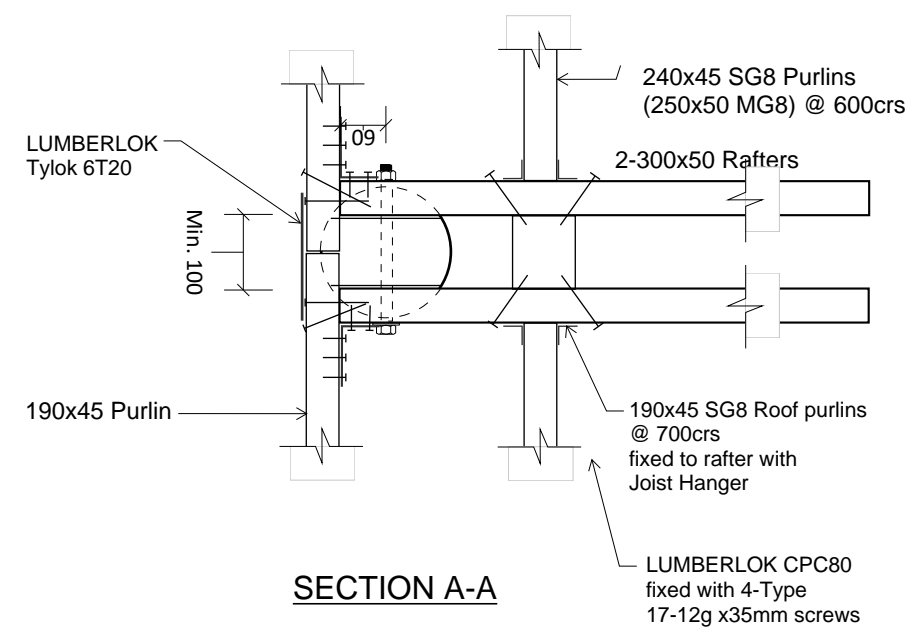
3. RAFTER TO BACK POLE FIXING
S1.2



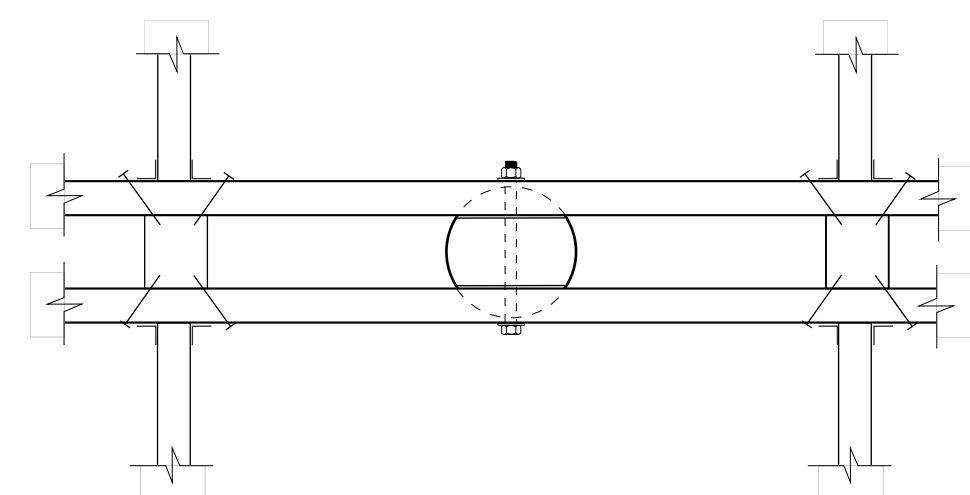
4. RAFTER TO MIDDLE POLE FIXING
S1.2



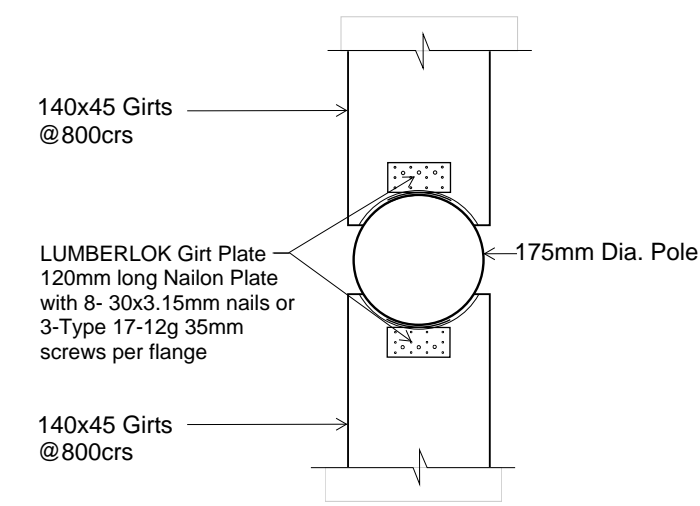
5. RAFTER TO FRONT POLE FIXING
S1.2



SECTION A-A



SECTION C-C



SECTION B-B

All timber has H3.2 treatment unless stated otherwise


Approved Building Consent
All drawings to be read in conjunction with sheet:
S3.02 STANDARD DETAILS

BC0174/23
Ashburton District Council


ASHBURTON
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TM Consultants Ltd
A 3 Dundas Street
PO Box 8874
Christchurch 8440
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P: 03 348 6086
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E: info@tmco.co.nz



TMCO.CO.NZ CONSULTING ENGINEERS
STRUCTURAL MECHANICAL CIVIL HYDRAULIC ELECTRICAL FIRE

Architect

STRUCTURAL DRAWINGS

Job Title

INCH SHED
STRUCTURAL DRAWINGS

LOT 7 MEADOWLANDS GREEN,
ALLENTON, ASHBURTON

Drawing Name

FRAMING DETAILS

Engineer: PVP Director: MBB
Digital Modeler: DE Manager: -
Drawing Scale: NTS

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Sheet No: Job No: Issue:
S3.2 220529 B



BAM002-BAV
Version 3
Date Issued: July 2018
Review Date: July 2019

FARM SHED DURABILITY WAIVER

Building Act 2004 – Section 67 “Waivers and Modifications”
Territorial Authority may grant building consent subject to waiver or modifications of Building Code.

BUILDING CONSENT NUMBER **BC 0174 - 23**
PROJECT LOCATION - **12 Meadowlands Green**
BUILDING CODE CLAUSE - B2
IMPORTANCE LEVEL - 1
Classification – ‘Outbuilding’
Description – Unlined Building.

BASIS OF WAIVER

The proposed roof cladding that does not comply with the NZ Metal Roof and Wall cladding Code of Practice for minimum pitch requirements. (A requirement of New Zealand Steel for any building). This Council will accept the proposed roof cladding on the grounds that a waiver form (B2 Durability) is signed by the owner. Council take into account that this building is an importance level 1 building classified as an “Outbuilding”. A Waiver is a legal option for Council. A waiver does not in any way assure compliance with the Building Code. Please note that there are cladding profiles that do comply where a low pitch roof is proposed.

ASHBURTON DISTRICT COUNCIL
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Important notes

- 1 Where a Building Consent is issued with a “waiver”, the Consent and Code Compliance Certificate shall in the description include the words “Subject to waiver”
- 2 The owner on signing this document acknowledges the reasons for the waiver

Owner name Kevin Inch
Farm name
Owner signature M. G. Inch

Waiver granted by Ashburton District Council

Date **8th July 2023**
Processing Officer **John D McGirr**
JD Building Consultants Ltd
for ADC - BCA

PRODUCER STATEMENT – DESIGN (ISSUE B)

File No. 220529

ISSUED BY: TM CONSULTANTS LIMITED
DESIGN ENGINEER: POLINA POTAPOVA
TO: KELVIN INCH
TO BE SUPPLIED TO: ASHBURTON DISTRICT COUNCIL
IN RESPECT OF: PROPOSED SHED – DESIGN OF ROOF FRAMING, WALL FRAMING, ROOF BRACING, WALL BRACING, GRAVITY AND WIND POSTS, CONCRETE SLAB FOUNDATION AND PILES.
AT: LOT 7 MEADOWLANDS GREEN, ALLENTON, ASHBURTON
LOT: 7 DP: 539231

TM CONSULTANTS LIMITED has been engaged by KELVIN INCH to provide STRUCTURAL ENGINEERING services in respect of the requirements of Clause B1 of the Building Code 2004 for:

- ☐ All
- ☒ Part only as specified above

of the proposed building work. The design carried out by us has been prepared in accordance with

- ☒ Compliance Documents issued by Ministry of Business, Innovation & Employment B1/VM1 and B1/VM4 of the approved documents
- ☐ Alternative solution as per the attached schedule

ASHBURTON DISTRICT COUNCIL

This proposal requires a resource consent
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The proposed building work covered by this Producer Statement is described on TM Consultants Ltd’s drawings titled Inch Shed and numbered S1.1-S1.2, S2.1, S3.1-S3.2 and dated 6/07/2023 together with the specification.

On behalf of TM Consultants Ltd, and subject to:

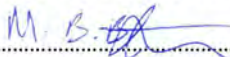
- i. Site verification of the following design assumptions:- Allowable foundation bearing pressure to be a minimum 100 kPa or an ultimate bearing pressure of 300 kPa in accordance with NZS 3604:2011.
- ii. All proprietary products meeting their performance specification requirements.

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,

This Producer Statement - Design is valid for 1 year only from the date of issue.

I, Matthew B Blyth am CPEng 237435. I am a Member of Engineering New Zealand and hold the following qualifications BE(Civil), CMEngNZ, CPEng(Structural), IntPE(NZ), APEC Engineer.

TM Consultants Ltd is a member of ACENZ.

SIGNED BY..........ON BEHALF OF TM Consultants Ltd

DATE: 6 July 2023

Original To: Kelvin Inch <sinch12345@gmail.com>

TM Consultants Ltd in issuing this statement holds a current policy of Professional Indemnity Insurance no less than \$200,000.

Note: This statement shall only be relied upon by the Building Consent Authority named above. Liability under this statement accrues to TM Consultants Ltd 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.

Construction monitoring site visits required are shown on the reverse.

RE: CONSTRUCTION MONITORING

Construction Monitoring site visits relating to compliance with the building consent documentation and for verification of design assumptions are required as follows:-

	TIME	NO. OF VISITS
1	Excavation to check ground conditions exposed	1
2	Foundations to check reinforcement and ground conditions	1 per pour
3	Prelining to check structural items designed	1

We confirm that records of our site visits will be left on site.

A Producer Statement, Construction Review, could be issued once the above construction monitoring site visits have been completed.

It is the owner's responsibility to notify the Engineer to enable the above site visits to be completed.

Please direct any queries back to TM Consultants Limited.

**ASHBURTON
DISTRICT COUNCIL**

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Form 2A

File No.: 220529

Memorandum from licensed building practitioner: Certificate of design work

Section 45 and Section 30C, Building Act 2004

THE BUILDING

Street address: LOT 7 MEADOWLANDS GREEN

Suburb: ALLENTON

Town/City: ASHBURTON

Postcode:

THE OWNER

Name(s): KELVIN INCH

Mailing address: LOT 7 MEADOWLANDS GREEN

Suburb: ALLENTON

PO Box/Private Bag:

Town/City: ASHBURTON

Postcode:

Phone number: 027 434 3390

Email address: sinch12345@gmail.com

ASHBURTON DISTRICT COUNCIL

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BASIS FOR PROVIDING THIS MEMORANDUM

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

(✓)

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 Matthew B Blyth carried out/supervised the following design work that is restricted building work

PRIMARY STRUCTURE: B1			
Design work that is restricted building work	Description	Carried out/supervised	Reference to plans and specifications
Primary structure			
Foundations (✓)	Concrete foundation beams and concrete piles, block retaining wall	(✓) Supervised	TM Consultant Ltd's drawings titled Inch Shed and numbered S1.1-S1.2, S2.1,S3.1-S3.2 and dated 06/07/2023 together with the specification.
Walls (✓)	Timber girts and poles	(✓) Supervised	As above

Roof	(✓)	Timber purlins and rafters.	(✓) Supervised	As above
Columns and beams	(✓)	Timber SED pole gravity and wind posts.	(✓) Supervised	As above
Bracing	(✓)	Steel sheet cross-bracing in the walls and roof.	(✓) Supervised	As above
Other	(X)	NA	(✓) Carried out (✓) Supervised	NA

WAIVERS AND MODIFICATIONS

Waivers or modifications of the building code are required () Yes ☒ No

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

Clause	Waiver/modification required
--------	------------------------------

ISSUED BY

Name: Matthew B. Blyth	LBP or Registration number: 237435
The practitioner is a: () Design LBP () Registered architect <input checked="" type="checkbox"/> Chartered professional engineer	
Design Entity or Company (optional): TM Consultants Ltd	
Mailing address (if different from below):	
Street address / Registered office: 5 Burdale Street	
Suburb: Riccarton	Town/City: Christchurch
PO Box/Private Bag: PO Box 8874	Postcode: 8440
Phone number: (03) 3486066	Mobile: 0211748852
After Hours:	Fax: (03) 3486065
Email address: mattb@tmco.co.nz	Website: www.tmco.co.nz

ASHBURTON DISTRICT COUNCIL


This proposal requires a resource consent
No building work is to be undertaken until the resource consent has been issued

DECLARATION

I **Matthew B. Blyth** 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

Signature: 

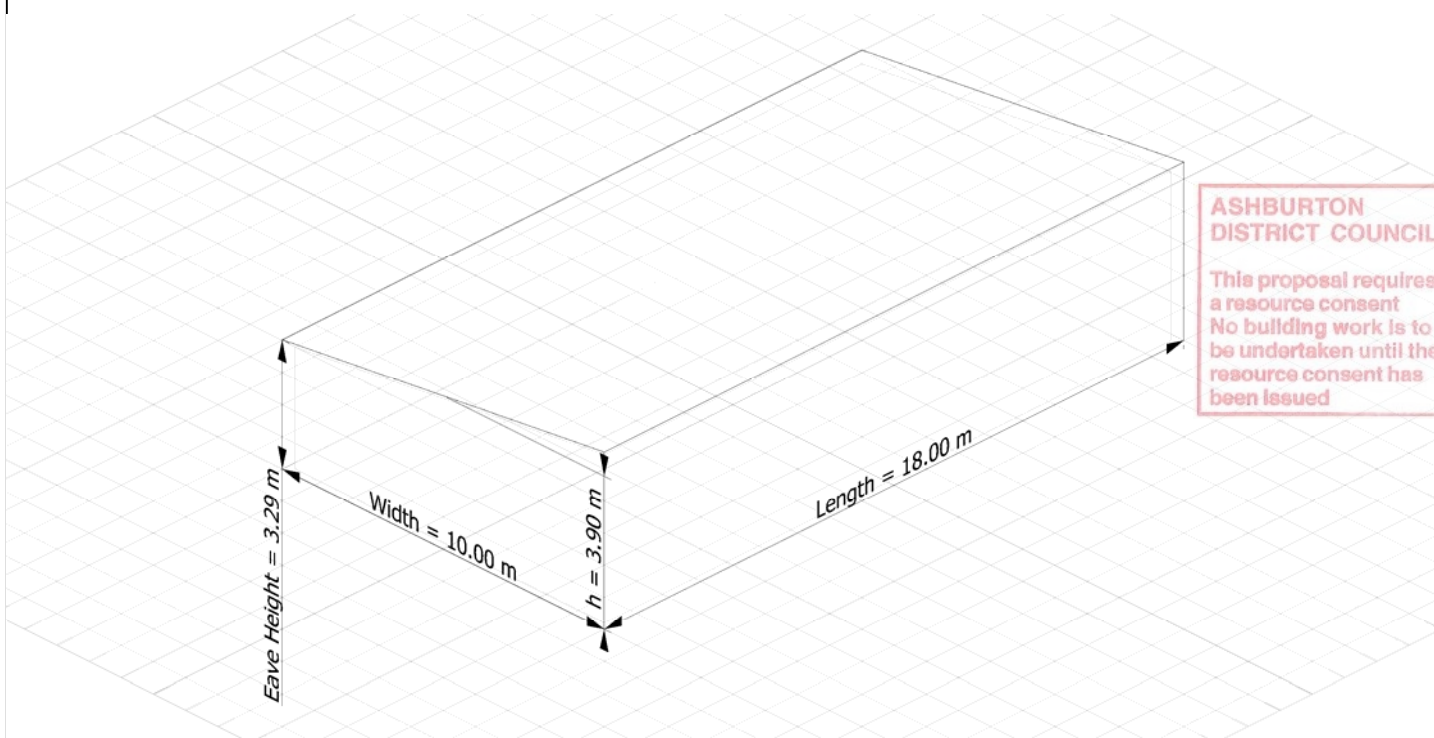
Date: **6 July 2023**

TITLE:
PROJECT:
CODE:

Approved Building Consent
TM Consultants
Documents
Polina Potapova
BC6174/23

Tuesday, 07 March 2023, 11:49:48

Ashburton District Council



TITLE:
PROJECT:
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Approved Building Consent
TM Consultants
Documents

Polina Potapova

Tuesday, 07 March 2023, 11:49:48

BC0174/23

Ashburton District Council

----- STRUCTURE DATA -----

TYPE: BUILDING
ORIENTATION: -90.0°
ROOF SHAPE: MONOSLOPE A
WIDTH: 10.00 m
LENGTH: 18.00 m
ROOF PITCH (α): 7.0°
SPANS: 1
AVERAGE HEIGHT (h): 3.90 m
BASE RL: 0.00 m

----- SITE DATA -----

LOCATION

LATITUDE: -43.877230
LONGITUDE: 171.755933
ELEVATION: 107.00 m

DESIGN

REFERENCE: AS/NZS 1170.2-2021
IMPORTANCE LEVEL: 1
LIFE: 50 YEARS

WIND

REGION: NZ2
ULTIMATE ARI: 100 YEARS

REGIONAL WIND SPEED (VR)

- Calculated as per AS/NZS 1170.2-2021 Section 3.2.

ULTIMATE: 42 m/s
ICE: 37 m/s
SERVICEABILITY: 39 m/s

DIRECTION MULTIPLIER (Md)

- Calculated for Region NZ2 as per AS/NZS 1170.2-2021 Section 3.3.

WIND	Md
N	0.95
NE	0.9
E	0.8
SE	0.9
S	0.95
SW	1.0
W	1.0
NW	1.0

CLIMATE CHANGE MULTIPLIER (Mc) = 1.0

- Calculated for Region NZ2 as per AS/NZS 1170.2-2021 Table 3.3.

TERRAIN/HEIGHT MULTIPLIER (Mz,cat)

- Calculated using averaging as per AS/NZS 1170.2-2021 Section 4.2.3 and varies with height.

NORTH WIND: Mz,cat = 0.91 (TC 2.0)

ZONE 1: TC 2 to 578.00 m

NORTH EAST WIND: Mz,cat = 0.91 (TC 2.0)

ZONE 1: TC 2 to 578.00 m

EAST WIND: Mz,cat = 0.91 (TC 2.0)

ZONE 1: TC 2 to 578.00 m

SOUTH EAST WIND: Mz,cat = 0.91 (TC 2.0)

ZONE 1: TC 2 to 578.00 m

SOUTH WIND: Mz,cat = 0.9008 (TC 2.12)

ZONE 1: TC 2 to 462.40 m
ZONE 2: TC 2.5 to 578.00 m

SOUTH WEST WIND: Mz,cat = 0.8915 (TC 2.23)

ZONE 1: TC 2 to 346.80 m
ZONE 2: TC 2.5 to 578.00 m

WEST WIND: Mz,cat = 0.91 (TC 2.0)

ZONE 1: TC 2 to 578.00 m

NORTH WEST WIND: Mz,cat = 0.91 (TC 2.0)

ZONE 1: TC 2 to 578.00 m

SHIELDING MULTIPLIER (Ms)

- Calculated as per AS/NZS 1170.2-2021 Section 4.3 and varies with height.

NORTH WIND: Ms = 1.0

NORTH EAST WIND: Ms = 1.0

EAST WIND: Ms = 1.0

SOUTH EAST WIND: Ms = 1.0

ID	HEIGHT	ELEVATION	SLOPE	AREA	BREADTH	LATITUDE	LONGITUDE
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ASHBURTON
DISTRICT COUNCIL

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BC6174/23

Ashburton District Council

001 3.00 m 107.00 m 0.0 83 m² 6.33 m -43.877817 171.756327

SOUTH WIND: Ms = 1.0

SOUTH WEST WIND: Ms = 1.0

WEST WIND: Ms = 1.0

NORTH WEST WIND: Ms = 1.0

TOPOGRAPHIC MULTIPLIER (Mt)

- Calculated as per AS/NZS 1170.2-2021 Section 4.4 and varies with height.
- Elevation data based on "DEFAULT" dataset (this can be edited in Settings > Wind).

WIND	CRITICAL	TOPOGRAPHY	H	Lu	x	Mh	Mlee	Mt
N	NbE	Flat	2.50 m	110.21 m	-2139.80 m	1.0	1.0	1.0
NE	NEbN	Flat	3.00 m	319.72 m	-1279.91 m	1.0	1.0	1.0
E	EBN	Flat	2.00 m	40.09 m	2219.89 m	1.0	1.0	1.0
SE	SE	Flat	3.00 m	160.29 m	-240.55 m	1.0	1.0	1.0
S	SbE	Flat	3.50 m	250.21 m	-40.76 m	1.0	1.0	1.0
SW	SSW	Flat	3.00 m	220.45 m	-60.68 m	1.0	1.0	1.0
W	WbN	Flat	6.00 m	20.55 m	2300.18 m	1.0	1.0	1.0
NW	-	Flat	-	-	-	0	1.0	1.0

----- ANALYSIS -----

LOAD CASE 01: Ultimate Wind

NORTH WIND

RL	Md	Mc	Mz, cat	ns	hs	bs	Ms	Mt	Vsit,β	qz
3.90 m	0.95	1.0	0.91	0	-	-	1.0	1.0	36.31 m/s	0.7910 kPa
3.51 m	0.95	1.0	0.91	0	-	-	1.0	1.0	36.31 m/s	0.7910 kPa
3.12 m	0.95	1.0	0.91	0	-	-	1.0	1.0	36.31 m/s	0.7910 kPa
2.73 m	0.95	1.0	0.91	0	-	-	1.0	1.0	36.31 m/s	0.7910 kPa
2.34 m	0.95	1.0	0.91	0	-	-	1.0	1.0	36.31 m/s	0.7910 kPa
1.95 m	0.95	1.0	0.91	0	-	-	1.0	1.0	36.31 m/s	0.7910 kPa
1.56 m	0.95	1.0	0.91	0	-	-	1.0	1.0	36.31 m/s	0.7910 kPa
1.17 m	0.95	1.0	0.91	0	-	-	1.0	1.0	36.31 m/s	0.7910 kPa
0.78 m	0.95	1.0	0.91	0	-	-	1.0	1.0	36.31 m/s	0.7910 kPa
0.39 m	0.95	1.0	0.91	0	-	-	1.0	1.0	36.31 m/s	0.7910 kPa
0.00 m	0.95	1.0	0.91	0	-	-	1.0	1.0	36.31 m/s	0.7910 kPa

NORTH EAST WIND

RL	Md	Mc	Mz, cat	ns	hs	bs	Ms	Mt	Vsit,β	qz
3.90 m	0.9	1.0	0.91	0	-	-	1.0	1.0	34.40 m/s	0.7100 kPa
3.51 m	0.9	1.0	0.91	0	-	-	1.0	1.0	34.40 m/s	0.7100 kPa
3.12 m	0.9	1.0	0.91	0	-	-	1.0	1.0	34.40 m/s	0.7100 kPa
2.73 m	0.9	1.0	0.91	0	-	-	1.0	1.0	34.40 m/s	0.7100 kPa
2.34 m	0.9	1.0	0.91	0	-	-	1.0	1.0	34.40 m/s	0.7100 kPa
1.95 m	0.9	1.0	0.91	0	-	-	1.0	1.0	34.40 m/s	0.7100 kPa
1.56 m	0.9	1.0	0.91	0	-	-	1.0	1.0	34.40 m/s	0.7100 kPa
1.17 m	0.9	1.0	0.91	0	-	-	1.0	1.0	34.40 m/s	0.7100 kPa
0.78 m	0.9	1.0	0.91	0	-	-	1.0	1.0	34.40 m/s	0.7100 kPa
0.39 m	0.9	1.0	0.91	0	-	-	1.0	1.0	34.40 m/s	0.7100 kPa
0.00 m	0.9	1.0	0.91	0	-	-	1.0	1.0	34.40 m/s	0.7100 kPa

EAST WIND

RL	Md	Mc	Mz, cat	ns	hs	bs	Ms	Mt	Vsit,β	qz
3.90 m	0.8	1.0	0.91	0	-	-	1.0	1.0	30.58 m/s	0.5611 kPa
3.51 m	0.8	1.0	0.91	0	-	-	1.0	1.0	30.58 m/s	0.5611 kPa
3.12 m	0.8	1.0	0.91	0	-	-	1.0	1.0	30.58 m/s	0.5611 kPa
2.73 m	0.8	1.0	0.91	0	-	-	1.0	1.0	30.58 m/s	0.5611 kPa
2.34 m	0.8	1.0	0.91	0	-	-	1.0	1.0	30.58 m/s	0.5611 kPa
1.95 m	0.8	1.0	0.91	0	-	-	1.0	1.0	30.58 m/s	0.5611 kPa
1.56 m	0.8	1.0	0.91	0	-	-	1.0	1.0	30.58 m/s	0.5611 kPa
1.17 m	0.8	1.0	0.91	0	-	-	1.0	1.0	30.58 m/s	0.5611 kPa
0.78 m	0.8	1.0	0.91	0	-	-	1.0	1.0	30.58 m/s	0.5611 kPa
0.39 m	0.8	1.0	0.91	0	-	-	1.0	1.0	30.58 m/s	0.5611 kPa
0.00 m	0.8	1.0	0.91	0	-	-	1.0	1.0	30.58 m/s	0.5611 kPa

SOUTH EAST WIND

RL	Md	Mc	Mz, cat	ns	hs	bs	Ms	Mt	Vsit,β	qz
3.90 m	0.9	1.0	0.91	0	-	-	1.0	1.0	34.40 m/s	0.7100 kPa
3.51 m	0.9	1.0	0.91	0	-	-	1.0	1.0	34.40 m/s	0.7100 kPa
3.12 m	0.9	1.0	0.91	0	-	-	1.0	1.0	34.40 m/s	0.7100 kPa
2.73 m	0.9	1.0	0.91	0	-	-	1.0	1.0	34.40 m/s	0.7100 kPa
2.34 m	0.9	1.0	0.91	0	-	-	1.0	1.0	34.40 m/s	0.7100 kPa
1.95 m	0.9	1.0	0.91	0	-	-	1.0	1.0	34.40 m/s	0.7100 kPa
1.56 m	0.9	1.0	0.91	0	-	-	1.0	1.0	34.40 m/s	0.7100 kPa
1.17 m	0.9	1.0	0.91	0	-	-	1.0	1.0	34.40 m/s	0.7100 kPa
0.78 m	0.9	1.0	0.91	0	-	-	1.0	1.0	34.40 m/s	0.7100 kPa
0.39 m	0.9	1.0	0.91	0	-	-	1.0	1.0	34.40 m/s	0.7100 kPa
0.00 m	0.9	1.0	0.91	0	-	-	1.0	1.0	34.40 m/s	0.7100 kPa

SOUTH WIND

RL	Md	Mc	Mz, cat	ns	hs	bs	Ms	Mt	Vsit,β	qz
3.90 m	0.95	1.0	0.9008	0	-	-	1.0	1.0	35.94 m/s	0.7750 kPa
3.51 m	0.95	1.0	0.9014	0	-	-	1.0	1.0	35.97 m/s	0.7763 kPa
3.12 m	0.95	1.0	0.902	0	-	-	1.0	1.0	35.99 m/s	0.7772 kPa
2.73 m	0.95	1.0	0.9026	0	-	-	1.0	1.0	36.01 m/s	0.7780 kPa
2.34 m	0.95	1.0	0.9032	0	-	-	1.0	1.0	36.04 m/s	0.7793 kPa
1.95 m	0.95	1.0	0.9039	0	-	-	1.0	1.0	36.07 m/s	0.7806 kPa
1.56 m	0.95	1.0	0.9045	0	-	-	1.0	1.0	36.09 m/s	0.7815 kPa
1.17 m	0.95	1.0	0.9051	0	-	-	1.0	1.0	36.11 m/s	0.7824 kPa
0.78 m	0.95	1.0	0.9057	0	-	-	1.0	1.0	36.14 m/s	0.7837 kPa
0.39 m	0.95	1.0	0.9064	0	-	-	1.0	1.0	36.17 m/s	0.7850 kPa
0.00 m	0.95	1.0	0.907	0	-	-	1.0	1.0	36.19 m/s	0.7858 kPa

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Ashburton District Council

SOUTH WEST WIND

RL	Md	Mc	Mz,cat	ns	hs	bs	Ms	Mt	Vsit,β	qz
3.90 m	1.0	1.0	0.8915	0	-	-	1.0	1.0	37.44 m/s	0.8411 kPa
3.51 m	1.0	1.0	0.8921	0	-	-	1.0	1.0	37.47 m/s	0.8424 kPa
3.12 m	1.0	1.0	0.8928	0	-	-	1.0	1.0	37.50 m/s	0.8438 kPa
2.73 m	1.0	1.0	0.8934	0	-	-	1.0	1.0	37.52 m/s	0.8447 kPa
2.34 m	1.0	1.0	0.894	0	-	-	1.0	1.0	37.55 m/s	0.8460 kPa
1.95 m	1.0	1.0	0.8946	0	-	-	1.0	1.0	37.57 m/s	0.8469 kPa
1.56 m	1.0	1.0	0.8952	0	-	-	1.0	1.0	37.60 m/s	0.8483 kPa
1.17 m	1.0	1.0	0.8959	0	-	-	1.0	1.0	37.63 m/s	0.8496 kPa
0.78 m	1.0	1.0	0.8965	0	-	-	1.0	1.0	37.65 m/s	0.8505 kPa
0.39 m	1.0	1.0	0.8971	0	-	-	1.0	1.0	37.68 m/s	0.8519 kPa
0.00 m	1.0	1.0	0.8977	0	-	-	1.0	1.0	37.70 m/s	0.8528 kPa

WEST WIND

RL	Md	Mc	Mz,cat	ns	hs	bs	Ms	Mt	Vsit,β	qz
3.90 m	1.0	1.0	0.91	0	-	-	1.0	1.0	38.22 m/s	0.8765 kPa
3.51 m	1.0	1.0	0.91	0	-	-	1.0	1.0	38.22 m/s	0.8765 kPa
3.12 m	1.0	1.0	0.91	0	-	-	1.0	1.0	38.22 m/s	0.8765 kPa
2.73 m	1.0	1.0	0.91	0	-	-	1.0	1.0	38.22 m/s	0.8765 kPa
2.34 m	1.0	1.0	0.91	0	-	-	1.0	1.0	38.22 m/s	0.8765 kPa
1.95 m	1.0	1.0	0.91	0	-	-	1.0	1.0	38.22 m/s	0.8765 kPa
1.56 m	1.0	1.0	0.91	0	-	-	1.0	1.0	38.22 m/s	0.8765 kPa
1.17 m	1.0	1.0	0.91	0	-	-	1.0	1.0	38.22 m/s	0.8765 kPa
0.78 m	1.0	1.0	0.91	0	-	-	1.0	1.0	38.22 m/s	0.8765 kPa
0.39 m	1.0	1.0	0.91	0	-	-	1.0	1.0	38.22 m/s	0.8765 kPa
0.00 m	1.0	1.0	0.91	0	-	-	1.0	1.0	38.22 m/s	0.8765 kPa

NORTH WEST WIND

RL	Md	Mc	Mz,cat	ns	hs	bs	Ms	Mt	Vsit,β	qz
3.90 m	1.0	1.0	0.91	0	-	-	1.0	1.0	38.22 m/s	0.8765 kPa
3.51 m	1.0	1.0	0.91	0	-	-	1.0	1.0	38.22 m/s	0.8765 kPa
3.12 m	1.0	1.0	0.91	0	-	-	1.0	1.0	38.22 m/s	0.8765 kPa
2.73 m	1.0	1.0	0.91	0	-	-	1.0	1.0	38.22 m/s	0.8765 kPa
2.34 m	1.0	1.0	0.91	0	-	-	1.0	1.0	38.22 m/s	0.8765 kPa
1.95 m	1.0	1.0	0.91	0	-	-	1.0	1.0	38.22 m/s	0.8765 kPa
1.56 m	1.0	1.0	0.91	0	-	-	1.0	1.0	38.22 m/s	0.8765 kPa
1.17 m	1.0	1.0	0.91	0	-	-	1.0	1.0	38.22 m/s	0.8765 kPa
0.78 m	1.0	1.0	0.91	0	-	-	1.0	1.0	38.22 m/s	0.8765 kPa
0.39 m	1.0	1.0	0.91	0	-	-	1.0	1.0	38.22 m/s	0.8765 kPa
0.00 m	1.0	1.0	0.91	0	-	-	1.0	1.0	38.22 m/s	0.8765 kPa

LOAD CASE 02: Serviceability Wind

NORTH WIND

RL	Md	Mc	Mz,cat	ns	hs	bs	Ms	Mt	Vsit,β	qz
3.90 m	0.95	1.0	0.91	0	-	-	1.0	1.0	33.72 m/s	0.6822 kPa
3.51 m	0.95	1.0	0.91	0	-	-	1.0	1.0	33.72 m/s	0.6822 kPa
3.12 m	0.95	1.0	0.91	0	-	-	1.0	1.0	33.72 m/s	0.6822 kPa
2.73 m	0.95	1.0	0.91	0	-	-	1.0	1.0	33.72 m/s	0.6822 kPa
2.34 m	0.95	1.0	0.91	0	-	-	1.0	1.0	33.72 m/s	0.6822 kPa
1.95 m	0.95	1.0	0.91	0	-	-	1.0	1.0	33.72 m/s	0.6822 kPa
1.56 m	0.95	1.0	0.91	0	-	-	1.0	1.0	33.72 m/s	0.6822 kPa
1.17 m	0.95	1.0	0.91	0	-	-	1.0	1.0	33.72 m/s	0.6822 kPa
0.78 m	0.95	1.0	0.91	0	-	-	1.0	1.0	33.72 m/s	0.6822 kPa
0.39 m	0.95	1.0	0.91	0	-	-	1.0	1.0	33.72 m/s	0.6822 kPa
0.00 m	0.95	1.0	0.91	0	-	-	1.0	1.0	33.72 m/s	0.6822 kPa

NORTH EAST WIND

RL	Md	Mc	Mz,cat	ns	hs	bs	Ms	Mt	Vsit,β	qz
3.90 m	0.9	1.0	0.91	0	-	-	1.0	1.0	31.94 m/s	0.6121 kPa
3.51 m	0.9	1.0	0.91	0	-	-	1.0	1.0	31.94 m/s	0.6121 kPa
3.12 m	0.9	1.0	0.91	0	-	-	1.0	1.0	31.94 m/s	0.6121 kPa
2.73 m	0.9	1.0	0.91	0	-	-	1.0	1.0	31.94 m/s	0.6121 kPa
2.34 m	0.9	1.0	0.91	0	-	-	1.0	1.0	31.94 m/s	0.6121 kPa
1.95 m	0.9	1.0	0.91	0	-	-	1.0	1.0	31.94 m/s	0.6121 kPa
1.56 m	0.9	1.0	0.91	0	-	-	1.0	1.0	31.94 m/s	0.6121 kPa
1.17 m	0.9	1.0	0.91	0	-	-	1.0	1.0	31.94 m/s	0.6121 kPa
0.78 m	0.9	1.0	0.91	0	-	-	1.0	1.0	31.94 m/s	0.6121 kPa
0.39 m	0.9	1.0	0.91	0	-	-	1.0	1.0	31.94 m/s	0.6121 kPa
0.00 m	0.9	1.0	0.91	0	-	-	1.0	1.0	31.94 m/s	0.6121 kPa

EAST WIND

RL	Md	Mc	Mz,cat	ns	hs	bs	Ms	Mt	Vsit,β	qz
3.90 m	0.8	1.0	0.91	0	-	-	1.0	1.0	28.39 m/s	0.4836 kPa
3.51 m	0.8	1.0	0.91	0	-	-	1.0	1.0	28.39 m/s	0.4836 kPa
3.12 m	0.8	1.0	0.91	0	-	-	1.0	1.0	28.39 m/s	0.4836 kPa
2.73 m	0.8	1.0	0.91	0	-	-	1.0	1.0	28.39 m/s	0.4836 kPa
2.34 m	0.8	1.0	0.91	0	-	-	1.0	1.0	28.39 m/s	0.4836 kPa
1.95 m	0.8	1.0	0.91	0	-	-	1.0	1.0	28.39 m/s	0.4836 kPa
1.56 m	0.8	1.0	0.91	0	-	-	1.0	1.0	28.39 m/s	0.4836 kPa
1.17 m	0.8	1.0	0.91	0	-	-	1.0	1.0	28.39 m/s	0.4836 kPa
0.78 m	0.8	1.0	0.91	0	-	-	1.0	1.0	28.39 m/s	0.4836 kPa
0.39 m	0.8	1.0	0.91	0	-	-	1.0	1.0	28.39 m/s	0.4836 kPa
0.00 m	0.8	1.0	0.91	0	-	-	1.0	1.0	28.39 m/s	0.4836 kPa

SOUTH EAST WIND

RL	Md	Mc	Mz,cat	ns	hs	bs	Ms	Mt	Vsit,β	qz
3.90 m	0.9	1.0	0.91	0	-	-	1.0	1.0	31.94 m/s	0.6121 kPa
3.51 m	0.9	1.0	0.91	0	-	-	1.0	1.0	31.94 m/s	0.6121 kPa
3.12 m	0.9	1.0	0.91	0	-	-	1.0	1.0	31.94 m/s	0.6121 kPa
2.73 m	0.9	1.0	0.91	0	-	-	1.0	1.0	31.94 m/s	0.6121 kPa
2.34 m	0.9	1.0	0.91	0	-	-	1.0	1.0	31.94 m/s	0.6121 kPa
1.95 m	0.9	1.0	0.91	0	-	-	1.0	1.0	31.94 m/s	0.6121 kPa
1.56 m	0.9	1.0	0.91	0	-	-	1.0	1.0	31.94 m/s	0.6121 kPa
1.17 m	0.9	1.0	0.91	0	-	-	1.0	1.0	31.94 m/s	0.6121 kPa
0.78 m	0.9	1.0	0.91	0	-	-	1.0	1.0	31.94 m/s	0.6121 kPa
0.39 m	0.9	1.0	0.91	0	-	-	1.0	1.0	31.94 m/s	0.6121 kPa
0.00 m	0.9	1.0	0.91	0	-	-	1.0	1.0	31.94 m/s	0.6121 kPa

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Ashburton District Council

SOUTH WIND

RL	Md	Mc	Mz, cat	ns	hs	bs	Ms	Mt	Vsit,β	qz
3.90 m	0.95	1.0	0.9008	0	-	-	1.0	1.0	33.37 m/s	0.6681 kPa
3.51 m	0.95	1.0	0.9014	0	-	-	1.0	1.0	33.40 m/s	0.6693 kPa
3.12 m	0.95	1.0	0.902	0	-	-	1.0	1.0	33.42 m/s	0.6701 kPa
2.73 m	0.95	1.0	0.9026	0	-	-	1.0	1.0	33.44 m/s	0.6709 kPa
2.34 m	0.95	1.0	0.9032	0	-	-	1.0	1.0	33.46 m/s	0.6717 kPa
1.95 m	0.95	1.0	0.9039	0	-	-	1.0	1.0	33.49 m/s	0.6729 kPa
1.56 m	0.95	1.0	0.9045	0	-	-	1.0	1.0	33.51 m/s	0.6738 kPa
1.17 m	0.95	1.0	0.9051	0	-	-	1.0	1.0	33.53 m/s	0.6746 kPa
0.78 m	0.95	1.0	0.9057	0	-	-	1.0	1.0	33.56 m/s	0.6758 kPa
0.39 m	0.95	1.0	0.9064	0	-	-	1.0	1.0	33.58 m/s	0.6766 kPa
0.00 m	0.95	1.0	0.907	0	-	-	1.0	1.0	33.60 m/s	0.6774 kPa

SOUTH WEST WIND

RL	Md	Mc	Mz, cat	ns	hs	bs	Ms	Mt	Vsit,β	qz
3.90 m	1.0	1.0	0.8915	0	-	-	1.0	1.0	34.77 m/s	0.7254 kPa
3.51 m	1.0	1.0	0.8921	0	-	-	1.0	1.0	34.79 m/s	0.7262 kPa
3.12 m	1.0	1.0	0.8928	0	-	-	1.0	1.0	34.82 m/s	0.7275 kPa
2.73 m	1.0	1.0	0.8934	0	-	-	1.0	1.0	34.84 m/s	0.7283 kPa
2.34 m	1.0	1.0	0.894	0	-	-	1.0	1.0	34.87 m/s	0.7296 kPa
1.95 m	1.0	1.0	0.8946	0	-	-	1.0	1.0	34.89 m/s	0.7304 kPa
1.56 m	1.0	1.0	0.8952	0	-	-	1.0	1.0	34.91 m/s	0.7312 kPa
1.17 m	1.0	1.0	0.8959	0	-	-	1.0	1.0	34.94 m/s	0.7325 kPa
0.78 m	1.0	1.0	0.8965	0	-	-	1.0	1.0	34.96 m/s	0.7333 kPa
0.39 m	1.0	1.0	0.8971	0	-	-	1.0	1.0	34.99 m/s	0.7346 kPa
0.00 m	1.0	1.0	0.8977	0	-	-	1.0	1.0	35.01 m/s	0.7354 kPa

WEST WIND

RL	Md	Mc	Mz, cat	ns	hs	bs	Ms	Mt	Vsit,β	qz
3.90 m	1.0	1.0	0.91	0	-	-	1.0	1.0	35.49 m/s	0.7557 kPa
3.51 m	1.0	1.0	0.91	0	-	-	1.0	1.0	35.49 m/s	0.7557 kPa
3.12 m	1.0	1.0	0.91	0	-	-	1.0	1.0	35.49 m/s	0.7557 kPa
2.73 m	1.0	1.0	0.91	0	-	-	1.0	1.0	35.49 m/s	0.7557 kPa
2.34 m	1.0	1.0	0.91	0	-	-	1.0	1.0	35.49 m/s	0.7557 kPa
1.95 m	1.0	1.0	0.91	0	-	-	1.0	1.0	35.49 m/s	0.7557 kPa
1.56 m	1.0	1.0	0.91	0	-	-	1.0	1.0	35.49 m/s	0.7557 kPa
1.17 m	1.0	1.0	0.91	0	-	-	1.0	1.0	35.49 m/s	0.7557 kPa
0.78 m	1.0	1.0	0.91	0	-	-	1.0	1.0	35.49 m/s	0.7557 kPa
0.39 m	1.0	1.0	0.91	0	-	-	1.0	1.0	35.49 m/s	0.7557 kPa
0.00 m	1.0	1.0	0.91	0	-	-	1.0	1.0	35.49 m/s	0.7557 kPa

NORTH WEST WIND

RL	Md	Mc	Mz, cat	ns	hs	bs	Ms	Mt	Vsit,β	qz
3.90 m	1.0	1.0	0.91	0	-	-	1.0	1.0	35.49 m/s	0.7557 kPa
3.51 m	1.0	1.0	0.91	0	-	-	1.0	1.0	35.49 m/s	0.7557 kPa
3.12 m	1.0	1.0	0.91	0	-	-	1.0	1.0	35.49 m/s	0.7557 kPa
2.73 m	1.0	1.0	0.91	0	-	-	1.0	1.0	35.49 m/s	0.7557 kPa
2.34 m	1.0	1.0	0.91	0	-	-	1.0	1.0	35.49 m/s	0.7557 kPa
1.95 m	1.0	1.0	0.91	0	-	-	1.0	1.0	35.49 m/s	0.7557 kPa
1.56 m	1.0	1.0	0.91	0	-	-	1.0	1.0	35.49 m/s	0.7557 kPa
1.17 m	1.0	1.0	0.91	0	-	-	1.0	1.0	35.49 m/s	0.7557 kPa
0.78 m	1.0	1.0	0.91	0	-	-	1.0	1.0	35.49 m/s	0.7557 kPa
0.39 m	1.0	1.0	0.91	0	-	-	1.0	1.0	35.49 m/s	0.7557 kPa
0.00 m	1.0	1.0	0.91	0	-	-	1.0	1.0	35.49 m/s	0.7557 kPa

----- INTERNAL PRESSURES -----

- Building has an impermeable roof and no openings greater than 0.5% of the corresponding wall area, use Table 5.1(A) to determine Cp,i.

LOAD CASE 01: Ultimate Wind

FACE: WEST (θ = 270°)

VOLUME FACTOR

VOLUME: 3029 m³
OPEN AREA: 0 m²
Kv: 1.0

INTERNAL 1

Cp,i: -0.3
Kc,i: 1.0
Kc,e: 0.9
Cshp,i: -0.3
pi: -0.26 kPa

INTERNAL 2

Cp,i: 0.0
Kc,i: 1.0
Kc,e: 0.9
Cshp,i: 0.0
pi: 0.00 kPa

FACE: NORTH (θ = 0°)

VOLUME FACTOR

VOLUME: 3029 m³
OPEN AREA: 0 m²
Kv: 1.0

INTERNAL 1

Cp,i: -0.3
Kc,i: 1.0
Kc,e: 0.9
Cshp,i: -0.3
pi: -0.26 kPa

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INTERNAL 2

Cp,i: 0.0
Kc,i: 1.0
Kc,e: 0.9
Cshp,i: 0.0
pi: 0.00 kPa

FACE: EAST ($\theta = 90^\circ$)

VOLUME FACTOR

VOLUME: 3029 m³
OPEN AREA: 0 m²
Kv: 1.0

INTERNAL 1

Cp,i: -0.3
Kc,i: 1.0
Kc,e: 0.9
Cshp,i: -0.3
pi: -0.21 kPa

INTERNAL 2

Cp,i: 0.0
Kc,i: 1.0
Kc,e: 0.9
Cshp,i: 0.0
pi: 0.00 kPa

FACE: SOUTH ($\theta = 180^\circ$)

VOLUME FACTOR

VOLUME: 3029 m³
OPEN AREA: 0 m²
Kv: 1.0

INTERNAL 1

Cp,i: -0.3
Kc,i: 1.0
Kc,e: 0.9
Cshp,i: -0.3
pi: -0.25 kPa

INTERNAL 2

Cp,i: 0.0
Kc,i: 1.0
Kc,e: 0.9
Cshp,i: 0.0
pi: 0.00 kPa

LOAD CASE 02: Serviceability Wind

FACE: WEST ($\theta = 270^\circ$)

VOLUME FACTOR

VOLUME: 3029 m³
OPEN AREA: 0 m²
Kv: 1.0

INTERNAL 1

Cp,i: -0.3
Kc,i: 1.0
Kc,e: 0.9
Cshp,i: -0.3
pi: -0.23 kPa

INTERNAL 2

Cp,i: 0.0
Kc,i: 1.0
Kc,e: 0.9
Cshp,i: 0.0
pi: 0.00 kPa

FACE: NORTH ($\theta = 0^\circ$)

VOLUME FACTOR

VOLUME: 3029 m³
OPEN AREA: 0 m²
Kv: 1.0

INTERNAL 1

Cp,i: -0.3
Kc,i: 1.0
Kc,e: 0.9
Cshp,i: -0.3
pi: -0.23 kPa

INTERNAL 2

Cp,i: 0.0
Kc,i: 1.0
Kc,e: 0.9
Cshp,i: 0.0
pi: 0.00 kPa

FACE: EAST ($\theta = 90^\circ$)

VOLUME FACTOR

VOLUME: 3029 m³
OPEN AREA: 0 m²
Kv: 1.0

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INTERNAL 1

Cp,i: -0.3
Kc,i: 1.0
Kc,e: 0.9
Cshp,i: -0.3
pi: -0.18 kPa

INTERNAL 2

Cp,i: 0.0
Kc,i: 1.0
Kc,e: 0.9
Cshp,i: 0.0
pi: 0.00 kPa

FACE: SOUTH ($\theta = 180^\circ$)

VOLUME FACTOR

VOLUME: 3029 m³
OPEN AREA: 0 m²
Kv: 1.0

INTERNAL 1

Cp,i: -0.3
Kc,i: 1.0
Kc,e: 0.9
Cshp,i: -0.3
pi: -0.22 kPa

INTERNAL 2

Cp,i: 0.0
Kc,i: 1.0
Kc,e: 0.9
Cshp,i: 0.0
pi: 0.00 kPa

----- WALL PRESSURES -----

LOAD CASE 01: Ultimate Wind

FACE: WEST ($\theta = 270^\circ$)

EXTERNAL

SURFACE	DISTANCE FROM EDGE	Ka	Cp,e	pe	pnet
Windward	All	1.0	0.7	0.55 kPa / 0.55 kPa	0.81 kPa / 0.55 kPa
Leeward	18.00 m	1.0	-0.34	-0.27 kPa / -0.27 kPa	-0.01 kPa / -0.27 kPa
Side	0.00 m to 3.90 m	1.0	-0.65	-0.51 kPa / -0.51 kPa	-0.25 kPa / -0.51 kPa
	3.90 m to 7.80 m	1.0	-0.5	-0.39 kPa / -0.39 kPa	-0.13 kPa / -0.39 kPa
	7.80 m to 11.70 m	1.0	-0.3	-0.24 kPa / -0.24 kPa	0.02 kPa / -0.24 kPa
	11.70 m to 18.00 m	1.0	-0.2	-0.16 kPa / -0.16 kPa	0.10 kPa / -0.16 kPa

LOCAL

SURFACE	DISTANCE FROM EDGE	REF	AREA	K1	Cshp,e	pe	pnet
Windward	All	WA1	1.00 m ²	1.5	0.945 / 0.945	0.83 kPa / 0.83 kPa	1.09 kPa / 0.83 kPa
Side	0.00 m to 2.00 m	SA1	4.00 m ²	1.5	-0.8775 / -0.8775	-0.77 kPa / -0.77 kPa	-0.51 kPa / -0.77 kPa
	0.00 m to 1.00 m	SA2	1.00 m ²	2.0	-1.17 / -1.17	-1.03 kPa / -1.03 kPa	-0.77 kPa / -1.03 kPa

FACE: NORTH ($\theta = 0^\circ$)

EXTERNAL

SURFACE	DISTANCE FROM EDGE	Ka	Cp,e	pe	pnet
Windward	All	1.0	0.7	0.55 kPa / 0.55 kPa	0.81 kPa / 0.55 kPa
Leeward	10.00 m	1.0	-0.5	-0.39 kPa / -0.39 kPa	-0.13 kPa / -0.39 kPa
Side	0.00 m to 3.90 m	1.0	-0.65	-0.51 kPa / -0.51 kPa	-0.25 kPa / -0.51 kPa
	3.90 m to 7.80 m	1.0	-0.5	-0.39 kPa / -0.39 kPa	-0.13 kPa / -0.39 kPa
	7.80 m to 10.00 m	1.0	-0.3	-0.24 kPa / -0.24 kPa	0.02 kPa / -0.24 kPa

LOCAL

SURFACE	DISTANCE FROM EDGE	REF	AREA	K1	Cshp,e	pe	pnet
Windward	All	WA1	1.00 m ²	1.5	0.945 / 0.945	0.83 kPa / 0.83 kPa	1.09 kPa / 0.83 kPa
Side	0.00 m to 2.00 m	SA1	4.00 m ²	1.5	-0.8775 / -0.8775	-0.77 kPa / -0.77 kPa	-0.51 kPa / -0.77 kPa
	0.00 m to 1.00 m	SA2	1.00 m ²	2.0	-1.17 / -1.17	-1.03 kPa / -1.03 kPa	-0.77 kPa / -1.03 kPa

FACE: EAST ($\theta = 90^\circ$)

EXTERNAL

SURFACE	DISTANCE FROM EDGE	Ka	Cp,e	pe	pnet
Windward	All	1.0	0.7	0.45 kPa / 0.45 kPa	0.66 kPa / 0.45 kPa
Leeward	18.00 m	1.0	-0.34	-0.22 kPa / -0.22 kPa	-0.01 kPa / -0.22 kPa

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Side	0.00 m to 3.90 m	1.0	-0.65	-0.42 kPa / -0.42 kPa	-0.21 kPa / -0.42 kPa
	3.90 m to 7.80 m	1.0	-0.5	-0.32 kPa / -0.32 kPa	-0.11 kPa / -0.32 kPa
	7.80 m to 11.70 m	1.0	-0.3	-0.19 kPa / -0.19 kPa	0.02 kPa / -0.19 kPa
	11.70 m to 18.00 m	1.0	-0.2	-0.13 kPa / -0.13 kPa	0.08 kPa / -0.13 kPa

LOCAL

SURFACE	DISTANCE FROM EDGE	REF	AREA	K1	Cshp,e	pe	pnet
Windward	All	WA1	1.00 m ²	1.5	0.945 / 0.945	0.67 kPa / 0.67 kPa	0.88 kPa / 0.67 kPa
Side	0.00 m to 2.00 m	SA1	4.00 m ²	1.5	-0.8775 / -0.8775	-0.62 kPa / -0.62 kPa	-0.41 kPa / -0.62 kPa
	0.00 m to 1.00 m	SA2	1.00 m ²	2.0	-1.17 / -1.17	-0.83 kPa / -0.83 kPa	-0.62 kPa / -0.83 kPa

FACE: SOUTH (θ = 180°)

EXTERNAL

SURFACE	DISTANCE FROM EDGE	Ka	Cp,e	pe	pnet
Windward	All	1.0	0.7	0.53 kPa / 0.53 kPa	0.78 kPa / 0.53 kPa
Leeward	10.00 m	1.0	-0.5	-0.38 kPa / -0.38 kPa	-0.13 kPa / -0.38 kPa
Side	0.00 m to 3.90 m	1.0	-0.65	-0.49 kPa / -0.49 kPa	-0.24 kPa / -0.49 kPa
	3.90 m to 7.80 m	1.0	-0.5	-0.38 kPa / -0.38 kPa	-0.13 kPa / -0.38 kPa
	7.80 m to 10.00 m	1.0	-0.3	-0.23 kPa / -0.23 kPa	0.02 kPa / -0.23 kPa

LOCAL

SURFACE	DISTANCE FROM EDGE	REF	AREA	K1	Cshp,e	pe	pnet
Windward	All	WA1	1.00 m ²	1.5	0.945 / 0.945	0.79 kPa / 0.79 kPa	1.04 kPa / 0.79 kPa
Side	0.00 m to 2.00 m	SA1	4.00 m ²	1.5	-0.8775 / -0.8775	-0.74 kPa / -0.74 kPa	-0.49 kPa / -0.74 kPa
	0.00 m to 1.00 m	SA2	1.00 m ²	2.0	-1.17 / -1.17	-0.98 kPa / -0.98 kPa	-0.73 kPa / -0.98 kPa

LOAD CASE 02: Serviceability Wind

FACE: WEST (θ = 270°)

EXTERNAL

SURFACE	DISTANCE FROM EDGE	Ka	Cp,e	pe	pnet
Windward	All	1.0	0.7	0.48 kPa / 0.48 kPa	0.71 kPa / 0.48 kPa
Leeward	18.00 m	1.0	-0.34	-0.23 kPa / -0.23 kPa	0.00 kPa / -0.23 kPa
Side	0.00 m to 3.90 m	1.0	-0.65	-0.44 kPa / -0.44 kPa	-0.21 kPa / -0.44 kPa
	3.90 m to 7.80 m	1.0	-0.5	-0.34 kPa / -0.34 kPa	-0.11 kPa / -0.34 kPa
	7.80 m to 11.70 m	1.0	-0.3	-0.20 kPa / -0.20 kPa	0.03 kPa / -0.20 kPa
	11.70 m to 18.00 m	1.0	-0.2	-0.14 kPa / -0.14 kPa	0.09 kPa / -0.14 kPa

LOCAL

SURFACE	DISTANCE FROM EDGE	REF	AREA	K1	Cshp,e	pe	pnet
Windward	All	WA1	1.00 m ²	1.5	0.945 / 0.945	0.71 kPa / 0.71 kPa	0.94 kPa / 0.71 kPa
Side	0.00 m to 2.00 m	SA1	4.00 m ²	1.5	-0.8775 / -0.8775	-0.66 kPa / -0.66 kPa	-0.43 kPa / -0.66 kPa
	0.00 m to 1.00 m	SA2	1.00 m ²	2.0	-1.17 / -1.17	-0.88 kPa / -0.88 kPa	-0.65 kPa / -0.88 kPa

FACE: NORTH (θ = 0°)

EXTERNAL

SURFACE	DISTANCE FROM EDGE	Ka	Cp,e	pe	pnet
Windward	All	1.0	0.7	0.48 kPa / 0.48 kPa	0.71 kPa / 0.48 kPa
Leeward	10.00 m	1.0	-0.5	-0.34 kPa / -0.34 kPa	-0.11 kPa / -0.34 kPa
Side	0.00 m to 3.90 m	1.0	-0.65	-0.44 kPa / -0.44 kPa	-0.21 kPa / -0.44 kPa
	3.90 m to 7.80 m	1.0	-0.5	-0.34 kPa / -0.34 kPa	-0.11 kPa / -0.34 kPa
	7.80 m to 10.00 m	1.0	-0.3	-0.20 kPa / -0.20 kPa	0.03 kPa / -0.20 kPa

LOCAL

SURFACE	DISTANCE FROM EDGE	REF	AREA	K1	Cshp,e	pe	pnet
Windward	All	WA1	1.00 m ²	1.5	0.945 / 0.945	0.71 kPa / 0.71 kPa	0.94 kPa / 0.71 kPa
Side	0.00 m to 2.00 m	SA1	4.00 m ²	1.5	-0.8775 / -0.8775	-0.66 kPa / -0.66 kPa	-0.43 kPa / -0.66 kPa
	0.00 m to 1.00 m	SA2	1.00 m ²	2.0	-1.17 / -1.17	-0.88 kPa / -0.88 kPa	-0.65 kPa / -0.88 kPa

FACE: EAST (θ = 90°)

EXTERNAL

SURFACE	DISTANCE FROM EDGE	Ka	Cp,e	pe	pnet
Windward	All	1.0	0.7	0.39 kPa / 0.39 kPa	0.57 kPa / 0.39 kPa
Leeward	18.00 m	1.0	-0.34	-0.19 kPa / -0.19 kPa	-0.01 kPa / -0.19 kPa

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Side	0.00 m to 3.90 m	1.0	-0.65	-0.36 kPa / -0.36 kPa	-0.18 kPa / -0.36 kPa
	3.90 m to 7.80 m	1.0	-0.5	-0.28 kPa / -0.28 kPa	-0.10 kPa / -0.28 kPa
	7.80 m to 11.70 m	1.0	-0.3	-0.17 kPa / -0.17 kPa	0.01 kPa / -0.17 kPa
	11.70 m to 18.00 m	1.0	-0.2	-0.11 kPa / -0.11 kPa	0.07 kPa / -0.11 kPa

LOCAL

SURFACE	DISTANCE FROM EDGE	REF	AREA	K1	Cshp,e	pe	pnet
Windward	All	WA1	1.00 m ²	1.5	0.945 / 0.945	0.58 kPa / 0.58 kPa	0.76 kPa / 0.58 kPa
Side	0.00 m to 2.00 m	SA1	4.00 m ²	1.5	-0.8775 / -0.8775	-0.54 kPa / -0.54 kPa	-0.36 kPa / -0.54 kPa
	0.00 m to 1.00 m	SA2	1.00 m ²	2.0	-1.17 / -1.17	-0.72 kPa / -0.72 kPa	-0.54 kPa / -0.72 kPa

FACE: SOUTH (θ = 180°)

EXTERNAL

SURFACE	DISTANCE FROM EDGE	Ka	Cp,e	pe	pnet
Windward	All	1.0	0.7	0.46 kPa / 0.46 kPa	0.68 kPa / 0.46 kPa
Leeward	10.00 m	1.0	-0.5	-0.33 kPa / -0.33 kPa	-0.11 kPa / -0.33 kPa
Side	0.00 m to 3.90 m	1.0	-0.65	-0.42 kPa / -0.42 kPa	-0.20 kPa / -0.42 kPa
	3.90 m to 7.80 m	1.0	-0.5	-0.33 kPa / -0.33 kPa	-0.11 kPa / -0.33 kPa
	7.80 m to 10.00 m	1.0	-0.3	-0.20 kPa / -0.20 kPa	0.02 kPa / -0.20 kPa

LOCAL

SURFACE	DISTANCE FROM EDGE	REF	AREA	K1	Cshp,e	pe	pnet
Windward	All	WA1	1.00 m ²	1.5	0.945 / 0.945	0.69 kPa / 0.69 kPa	0.91 kPa / 0.69 kPa
Side	0.00 m to 2.00 m	SA1	4.00 m ²	1.5	-0.8775 / -0.8775	-0.64 kPa / -0.64 kPa	-0.42 kPa / -0.64 kPa
	0.00 m to 1.00 m	SA2	1.00 m ²	2.0	-1.17 / -1.17	-0.85 kPa / -0.85 kPa	-0.63 kPa / -0.85 kPa

----- ROOF PRESSURES -----

LOAD CASE 01: Ultimate Wind

FACE: WEST (θ = 270°)

EXTERNAL

SURFACE	DISTANCE FROM EDGE	Ka	Cp,e	pe	pnet
Crosswind Slope (Table 5.3(A))	0.00 m to 3.90 m	1.0	-0.9 -0.4	-0.71 kPa / -0.71 kPa -0.32 kPa / -0.32 kPa	-0.45 kPa / -0.71 kPa -0.06 kPa / -0.32 kPa
	3.90 m to 7.80 m	1.0	-0.5 0.0	-0.39 kPa / -0.39 kPa 0.00 kPa / 0.00 kPa	-0.13 kPa / -0.39 kPa 0.26 kPa / 0.00 kPa
	7.80 m to 11.70 m	1.0	-0.3 0.1	-0.24 kPa / -0.24 kPa 0.08 kPa / 0.08 kPa	0.02 kPa / -0.24 kPa 0.34 kPa / 0.08 kPa
	11.70 m to 18.00 m	1.0	-0.2 0.2	-0.16 kPa / -0.16 kPa 0.16 kPa / 0.16 kPa	0.10 kPa / -0.16 kPa 0.42 kPa / 0.16 kPa

LOCAL

	SURFACE	DISTANCE FROM EDGE	REF	AREA	K1	Cshp,e	pe	pnet
kPa	Upwind Corners	0.00 m to 2.00 m	RC1	1.00 m ²	3.0	-2.43 / -2.43	-2.13 kPa / -2.13 kPa	-1.87 kPa / -2.13
						-1.08 / -1.08	-0.95 kPa / -0.95 kPa	-0.69 kPa / -0.69
kPa	Upwind Edges	0.00 m to 2.00 m	RA1	4.00 m ²	1.5	-1.215 / -1.215	-1.06 kPa / -1.06 kPa	-0.80 kPa / -1.06
						-0.54 / -0.54	-0.47 kPa / -0.47 kPa	-0.21 kPa / -0.21
kPa		0.00 m to 1.00 m	RA2	1.00 m ²	2.0	-1.62 / -1.62	-1.42 kPa / -1.42 kPa	-1.16 kPa / -1.42
						-0.72 / -0.72	-0.63 kPa / -0.63 kPa	-0.37 kPa / -0.37

FACE: NORTH (θ = 0°)

EXTERNAL

SURFACE	DISTANCE FROM EDGE	Ka	Cp,e	pe	pnet
Downwind Slope (Table 5.3(A))	0.00 m to 3.90 m	1.0	-0.9 -0.4	-0.71 kPa / -0.71 kPa -0.32 kPa / -0.32 kPa	-0.45 kPa / -0.71 kPa -0.06 kPa / -0.32 kPa
	3.90 m to 7.80 m	1.0	-0.5 0.0	-0.39 kPa / -0.39 kPa 0.00 kPa / 0.00 kPa	-0.13 kPa / -0.39 kPa 0.26 kPa / 0.00 kPa
	7.80 m to 10.00 m	1.0	-0.3 0.1	-0.24 kPa / -0.24 kPa 0.08 kPa / 0.08 kPa	0.02 kPa / -0.24 kPa 0.34 kPa / 0.08 kPa

LOCAL

	SURFACE	DISTANCE FROM EDGE	REF	AREA	K1	Cshp,e	pe	pnet
kPa	Upwind Corners	0.00 m to 2.00 m	RC1	1.00 m ²	3.0	-2.43 / -2.43	-2.13 kPa / -2.13 kPa	-1.87 kPa / -2.13
						-1.08 / -1.08	-0.95 kPa / -0.95 kPa	-0.69 kPa / -0.69

ASHBURTON
DISTRICT COUNCIL

This proposal requires
a resource consent
No building work is to
be undertaken until the
resource consent has
been issued

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kPa	Upwind Edges	0.00 m to 2.00 m	RA1	4.00 m²	1.5	-1.215 / -1.215	-1.06 kPa / -1.06 kPa	-0.86 kPa / -0.86 kPa
kPa						-0.54 / -0.54	-0.47 kPa / -0.47 kPa	-0.21 kPa / -0.21 kPa
kPa		0.00 m to 1.00 m	RA2	1.00 m²	2.0	-1.62 / -1.62	-1.42 kPa / -1.42 kPa	-1.16 kPa / -1.42 kPa
kPa						-0.72 / -0.72	-0.63 kPa / -0.63 kPa	-0.37 kPa / -0.37 kPa
FACE: EAST (θ = 90°)								
EXTERNAL								
	SURFACE	DISTANCE FROM EDGE	Ka		Cp,e	pe	pnet	
	Crosswind Slope (Table 5.3(A))	0.00 m to 3.90 m	1.0		-0.9 -0.4	-0.58 kPa / -0.58 kPa -0.26 kPa / -0.26 kPa	-0.37 kPa / -0.58 kPa -0.05 kPa / -0.26 kPa	
		3.90 m to 7.80 m	1.0		-0.5 0.0	-0.32 kPa / -0.32 kPa 0.00 kPa / 0.00 kPa	-0.11 kPa / -0.32 kPa 0.21 kPa / 0.00 kPa	
		7.80 m to 11.70 m	1.0		-0.3 0.1	-0.19 kPa / -0.19 kPa 0.06 kPa / 0.06 kPa	0.02 kPa / -0.19 kPa 0.27 kPa / 0.06 kPa	
		11.70 m to 18.00 m	1.0		-0.2 0.2	-0.13 kPa / -0.13 kPa 0.13 kPa / 0.13 kPa	0.08 kPa / -0.13 kPa 0.34 kPa / 0.13 kPa	
LOCAL								
	SURFACE	DISTANCE FROM EDGE	REF	AREA	K1	Cshp,e	pe	pnet
kPa	Upwind Corners	0.00 m to 2.00 m	RC1	1.00 m²	3.0	-2.43 / -2.43	-1.73 kPa / -1.73 kPa	-1.52 kPa / -1.73 kPa
kPa						-1.08 / -1.08	-0.77 kPa / -0.77 kPa	-0.56 kPa / -0.56 kPa
kPa	Upwind Edges	0.00 m to 2.00 m	RA1	4.00 m²	1.5	-1.215 / -1.215	-0.86 kPa / -0.86 kPa	-0.65 kPa / -0.86 kPa
kPa						-0.54 / -0.54	-0.38 kPa / -0.38 kPa	-0.17 kPa / -0.17 kPa
kPa		0.00 m to 1.00 m	RA2	1.00 m²	2.0	-1.62 / -1.62	-1.15 kPa / -1.15 kPa	-0.94 kPa / -1.15 kPa
kPa						-0.72 / -0.72	-0.51 kPa / -0.51 kPa	-0.30 kPa / -0.30 kPa
FACE: SOUTH (θ = 180°)								
EXTERNAL								
	SURFACE	DISTANCE FROM EDGE	Ka		Cp,e	pe	pnet	
	Upwind Slope (Table 5.3(A))	0.00 m to 3.90 m	1.0		-0.9 -0.4	-0.68 kPa / -0.68 kPa -0.30 kPa / -0.30 kPa	-0.43 kPa / -0.68 kPa -0.05 kPa / -0.30 kPa	
		3.90 m to 7.80 m	1.0		-0.5 0.0	-0.38 kPa / -0.38 kPa 0.00 kPa / 0.00 kPa	-0.13 kPa / -0.38 kPa 0.25 kPa / 0.00 kPa	
		7.80 m to 10.00 m	1.0		-0.3 0.1	-0.23 kPa / -0.23 kPa 0.08 kPa / 0.08 kPa	0.02 kPa / -0.23 kPa 0.33 kPa / 0.08 kPa	
LOCAL								
	SURFACE	DISTANCE FROM EDGE	REF	AREA	K1	Cshp,e	pe	pnet
kPa	Upwind Corners	0.00 m to 2.00 m	RC1	1.00 m²	3.0	-2.43 / -2.43	-2.04 kPa / -2.04 kPa	-1.79 kPa / -2.04 kPa
kPa						-1.08 / -1.08	-0.91 kPa / -0.91 kPa	-0.66 kPa / -0.66 kPa
kPa	Upwind Edges	0.00 m to 2.00 m	RA1	4.00 m²	1.5	-1.215 / -1.215	-1.02 kPa / -1.02 kPa	-0.77 kPa / -1.02 kPa
kPa						-0.54 / -0.54	-0.45 kPa / -0.45 kPa	-0.20 kPa / -0.20 kPa
kPa		0.00 m to 1.00 m	RA2	1.00 m²	2.0	-1.62 / -1.62	-1.36 kPa / -1.36 kPa	-1.11 kPa / -1.36 kPa
kPa						-0.72 / -0.72	-0.61 kPa / -0.61 kPa	-0.36 kPa / -0.36 kPa
LOAD CASE 02: Serviceability Wind								
FACE: WEST (θ = 270°)								
EXTERNAL								
	SURFACE	DISTANCE FROM EDGE	Ka		Cp,e	pe	pnet	
	Crosswind Slope (Table 5.3(A))	0.00 m to 3.90 m	1.0		-0.9 -0.4	-0.61 kPa / -0.61 kPa -0.27 kPa / -0.27 kPa	-0.38 kPa / -0.61 kPa -0.04 kPa / -0.27 kPa	
		3.90 m to 7.80 m	1.0		-0.5 0.0	-0.34 kPa / -0.34 kPa 0.00 kPa / 0.00 kPa	-0.11 kPa / -0.34 kPa 0.23 kPa / 0.00 kPa	
		7.80 m to 11.70 m	1.0		-0.3 0.1	-0.20 kPa / -0.20 kPa 0.07 kPa / 0.07 kPa	0.03 kPa / -0.20 kPa 0.30 kPa / 0.07 kPa	
		11.70 m to 18.00 m	1.0		-0.2 0.2	-0.14 kPa / -0.14 kPa 0.14 kPa / 0.14 kPa	0.09 kPa / -0.14 kPa 0.37 kPa / 0.14 kPa	
LOCAL								
	SURFACE	DISTANCE FROM EDGE	REF	AREA	K1	Cshp,e	pe	pnet
kPa	Upwind Corners	0.00 m to 2.00 m	RC1	1.00 m²	3.0	-2.43 / -2.43	-1.84 kPa / -1.84 kPa	-1.61 kPa / -1.84 kPa
kPa						-1.08 / -1.08	-0.82 kPa / -0.82 kPa	-0.59 kPa / -0.59 kPa
kPa	Upwind Edges	0.00 m to 2.00 m	RA1	4.00 m²	1.5	-1.215 / -1.215	-0.92 kPa / -0.92 kPa	-0.69 kPa / -0.92 kPa

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kPa						-0.54	/ -0.54	-0.41 kPa / -0.41 kPa	-0.18 kPa / -0.18 kPa
kPa	0.00 m to 1.00 m	RA2	1.00 m ²	2.0		-1.62	/ -1.62	-1.22 kPa / -1.22 kPa	-0.99 kPa / -1.22
kPa						-0.72	/ -0.72	-0.54 kPa / -0.54 kPa	-0.31 kPa / -0.31
FACE: NORTH (θ = 0°)									
EXTERNAL									
	SURFACE	DISTANCE FROM EDGE	Ka		Cp,e	pe		pnet	
	Downwind Slope (Table 5.3(A))	0.00 m to 3.90 m	1.0		-0.9	-0.61 kPa / -0.61 kPa	-0.38 kPa / -0.61 kPa		
					-0.4	-0.27 kPa / -0.27 kPa	-0.04 kPa / -0.27 kPa		
		3.90 m to 7.80 m	1.0		-0.5	-0.34 kPa / -0.34 kPa	-0.11 kPa / -0.34 kPa		
					0.0	0.00 kPa / 0.00 kPa	0.23 kPa / 0.00 kPa		
		7.80 m to 10.00 m	1.0		-0.3	-0.20 kPa / -0.20 kPa	0.03 kPa / -0.20 kPa		
					0.1	0.07 kPa / 0.07 kPa	0.30 kPa / 0.07 kPa		
LOCAL									
	SURFACE	DISTANCE FROM EDGE	REF	AREA	K1	Cshp,e	pe	pnet	
kPa	Upwind Corners	0.00 m to 2.00 m	RC1	1.00 m ²	3.0	-2.43	/ -2.43	-1.84 kPa / -1.84 kPa	-1.61 kPa / -1.84
kPa						-1.08	/ -1.08	-0.82 kPa / -0.82 kPa	-0.59 kPa / -0.59
kPa	Upwind Edges	0.00 m to 2.00 m	RA1	4.00 m ²	1.5	-1.215	/ -1.215	-0.92 kPa / -0.92 kPa	-0.69 kPa / -0.92
kPa						-0.54	/ -0.54	-0.41 kPa / -0.41 kPa	-0.18 kPa / -0.18
kPa		0.00 m to 1.00 m	RA2	1.00 m ²	2.0	-1.62	/ -1.62	-1.22 kPa / -1.22 kPa	-0.99 kPa / -1.22
kPa						-0.72	/ -0.72	-0.54 kPa / -0.54 kPa	-0.31 kPa / -0.31
FACE: EAST (θ = 90°)									
EXTERNAL									
	SURFACE	DISTANCE FROM EDGE	Ka		Cp,e	pe		pnet	
	Crosswind Slope (Table 5.3(A))	0.00 m to 3.90 m	1.0		-0.9	-0.50 kPa / -0.50 kPa	-0.32 kPa / -0.50 kPa		
					-0.4	-0.22 kPa / -0.22 kPa	-0.04 kPa / -0.22 kPa		
		3.90 m to 7.80 m	1.0		-0.5	-0.28 kPa / -0.28 kPa	-0.10 kPa / -0.28 kPa		
					0.0	0.00 kPa / 0.00 kPa	0.18 kPa / 0.00 kPa		
		7.80 m to 11.70 m	1.0		-0.3	-0.17 kPa / -0.17 kPa	0.01 kPa / -0.17 kPa		
					0.1	0.06 kPa / 0.06 kPa	0.24 kPa / 0.06 kPa		
		11.70 m to 18.00 m	1.0		-0.2	-0.11 kPa / -0.11 kPa	0.07 kPa / -0.11 kPa		
					0.2	0.11 kPa / 0.11 kPa	0.29 kPa / 0.11 kPa		
LOCAL									
	SURFACE	DISTANCE FROM EDGE	REF	AREA	K1	Cshp,e	pe	pnet	
kPa	Upwind Corners	0.00 m to 2.00 m	RC1	1.00 m ²	3.0	-2.43	/ -2.43	-1.49 kPa / -1.49 kPa	-1.31 kPa / -1.49
kPa						-1.08	/ -1.08	-0.66 kPa / -0.66 kPa	-0.48 kPa / -0.48
kPa	Upwind Edges	0.00 m to 2.00 m	RA1	4.00 m ²	1.5	-1.215	/ -1.215	-0.74 kPa / -0.74 kPa	-0.56 kPa / -0.74
kPa						-0.54	/ -0.54	-0.33 kPa / -0.33 kPa	-0.15 kPa / -0.15
kPa		0.00 m to 1.00 m	RA2	1.00 m ²	2.0	-1.62	/ -1.62	-0.99 kPa / -0.99 kPa	-0.81 kPa / -0.99
kPa						-0.72	/ -0.72	-0.44 kPa / -0.44 kPa	-0.26 kPa / -0.26
FACE: SOUTH (θ = 180°)									
EXTERNAL									
	SURFACE	DISTANCE FROM EDGE	Ka		Cp,e	pe		pnet	
	Upwind Slope (Table 5.3(A))	0.00 m to 3.90 m	1.0		-0.9	-0.59 kPa / -0.59 kPa	-0.37 kPa / -0.59 kPa		
					-0.4	-0.26 kPa / -0.26 kPa	-0.04 kPa / -0.26 kPa		
		3.90 m to 7.80 m	1.0		-0.5	-0.33 kPa / -0.33 kPa	-0.11 kPa / -0.33 kPa		
					0.0	0.00 kPa / 0.00 kPa	0.22 kPa / 0.00 kPa		
		7.80 m to 10.00 m	1.0		-0.3	-0.20 kPa / -0.20 kPa	0.02 kPa / -0.20 kPa		
					0.1	0.07 kPa / 0.07 kPa	0.29 kPa / 0.07 kPa		
LOCAL									
	SURFACE	DISTANCE FROM EDGE	REF	AREA	K1	Cshp,e	pe	pnet	
kPa	Upwind Corners	0.00 m to 2.00 m	RC1	1.00 m ²	3.0	-2.43	/ -2.43	-1.76 kPa / -1.76 kPa	-1.54 kPa / -1.76
kPa						-1.08	/ -1.08	-0.78 kPa / -0.78 kPa	-0.56 kPa / -0.56
kPa	Upwind Edges	0.00 m to 2.00 m	RA1	4.00 m ²	1.5	-1.215	/ -1.215	-0.88 kPa / -0.88 kPa	-0.66 kPa / -0.88
kPa						-0.54	/ -0.54	-0.39 kPa / -0.39 kPa	-0.17 kPa / -0.17
kPa		0.00 m to 1.00 m	RA2	1.00 m ²	2.0	-1.62	/ -1.62	-1.18 kPa / -1.18 kPa	-0.96 kPa / -1.18
kPa						-0.72	/ -0.72	-0.52 kPa / -0.52 kPa	-0.30 kPa / -0.30

ASHBURTON DISTRICT COUNCIL

This proposal requires resource consent

No building work is to be undertaken until the resource consent has been issued

FILE NAME: LOT 7 MEADOWLAND SHED

DATE: 13 Sep

FILE No: 22 0529 -

DESIGNER: PYP

SHEET No: 1-01

Approved Building Consent Documents

BC0174/23

TM CONSULTANTS

LOADING - Importance level I.

$$G_{roof} = 0.3 \text{ kPa}$$

$$Q_{roof} = 0.25 \text{ kPa}$$

$$S_n^{ULS} = 0.83 \times \mu = 0.58 \text{ kPa} \quad \mu = 0.7 \left(\frac{60-7}{50} \right)^2$$

$$S_n^{SLS} = \frac{0.58 \text{ kPa}}{1.15} \times 0.85 = 0.43 \text{ kPa}$$

$$\text{Wind: high wind zone} \rightarrow P^{ULS} = 1.16 \text{ kPa} \left(\frac{41}{45} \right)^2 = 0.96 \text{ kPa} \times C_{qg}$$

$$P_s^{SLS} = 0.784 \text{ kPa}$$

$$P_N^{ULS} = 0.791 \text{ kPa}$$

$$P_N^{SLS} = 0.682 \text{ kPa}$$

ES - Zone I

Soil type - Deep Soil. $D = L_n(T) = 3.00$

$$P_{west}^{ULS} = 0.877 \text{ kPa}$$

Ashburton

$$Z = 0.2$$

$$P_W^{SLS} = 0.076 \times 0.914$$

IL 1 / 50 years

$$R_u = 0.5$$

$$C(T)^{ULS} = 800 \times 0.2 \times 0.5 \times 1.0 = 0.3$$

$$C(T)^{SLS} = 0.15$$

$$W_{t, mid}^{roof} = \frac{0.5 \text{ kN}}{1.25} + \left(\frac{3.6 \times 0.024 \times 5}{2} \right) \times 3 + 0.35 \text{ kPa} \times 4.5 \text{ m} \times \frac{3.6}{2} \times 2 = 7.67 \approx 7.7 \text{ kN}$$

$$W_{t, corn} = \frac{0.3 \text{ kPa} \times 4.5 \text{ m}}{2} \times 0.65 + 0.35 \times \left(\frac{4.5 \text{ m}}{2} + 9.9 \text{ m} \right) \times \frac{3.55}{2} = 7.665 \approx 7.7 \text{ kN}$$

$$\mu = 3.0 \rightarrow \left. \begin{array}{l} S_p = 0.7 \\ k_{\mu} = 2.143 \end{array} \right\} C_d(T_1) = \frac{0.3 \times 0.7}{2.143} = 0.098 = 0.1$$

$$F = 7.7 \text{ kN} \times 0.1 = 0.77 \text{ kN}$$

High = 7 km/s.

Site = 71 m/s.

∴ High wind zone correct.

ASHBURTON DISTRICT COUNCIL

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LOADING

WIND LOAD

$$h = 3.5m ; d_s = 9.5m$$

$$h/d_s = 0.38 \rightarrow C_{pe} = -0.9$$

$$-0.4$$

$$w_{wall} = 0.7 \times 0.96 = 0.87$$

$$w_{dn} = -0.58 kPa$$

$$0.18 kPa$$

$$0.67 kPa$$

$$0.48 kPa$$

$$-0.3/1 \quad -0.5/0 \quad -0.9/0.4$$

$$1.8 \quad 2.6 \quad 3.6$$

$$C_{pi} = (0.7 + 0.9) \times 0.96 \times 0.8 = 1.23 kPa$$

$$5.53 kN/m$$

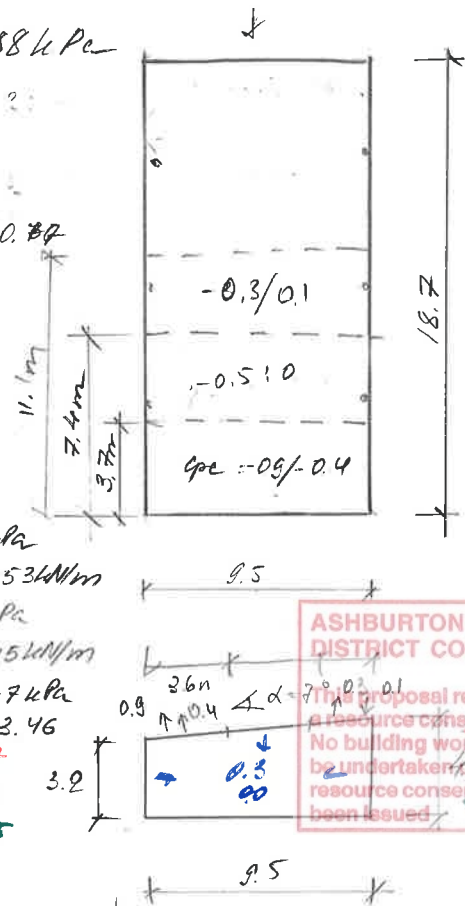
$$C_{pi} = (0.5 + 0.7) \times 0.96 \times 0.8 = 0.92 kPa$$

$$4.15 kN/m$$

$$C_{pi} = (0.3 + 0.7) \times 0.96 \times 0.8 = 0.77 kPa$$

$$3.46$$

$$w_{wall} = (0.5 + 0.7) \times 0.8 \times 0.88 kPa = 0.84$$



ASHBURTON DISTRICT COUNCIL

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Purlin design $\Rightarrow 4.5m$ span

Consider local factors. $C_{pe}^{max} = -0.9 / 0.4$

$$\rightarrow w_{dn}^{ULS} = (0.2 + 0.3) \times 0.96 kPa = 0.48 kPa$$

$$w_{up}^{ULS} = (-0.9) \times 0.96 kPa = -0.86 kPa$$

Consider purlin spacing $\Rightarrow 0.9$ c/s

$$ULS: 1.2G + w_{dn} = w = (1.2 \times 0.8 kPa + 0.48) \times 0.9m = 0.76 kN/m$$

$$\rightarrow M^* = 1.92 kN \times m \quad R_A = R_B = 1.7 kN$$

$$0.9G + w_{up} = w = (0.9 \times 0.3 - 0.86) \times 0.9m = -0.531 kN/m$$

$$M^* = -1.34 kN \times m \quad R_A = -1.2 kN$$

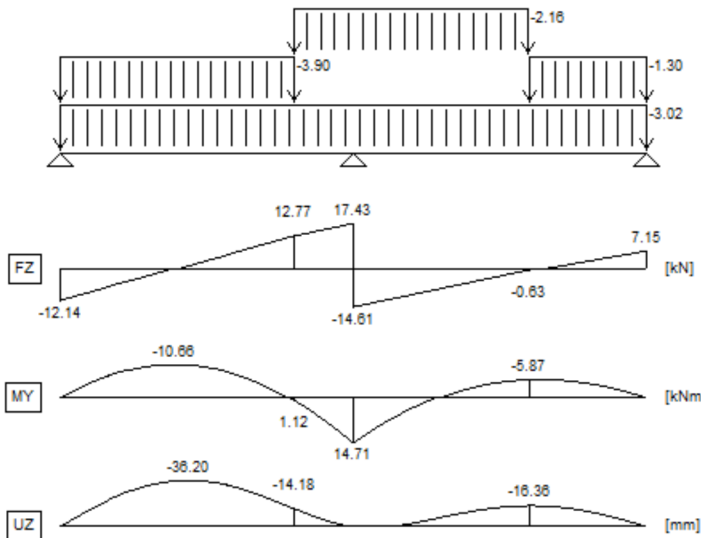
$$1.2G + s_n \quad w = (1.2 \times 0.3 kPa + 0.58 kPa) \times 0.9m = 0.85 kN/m$$

$$M^* = 2.14 kN \times m \quad R_A = R_B = 1.9 kN$$

Properties

×

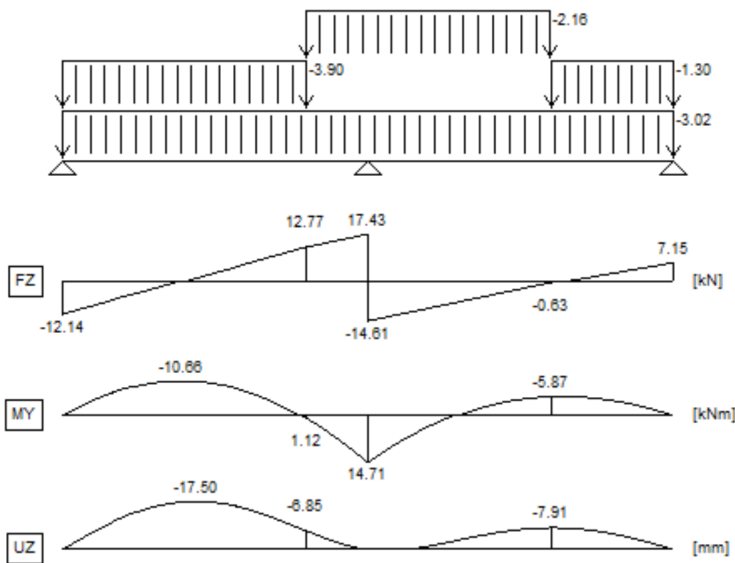
Modulus of elasticity: 5400 [N/mm²]
Moment of inertia: 9145 [cm⁴]



Properties

×

Modulus of elasticity: 5400 [N/mm²]
Moment of inertia: 18920 [cm⁴]



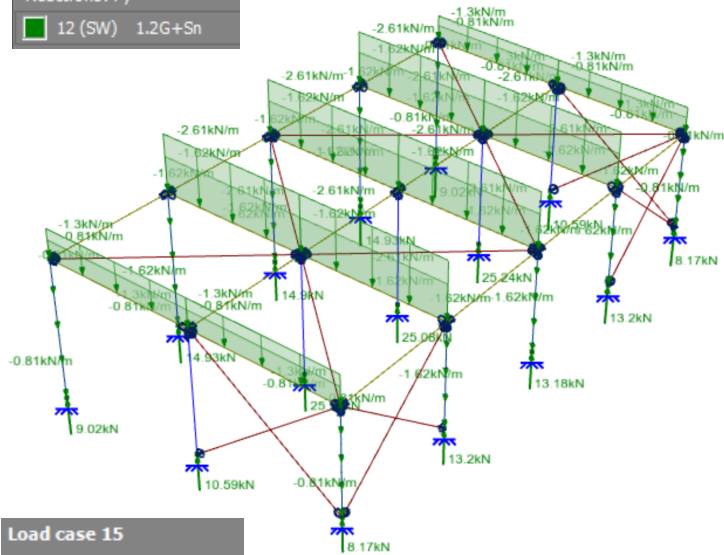
ASHBURTON
DISTRICT COUNCIL

This proposal requires
a resource consent
No building work is to
be undertaken until the
resource consent has
been issued

Load case 12

Reactions: Fy

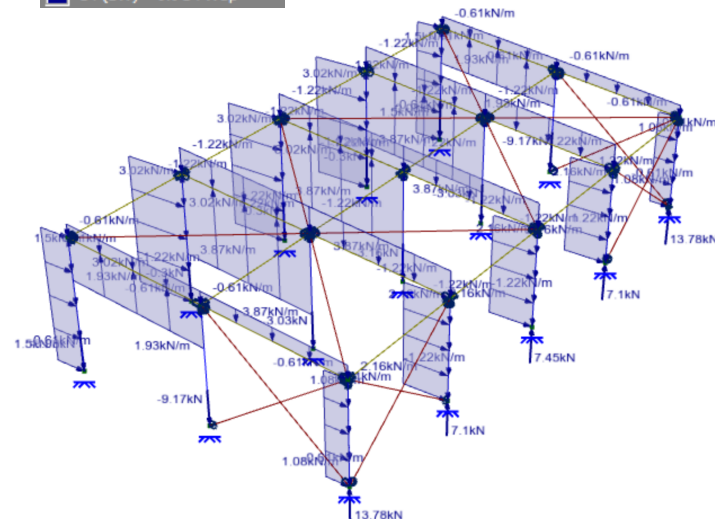
12 (SW) 1.2G+Sn



Load case 14

Reactions: Fy

14 (SW) 0.9G+Wup

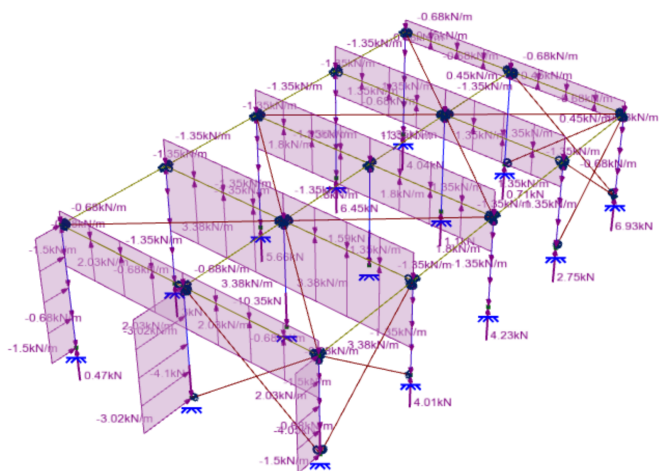


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Load case 15

Reactions: Fy

15 (SW) G+Wdn alog



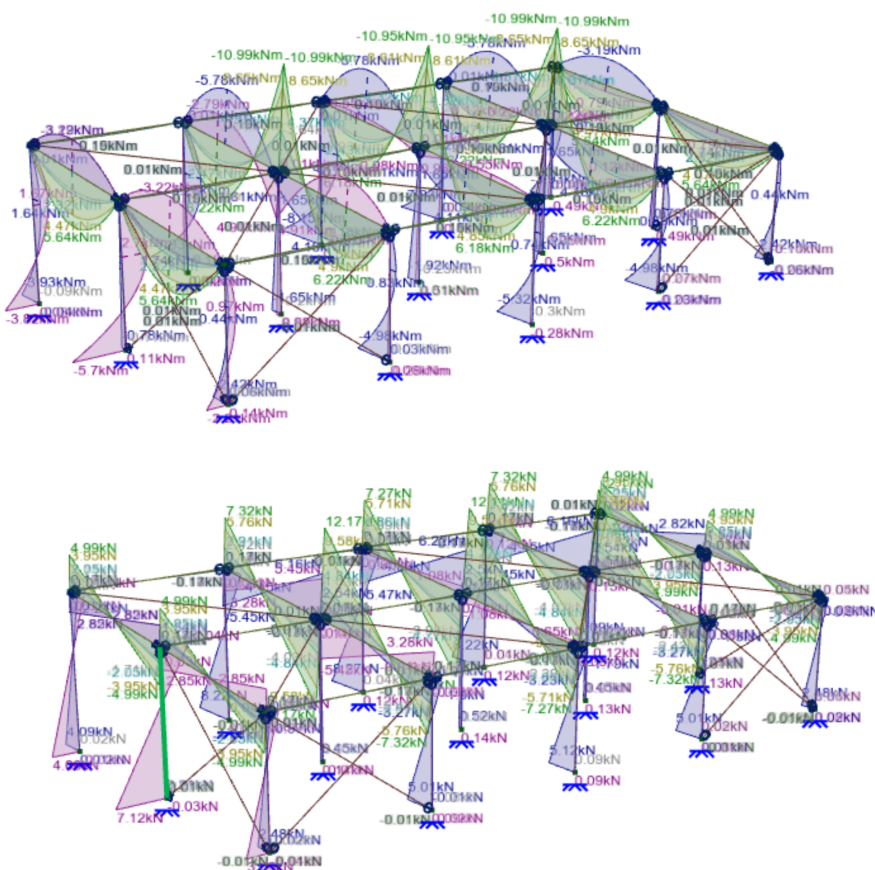
ASHBURTON DISTRICT COUNCIL

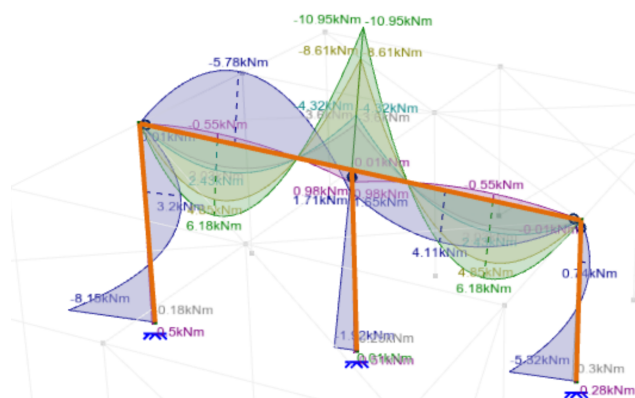
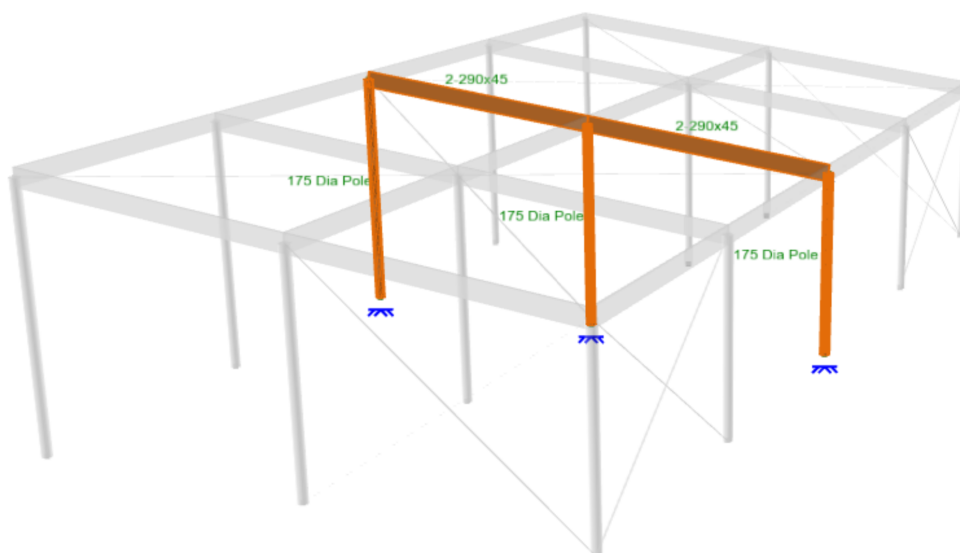
This proposal requires a resource consent
No building work is to be undertaken until the resource consent has been issued

Load cases 11-16

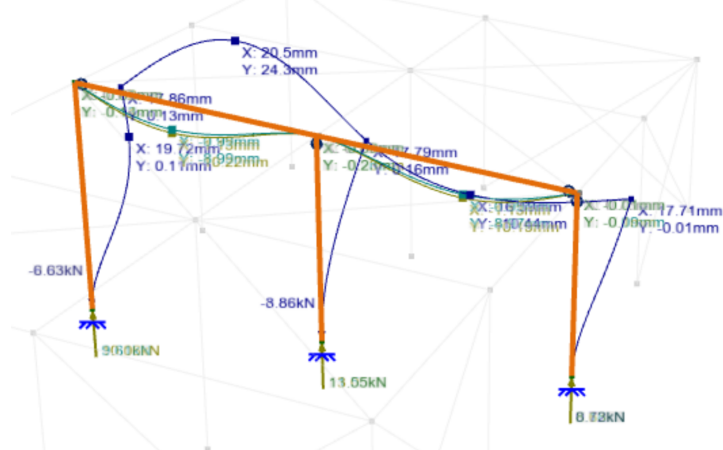
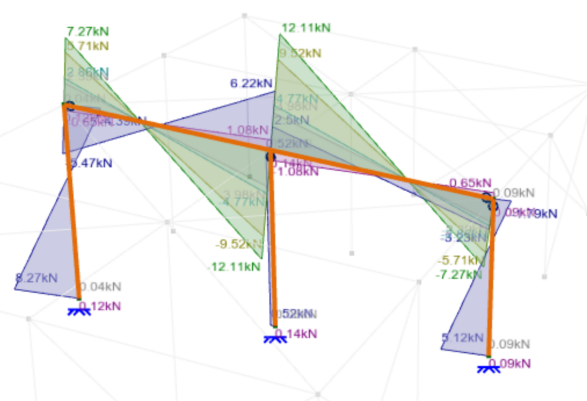
(1) ULS

11 (SW)	1.2G+1.5Q
12 (SW)	1.2G+Sn
13 (SW)	1.2G+Wdn
14 (SW)	0.9G+Wup
15 (SW)	G+Wdn alog
16 (SW)	G+EQuls





Load cases 11-16		
(1) ULS		
11 (SW)	1.2G+1.5Q	
12 (SW)	1.2G+Sn	
13 (SW)	1.2G+Wdn	
14 (SW)	0.9G+Wup	
15 (SW)	G+Wdn alog	
16 (SW)	G+EQuls	



Load cases 21,23,24,26	
(2) SLS	
21 (SW)	G+0.7Q
23 (SW)	G+S _n sls
24	Wup sls
26	EQsls

FILE NAME:

DATE:

DESIGNER:

FILE No:

SHEET No: 03

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Ashburton District Council

CONSULTANTS

PURLING DESIGN - 4.5m Span - Rafter spacing - 0.9m

LOADS:

$$\text{ULS } 1.2G + 1.5Q \quad w = (1.2 \times 0.3 + 1.5 \times 0.25) \times 0.9m = 0.66 \text{ kN/m}$$

$$M^* = 1.67 \text{ kN}\cdot\text{m} \quad R_A = R_B = 1.49 \text{ kN}$$

$$1.2G + S_n \quad w = (1.2 \times 0.3 + 0.58 \text{ kPa}) \times 0.9m = 0.85 \text{ kN} \quad M^* = 2.14 \text{ kN} \quad R_A = 1.9 \text{ kN}$$

$$1.2G + W_{dn} \quad w = (1.2 \times 0.3 + 0.48 \text{ kPa}) \times 0.9m = 0.764 \text{ kN/m} \quad M^* = 1.92 \text{ kN} \quad R_A = 1.7$$

$$(0.9 \times 0.4 - 1.22) \times 0.9 = -0.783 \quad M^* = -1.98 \quad R_A = 1.76$$

$$0.9G + W_{up} \quad w = (0.9 \times 0.3 - 0.86 \text{ kPa}) \times 0.9m = -0.531 \text{ kN/m} \quad M^* = 1.34 \text{ kN}\cdot\text{m} \quad R_A = -1.3 \text{ kN}$$

$$W_{dn}^{\text{ULS}} = (0.2 + 0.3) \times 0.96 \text{ kPa} = 0.48 \text{ kPa}$$

$$W_{up}^{\text{ULS}} = (-0.9) \times 0.96 \text{ kPa} = -0.86 \text{ kPa}$$

$$\text{SLS: } (G + 0.4Q) \text{ kPa} \Rightarrow w = 2 \times (0.3 + 0.4 \times 0.25) \times 0.9m = 0.72 \text{ kN/m}$$

$$S_n^{\text{SLS}} \quad w = 0.48 \text{ kPa} \times 0.9m = 0.39 \text{ kN/m}$$

$$0.733 \text{ kPa} \times 0.9m = 0.66 \text{ kN/m}$$

$$W_{up}^{\text{SLS}} \quad w = (-0.9) \times 0.814 \times 0.9m = -0.66 \text{ kN/m}$$

$$1.23 \text{ kPa} \times 0.814 \times 0.9m = -0.9 \text{ kN/m}$$

$$\text{consider } 240 \times 45 @ 900 \Rightarrow I_x = 57.84 \times 10^6 \text{ mm}^4$$

$$\Delta = \frac{5 \times 0.72 \times (4.5)^4}{384 \times 5.4 \times 57.8} \times 10^3 = 13.7 \text{ mm} < \Delta_{\text{max}} = \frac{4500}{300} = 15 \text{ mm}$$

$$\Delta = \frac{(-0.66) \times 5 \times (4.5)^4}{384 \times 5.4 \times 57.8} = 12.6 \text{ mm} \leq \Delta_{\text{max}} = 12 \text{ mm}$$

$$18.5 \text{ mm} > 15 \text{ mm}$$

$$\text{Rafter-purlins } - 240 \times 45 \text{ SGB @ 900cs} \rightarrow W_t = 0.06 \text{ kPa}$$

fixing - HJ 47x120 Joist Hanger

$$\text{reduce spacing to } 600\text{cs} \Rightarrow w = 0.733 \text{ kPa} \times 0.6m = 0.44 \text{ kN/m}$$

$$\rightarrow \Delta = (5 \times 0.44 \times (4.5)^4) / (384 \times 5.4 \times 25.72) \times 10^3 = 16.9 \text{ mm} > \Delta = 15 \text{ mm}$$

$$M^* = (1.2 \times 0.4 + 0.58) \times 0.6m \times (4.5m)^2 / 8 = 1.61 \text{ kN}\cdot\text{m}$$

$$qM = 0.8 \times 0.8 \times 0.4 \times 14 \times 0.432 = 1.55 \text{ kN}\cdot\text{m}$$

$$= 0.8 \times 0.8 \times 0.7 \times 14 \times 0.432 = 2.7 \text{ kN}\cdot\text{m} - (\text{blocking})$$

ASHBURTON DISTRICT COUNCIL

This proposal requires a resource consent. No building work is to be undertaken until the resource consent has been issued.

MAIN RAFTER DESIGN

Rafter span - $s = 4.5m$ tributary width - $4.5m$

Load combinations:

ULS: $1.2G + 1.5Q$ $w = 0.785 kPa \times 4.5m = 3.53 kN/m$

$$M_{1.2G+1.5Q}^{mid} = 4.7 kNm \quad M_{1.2G+1.5Q}^{TOP} = 8.4 kNm$$

$$R_A = 5.6 kN \quad R_B = 18.6 kN$$

$$1.2G + 8m \quad w = 0.94 kPa \times 4.5m = 4.23 kN/m$$

$$M_{1.2G+8m}^{mid} = 6.0 kNm \quad M_{1.2G+8m}^{TOP} = 10.7 kNm$$

$$R_A = 7.14 kN \quad R_B = 23.8 kN$$

$$0.9G + W_{up} \quad w = (0.9 \times 0.8 kPa - 0.7 \times 0.96 kPa) \times 4.5m = -1.81 kN/m$$

$$R_A = 3.0 kN \quad R_B = 10.12 kN$$

SLS: $G + 0.7 Q$ $w = 0.775 \times 4.5m = 3.49 kN/m$

for $300 \times 45 LVL \rightarrow I_x = 101.25 \times 10^{-6} m^4$

$$\Delta = 36 mm < \Delta_{max} = \frac{4500}{300} = 15 mm$$

$$k_2 G \quad w = 0.6 kPa \times 4.5m = 2.7 kN/m$$

$$\Delta = 4.5 mm$$

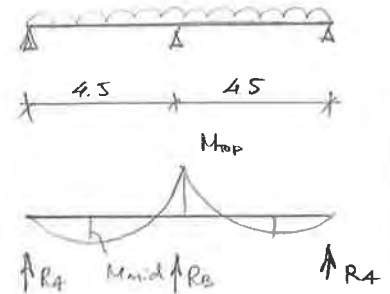
Use $240 \times 45 LVL \quad \Delta = 4.3 mm \quad (k_2 G)$

if use $290 \times 90 SGB \quad \Delta = 8.1 mm \rightarrow Z_x =$

$$\phi M = 0.8 \times 0.8 \times 1.0 \times 14 \times 1.261 = 11.3 kNm > M_{1.2G+8m} = 10.7 kNm$$

Adopt $290 \times 45 SGB$

$$\text{fixing } \downarrow = \begin{matrix} 23.8 kN_{mid} \\ 7.14 kN_{ends} \end{matrix} \quad \uparrow \begin{matrix} 10.12 kN \\ 3.0 kN \end{matrix}$$

ASHBURTON
DISTRICT COUNCILThis proposal requires
a resource consent
No building work is to
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$$290 \times 45$$

$$\Delta = 18.0 mm \quad I_x = 9146$$

$$240 \times 40$$

$$I_x = 10268$$

FILE NAME: LOT 7 MEADOWLANDS GREENS

DATE:

FILE No:

DESIGNER:

SHEET No: 05

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Ashburton District Council

CONSULTANTS

WALL CURTS DESIGN 150x45 S68

CURTS span $S = 4.5m$: concrete - 11m

LOADS:

$$WULS - \begin{matrix} (0.7+0.3) \\ 0.7 \times 0.96 = 0.672 \text{ kPa} \\ 1.2 \times 0.96 = 1.152 \text{ kPa} \end{matrix} \quad -w = 0.672 \times 1.1m = 0.7392 \text{ kN/m}$$

$$M^* = 2.67 \text{ kNm} \quad R_A = R_B = 6.0 \text{ kN}$$

$$0.64g$$

$$WULS \Rightarrow 0.96 \text{ kPa} \times 0.672 \times 1.1m = 0.714 \text{ kN/m}$$

$$(0.7+0.5) \times 0.96 \times 0.814 = 0.94 \text{ kPa} \times a \rightarrow \text{consider } 140 \times 45 \text{ S68} \rightarrow I_x = 1.08 \times 10^{-6} \text{ m}^4$$

$$0.84 \text{ kPa} \times a$$

$$\Rightarrow a = 0.8m \rightarrow w = 0.76 \text{ kN/m} \quad w_{ULS} = 0.82 \text{ kN/m}$$

$$\Delta = \frac{5 \times 0.714 \times (4.5m)^3}{384 \times 5110 \times 1.93} = 68.54 \text{ mm}$$

$$\text{if use } 2-140 \times 45 \text{ S68} \quad I_x = 20.58 \times 10^{-6}$$

$$\text{if use } 2-180 \times 45 \text{ S68} \quad I_x = 25.72 \times 10^{-6} \quad @ 800 \text{ cr}$$

$$\Delta_{max} < \frac{4500}{200} = 22.5 \text{ mm}$$

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This proposal requires resource consent. No building work is to be undertaken until the resource consent has been issued.

$$\phi M = 2.63 \text{ kNm} \rightarrow 2-140 \times 45 \rightarrow I_x = 20.58 \rightarrow @ 600 \text{ cr} \rightarrow M^* = 1.46 \text{ kNm} \quad R_A = 1.3 \text{ kN}$$

$$\phi M = 1.21 \text{ kNm} \rightarrow 180 \times 45 \rightarrow I_x = 25.72 \times 10^{-6} \text{ m}^4 @ 800 \text{ cr} \quad M^* = 1.95 \text{ kNm} \quad R_A = 1.73 \text{ kN}$$

$$2-180 \times 45 \rightarrow I_x = 51.44 \times 10^{-6} \text{ m}^4 @ 12m$$

ADOPT 2-140x45 @ 600 crs

fixing = 1.3 kN

$$\text{if } 140 \times 45 \rightarrow I_x = 10.29 \times 10^{-6} \text{ m}^4 \quad Z_x = 0.147 \times 10^{-3} \text{ m}^3$$

$$\Rightarrow \phi M = 1.15 \text{ kNm} \quad a = 0.3m \text{ spacing}$$

$$\text{if doubled } \rightarrow I_x = 20.58 \quad a = 0.5m$$

$$\phi M = 2.3 \text{ kNm} \quad a = 0.5m \quad M^* = 1.46 \text{ kNm}$$

$$\text{if } 180 \times 45 \rightarrow I_x = 25.72 \quad Z_x = 0.27 \times 10^{-3} \text{ m}^3 \rightarrow \phi M = 2.12 \text{ kNm} > M^* = 1.15 \text{ kNm} = 1.75 \text{ kNm}$$

$$\Rightarrow a = 0.6m \rightarrow \Delta = 2.7 \text{ mm}$$

11

FILE NAME: 7 Meadowland Green - Iish Shed

DATE:

FILE No: 220529

DESIGNER:

SHEET No: 1

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Ashburton District Council

TM CONSULTANTS
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WALL GURTS & ROOF RAFTERS

Proposed by Architects

- roof rafters - 190x45 at 800cs \rightarrow 190x45 @ 800cs ✓
240x45 @ 1.0m cs
- wall girts - 140x45 at 1.100cs \rightarrow 140x45 at 800cs ✓

Roof rafters

Wind $\rightarrow p_{ws} = 0.88 \text{ kPa} \rightarrow w = C_{pe} \times p = (-0.9) \times 0.88 \text{ kPa} = 0.792 \text{ kPa}$

Snow $\rightarrow w = 0.504 \text{ kPa} \rightarrow$

\rightarrow ULS: $1.2G + 1.5Q \rightarrow w = 0.725 \text{ kPa}$

$1.2G + 8m \rightarrow w = 0.86 \text{ kPa} \rightarrow$ Governs

$0.0G + W_{ho} \rightarrow w = -0.52 \text{ kPa}$

consider 190x45 $\rightarrow I = 0.27 \times 10^{-3} \text{ m}^3$ (with mid. blocking) \rightarrow

190x45 at 700cs

$\varphi M = 0.8 \times 0.8 \times 0.7 \times 14 \times 0.27 = 1.7 \text{ kN}\cdot\text{m}$

$\rightarrow a = \frac{8 \times M^*}{w \times l^2} = \frac{8 \times 1.7}{0.86 \times (4.5\text{m})^2} = 0.78 \text{ m}$ consider 0.7m spacing

$\rightarrow M^* = 1.52 \text{ kN}\cdot\text{m} < \varphi M = 1.7 \text{ kN}\cdot\text{m}$

consider 240x45 $\rightarrow I = 0.432 \times 10^{-3} \text{ m}^3 \rightarrow$

240x45 at 1.0mcs $\rightarrow \varphi M = 0.8 \times 0.8 \times 0.6 \times 14 \times 0.432 = 2.3 \text{ kN}\cdot\text{m}$

$a = \frac{8 \times 2.3}{0.86 \times (4.5\text{m})^2} = 1.0 \text{ m} \rightarrow M^* = 2.18 \text{ kN} < \varphi M = 2.3 \text{ kN}$

ASHBURTON DISTRICT COUNCIL
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FILE NAME: 7 MEADOWLANDS. GREENS

DATE:

FILE No: 220529

DESIGNER:

SHEET No:

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FIXING DESIGN

RAFTER TO MIDDLE POLE FIXING

$$V_{126+54}^* = 7.3 \text{ kN}$$

$$\text{for 2-M16 bolts} \rightarrow \phi V = \phi k_t \times d \times Q_{kL} \times n_r = 0.7 \times 0.8 \times 2 \times 4.65 \times 2 = 10.42 \text{ kN}$$

RAFTER TO MIDDLE POLE FIXING

$$V_{B+WUP}^* = 10.8 + 8.1 = 18.9 \text{ kN}$$

$$\text{for 3-M16 bolts} \rightarrow \phi V = \phi k_t \times 1.25 \times 2 \times Q_{kL} \times n_r = 0.7 \times 1.0 \times 1.25 \times 2 \times 4.65 \times 3 = 24.4 \text{ kN}$$

$$\text{for 2-M16 in pole } b = 160 \text{ mm} \rightarrow \phi V = 0.7 \times 1.0 \times 1.25 \times 2 \times 16.5 \text{ kN} = 28.9 \text{ kN}$$

$$Q_{kL} = 6.45 \times b \times d = (6.45 \times 160 \text{ mm} \times 16 \text{ mm}) / 10^3 = 16.5 \text{ kN}$$

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DISTRICT COUNCILThis proposal requires
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Design of Laterally Loaded Nailed Connection in Timber

Job No: 180...

Engineer: mh

Description: Connection A

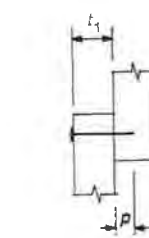
Load duration	Medium
Number of Nails in connection, n	6
Timber Group	J5
Timber Condition	Dry
Type of Joint	Two Member
Side Plates	None
Nail Diameter	4 mm
Side Grain/End Grain	End Grain

t1	50 mm
p	50 mm
to	0 mm
Nail Length	100.00 mm

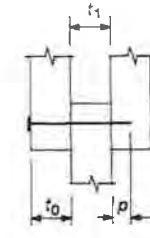
ϕ	0.70
Qk	990.00 N
Qn	3225.37 N
ϕQn	2.3 kN

Modification factors	
a	1.00
b	0.80
c	0.67
d	1.00
e	1.00
f	1.00
g	1.01

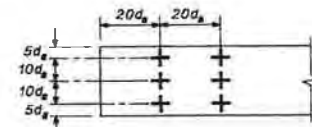
Min dimensions full capacity (mm)		
Solid timber	Plywood	
40	6	mm
40		mm
0	0	mm
80.00		mm



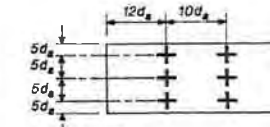
(a) Two-member joint



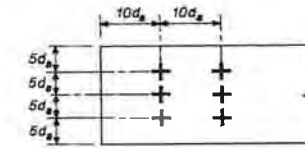
(b) Three-member joint



Minimum spacing of nails - No preboring
All timber except Radiata pine



Minimum spacing of nails - No preboring
Radiata pine only



Minimum spacing of nails and screws - Prebored to 0.8ds
All timber

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DISTRICT COUNCIL

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a resource consent
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FILE NAME: LOT 7 MEADOWLANDS SHED

DATE:

FILE No:

DESIGNER:

SHEET No:

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Documents

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Ashburton District Council

TM
CONSULTANTS
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TIMBER POLE DESIGN

$$N_{max} = N_{1.2615m} = 25.2 \text{ kN} \rightarrow$$

$$\text{Combination: } V_{max} = 6.3 \text{ kN} \\ M^* = 6.65 \text{ kNm}$$

$$\text{for } \phi 175 \text{ Dia} \rightarrow \phi N = 0.8 \times 21 \times 0.024 = 40.4 \text{ kN}$$

$$\phi V =$$

$$\phi M = 0.8 \times 38 \times 10^3 \times 0.526 \times 10^{-3} = 16.0 \text{ kNm}$$

Adopt $\phi 175$ Dia SED POLE

ASHBURTON
DISTRICT COUNCIL

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a resource consent
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3121
B: 40

FILE NAME: LOT 7 Meadowland

DATE: 14 Nov 2022

DESIGNER: PYP

FILE No: 220529

SHEET No: 1

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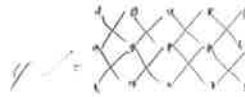
PROVIDE YOU CAN BUILD ON

1300 → 14

BRACE ELEMENTS.

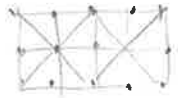
ROOF BRACE

Max tension $T_{max} = 3.7 \text{ kN}$



if use $0.55 \times 27 \text{ GALV. STRIP BRACE} \Rightarrow \phi T = 0.7 \times 1.0 \times 7.2 = 5.04 \text{ kN}$

if use



\Rightarrow max tension $T_{max} = 6.9 \text{ kN}$

use $0.91 \text{ m} \times 53 \text{ mm GALV MULTI-BRACE} \Rightarrow \phi T = 0.7 \times 1.0 \times 14.8 \text{ kN} = 10.36 \text{ kN}$

$> T_{max} = 6.9 \text{ kN}$

ASHBURTON
DISTRICT COUNCIL

This proposal requires
a resource consent
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be undertaken until the
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FILE NAME: LOT 7 MEADOWLANDS SHEAR

DATE: 14 Nov 2022

FILE No:

DESIGNER: PVP

SHEET No:

Approved Building Consent
Documents

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Ashburton District Council

CONSULTANTS
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FOUNDATION DESIGN

1 BEARING DESIGN

Assume good ground \rightarrow UGPR - 300 kPa

$$Q_{ult} = 150 \text{ kPa}$$

$$Q_{SL} = 100 \text{ kPa}$$

Consider $600 \times 600 \times 1200 \text{ mm}$ deep post hole

$$A_s = 0.36 \text{ m}^2 = 0.36 \text{ m}^2$$

$$N_{120 \text{ mm}} = 25.3 \text{ kN}$$

$$N_{G+0.7Q} = 13.2 \text{ kN}$$

$$q_{ult} = \frac{25.3 \text{ kN}}{0.36 \text{ m}^2} = 70.3 \text{ kPa} < Q_{ult} = 150 \text{ kPa}$$

$$q_{SL} = \frac{13.2 \text{ kN}}{0.36 \text{ m}^2} = 37 \text{ kPa} < Q_{SL} = 100 \text{ kPa}$$

ASHBURTON
DISTRICT COUNCIL

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a resource consent
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DESIGN FOR UPLIFT

$$N_{up}^{G+wind} = 10.4 \text{ kN}$$

$$N_{max}^{G+Wup} = 18.0 \text{ kN}$$

$$W_t = 0.36 \text{ m}^2 \times 1.2 \text{ m} \times 24 \text{ kN/m}^3 = 10.4 \text{ kN}$$

$$\text{if hole } 0.8 \text{ m} \times 0.8 \text{ m} \times 1.2 \text{ m} \rightarrow W_t = 0.64 \text{ m}^2 \times 1.2 \text{ m} \times 24 = 18.4 \text{ kN}$$

LATERAL RESTRAIN DESIGN

$$M_{max} = 8.14 \text{ kN} \times \text{m}$$



Thermakraft
ONE WRAP
SYSTEM

10 Products - One system
One warranty

ASHBURTON DISTRICT COUNCIL
Air Barrier
This proposal requires
resource consent
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Thermakraft[™] COVERTEK 403

Non self-supporting roof and wall underlay

Kingspan Thermakraft Covertek 403 is a fire retardant, light weight roof and wall underlay designed as a means of managing condensation, water vapour transfer and water ingress. Primarily developed as a roof underlay, Covertek 403 can also be used on walls if you are after a one stop solution. It is not self-supporting as a roof underlay and is a more affordable option where a supporting component is to be installed in the building.

Covertek 403 comes in three roll sizes:

1350mm wide	18.6m long	25m ² coverage*
1350mm wide	37m long	50m ² coverage*
1350mm wide	55m long	75m ² coverage*

* **Note:** m² is the roll size for actual coverage, allow for laps and joins.



Covertex 403

Non self-supporting roof and wall underlay

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Scope of Use

Roof Application

- Suitable with masonry tile, metal tile and profiled metal roof cladding.
- Can be used on roofs up to and including NZS 3604 'Extra High' wind zones.
- Covertex 403 requires underlay support (not self-supporting).
- Will provide temporary weather protection during construction (maximum 7 days for roof application), same day coverage recommended.

Wall Application

- Can be used with timber and steel framing, either directly fixed or in conjunction with an 18mm minimum drained cavity.
- With absorbent wall claddings (e.g. timber, brick or fibre cement) or non-absorbent wall claddings (e.g. metal or plastic).
- Is suitable for use in all Wind Zones of NZS 3604 up to, and including, 'Very High', when used as standalone flexible underlay, and 'Extra High' when used as a flexible underlay over a rigid wall underlay.
- Is suitable as an air barrier in unlined wall spaces.
- Will provide temporary weather protection during construction (maximum 42 days for wall application).

General

- Is fire retardant.
- Unaffected by LOSP or other solvent based treated timber. However, LOSP or other solvent based treated timber must have sufficient time for the solvent chemical to flash off in well ventilated area. Recommended minimum 7 days.
- Tear resistant and strong.

Limitations

- Cannot be exposed to the weather or UV for more than 7 days as a roof underlay and 42 days as a wall underlay.
- Can only be used as a Roof underlay on roofs of 10° pitch or greater.
- Must be used with underlay support products in roof application.
- Must not be used under translucent roof sheeting.

Compliance

Roof Application

- Covertex 403 can be used as a roof underlay within the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1, with regards to building height and floor plan area.
- Refer BRANZ Appraisal No 917 (2020) and CodeMark certificate for full details.

Wall Application

- Covertex 403 can be used as a wall underlay within the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1, with regards to building height and floor plan area
- Refer BRANZ Appraisal No 917 (2020) for full details.

Flammability Index

Covertex 403 Underlay has an AS 1530 Part 2 Flammability Index of not greater than 5 and therefore meets the requirements of NZBC Acceptable Solution C/AS2, Paragraph 4.17.8 b), for the surface finish requirements of suspended flexible fabric used as an underlay to exterior cladding that is exposed to view in occupied spaces.

Durability

Meets the Performance Requirements of NZBC Clauses B2, Durability (B2.3.1 (a) 50 years, B2.3.1 (b) 15 years and B2.3.2), and F2.3.1, providing:

- It is not damaged.
 - Is installed in accordance with instructions.
 - Is not left exposed for more than 7 days (roof) same day coverage recommended.
 - Is installed by or under guidance of Licensed Building Practitioners.
 - Is compatible with cladding system used.*
- * **Note:** specifiers and product user must test for roof or wall cladding system compatibility with the underlay before installation.

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Property Performance

The following data represents the minimum pass rates required by the NZBC. This product tests well beyond the minimum standards. If you require actual performance results, please contact your local Kingspan Insulation representative.

NZBC E2/AS1 Table 23 (NZS2295) Roof Underlay Properties	Absorbency	Vapour Resistance	pH of Extract	Shrinkage	Water Resistance	Air Resistance
Property Performance Requirement	≥ 150gsm	≤ 7 MN.s/g	≥ 5.5 and ≤ 8	≤ 0.5%	≥ 100mm	≥ 0.1 MN.s/m ³
Property Performance	Pass	Pass	Pass	Pass	Pass	Pass*

* **Note:** Can be used as an air barrier.

Control of Condensation

In climatic regions where condensation risks are high, such as cold or high humidity areas, care needs to be taken in specifying the correct design and installation to prevent moisture build-up in the roof cavities.

Factors which adversely affect the condensation risk in roofing systems include:

- Humid, and/or cold climatic regions.
- Warm/Skillion roof construction.
- Low roof cavity air volume and restricted air movement.
- Omitting Vapour Control Layers.
- Ceiling penetrations and entry of warm air into roof cavities.
- Occupancy activities which have high moisture loading on conditioned spaces.
- Low pitched roof.
- Bulk insulation.
- Building structures ability to naturally dry construction moisture.

Skillion and Warm Roof Construction are particularly sensitive to moisture accumulation and the design and installation of roof construction needs to take into account the higher condensation risks. Refer MRM Code of Practice for details.

For passive ventilation of the roof space, it is recommended that all roof underlays are terminated at the ridge, and if not it should be slit or slotted to allow for passive ventilation. (For further information refer to the NZ MRM Roofing Code of Practice).

Product Warranty

Standard Kingspan Insulation Warranty applies. Refer to Kingspan Insulation Warranty statement for further details. This is available online at thermakraft.co.nz or call **0800 806 595**.

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0800 806 595
www.thermakraft.co.nz

Thermakraft and Ausmesh products are brought to you by Kingspan Insulation NZ Limited.



The recommendations contained in Kingspan's literature are based on good building practice, but are not an exhaustive statement of all relevant information and are subject to any conditions contained in the Warranty. All product dimensions and performance claims are subject to any variation caused by normal manufacturing process and tolerances. Furthermore, as the successful performance of the relevant system depends on numerous factors outside the control of Kingspan (for example quality of workmanship and design), Kingspan shall not be liable for the recommendations in that literature and the performance of the Product, including its suitability for any purpose or ability to satisfy the relevant provisions of the Building Code, regulations and standards. Literature subject to change without notification. Latest documentation can be found online. E&OE.