From: Corban Walls s 9(2)(a)
Sent: Wednesday, 23 August 2017 1:10 p.m.
To: Determinations
Subject: 6 Island Bay Road Determination (1of2)
Attachments: P1 determination-application-form.pdf; 6 Island Bay Road - BC Application.pdf; Council Letter - 21st August.pdf; Council Letter 4th August.pdf; Cover Letter.pdf; Dow Corning 121 Spec.pdf; Dow Corning 795 Spec.pdf; Engineering Calculations PS1.pdf; Engineering COD.pdf; Glass Engineering Calculations.pdf; LBP Certificate of Design Work.pdf; Structural Glazing Example 1.pdf; Structural Glazing Example 2.pdf; Viridian Glass PS1.pdf; Water Tight Test Report.pdf

s 9(2)(a)

Corban Walls
s 9(2)(a)

Residential application for a project information memorandum and/or building consent

Section 33 or section 45, Building Act 2004

Auckland Council
Te Kaunihera o Tāmaki Makaurau

Date received: Application No:

APPLICATION TYPE *(tick appropriately)*

✓ As applicable; if you have an existing application relating to this building work, note the number beside the application type:

☐ Project information memorandum (PIM)	
☑ Building consent (BC)	
☑ Stage 2 of intended 2 stages	
☐ Amendment to building consent N°:	
☐ National multi-use approval No:	

✓ As applicable RBW = Restricted building work
FAP = Financial assistance package applicable

Does application involve RBW	☑ Yes	☐ No
Is this a re-clad application	☐ Yes	☑ No
Has a pre-application meeting been held	☐ Yes	☑ No
Is this application subject to a claim under the FAP scheme	☐ Yes	☑ No
If yes, FAP claim number:		

THE BUILDING

Street address of building: (*for structures that do not have a street address, state the nearest street intersection and the distance and direction from that intersection*)

6 Island Bay Road, Beach Haven, Auckland New Zealand

Legal description of land where building is located: (*state legal description as at the date of application and, if the land is proposed to be subdivided, include details of relevant lot numbers and subdivision consent*)

Lot 3 DP 194346

Building name:

Location of building within site/block number: (*include nearest street access*)

Number of levels: (*include ground level and any levels below ground*) Two

Level or unit number:

Current, lawfully established, use: (*include number of occupants per level and per use if more than 1*)

Area: (*total floor area; indicate area affected by the building work if less than the total floor area*) 290 m^2

Year first constructed: 2016

THE OWNER

Name of owner: (*Include preferred form of address e.g. Mr, Miss, Dr if an individual*) Mr Corban Walls

Contact person: (*Insert n/a if the applicant is an individual*) Corban Walls

Mailing address: s 9(2)(a)

Postcode: s 9(2)(a)

Street address/registered office:

Phone number: Daytime

After hours:

Facsimile number:

Mobile: s 9(2)(a)

Email address: s 9(2)(a)

Website:

The follow evidence of ownership is attached to this application ☑ *Certificate of Title* ☐ *Lease agreement* ☐ *Sale & Purchase agreement* ☐ *Other document showing full name of legal owners of the building*

AGENT *(only required if application is being made on behalf of the owner)*

Name of agent:			
Contact person:			
Mailing address:		Postcode:	
Street address / registered office:			
Phone number: Daytime		After hours:	
Facsimile number:		Mobile:	
Email address:		Website:	
Relationship to owner: *(supply details of authorisation from the owner to make the application on the owner's behalf)*			

THE APPLICANT *(only required where sale and purchase agreement in place or certificate of title has not been issued)*

Name of applicant: *(Include preferred form of address e.g. Mr, Miss, Dr if an individual)*			
Contact person: *(Insert n/a if the applicant is an individual)*			
Mailing address:		Postcode:	
Street address / registered office:			
Phone number: Daytime		After hours:	
Facsimile number:		Mobile:	
Email address:		Website:	
Relationship to owner: *(supply details of authorisation from the owner to make the application on the owner's behalf)*			

FIRST POINT OF CONTACT FOR COMMUNICATIONS WITH COUNCIL / BUILDING CONSENT AUTHORITY

Full name:	Corban Walls		
Mailing address:	s 9(2)(a)	Postcode:	s 9(2)(a)
Phone number:		Mobile:	s 9(2)(a)
Facsimile number:		Email address:	s 9(2)(a)
Preferred method of correspondence:		Email: ☑	Post: ☐

BILLING

All consent related invoices/refunds to be billed to:	Owner: ☑	Agent: ☐	Applicant: ☐
Preferred method of billing:		Email: ☑	Post: ☐
Purchase order/Reference number: (if applicable)			

Please note: *any refunds are paid to the receipted name unless written authorisation has been received from the receipted person or company stating otherwise*

SIGNATURE

Signature:  Owner: ☑ Agent: ☐ Applicant: ☐

Name: Corban Walls Date: 26th October 2016

If you are signing this application on behalf of a company/trust/other entity (the agent), you are declaring that you are duly authorised to sign on behalf of the owner to make this application

THE PROJECT

Description of the building work: Stage 2 of 2 involves the construction of the 2 level, 3 bedroom dwelling with 3 car garage. This will include all above ground structure cladding and glazing, and roofing. Roof deck over garage and hard landscaping.

Current, lawfully established use:

HOUSING	☑ Detached dwelling ☐ Multi-unit dwelling ☐ Group dwelling
ANCILLARY	☐ Outdoor fire ☐ Retaining wall ☐ _____
OUTBUILDINGS	☐ Carport ☐ Garage ☐ Pool ☐ _____

Will the building work result in a change of use? ☐ Yes ☑ No

If yes, provide details of new use:

Estimated total value of building work for **this** application, (building consent or amendment) including goods and services tax $ 480,000

Stage: 2 of an intended: 2 stages

Intended life of new building (if less than 50 years): number of years

LIST OF OTHER APPROVALS GAINED *(please provide details)*

APPROVAL	REFERENCE NUMBER	DETAILS
Building consents previously issued for this project: (*if any*)	BB-1256797	
Resource consent	LF-2142147	Land use consent
Engineering approval		
Certificate of Acceptance	COA-1257426	32x Concrete Piles
Other		

PROJECT INFORMATION MEMORANDUM *(the following matters are involved in the project)*

☐ Subdivision

☐ Alterations to land contours

☐ New or altered connections to public utilities

☐ New or altered locations and/or external dimensions of buildings

☐ New or altered access for vehicles

☐ Building work over or adjacent to any road or public place

☒ Disposal of stormwater or wastewater

☐ Building work over any existing drains or sewers or in close proximity to wells or water mains

☐ Other matters known to the applicant that may require authorisations from the Building Consent Authority, please specify:

ATTACHMENTS *(the following documents are attached to this application)*

- ☑ Plans and specifications
- ☐ Development contribution notice
- ☐ Project information memorandum
- ☑ Completed relevant checklist(s)
- ☐ Certificate attached to project information memorandum
- ☐ Memoranda from Licensed Building Practitioner(s) who carried out or supervised any design work that is restricted building work

MEANS OF COMPLIANCE *(the building work will comply with the building code as follows)*

Clause (*involved in the proposed building work*)	**Means of compliance** (*refer to compliance documents*) or detail of alternative solution in the plans or specifications	**Clause** (*involved in the proposed building work*)	**Means of compliance** (*refer to compliance documents*) or detail of alternative solution in the plans or specifications
B1 Structure	☑ B1/AS1 ☐ NZS 3604 ☐ NZS 4229 ☐ AS/NZS 1170 ☐ Other _____	**G1 Personal hygiene**	☑ G1/AS1 ☐ Other _____
B2 Durability	☑ B2/AS1 ☐ NZS 3101 ☐ NZS 3604 ☐ NZS 3602 ☐ Other _____	**G2 Laundering**	☑ G2/AS1 ☐ Other _____
C1-C6 Protection from Fire	☑ C/AS1-7 ☐ C/VM2 ☐ Specific design	**G3 Food preparation and prevention of contamination**	☑ G3/AS1 ☐ Other _____
D1 Access Routes	☑ D1/AS1 ☐ NZS 4121 ☐ Other_____	**G4 Ventilation**	☑ G4/AS1 ☐ AS 1668.2 ☐ NZS 4303 ☐ AS/NZS 3666.1&2 ☐ Other _____
D2 Mechanical installations for access	☐ D2/AS1 ☐NZS 4121 ☐ NZS 4332 ☐ NZS 4334 ☐ Other n/a	**G5 Interior environment**	☑ G5/AS1 ☐ NZS 4214 ☐ NZS 4121 ☐ Other _____
E1 Surface water	☑ E1/AS1 ☐ E1/VM1 ☐ Other _____	**G6 Airborne and impact sound**	☑ G6/AS1 ☐ Other _____
E2 External moisture	☐ E2/AS1 ☐ E2/AS2 ☐ E2/AS3 ☐ E2/VMI ☑ AS/NZS 4284 ☐ Specific design (Façade Engineer) ☑ Other _____	**G7 Natural light**	☑ G7/AS1 ☐ NZS 6703 ☐ Other _____
E3 Internal moisture	☑ E3/AS1 ☐ NZS 4214 ☐ Other _____	**G8 Artificial light**	☑ G8/AS1 ☐NZS 6703 ☐ Other _____
F1 Hazardous agents on site	☑ F1/AS1 ☐ Other _____	**G9 Electricity**	☑ G9/AS1 ☐ AS/NZS 3000 ☐ Other _____
F2 Hazardous building materials	☑ F2/AS1 ☐ NZS 4223.3 ☐ Other _____	**G10 Piped services**	☑ G10/AS1 ☐ 3501 ☐ NZS 7646 ☐ AS/NZS 5601.1 ☐ Other _____
F3 Hazardous substances	☑ F3/VM1 ☐ Hazardous Substances and New Organisms Act 1996 ☐ Other _____	**G11 Gas as an energy source**	☑ G11/AS1 ☐ AS/NZS 5601.1 ☐ Other _____
F4 Safety from falling	☑ F4/AS1 ☑ Fencing of Swimming Pools Act 1987 ☐ Other _____	**G12 Water supplies**	☐ G12/AS1 ☑ AS/NZS 3500.1 ☐ Other _____
F5 Construction and demolition hazards	☑ F5/AS1 ☐ Other _____	**G13 Foul water**	☐ G13/AS1 ☐ G13/AS2 ☐ G13/AS3 ☑ AS/NZS 3500.2 ☐ Other _____
F6 Visibility in Escape Routes	☑ F6/AS1 ☐ AS/NZS 2293.2 ☐ NZS 6104 ☐ AS 2293.1 & 3 ☐ Other _____	**G14 Industrial liquid waste**	☑ G14/AS1 ☐ Other _____
F7 Warning systems	☑ F7/AS1 ☐ NZS 4514 ☐ NZS 4512 ☐ NZS 4515 ☐ NZS 4541 ☐ AS 3786 ☐ Other _____	**G15 Solid waste**	☑ G15/AS1 ☐ Other _____
F8 Signs	☑ F8/AS1 ☐ AS/NZS 2293.2 ☐ Other _____	**H1 Energy efficiency**	☑ H1/AS1 ☐ NZS 4218 ☐ NZS 4243 ☐ NZS 4214 ☐ ALF Design Manual ☐ Other _____
Cable car ☐ Yes ☑ No	☐ NZS 5270:2005 Part 16, Appendix C ☐ Other _____		

Waivers and modifications: *State nature of waiver or modification of building code required*

PRODUCER STATEMENTS

The design professional is responsible for ensuring architectural drawings are stamped verifying that the plans accurately reflect their intentions; if required, construction monitoring levels and inspections must be attached to the producer statement.

For further information please refer to Auckland Councils producer statement policy at www.aucklandcouncil.govt.nz

RESTRICTED BUILDING WORK

Will the building work include any restricted building work? Yes ☑ No ☐

Is a solid fuel heater involved? (If yes, is exemption required) Yes ☐ No ☑

If the flue penetration through the roof exceeds 300mm; this is deemed restricted building work (RBW). All RBW is required to be installed by a licensed building practitioner; however, as there are no license classes available for this type of work Council will apply an exemption if requested. Where an exemption is requested, Council will either inspect the work or rely on a producer statement issued by a person approved to issue such statements (refer to Auckland Council Producer Statement Register on our website for further information)

KEY CONTACTS / LICENSED BUILDING PRACTITIONERS (LBP) *(please provide details)*

Please provide the following details for all licensed building practitioners (LPB) who will be involved in carrying out or supervising restricted building work. (*If these details are unknown at the time of application, they **must** be supplied before the building work begins).*

Designer or Architect

Business/Name: CAD Services / s 9(2)(a)			
Address: CADServices@xtra.co.nz			
Daytime:	After hours:		
Mobile:	Fax:		
Registration or LBP Registration No: BP124743 Design D1			

Structural Engineer

Business/Name: Jackson Clapperton Partners	
Address: jcp.ltd@xtra.co.nz	
Daytime: 09 820 0131	After hours:
Mobile: s 9(2)(a)	Fax:
Registration or LBP Registration No: CP Eng. 7518	

Head Contractor / Site Manager

Business/Name: Buildstrong / s 9(2)(a)	
Address: s 9(2)(a) @buildstrong.co.nz	
Daytime:	After hours:
Mobile: s 9(2)(a)	Fax:
LBP Registration No: BP123975	

Builder / Carpentry work

Business/Name: Buildstrong / s 9(2)(a)	
Address: s 9(2)(a) @buildstrong.co.nz	
Daytime:	After hours:
Mobile: s 9(2)(a)	Fax:
LBP Registration No: BP123975	

Drain layer

Business/Name: Collins Drainage / s 9(2)(a)	
Address: info@collinsdrainage.co.nz	
Daytime:	After hours:
Mobile: s 9(2)(a)	Fax:
Registration No: 20886	

Plumber

Business/Name: Collins Plumbing / s 9(2)(a)	
Address: s 9(2)(a)	
Daytime: 09 962 5395	After hours:
Mobile: s 9(2)(a)	Fax:
Registration No: 19231	

KEY CONTACTS / LICENSED BUILDING PRACTITIONERS (LBP) *(please provide details)*

Electrician

Business/Name:	Rhythm Electrics / s 9(2)(a)		
Address:	s 9 (2)(@rhythmelectrics.co.nz		
Daytime:		After hours:	
Mobile:	s 9(2)(a)	Fax:	
Registration No:	E249847		

Gas Fitter

Business/Name:	Collins Plumbing / s 9(2)(a)		
Address:	s 9(2)(a)		
Daytime:	09 962 5395	After hours:	
Mobile:	s 9(2)(a)	Fax:	
Registration No:	19231		

Foundation work

Business/Name:	Buildstrong / s 9(2)(a)		
Address:	s 9 (2)(@buildstrong.co.nz		
Daytime:		After hours:	
Mobile:	s 9(2)(a)	Fax:	
LBP Registration No:	BP123975		

Bricklaying

Business/Name:			
Address:			
Daytime:		After hours:	
Mobile:		Fax:	
LBP Registration No:			

Blocklaying

Business/Name:			
Address:			
Daytime:	After hours:		
Mobile:	Fax:		
LBP Registration No:			

External Plastering

Business/Name:			
Address:			
Daytime:		After hours:	
Mobile:		Fax:	
LBP Registration No:			

Roofing work

Business/Name:			
Address:			
Daytime:	After hours:		
Mobile:	Fax:		
LBP Registration No:			

Other

Business/Name:			
Address:			
Daytime:		After hours:	
Mobile:		Fax:	
LBP Registration No:			

OFFICE ONLY USE

Receipt No:	
Deposit $:	
PIM/BC No:	
Date:	

New compliance schedule required	☐ Yes	☐ No
Existing compliance schedule requires amending	☐ Yes	☐ No

Area Office		
☐Central	☐Henderson	☐Orewa
☐Papakura	☐Pukekohe	☐Takapuna
☐Manukau		

☐Compass ☐MBC ☐ Professional

Collins Plumbing / s 9(2)(a)

s 9(2)(a)

COMMENTS

09 962 5395

Lodgement checklist: residential

Please attach this checklist with your application

Auckland Council
Te Kaunihera o Tāmaki Makaurau

GUIDANCE INFORMATION

Documentation must cover all aspects identified in this lodgement checklist. The checklist is designed to ensure applicants know up front what information is required, please ensure you read it and answer all questions with the applicable answer. This will ensure your application is processed in a timely manner. For guidance refer to the building consent practice notes on the Auckland Council website.

All applications must be accompanied by 2 x comprehensive sets of documentation (except in Manukau where 3 x sets are required).

Standard of documentation

Section 7 of the Building Act defines 'plans and specifications' as the drawings, specifications and other documents according to which a building is to be constructed, altered, demolished or removed. Documentation is required to be of a high, professional standard. Refer to the Ministry of Business, Innovation & Employment publication "Guide to applying for a building consent" for a copy visit www.building.govt.nz

Drawings must be:-

- Produced to scale on white A3, A2 or A1 paper. Minimum font size of 10 or if CAD 2.5
- Produced in black ink only (no coloured or freehand drawings)
- each drawing must contain:-
  - a drawing number and title
  - designer's name
  - address of property
  - be dated for version control
- specifications must be project specific and include relevant supporting documentation (installation details)

Restricted building work (RBW): From March 1st 2012 the introduction of 'RBW' takes effect for residential dwellings and apartment buildings. It is defined as design or building work that is critical to the integrity of the building.
A house is:

- A free-standing, fully detached building consisting of a single residential unit (and can also have 1 or more residential facilities such as a foyer, laundry, garage, etc)

Licensed building practitioners (LBPs) are the only people allowed to supervise or carry out RBW. The classes of RBW are: design, carpentry, site supervision, roofing, bricklaying, blocklaying, external plastering, foundations and emergency warning systems.

For further information about licensing or restricted building work refer to the Ministry of Building Innovation and Employment website www.building.govt.nz

Applications supported by a producer statement (PS): If an application is supported by a producer statement, the architectural plans must be counter-signed by the design specialist (i.e. engineer) confirming design details unless the drawings are provided by the specialist.

Note: producer statements must be dated no older than 90 days and the author must be listed on Councils Approved Author Register. For a list of approved authors please visit www.aucklandcouncil.govt.nz

Deposit: all applications must be supported by a deposit payable at the time of lodgement. A final invoice will be sent when your building consent has been approved; the final invoice covers the full cost of processing the application as well as fees for inspections and the code compliance certificate less the deposit already paid.

Water meter applications: for new water meter connections download an application form and apply direct to WaterCare (note independent charges will occur) please refer to www.watercare.co.nz

Vehicle crossing applications: all building consent applicants should advise whether the property has an existing vehicle crossing that will be used to serve the new building or development. If you do not have an existing crossing **OR** are building within 1.0m of the road corridor **OR** a new building on a vacant lot, then a new vehicle crossing application must be submitted to Auckland Council, who act as the receiving agent for Auckland Transport. A "Vehicle Crossing Application Form", and description of the approval process, can be viewed and downloaded from the website www.at.govt.nz by typing in the keywords "Vehicle Crossing" in the search bar and selecting the "Vehicle Crossing link". The completed application form together with the application fee must be submitted in person to your nearest Auckland Council Service Centre.

Network utility operator: prior approval is required if the building is under or near high voltage transmission lines or over or near public drains.

Financial assistance package (FAP): if this application is subject to a claim under the Financial Assistance Package (FAP) scheme; you must lodge this application in person at the Graham Street Service Centre, 35 Graham Street, Auckland City.

SITE ADDRESS

Property address: 6 Island Bay Road, Beach Haven

DECLARATION

I/We confirm that all the information/documentation as indicated on this checklist is provided. If this Residential Building Consent application includes a Solid Fuel Heater, Solar water heater/heat pump water heater or a Pool/ Spa Pool **all relevant sections of this checklist must be completed** (please tick ✓ as applicable):

	Solid fuel heater		Solar water heater/heat pump water heater	✓	Pool / Spa Pool

Owner / Agent signature: [signature]

Date: 26th October 2016

VEHICLE CROSSING

All building consent applicants should advise whether the property has an existing vehicle crossing that will be used to serve the new building or development. If you do not have an existing crossing OR are building within 1.0m of the road corridor OR a new building on a vacant lot, then a new vehicle crossing application must be submitted to Auckland Council, who act as the receiving agent for Auckland Transport. A "Vehicle Crossing Application Form" and description of the approval process, can be viewed and downloaded from the website www.at.govt.nz by typing "Vehicle Crossing" in the search bar and selecting the "Vehicle Crossing link". The completed application form together with fee must be submitted in person to your nearest Auckland Council Service Centre.

Yes	No	N/A	☑ New vehicle crossing OR ☐ Building within 1.0m of road corridor
Yes	No	N/A	☐ Existing vehicle crossing

Customer use (circle appropriate)			Description	Council use only		
GENERAL REQUIREMENTS (N/A denotes not applicable)				Entire section N/A		☐
Yes	No	N/A	Application form completed in full and signed	Yes	No	N/A
Yes	No	N/A	Application fee as per Auckland Council fee schedule	Yes	No	N/A
Yes	No	N/A	Project description is accurate and describes all work involved in the project	Yes	No	N/A
Yes	No	N/A	Building within 2m of or over a public drain requires Watercare Services Ltd (WSL) or other NUO approval.	Yes	No	N/A
Yes	No	N/A	Have you provided bridging design details to build over the drain?	Yes	No	N/A
Yes	No	N/A	Building within 10m of a WSL main trunk line requires WSL or other NUO approval.	Yes	No	N/A
Yes	No	N/A	CCTV video / DVD and report provided for building over / near public drains?	Yes	No	N/A
Yes	No	N/A	Has the WSL or other NUO build-over approval been applied/approved/notified of? (Please circle one).	Yes	No	N/A
Yes	No	N/A	WSL application form provided to the customer for them to apply.	Yes	No	N/A
Yes	No	N/A	Certificate of title (no older than 90 days) including all consent notices and encumbrances; sale and purchase agreement or lease agreement	Yes	No	N/A
Yes	No	N/A	Letter of authorisation from owner if application is submitted by an agent, company or trust	Yes	No	N/A

MEMORANDUM / CERTIFICATE OF DESIGN WORK (CoW)				Entire section N/A		☐
Yes	No	N/A	The designer has provided a memorandum of design for restricted building work?	Yes	No	N/A
Yes	No	N/A	The engineer has provided a memorandum of design for restricted building work?	Yes	No	N/A
Yes	No	N/A	The memorandum of design is completed in full and personally signed by licensed building practitioner?	Yes	No	N/A
Yes	No	N/A	Is there a waiver or modification?	Yes	No	N/A

Customer use (circle appropriate)			Description	Council use only		
AMENDMENTS				Entire section N/A		☐
Yes	No	N/A	Has the original consent been issued? (If not, this change is considered a revision not an amendment).	Yes	No	N/A
Yes	No	N/A	Does the description of building work accurately summarise the changes?	Yes	No	N/A
Yes	No	N/A	Plans clouded to show changes? (two copies minimum provided)	Yes	No	N/A
SITE PLAN (SCALE 1:100 FOR URBAN AREAS AND 1:200 FOR RURAL AREAS)				Entire section N/A		☐
Yes	No	N/A	Legal description; Lot, DP and street address indicated?	Yes	No	N/A
Yes	No	N/A	North point indicated on the site plan?	Yes	No	N/A
Yes	No	N/A	Land contours, or spot levels shown at maximum 1m increments; datum identified with levels indicated.	Yes	No	N/A
Yes	No	N/A	Site boundaries including bearings of boundaries / exclusive area boundaries for cross lease properties, common areas clearly shown.	Yes	No	N/A
Yes	No	N/A	All existing and proposed buildings clearly defined with dimensions from boundaries and other buildings (including notional boundaries if appropriate)	Yes	No	N/A
Yes	No	N/A	All existing and proposed sanitary/storm water drainage (including on-site treatment systems) indicated with distances to boundaries	Yes	No	N/A
Yes	No	N/A	Location of HWC if external	Yes	No	N/A
FOUNDATION PLAN (SCALE 1:100 OR 1:50)				Entire section N/A		☐
Yes	No	N/A	Slab construction: concrete, steel reinforcing, slab thickening and control joints specified, detailed and dimensioned. If SED (e.g. rib-raft) provide engineers design (Refer specific engineered design section)	Yes	No	N/A
Yes	No	N/A	Cross section of footing details including height in relation to ground levels shown	Yes	No	N/A
Yes	No	N/A	Suspended timber floor construction: pile type, treatment, size, embedment depth and layout specified, detailed and dimensioned.	Yes	No	N/A
Yes	No	N/A	Subfloor framing details, including size, centres, fixings, timber treatment and grading details for all subfloor and deck framing	Yes	No	N/A
Yes	No	N/A	Joist layout plan for all levels including joist size, centres, timber treatment and grading details for all floors and decks.	Yes	No	N/A
FLOOR PLAN (SCALE 1:100 OR 1:50)				Entire section N/A		☐
Yes	No	N/A	Existing and proposed layout and use	Yes	No	N/A
Yes	No	N/A	Internal stairs, handrails and decking shown	Yes	No	N/A
Yes	No	N/A	Finished floor levels shown?	Yes	No	N/A
Yes	No	N/A	Location of smoke alarms?	Yes	No	N/A
Yes	No	N/A	Location of HWC if internal?	Yes	No	N/A
ELEVATIONS (SCALE 1:100 OR 1:50)				Entire section N/A		☐
Yes	No	N/A	Elevations for each external wall provided?	Yes	No	N/A
Yes	No	N/A	Existing and finished ground levels/floor levels indicated?	Yes	No	N/A
Yes	No	N/A	External stairs, handrails and decking shown?	Yes	No	N/A
Yes	No	N/A	Sub floor ventilation indicated?	Yes	No	N/A
CROSS-SECTIONS (SCALE 1:100 OR 1:50)				Entire section N/A		☐
Yes	No	N/A	A minimum of two cross sections through the length and width of the building?	Yes	No	N/A
Yes	No	N/A	Retaining wall details (cut, fill, height of retained ground, waterproof membrane and drainage) and height of wall indicated?	Yes	No	N/A
Yes	No	N/A	Are foundation details, terraces, steps, balustrades indicated as to proximity to services?	Yes	No	N/A
Yes	No	N/A	Floor, wall and roof construction shown (size, height, timber treatment, grading, insulation, lining and cladding)?	Yes	No	N/A
Yes	No	N/A	Finished ground levels and floor levels?	Yes	No	N/A

Customer use (circle appropriate)			Description	Council use only		
ROOF PLAN + ROOF FRAMING PLAN (SCALE 1:100 OR 1:50)				Entire section N/A		☐
Yes	No	N/A	Roof bracing plan?	Yes	No	N/A
Yes	No	N/A	M/F producer statement for computer software, fabricator design statement and truss layout plan supplied?	Yes	No	N/A
Yes	No	N/A	Location and size of rainwater heads, scuppers, internal gutters, spouting and downpipes indicated?	Yes	No	N/A
PLUMBING AND DRAINAGE PLAN (SCALE 1:100 OR 1:50)				Entire section N/A		☐
Yes	No	N/A	Existing and proposed fixtures and fittings?	Yes	No	N/A
Yes	No	N/A	Details of storm water/sewer disposal systems provided? E.g. detention tanks, pumps and effluent disposal including location, size, volume and depth of excavations (if applicable)	Yes	No	N/A
Yes	No	N/A	On-site waste water disposal and TP58 report?	Yes	No	N/A
Yes	No	N/A	Soakage report provided and details shown on plans?	Yes	No	N/A
Yes	No	N/A	Locate wastes, pipes and outlets, including sizes and gradients, shown in relation to mid-floor framing or slab construction. Schematic for more than one level.	Yes	No	N/A
BUILDING ENVELOPE (SCALE 1:5 OR 1:10)				Entire section N/A		☐
Yes	No	N/A	E2/AS1 risk matrix provided for each elevation	Yes	No	N/A
Yes	No	N/A	Cross sections / details of all roof and wall junctions, eaves, balustrade, parapets, penetrations, control joints and sill/head/jamb flashings	Yes	No	N/A
Yes	No	N/A	Current manufacturer's technical specifications/installation instructions and maintenance requirements for all cladding systems	Yes	No	N/A
Yes	No	N/A	Quality assurance programme (if re-clad)	Yes	No	N/A
BRACING PLAN				Entire section N/A		☐
Yes	No	N/A	Bracing calculations, specifications and layout (wall, subfloor and deck)?	Yes	No	N/A
SPECIFIC ENGINEERED DESIGN (SED)				Entire section N/A		☐
Yes	No	N/A	Engineering calculations and drawings?	Yes	No	N/A
Yes	No	N/A	Producer statements completed in full and signed (where provided) and author on Council register	Yes	No	N/A
Yes	No	N/A	Plans signed and dated by engineer or structural drawings provided or schedule listing work covered if supported by producer statement	Yes	No	N/A
OTHER DOCUMENTATION (specification / reports / calculations)				Entire section N/A		☐
Yes	No	N/A	Two copies of project-specific specifications and design reports provided?	Yes	No	N/A
Yes	No	N/A	Waterproofing details and floor / wall linings and finishes specified for wet areas (i.e. bathroom and laundry)?	Yes	No	N/A
Yes	No	N/A	Soil and ground stability; geotechnical report / plans?	Yes	No	N/A
Yes	No	N/A	Site contamination; report / plans?	Yes	No	N/A
Yes	No	N/A	Flooding and surface water; report / plans?	Yes	No	N/A
Yes	No	N/A	Erosion and sediment control plan; report / plans?	Yes	No	N/A
Yes	No	N/A	Energy efficiency (H1) report and calculations?	Yes	No	N/A
Yes	No	N/A	Acoustic design report?	Yes	No	N/A
Yes	No	N/A	Fire design report / construction details if building within 1m of boundary, > 3 stories, or household units are attached	Yes	No	N/A
Yes	No	N/A	Agreement to provide producer statement construction if applicable?	Yes	No	N/A

Customer use (circle appropriate)			Description	Council use only		
PLANNING INFORMATION				Entire section N/A		☐
Yes	No	N/A	Copy of approved resource consent and conditions together with stamped plans provided?	Yes	No	N/A
Yes	No	N/A	Location, dimensions and gradient of car parking/ manoeuvring/ vehicle crossing shown on the plan?	Yes	No	N/A
Yes	No	N/A	All areas and volumes of proposed disturbed earth (eg. excavation, fill, retaining) indicated?	Yes	No	N/A
Yes	No	N/A	All areas of impermeable coverage, building and landscaping shown and calculations provided?	Yes	No	N/A
Yes	No	N/A	Show compliance with outdoor living and service court provisions shown?	Yes	No	N/A
Yes	No	N/A	Are all streams and riparian margins shown on the plan?	Yes	No	N/A
Yes	No	N/A	Are all trees protected by the District Plan (height, girth and drip line) shown?	Yes	No	N/A
Yes	No	N/A	Height in relation to boundary controls shown at the critical points and with the maximum height control shown including relevant ground and floor levels?	Yes	No	N/A
Yes	No	N/A	Have you checked that your development is / is not affected by any provisions of the Unitary Plan (which have immediate legal effect)	Yes	No	N/A
DEMOLITION / REMOVAL / RELOCATION (*if included as part of building project*)				Entire section N/A		☐
Yes	No	N/A	Services capped and sealed inside boundary?	Yes	No	N/A
Yes	No	N/A	All existing buildings and buildings to be demolished / removed shown?	Yes	No	N/A
Yes	No	N/A	Safety plan / report detailing safe handling and disposal of hazardous materials provided?	Yes	No	N/A
Yes	No	N/A	Pollution prevention plan covering control of noise and dust provided?	Yes	No	N/A
Yes	No	N/A	Details/means of barricading the site to prevent public access provided?	Yes	No	N/A
Yes	No	N/A	Third party report for relocatable building?	Yes	No	N/A
SWIMMING / SPA POOL AND POOL FENCING				Entire section N/A		☐
Yes	No	N/A	☑ Swimming pool ☐ Spa pool ☐ Ornamental pool	Yes	No	N/A
Yes	No	N/A	☑ In-ground ☐ Above ground	Yes	No	N/A
Yes	No	N/A	Pool specifications i.e. type, brand, installation, etc	Yes	No	N/A
Yes	No	N/A	Engineering calculations / producer statements provided for structural design elements (refer to SED section)	Yes	No	N/A
Yes	No	N/A	Site plan with location of proposed pool and pool fencing including any gates; gates to show opening direction (refer also to site plan section) and any changes in ground levels	Yes	No	N/A
Yes	No	N/A	Immediate pool area specified (i.e. pool isolated)	Yes	No	N/A
Yes	No	N/A	Manufacturer's specification for fencing	Yes	No	N/A
Yes	No	N/A	Plans to show details of fencing, i.e. materials, height, gate mechanisms (closing and latching devices) and latch heights specified	Yes	No	N/A
Yes	No	N/A	**If building is used as part of fencing:** ☐ Floor plan indicating location and opening projection of all doors opening into pool area ☐ Construction details and type of self-closing / latching devices for all doors leading into pool area ☐ Elevations indicating any windows <1.2m in height opening into pool area and details of locking mechanisms i.e. restrictors	Yes	No	N/A
Yes	No	N/A	**If boundary fencing used as part of pool fencing**: ☐ Photos showing all intersecting fences note: no climbable intersecting fences, rails, etc permitted ☐ Photos showing both sides of fence note: no climbable projections permitted within 1.2m of fence (i.e. trees, sheds, etc) ☐ Cross-section showing details of fencing (height, openings, materials, etc)	Yes	No	N/A
Yes	No	N/A	Exemption for pool covers, door alarms and non-complying doors?	Yes	No	N/A

Customer use (circle appropriate)			Description	Council use only		
SOLID FUEL HEATER APPLIANCE				Entire section N/A		☐
Yes	No	N/A	Location of solid fuel heating appliance shown on floor plan?	Yes	No	N/A
Yes	No	N/A	Location of all windows and doors in close proximity to appliance shown?	Yes	No	N/A
Yes	No	N/A	Location of hot water cylinder (if wetback) provided?	Yes	No	N/A
Yes	No	N/A	Cross section through building to show penetrations through floor joists (required where building is 2 or more stories)?	Yes	No	N/A
Yes	No	N/A	Cross section through roof showing roof material and flashing details; floor construction (i.e. timber / concrete floor) and type of restraint (i.e. method of fixing appliance to hearth and hearth to floor)	Yes	No	N/A
Yes	No	N/A	Cross section through chimney where false chimney surround constructed	Yes	No	N/A
Yes	No	N/A	Elevation or photo of external wall that the appliance is being installed on to show location and height of flue; dimensions to be included (and clearances from upper storey windows where flue penetrates a lower storey)	Yes	No	N/A
Yes	No	N/A	Wetback details; details of valves and water supply pipes?	Yes	No	N/A
Yes	No	N/A	Type and capacity of hot water cylinder Note: HWC must be open vented low pressure system if wetback installed	Yes	No	N/A
Yes	No	N/A	Manufacturer's specifications, indicating make and model, installation instructions, clearances, flue details, flashing details, hearth insulating method, etc?	Yes	No	N/A
Yes	No	N/A	Method of ventilation specified? (Opening window; air duct; air blower)	Yes	No	N/A
Yes	No	N/A	National Environmental Standard: details of emission and thermal efficiency ratings for model installed	Yes	No	N/A
Yes	No	N/A	Authorisation number ECAN Nelson	Yes	No	N/A
Yes	No	N/A	Second hand appliance: third party report on condition of appliance, third party must also confirm that the appliance complies with emission standards	Yes	No	N/A
Yes	No	N/A	Heritage buildings: approval required from NZ Historic Places Trust and / or Planning Team	Yes	No	N/A
Yes	No	N/A	If RBW, has an exemption under clause K of Schedule 1 been requested? (Refer to application form)	Yes	No	N/A

WATER HEATERS (SOLAR OR HEAT PUMP)				Entire section N/A		☐
Yes	No	N/A	Location and capacity of hot water cylinder and temperature or pressure relief valve discharge point provided?	Yes	No	N/A
Yes	No	N/A	Supporting structural components in the roof space are details provided?	Yes	No	N/A
Yes	No	N/A	Connection and weatherproofing details, including flashing details, provided?	Yes	No	N/A
Yes	No	N/A	At least two elevations provided to show compliance with height to boundary restrictions and position / inclination of panels?	Yes	No	N/A
Yes	No	N/A	Location of solar panels in relation to rafters / trusses details provided?	Yes	No	N/A
Yes	No	N/A	Span and centres of rafters / trusses and under purlins if applicable details provided?	Yes	No	N/A
Yes	No	N/A	Weight of panels; size of panel (area); and dimensions to edge of roof	Yes	No	N/A
Yes	No	N/A	Temperature or pressure valve discharge point details provided?	Yes	No	N/A
Yes	No	N/A	Specifications and technical data sheets provided?	Yes	No	N/A
Yes	No	N/A	Engineering calculations / producer statements provided for structural design elements (refer to SED section)	Yes	No	N/A
Yes	No	N/A	Product certification / appraisal certificates	Yes	No	N/A

COUNCIL USE

Consent number: PIM number:

Other relevant consent numbers:

Project complexity level? R1 ☐ R2 ☐ R3 ☐

Application accepted: (please circle) Yes No

If NO, state the reason(s) why application not accepted in comments section below:

COUNCIL USE *(continued)*

LBP register checked: (please circle)	Yes	No	NA	Designer / Draftsperson / Engineer number	
IPENZ register checked: (please circle)	Yes	No	NA	Chartered professional engineer number	
NZRAB register checked: (please circle)	Yes	No	NA	Registered architect number	

Name of Lodgement Officer:		Signature:		Date	

Agreement to provide a producer statement during construction

Producer statement construction (PS3) or producer statement construction review (PS4)

I, being the owner / agent confirm that I have engaged the following producer statement author(s) **listed on the reverse side** of this document to be responsible for carrying out construction (PS3) or observing and supervising construction (PS4)

Name:	Corban Walls	☒ Owner ☐ Agent	
Signature:		Date:	26th October 2016
Building consent number (if known)	BB-1256797		
Address of project:	6 Island Bay Road, Beach Haven, Auckland 0626		

Important notes:

In order to approve a building consent, Council must be satisfied on reasonable grounds that the provisions of the Building Code will be met. Council must also be satisfied that the building work is constructed in accordance with the building consent and Building Code before it can issue a code compliance certificate. Producer statements are a mechanism used for establishing compliance with the Building Code and are a cost-effective alternative to Council undertaking design reviews and inspections itself.

In some instances, building work that is specifically designed may require specialist installation / supervision. Where these elements are identified, the owner / agent may enter into an agreement with Council, to provide a producer statement to support compliance.

*This form serves as acknowledgement by the owner/agent that a producer statement will be provided on completion of the building work to which it relates. If at the time of application, the design professional or contractor details are unknown, please complete all other fields of this form noting the words **"to be advised"** in the author's name field.*

Producer statement construction (PS3) *If an owner / agent intends to provide a PS3 for internal waterproofing or installation of a heating appliance in lieu of an inspection the author must be on Councils Producer Statement Register and the author **must** phone the Call Centre on (09) 301 0101 to advise they will be performing the work. At this time Council staff will check and confirm the author is on the Register and if so, record the contractor's details against the building consent. An inspection is not required for this work. All other work performed by a contractor must be inspected and supported by a producer statement.*

Producer statement construction review (PS4) *Producer statements must be supported by way of site observation records and instructions, diary notes, testing and commissioning certificates, warranties, or such documents applicable to the construction, which has been undertaken / observed / supervised.*

On completion of the building work, Council will rely on the producer statement and supporting documentation when making its decision on whether to issue a code compliance certificate. All producer statement authors must be listed on the Auckland Council Producer Statement Register; the register can be found on the Councils website @ **www.aucklandcouncil.govt.nz** .

***Please note** that whilst every effort is made to identify producer statement requirements at consent stage; it may be possible that further information is required during construction and prior to the issue of the Code Compliance Certificate.*

Tick if applies	Description of work *(delete items not applicable)*	Producer Statement Authors name *(If unknown, write TBA)*	Approved author #	Type
☐				PS4
☐				PS4
☐				PS3 PS4
☑	Internal waterproofing membranes			PS3
☑	External waterproofing membranes			PS3
☐	Heating appliance			PS3
☑	Stormwater management devices			PS4
☐				PS4
☐				PS4
☐				PS3 PS4
☑	Structural steel / portal frames			*
☐				PS4
☐				*
☑	Inspection & test plan (ITP) structural steel welding			*
☐				PS3
☐				PS3
☐				PS3
☐				PS3
☑	Heating ventilation & air-conditioning (HVAC)			PS4
☑	Proprietary product installation			PS3
☐				PS4
☐				PS4
☐				
☐				

* *Refer to conditions of consent for type of producer statement and certification requirements*

21 August 2017

Mr C Walls

s 9(2)(a)

Dear Sir

Building consent number:	BCO10030652-2
Address:	6 Island Bay Road, Beach Haven
Description:	RBW - Stage 2 - the construction of the two level, threee bedroom dwelling with three car garage. this will include all above ground structure cladding, glazing and roofing, the roof deck over garage and hard landscaping.
Area office:	Takapuna / Graham Street Service Centre

I have received your e-mails and attachments of the 9th and 10th August 2017

As outlined in my previous correspondence of the 4 August 17, you are proposing a number of alternative solutions, and as such demonstrating compliance with the building code in some instance can be quite involved. Again I reiterate Council are not anti-alternative solutions, but must be satisfied on reasonable grounds that if built per the issued building consent compliance will be achieved.

The items I had identified earlier were in no way a comprehensive list. To provide assistance I have responded to some of the information provided in your e-mail.

The X lam floor is noted as being treated to H1.2. Using NZS 3602: 2003 for guidanceH1.2 raises other questions in and around wet areas.

The issue with the windows we have discussed a number of times. As Council do not have an expert in the field of window joinery testing there is no value in repeating the test for me or anyone else in Council for that matter. Furthermore testing of window joinery is not just about weathertightness. You may which to consider the requirements of NZS 4211 for guidance.

Providing the latest Kingspan documentation including Codemark is a step in the right direction, but as previously stated the relevant information to allow the building to be built needs to be reflected on the plans. As far as the CodeMark goes what about those clauses of the Building Code that are not covered by the CodeMark, what will be provided to address them?

The building consent application documentation states 120x5.0 dia nails, now you are calling up 8g screws, the manufacturer may have approved this, but this does not demonstrate compliance with the Building Code, and what of the location of the fixings?

I have no issue with the TPO membrane, but does the CodeMark cover it being attached to PIR insulation?

The designer is responsible for ensuring that the plans and specifications are sufficient to result in the building work complying with the Building Code, if it were properly completed in accordance with those plans and specifications. Council's role is to check and ensure that the application complies with the Building Code. Yes, it is not uncommon for Council to raise questions, but these should be fairly minor.

I am sorry, but the information provided to date is well short of Councils expectations in demonstrating compliance. Hence my recommendation to have the application peer reviewed, and obviously the determination option is still available.

I have extent the time for you to get this information together a further 28 days from today, as there is a fair amount of work required to get it to a point where a building consent can be issued.

As I will be on annual leave from the end of this week, any further correspondence relating to this matter should be addressed to Mark Murray. His e-mail address is mark.murray@aucklandcouncil.govt.nz.

Yours faithfully

Rob Woodger
Team Leader Specialist Reclads
Building Control

Auckland Council
Te Kaunihera o Tāmaki Makaurau

4 August 2017

Mr Coban Walls
s 9(2)(a)

Building consent number:	BCO10030652-2
Address:	6 Island Bay Road, Beach Haven
Description:	RBW - Stage 2 - the construction of the two level, threee bedroom dwelling with three car garage. this will include all above ground structure cladding, glazing and roofing, the roof deck over garage and hard landscaping.
Area office:	Takapuna / Graham Street Service Centre

Dear Sir

Thank you for your patience regarding the building consent application at 6 Island Bay Road, Beach Haven.

Your proposal has a number of alternative materials and methods of construction, which can be more challenging and often take more time to understand how compliance will be achieved, than using more convention methods. That is not to say Council are anti-innovation, in fact quite the opposite, it's just at the end of the day, Council must be satisfied on reasonable grounds that if built per the consented documents, compliance will be achieved.

There are still a number of areas that need further explanation/clarity as follows

1. You have nominated X-lam floor and floor panels, but it is not clear as to the treatment level if any is proposed, and dependent on the answer to this, may raise other questions.

2. The aluminium joinery, which we have discussed, and I have subsequently discussed with my manager, remains a concern. Other than the AAMA field test for weathertightness, nothing else has been provided to demonstrate compliance. As explained, when using E2/AS1 for guidance, NZS 4211:2008 (Specification for performance of windows) is the testing standard referenced. Again this is not to say this is the only standard that can be used, however having said that, it is important to understand the NZS 4211 test is not just for weathertightness but includes other tests. Council need more information to be satisfied compliance will be achieved.

3. The use of Kingspan in the roof and ceiling as detailed is of concern. You have supplied three Kingspan manuals, and the Kingspan CodeMark (SAIG-

CM20104) for Kingspan KS1000RW. The CodeMark makes reference to a data sheet dated January 2016 (NZ version), which does not appear to have been provided. There is other material referred to in the CodeMark which also do not appear to have been provided either. Obviously it is not just a matter of providing the material, but also ensuring the relevant information within them reflects those within the application.

4. Also in relation to the Kingspan CodeMark, not all clauses of the Building Code are covered, therefore those code clauses that are appropriate to this application and not covered by the CodeMark need to be addressed.

5. Some of the detailing I have concerns with for example (not to be considered a complete list)
   Sheet S-10 detail 2 –
   a. There is a fixing of the plywood forming the gutter fixed only into the PIR insulation,
   b. What is the down turn of the cap flashing into the gutter.
   c. It is unclear what the top bolt in the beam is doing.
   d. It appears there is RAB to be attached over the Kingspan, how will this be attached?
   e. There is an aluminium bracket only fixed into the Kingspan.
   f. Is the cladding system based on a drain and ventilated cavity or a drained cavity.
   g. Depending on the treatment level if any of the X-lam wall panels, are there any compatibility issues to be considered not only between the X-lam and the aluminium skin of the Kingspan, but in general.

6. The fixing of the weatherboards with 120mm long by 5.0 dia. nails and the location of the nails is not normal trade practice. The location of the fixings and size of the nails I am concerned will as the fixings will likely split the boards and also raise the issue of the ongoing weathertightness of the cladding itself.

7. The reliance of sealant as a primary means of weathertightness is not in Councils opinion best practice.

8. The entry roof, above the front door is lined with PIR insulation with TPO membrane. Can TPO be applied to PIR insulation?

The above is not to be considered a comprehensive list of all items that need addressing, but I think at this stage, it is fair to say Council are not in a position with the information provided, to be satisfied on reasonable grounds that compliance with the building code will be achieved and be able to issue the building consent.

I appreciate this is not the kind of news you were hoping for, but Council would be failing its statutory obligations under the Building Act if it were to issue the building consent based on the information provide to date.

Where to from here? With due respect to the designer, there is a lot more information and work required (possibly including testing) to be done to get it to the point a building consent can be issued. May I suggest having your proposal peer reviewed by a person with experience in alternative designs/solutions. Alternatively the option to apply for a determination directly to the Ministry of Innovation and Employment (MBIE) challenging our decision, refusing to issue the building consent, is also available. Information relating to determinations can be obtained from the MBIE web-site.

Finally, unless new information demonstrating compliance is received by Council within the next 28 days from the date of this correspondence, under section 50 of the Building Act 2004 your application will be refused.

Yours faithfully

Rob Woodger
Team Leader Specialist Reclads
Building Control

22nd August 2017

To whom it may concern,

I have been working through the second stage of our building consent with Auckland Council since November 2016. We've come to a point where they're not sure how to rule on the fixed glazed window joinery that I've designed. Basically I'm wanting build my own window frames and have them structurally glazed by Viridian Glass. The fixed glazing is only in certain areas of the house and all the opening doors and windows will be a propriety system from Fletcher Aluminuim.

Innovation and creation should be the birthright of every New Zealander, it's the kiwi way. I'm seeking a determination as I believe there should be allowance for when industry experienced home owners want to innovate and create bespoke features for their own homes. This design should have been a simple 'Alternative Solution' as it's incredibly basic and actually has multiple benefits over conventional glazing systems. The theology behind the entire buildings design is to far exceed the Building Code requirements in all areas and the glazing is a key part of this.

CUSTOM WINDOW JOINERY

Pros:

- Structurally sound - joinery and structural panels are tied together
- Low maintenance - little to no maintenance required especially with the use of nano-coatings
- Cost effective - the simplicity of the design make its far cheaper than other systems
- Junctions minimised - continuous aluminium means there are 90% potential leak points compared to other joinery
- Thermal efficient - less thermal bridging compared to any other aluminium joinery
- Air and water tight - structural seal and weather seal make the glazing incredibly watertight... much like a fish tank
- Water path - joinery is fixed to the outside of the building so if water did make it's way in it would track vertically downwards and to the exterior of the building
- Acoustic performance - greatly improved acoustic performance limiting external noise compared to other aluminium joinery

Cons:

- Onsite Glazing - Clean, dry site needed and the use of two-part adhesives
- Installation labour - labour content for the actual glass install is higher than most systems

Information provided so far:

- Specification of glass (Viridian Glass)
- Specification of adhesives for structural glazing (Dow Corning)
- Adhesive suppliers approval (Dow Corning)
- Viridian Glass engineers glazing calculations (Greg Yim - Viridian Glass)
- Viridian Glass PS1
- Structural Engineers calculations (Jackson Clapperton)
- Structural Engineers PS1 (Jackson Clapperton)
- Watertightness Test AAMA 501.2 (John Downer - Water Tight Results)
- Provided Certificate of Design Works for custom glazing (Murray Walls)

These things have been considered and allowed for:

- Seismic moment
- Safety from falling
- Extra High Wind Zone
- Live and static loads considering flooring deflection
- Rigidity under load
- Required site conditions specified for install
- Watertightness
- Maintenance
- Water drainage, deflection and drying

All information requested by Auckland Council has been provided. Testing has been undertaken and there is no other facet of the design that needs to be considered. Auckland Council continues to request more information but will not provide specifics on what further information is required. To put it simply I want to build my own window frames, the design is incredibly simple and practically impenetrable. This should've been a simple Alternative Solution.

In many ways our design is similar to other structurally glazed joinery but the shape of the aluminium in is different, this is to limit thermal bridging and to allow standard 'off-the-shelf' aluminium extrusions to be used. The joinery also works in conjunction with the XLAM cross laminated timber panels which simplifies the construction process as the joinery sections can be easily fixed into the edge of the XLAM CLT panel and effectively the panel and the joinery become one. I'm trying to simplify the construction of our house so we can limit ongoing maintenance, and glass a suitably maintenance free product.

I'm a mechanical engineer with 19 years of experience and I've designed and constructed multiple bespoke buildings. I have designed this window joinery under the guidance of my father (Murray Walls) who is a registered LBP and has been in the construction industry for longer than I know. What I'm proposing is incredibly simple, low risk and cost effective. I believe it's these types of basic innovations that need to be welcomed into our housing industry. So far we're over 750 days into our consent process, we're caught in a web of bureaucracy and I think it's incredibly unfair and unjustified.

Please find attached all the relevant information. If you need anything else please do not hesitate to contact me.

I appreciate your time and look forward to receiving your help.

Kind regards,

Corban Walls
s 9(2)(a)

INFORMATION PROVIDED WITH THE APPLICATION:

- Building Consent application
- Council Letter from 4th August
- Council Letter from 21st August
- Dow Corning structural silicon specifications
- Jackson Clapperton structural engineering PS1
- Jackson Clapperton Certificate of Design Work
- Viridian Glass engineers calculations
- House drawings
- Designer Certificate of Design Work
- Two examples of proprietary structural glazing systems
- Viridian Glass PS1
- Water Tight Results test report

DOW CORNING

High Performance Building
Solutions

Dow Corning® 121 Structural Glazing Sealant

Fast-cure structural silicone sealant simplifies installation, reduces repair time

Meets Industry Standards

- ASTM C719 Class 25 (G, A, O)
- ASTM C1184 Structural Sealant Specification

Features/Benefits

- Easy-to-use, 1:1 mix ratio for simplified dispensing
- Fast, 24-hour cure
- Available in black and gray, 400 ml (2 x 200 ml)/13.5 fl. oz. (2 x 6.8 fl. oz.) cartridges
- Suitable for structural glazing and weathersealing[1]
- Provides primerless adhesion to glass, alodine and anodized aluminum[2]
- Adheres to *Dow Corning*® brand structural sealants for reglazing applications
- Achieves adhesion and structural strength in 24 to 48 hours[3]
- 20-year Structural Adhesion Limited Warranty available

Façade contractors and manufacturers now have a high-performance solution to the challenges posed by slow-curing one-part sealants, mixing challenges of multipart sealants and limited movement capability of tapes. *Dow Corning*® 121 Structural Glazing Sealant answers those challenges with a fast-cure, easy-to-install formulation.

Dow Corning 121 Structural Glazing Sealant is a neutral-cure, RTV silicone sealant ideal for repair or replacement of structurally glazed glass and other substrates. It is equally suitable for on-site structural glazing – including storefront systems or attachment of panel stiffeners – as it is for in-shop structural glazing.

Easy-to-use, user-friendly dispensing

Featuring a unique 1-to-1 ("121") mix ratio, *Dow Corning* 121 Structural Glazing Sealant is supplied in a two-part cartridge, complete with a static mixer. Whether for repair, restoration or new construction, contractors will appreciate this simplified solution that both eliminates the need for specialized pumps and mixing equipment and minimizes quality assurance issues.

Enhanced productivity

Compared with one-part sealants, *Dow Corning* 121 Structural Glazing Sealant offers increased efficiency and productivity.

- Repairs can be completed in just one day (24 hours) compared with 14-21 days
- Swing stage rental is reduced from one month to two days

Superior performance

Dow Corning 121 Structural Glazing Sealant leverages silicone benefits for better performance than organic weatherseals and structural tapes, offering durable, UV-resistant, long-life performance and excellent movement capability.

[1]All structural glazing applications MUST be reviewed by the technical staff at Dow Corning Corporation. If their recommendations are followed, Dow Corning will issue a project-specific structural adhesive warranty.

[2]Certain sealing materials used in the anodizing process may increase the potential for use of primer to gain adhesion within a 24-hour period. *Dow Corning*® Primer C is recommended for fast and consistent adhesion, especially to *Kynar*™, polyester powdercoat and other high-performance substrates approved for architectural structural glazing applications.

[3]Adhesion must be confirmed prior to removing temporary attachments or shipping to the job site. In general terms, glazed units can be moved or temporary attachments removed within 24 hours, depending on the temperature and relative humidity (RH). *Dow Corning*® 121 Structural Glazing Sealant can achieve the necessary strength and adhesion properties in 24 hours when applied and cured at 23°C and 50% RH. Check adhesion before moving units.

Service and support from a trusted source

To assist with your building project needs, Dow Corning offers a full range of project services, including blueprint reviews of structural joint designs, as well as an available 20-year Structural Adhesion Limited Warranty.

Contact us

With more than 50 years of construction industry experience, Dow Corning High Performance Building Solutions has developed a wide range of proven materials for structural and protective glazing, weatherproofing, insulating glass, window and door fabrication, high-efficiency insulation, and building materials protection. Learn more about *Dow Corning* 121 Structural Glazing Sealant and our full range of construction industry solutions, including service and support, at **dowcorning.com/construction**.

Dow Corning has sales offices, manufacturing sites, and science and technology laboratories around the globe. Find local contact information at **dowcorning.com/ContactUs**.

Images: AV19261, AV21230

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DOW CORNING

We help you invent the future.™

Product Information
Silicone Sealants

DOW CORNING

Dow Corning® 795 Silicone Building Sealant

Neutral, one-part silicone sealant

FEATURES & BENEFITS

- Suitable for most new construction and remedial sealing applications
- Versatile – high performance structural glazing and weather sealing from a single product
- Available in 16 standard colors; custom colors also available
- Excellent weatherability – virtually unaffected by sunlight, rain, snow, ozone and temperature extremes of -40°F (-40°C) to 300°F (149°C)
- Excellent unprimed adhesion to a wide variety of construction materials and building components, including anodized, alodined, most coated and many Kynar®[1]-painted aluminums[2]
- Ease of application – ready to use as supplied
- Ease of use – all-temperature gunnability, easy tooling and low-odor cure byproduct
- Meets global standards (Americas, Asia and Europe)

COMPOSITION

- One-part, neutral-cure, RTV silicone sealant

APPLICATIONS

- Structural and nonstructural glazing
- Structural attachment of many panel systems
- Panel stiffener applications
- Weather sealing of most common construction materials including glass, aluminum, steel, painted metal, EIFS, granite and other stone, concrete, brick and plastics

TYPICAL PROPERTIES

Specification Writers: These values are not intended for use in preparing specifications. Please contact your local Dow Corning sales office or your Global Dow Corning Connection before writing specifications on this product.

Test	Property	Unit	Result
As Supplied			
ASTM C 679	Tack-Free Time, 50% RH	hours	3
	Curing Time at 25°C (77°F) and 50% RH	days	7–14
	Full Adhesion	days	14–21
ASTM C 639	Flow, Sag or Slump	Inches (mm)	0.1 (2.54)
	Working Time	minutes	20–30
	VOC Content	g/L	28
As Cured-After 21 days at 25°C (77°F) and 50% RH			
ASTM D 2240	Durometer Hardness, Shore A	points	35
ASTM C 794	Peel Strength	lb/in (kg/cm)	32 (5.7)
ASTM C 1135	Tension Adhesion Strength		
	At 25% extension	psi (MPa)	45 (0.310)
	At 50% extension	psi (MPa)	60 (0.414)
ASTM C 719	Joint Movement Capability	percent	± 50
ASTM C 1248	Staining (granite, marble, lime- Stone, brick and concrete)		None
As Cured-After 21 days at 25°C (77°F) and 50% RH followed by 10,000 hours in a QUV weatherometer, ASTM G 53			
ASTM C 1135	Tensile Adhesion Strength		
	At 25% extension	psi (MPa)	35 (0.241)
	At 50% extension	psi (MPa)	50 (0.345)

[1]Based on South Coast Air Quality Management District of California. Maximum VOC is listed both inclusive and exclusive of water and exempt compounds. For a VOC data sheet for a specific sealant color, please send your request to product.inquiry@dowcorning.com.

[1]Kynar is a trademark of Atofina Chemicals Inc.
[2]Contact your local Dow Corning Sales Application Engineer for specifics.

DESCRIPTION

Dow Corning® 795 Silicone Building Sealant is a one-part, neutral-cure, architectural-grade sealant that easily extrudes in any weather and cures quickly at room temperature. This cold-applied, non-sagging silicone material cures to a medium- modulus silicone rubber upon exposure to atmospheric moisture. The cured sealant is durable and flexible enough to accommodate ±50 percent movement of original joint dimension when installed in a properly designed weather seal joint. In a properly designed structurally glazed joint, the sealant is strong enough to support glass and other panel materials under high wind load.

APPROVALS/ SPECIFICATIONS

Dow Corning 795 Silicone Building Sealant meets the requirements of:

- Federal Specification TT-S 001 543A (COM-NBS) Class A for silicone building sealants
- Federal Specification TT-S-00230C (COM-NBS) Class A for one- component building sealants
- ASTM Specification C 920 Type S, Grade NS, Class 50, Use NT, G, A and O
- ASTM Specification C 1184 for structural silicone sealants
- Canadian Specification CAN2-19.13- M82

COLORS

Dow Corning 795 Silicone Building Sealant is available in 16 colors: white, limestone, champagne, natural stone, gray, black, bronze, sandstone, adobe tan, dusty rose, rustic brick, blue spruce, anodized aluminum, and charcoal. Custom colors may be ordered to match virtually any substrate.

HOW TO USE

Please consult the *Dow Corning Americas Technical Manual*, Form No. 62-1112, for detailed information on state-of-the- art application methods and joint design. Please contact your local Dow Corning Sales Application Engineer for specific advice.

Preparation

Clean all joints, removing all foreign matter and contaminants such as grease, oil, dust, water, frost, surface dirt, old sealants or glazing compounds and protective coatings.

Application Method

Install backing material or joint filler, setting blocks, spacer shims and tapes. Mask areas adjacent to joints to ensure neat sealant lines. Primer is generally not required on non-porous surfaces, but may be necessary for optimal sealing of certain porous surfaces. A test placement is always recommended. Apply *Dow Corning* 795 Silicone Building Sealant in a continuous operation using positive pressure. (The sealant can be applied using many types of air-operated guns and most types of bulk dispensing equipment.) Before a skin forms (typically within 15 minutes), tool the sealant with light pressure to spread the sealant against the backing material and joint surfaces. Remove masking tape as soon as the bead is tooled.

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USABLE LIFE AND STORAGE

When stored at or below 27°C (80°F), *Dow Corning* 795 Silicone Building Sealant has a shelf life of 12 months from the date of manufacture. Refer to product packaging for "Use By Date."

PACKAGING INFORMATION

Dow Corning 795 Silicone Building Sealant is supplied in 10.3-fl oz (305-mL) disposable plastic cartridges that fit ordinary caulking guns, 20-fl oz (590- mL) sausages and 2- and 4.5-gal (7.5- and 1 7-L) bulk containers.

LIMITATIONS

Dow Corning 795 Silicone Building Sealant should not be used:

- In structural applications without prior review and approval by your local Dow Corning Sales Application Engineer
- In below-grade applications
- When surface temperatures exceed 50°C (122°F) during installation
- On surfaces that are continuously immersed in water
- On building materials that bleed oils, plasticizers or solvents that may affect adhesion

- On frost-laden or wet surfaces
- In totally confined joints (the sealant requires atmospheric moisture for cure)
- If the sealant is intended to be painted (paints do not typically adhere to most silicone sealants)
- To surfaces in direct contact with food or other food-grade applications

This product is neither tested nor represented as suitable for medical or pharmaceutical uses.

HEALTH AND ENVIRONMENTAL INFORMATION

To support customers in their product safety needs, Dow Corning has an extensive Product Stewardship organization and a team of Product Safety and Regulatory Compliance (PS&RC) specialists available in each area.

For further information, please see our website, dowcorning.com or consult your local Dow Corning representative.

LIMITED WARRANTY INFORMATION – PLEASE READ CAREFULLY

The information contained herein is offered in good faith and is believed to be accurate. However, because conditions and methods of use of our products are beyond our control, this information should not be used in substitution for customer's tests to ensure that our products are safe, effective, and fully satisfactory for the intended end use. Suggestions of use shall not be taken as inducements to infringe any patent.

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DOW CORNING DISCLAIMS LIABILITY FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES.

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

PRODUCER STATEMENT – PS1 – DESIGN

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

Our Ref-: 2004/003/H

ISSUED BY:.....Jackson Clapperton & Partners Ltd.....
(Design Firm)

TO:.....Alexandra & Corban Walls.....
(Owner/Developer)

TO BE SUPPLIED TO:.....Auckland Council.....
(Building Consent Authority)

IN RESPECT OF:.....New Dwelling (Stage 2).....
(Description of Building Work)

AT:.....6 Island Bay Road, Birkdale, Auckland, 0626.....
(Address)

..... **LOT**.....3..... **DP**.....194346..... **SO** .....

We have been engaged by the owner/developer referred to above to provide .....structural engineering design.....
.....services in respect of the requirements of
(Extent of Engagement)

Clause(s) .....B1 & B2*.....(* only those elements covered by our design).....of the Building Code for
All ☐ or Part only ☑[1] (as specified below), of the proposed building work.

1. Roof structure, roof beams, floor beams, walls, floors, wall bracing, handrails, connections & supports.

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

☑ Compliance Documents issued by the Ministry of Business, Innovation & Employment.....B1/VM1, 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 .....

.....Island Bay Road House.....and numbered .....Ref 201504 sheets S-01 to S-12.....;
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 .Loads to AS/NZS1170.....

(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, ...s 9(2)(a)..... am:
(Name of Design Professional)
(Approved Author no. 1037)

☐CPEng .....7518.....#

☐Reg Arch ..... .#

I am a Member of : ☑IPENZ ☐NZIA and hold the following qualifications:...BE, MIPENZ, CPEng.....
The Design Firm issuing this statement holds a current policy of Professional Indemnity Insurance no less than $200,000*.
The Design Firm is a member of ACENZ: ☑

SIGNED BY .....s 9(2)(a)..... ON BEHALF OF Jackson Clappperton & Partners Ltd.....
(Design Firm)

Date.....10/11/2016..... (signature).....

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

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

Jackson Clapperton & Partners Ltd

Consulting Engineers | Geomechanics Laboratory | Registered Surveyors

16a Saunders Place, Avondale, Auckland
P.O. Box 71065, Rosebank Road, Auckland
e-mail: jcp.ltd@xtra.co.nz

Ph: (09) 820 0131
(09) 820 0132
Fax: (09) 820 0133

Our Ref: 2003/004/H **Date:** 20/09/2016

Project: New Dwelling at 6 Island Bay Road, Birkdale for Corban Walls.

These calculations cover the design of the second stage of the dwelling and covers the structure from the top of the concrete ground floor slab. It also excludes the Dincel concrete retaining wall which runs down the Eastern side of the ground floor.

The Dincel wall, the ground floor concrete slab, foundation beams, foundations and sub-floor bracing were all undertaken as a first stage and have previously been issued with a Building Consent. Work is currently underway on that first stage.

Loads (to AS/NZS 1170)

Roof : TPO roofing on 105mm thick XLAM, Gib or Cedar lining/soffits.
G = 0.75 kPa Qu = 0.25 kPa
Qc = 1.0 kN

Roof : Kingspan KS1000 roof panels on PS25-25x09 Posi-struts @ 666mm c/c @ 8 degrees. 13mm Gib.
G = 0.45 kPa Qu = 0.25 kPa
Qc = 1.0 kN

Upper External walls: G = 0.60 kPa (Cedar weatherboards on 20mm battens on Kingspan insulation board on 75mm XLAM panels.)

Partitions G = 0.40 kPa (90x45 or 140x45 timber framed walls with Gib linings)

Up. Floor: 105mm XLAM Flooring with 13mm gib. ceiling
G = 0.65 kPa Qu = 1.5 kPa
Qc = 1.8 kN

Wind Loading: (AS/NZS 1170.2:2002)

Importance Level- Allow for Importance level 2.

Design Working life at least 50 years. Therefore APE-: Wind = 1/500
E/Q= 1/500
SLS1 = 1/25

Region A1 to A7 V_{R500} = 45 m/s & V_{R25} = 37 m/s

Any direction M_d = 1.0 Building height = 10.0 m

Assume Terrain category 3 area for 440m before waters edge. Then cat 1.

Therefore terrain cat. = $\frac{(3)(440) + (1)(60)}{500}$ = 2.76 ∴ $M_{(z,cat)}$ = 0.87 for ULS & SLS

Site lies on the side of a Hill. H = 95 m ∴ H/2= 47.5 m

From topographical map Lu= 190 m ∴ϕ= 0.250

1.44Lu= 274 m & 1.6H = 152 m

Site is approx. 30 m from crest, therefore inside the topographical zone.

Therefore M_h = 1.40 at crest $M_{h(at\ site)} = \frac{(M_h - 1)(1.44Lu-x)}{1.44Lu} + 1$ = 1.36

& M_s = 1.0

∴ Vusite = $V_R M_d (M_{(z,cat)} M_s M_t)$ = 53.1 m/s (ULS) (Equiv. to between Very High & Extra High wind)

& Vssite = $V_R M_d (M_{(z,cat)} M_s M_t)$ = 43.7 m/s (SLS)

pu = $(0.5)(1.2)(V_{des,\theta})^2 c_{fig} c_{dyn}$ = 1.69 kPa (ULS)

ps = $(0.5)(1.2)(V_{des,\theta})^2 c_{fig} c_{dyn}$ = 1.14 kPa (SLS)

Consider E/Q loading.

$C(T) = C_h(T)ZRN(T,D)$ Adopt $C_h(T)$= 3 as worst case.

Z = 0.13 R= 1.0 for APE = 1/500 N(T,D)= 1.0

R= 0.25 for APE = 1/25

ULS $C(T) = (3)(0.13)(1.0)(1.0)$ = 0.390 S_p = 0.70

SLS $C(T) = (3)(0.13)(1.0)(0.25)$ = 0.098 S_p = 0.70

Assume μ = 1.25 ULS, for nominally ductile concrete. & μ = 1.0 for SLS

Therefore $C_d(T) = \frac{C(T_1)S_p}{k_\mu} = \frac{(0.39)(0.7)}{1.25}$ = 0.218 Where $k_\mu = \mu$

& $C_d(T) = \frac{C(T_1)S_p}{k_\mu} = \frac{(0.098)(0.7)}{1.0}$ = 0.068

Therefore Eu = (0.218)Wt & Es = (0.068)Wt

Jackson Clapperton & Partners Ltd
Consulting Engineers & Regd Surveyors
P.O. Box 71065, Rosebank Road, Auckland
Ph: (09) 8200-131 Fax: (09) 8200-133

Project:	New Dwelling for Corban Walls at 6 Island Bay Road, Birkdale	
Ref. No:	2003/004/H	Page No. 3
Date:	20/09/2016	Designed: MD

(A) WALL BRACING

i) UPPER STOREY-:

Along Building-:

Trib. Area = ((3.8+3)/2/2)(5.8)+(2.9/2)(1.2) = 11.6 m^2
Wu = (1.2)(1.69)(11.6) = 23.52 kN = 470 BU's

Across Building-:

Trib. Area = (3.8/2)(16.4) = 31.2 m^2
Wu = (1.2)(1.69)(31.2) = 63.19 kN = 1264 BU's

Consider E/Q Load -:

		Wt
Roof	(0.5)(16.4)(7)	= 57.4
Partitions	(0.9)(12)(1/2)	= 5.4
Ext walls	(0.5)(8.6)(3.6/2)	= 7.7
Ext walls	(0.5)(1.2)(16)	= 9.6
Glazing	(0.2)(40)(3.6/2)	= 14.4
		Σ 94.5 kN

Therefore Eu = (0.128)(57.7)= 12.1 kN = 241 BU's

ii) LOWER STOREY-:

Along Building-:

Trib. Area = (11.6)(2) + (13.2)(3/2)+(1.2)(6)= 50.2 m^2
Wu = (1.2)(1.69)(50.2) = 101.81 kN = 2036 BU's

Across Building-:

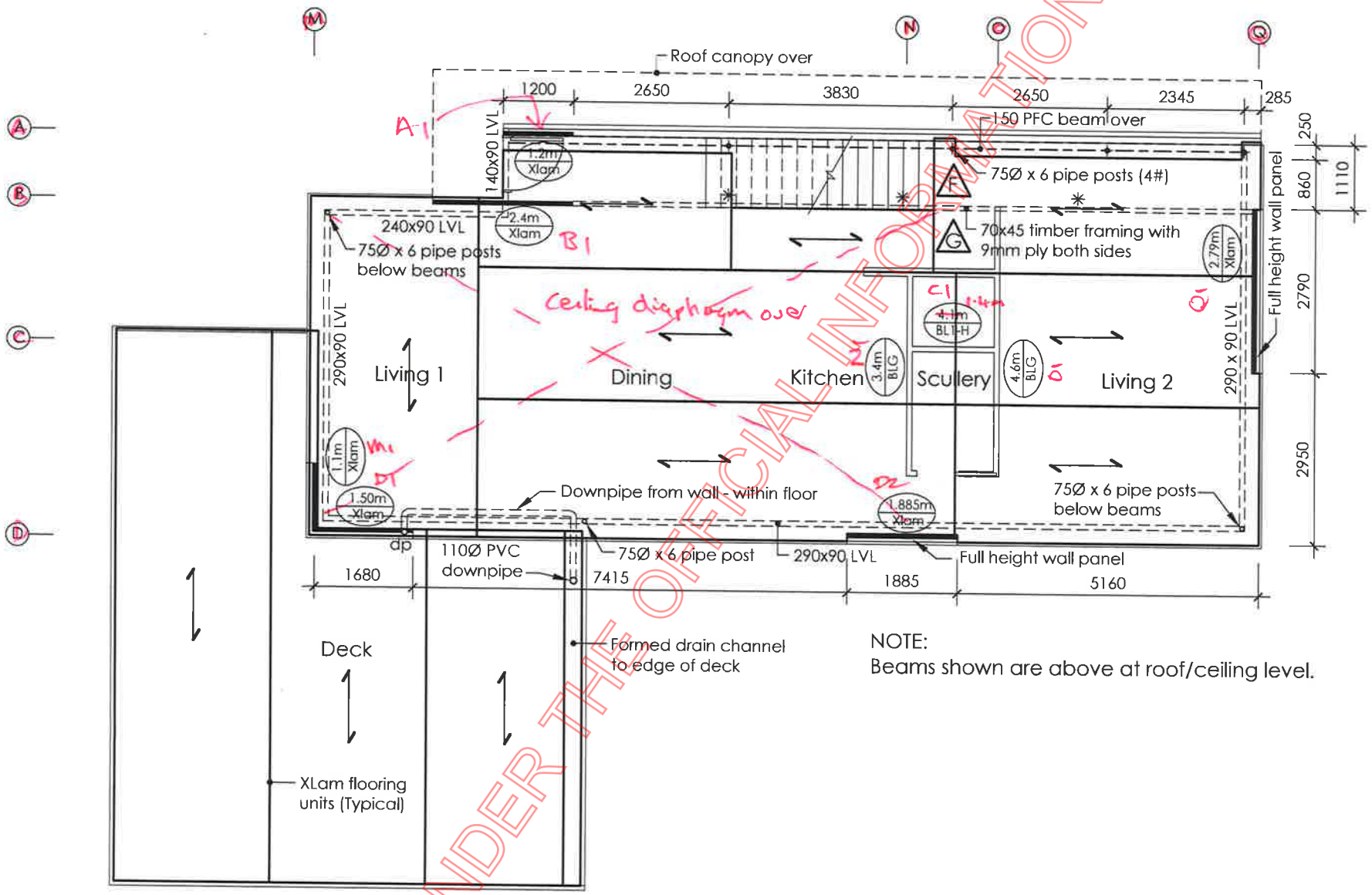
Trib. Area = (2)(31.2) + (16.4)(3.0/2) + (3.3)(2.8) = 96.2 m^2
Wu = (1.2)(1.69)(96.2) = 195.17 kN = 3903 BU's

Consider E/Q Load -:

		Wt
Roof	(0.5)(16.4)(7)	= 57.4
Up. Partitions	(0.9)(12)	= 10.8
Up. Ext walls	(0.5)(8.6)(3.6)	= 15.5
Up. Ext walls	(0.5)(1.2)(16)	= 9.6
Glazing	(0.2)(40)(3.6)	= 28.8
Up. Floor	(0.65+(0.3)(1.5))(16.4)(7)	= 126.3
Low. Partitions	(0.7)(41)(1/2)	= 14.4
Garage roof deck	(0.65+(0.3)(2))((6.2)(9.3)+(5.4)(1.8))	= 84.2
Low. Ext walls	(0.5)(19.2/2)	= 4.8
Deck Handrail	(0.65)(22.6)(1.1)	= 16.2
Glazing	(0.2)(22.7/2)	= 2.3
		Σ 370.2 kN

Therefore Eu = (0.128)(370.2)= 47.4 kN = 948 BU's

See Bracing details attached



NOTE:
Beams shown are above at roof/ceiling level.

wall legend:

- 90mm thick ir
- 125mm thick (75mm Xlam + 50
- 75mm thick X
- 75mm thick X
- Windows to b
- ✳ Denotes roof above

Upper level Bracing

3A

Upper Floor (3B)

Corban Walls

Jackson Clapperton & Pa

GIB EzyBrace® 2011 Software

SINGLE OR UPPER STOREY WALLS ALONG

V06/11

Lines		Bracing Elements							
1	2	3	4	5	6	7	8	9	10
Line Total Check	Line Label	Bracing Element No.	Available Wall Length L (m)	Angle to Bracing line (degrees)	Element Height H (m)	Bracing Type	Supplier	Bracing Units Achieved W	Bracing Units Achieved E
283	A	1	1.2		2.7	B	XLM	283	283
566	B	1	2.4		2.7	B	XLM	566	566
113	C	1	1.4		3.1	BL1-H	GIB®	139	113
613	D	1	1.5		2.9	D	XLM	271	271
		2	1.885		2.9	D	XLM	341	341

Note: See page 3B attached for XLM brace figures

					Wind	Earthq.
Totals Achieved	W	#DIV/0!	EQ	#DIV/0!	1601	1575
Timber Floor, design limit of 120 BU/m			***declined***		*OK*	*OK*
Totals Required (from Demand)					470	241

Upper floor

3C

Corban Walls

Jackson Clapperton & Pa

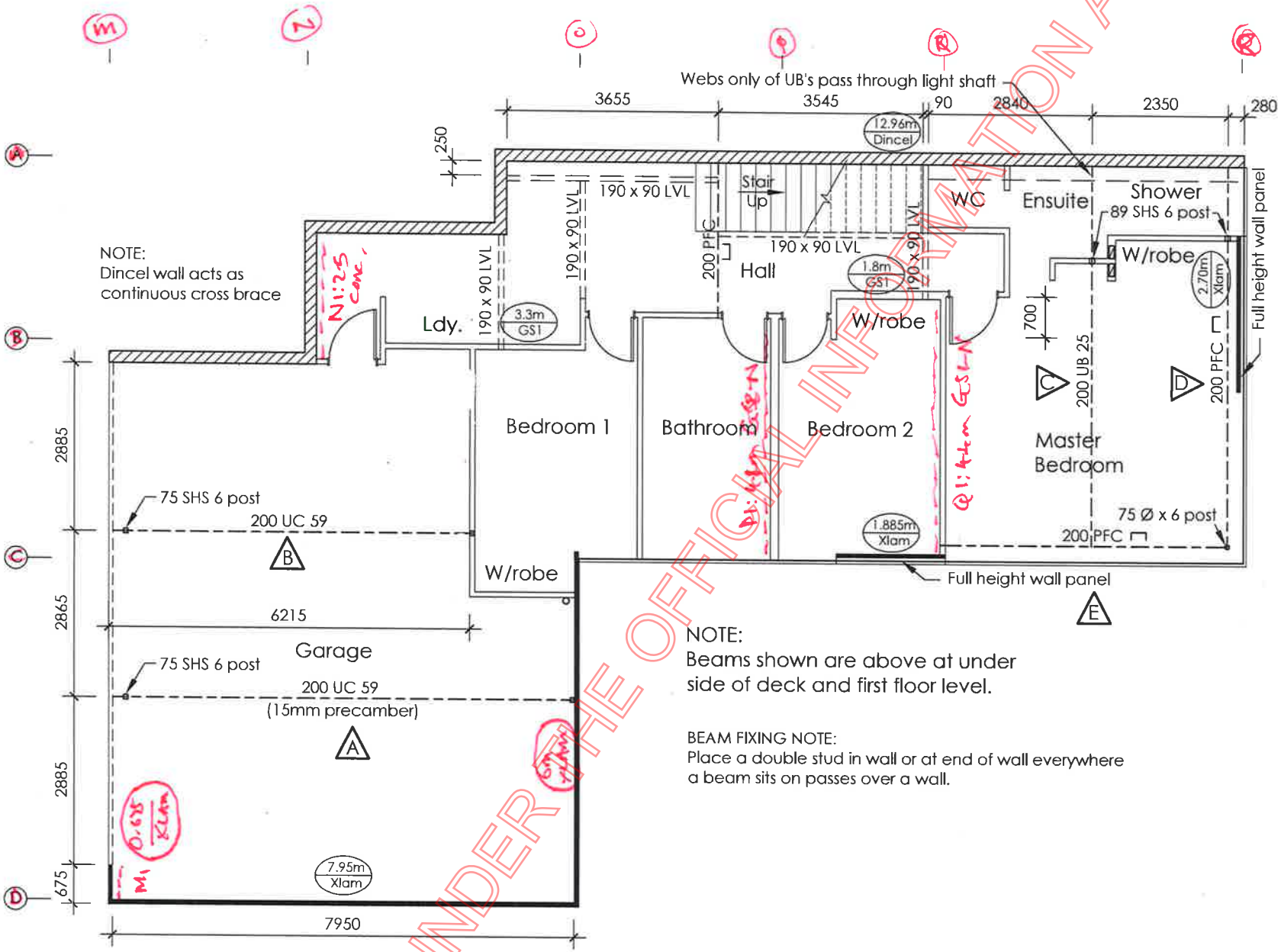
GIB EzyBrace® 2011 Software

SINGLE OR UPPER STOREY WALLS ACROSS

V06/11

Lines		*Bracing Elements*							
1	2	3	4	5	6	7	8	9	10
Line Total Check	Line Label	Bracing Element No.	Available Wall Length L (m)	Angle to Bracing line (degrees)	Element Height H (m)	Bracing Type	Supplier	Bracing Units Achieved W	Bracing Units Achieved E
455	**M**	1	1		2.9	E	XLM	455	455
372	**N**	1	3.4		3.2	BLG-H	GIB®	383	372
504	**O**	1	4.6		3.2	BLG-H	GIB®	518	504
1116	**P**	1	2.79		3	F	XLM	1116	1116

					Wind	Earthq.
Totals Achieved	W	#DIV/0!	EQ	#DIV/0!	2471	2447
Timber Floor, design limit of 120 BU/m			***declined***		*OK*	*OK*
Totals Required (from Demand)					1264	264



NOTE:
Beams shown are above at under side of deck and first floor level.

BEAM FIXING NOTE:
Place a double stud in wall or at end of wall everywhere a beam sits on passes over a wall.

wall legend:

- 200mm Dincel reta
- 125mm thick exteri (75mm Xlam + 50mm insu
- 90mm thick interno
- 140mm thick intern

symbol legend:

- dp — 110mm Ø PVC dov
- Steel beam over to
- Timber beam over
- Span direction of X
- Steelwork elevatio
- 1.885 Xlam — Bracing wall - leng
- A — Bracing line

LOWER FLOOR

Corban Walls

Jackson Clapperton & P

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LOWER WALLS ACROSS

V06/11

Lines		*Bracing Elements*							
1	2	3	4	5	6	7	8	9	10
Line Total Check	Line Label	Bracing Element No.	Available Wall Length L (m)	Angle to Bracing line (degrees)	Element Height H (m)	Bracing Type	Supplier	Bracing Units Achieved	
								W	E
545	**M**	1	4.2		2.7	BLG-H	GIB®	560	545
545	**N**	1	4.2		2.7	BLG-H	GIB®	560	545
545	**O**	1	4.2		2.7	BLG-H	GIB®	560	545
571	**P**	1	4.4		2.7	BLG-H	GIB®	587	571
637	**Q**	1	2.7			B	XLM	637	637

					Wind	Earthq.
Totals Achieved	W	#DIV/0!	EQ	#DIV/0!	2904	2843
Timber Floor, design limit of 120 BU/m			***declined***		*OK*	*OK*
Totals Required (from Demand)					3803	948

lower Storey (3F)

Corban Walls

Jackson Clapperton & Pa

GIB EzyBrace® 2011 Software

LOWER WALLS ACROSS

V06/11

Lines		Bracing Elements							
1	2	3	4	5	6	7	8	9	10
Line Total Check	Line Label	Bracing Element No.	Available Wall Length L (m)	Angle to Bracing line (degrees)	Element Height H (m)	Bracing Type	Supplier	Bracing Units Achieved W	Bracing Units Achieved E
159	M	1	0.675		2.7	B	XLM	159	159
444	N	1	2.5		2.7	Wall	Concrete	444	444
1416	O	1	6		2.7	B	XLM	1416	1416
313	P	1	4.1		2.7	GS2-N	GIB®	357	313
336	Q	1	4.4		2.7	GS2-N	GIB®	383	336
637	R	1	2.7		2.7	B	XLM	637	637

Note: Also have Dincel (Concrete) wall which runs full length of this storey to act as a vertical cantilever

Excess load = (3907 − 3397) / 20 = 25.5 kN

over a length of 19.6m

∴ lateral load approx 25.5 / 19.6 = 1.3 kN/m

This is far less than the capacity of that wall — Accept.

Totals Achieved	W	#DIV/0!	EQ	#DIV/0!	Wind 3397	Earthq. 3307
Timber Floor, design limit of 120 BU/m			***declined***		~~OK~~	OK
Totals Required (from Demand)					3903	948

accept see above

Wall Load Capacity Tables

CLT WALLS – RADIATA PINE

- Fixing details of the walls require structural engineering design
- Fixing strength depends upon fixing type and foundation medium
- All load demands (wind & seismic) require engineering design

Panel Thickness	Height of Wall (m)	Axial Capacity P_c (kN/m)	Tensile Capacity P_t (kN/m)	Shear Capacity V (kN/m)	Bracing Capacity (BU/m)
XL3/60	1.0	527	282	66	1322
	2.0	314	282	17	336
	3.0	169	282	5	101
	5.0	75	282	2.1	42
XL3/75	1.0	535	282	73	1462
	2.0	416	282	22	432
	3.0	276	282	7.7	153
	5.0	107	282	2.1	42
XL3/90	1.0	936	493	131	2613
	2.0	751	493	48	950
	3.0	510	493	20	400
	5.0	205	493	4.4	87
XL3/105	1.0	936	493	131	2614
	2.0	862	493	53	1061
	3.0	645	493	24	484
	5.0	325	493	5.9	118
XL5/130	1.0	1204	634	168	3360
	2.0	1204	634	77	1530
	3.0	950	634	38	757
	5.0	550	634	11	224
XL5/145	1.0	1405	739	196	3917
	2.0	1405	739	94	1872
	3.0	1162	739	48	957
	5.0	706	739	15	308
XL5/175	1.0	1405	739	196	3917
	2.0	1405	739	98	1960
	3.0	1335	739	53	1065
	5.0	926	739	19	383
XL7/200	1.0	1872	986	261	5225
	2.0	1872	986	131	2614
	3.0	1821	986	77	1539
	5.0	1289	986	30	598

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(B) Cantilevered Xlam Roof. (Adj. Grid A) Span = 1.00 m 1.30 m cant.

Loads	kN/m²	Trib. Width (m)	G (kN/m)	Qu (kN/m)
Roof	0.75	1.0	0.75	0.25
			Σ 0.75 kN/m	Σ 0.25 kN/m

Point Load Qc = 1.00 kN

ULS Wu=(-1.8)(1.69)(1) = -3.02 kN/m Ws=(-1.8)(1.14)(1)= -2.05 kN/m

At ends of cantilever

M*= $\frac{wN^2}{2}$ = 1.08 kNm/m (1.2G+1.5Qu)

M*= $\frac{wN^2}{2}$ = 0.76 + PN = 1.95 = 2.71 kNm/m -governs (1.2G+1.5Qc)

M*= $\frac{wN^2}{2}$ = -1.98 kNm/m (0.9G+Wu)

At Midspan

M*= $\frac{wL^2}{8}$ = 0.95 $\frac{wN^2}{2x2}$ = -0.59 = 0.36 kNm (1.2G+1.5Qu)

M*= $\frac{wL^2}{8}$ = 0.11 + $\frac{PL}{4}$ = 0.4 - $\frac{wN^2}{2x2}$ = -0.38 = 0.11 kNm (1.2G+1.5Qc)

Try XLAM X3/105 laminated timber support.

∴ϕM= 23.00 kNm/m (From manufacturers data sheets.) OK

SLS EI= 744 x10⁹ Nmm²/m

At end of cantilever.

G△= $\frac{(wx10^3)L^3N(3(N/L)^3+4(N/L)^2-1)}{24EI}$ = 0.7 mm/m & Qu△= 0.22 mm/m

Or Qu△= $\frac{(wx10^3)LN^3(4+3(N/L))}{24EI}$ = 0.24 mm/m & Qu△= -1.85 mm/m OK

LT△= 1.3 mm/m < Limit = $\frac{span}{500}$ = 5.2 mm/m OK

ST△= 1.5 mm/m < Limit = $\frac{span}{300}$ = 8.7 mm/m OK

At Midspan

G△= $\frac{(wx10^3)((5/16)L^4-(3/4)(N^2L^2))}{24EI}$ = -0.04 mm/m & Qu△= -0.01 mm/m

Or Qu△= $\frac{5(wx10^3)L^4}{384EI}$ = 0.01 mm/m

LT△= -0.1 mm < Limit = $\frac{span}{500}$ = 2.0 mm OK

ST△= -0.1 mm < Limit = $\frac{span}{300}$ = 3.3 mm OK

Reaction at Front Support -: G = 1.98 kN/m (max.) Qu = 0.66 kN/m

Reaction at Rear Support -: G = -0.26 kN/m (min.) Qu = -0.09 kN/m

Wu= -2.56 kN/m to outer support

Wu= 6.49 kN/m to inner support

USE XL3/105

Standard Panel Configurations Radiata Pine

Page 4 A

STANDARD PANEL CONFIGURATIONS - RADIATA PINE, NZ GROWN

Type	XL3/60	XL3/75	XL3/90	XL3/105	XL5/130	XL5/145	XL5/175	XL7/200
EI^{1m}_{eff} (Nmm²)	$1.39x10^{11}$	$2.53x10^{11}$	$4.81x10^{11}$	$7.44x10^{11}$	$1.33x10^{12}$	$1.78x10^{12}$	$2.84x10^{12}$	$4.25x10^{12}$
ϕM_{rx} (per m width)	7.5kNm	11kNm	17kNm	23kNm	33kNm	40kNm	52kNm	69kNm

Thickness	60mm	75mm	90mm	105mm	130mm	145mm	175mm	200mm
Layer 1	R20-8	R20-8	R35-8	R35-8	R35-8	R35-8	R35-8	R35-8
Layer 2	R20-C	R35-C	R20-C	R35-C	R20-C	R20-C	R35-C	R20-C
Layer 3	R20-8	R20-8	R35-8	R35-8	R20-C	R35-C	R35-C	R35-C
Layer 4					R20-C	R20-C	R35-C	R20-C
Layer 5					R35-8	R35-8	R35-8	R35-C
Layer 6								R20-C
Layer 7								R35-8

Code	Thickness	Grade	Modulus of Elasticity
R20-8	20mm	G8	E_0 = 8000MPa
R20-C	20mm	<G8	E_0 = 6000MPa
R35-8	35mm	G8	E_0 = 8000MPa
R35-C	35mm	<G8	E_0 = 6000MPa

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(C) Roof Beam Adjacent to Grid A — Max. Span = 3.80 m

Loads	kN/m²	Trib. Width (m)	G (kN/m)		Qu (kN/m)
Roof	0.75	1.8	1.35	0.25	0.45
s/w	0.2	-	0.20		-
			Σ 1.55 kN/m		Σ 0.45 kN/m

Point Load Qc = 1.00 kN

Wu= -2.56 kN/m Ws= -1.72 kN/m

ULS

$M^*= \frac{wL^2}{8}$ = 4.6 kNm (1.2G+1.5Qu)

$M^*= \frac{wL^2}{8}$ = 3.36 + $\frac{PL}{4}$ = 1.43 = 4.78 kNm/m -governs (1.2G+1.5Qc)

$M^*= \frac{wL^2}{8}$ = -2.09 kNm/m (0.9G+Wu)

Try 150x75PFC Le= F.R.

$\therefore \phi M=$ (0.9)(0.3)x 129 = 34.83 kNm OK

SLS E= 200 MPa I = 8.34 $x10^6$ mm^3

$G\triangle= \frac{5(wx10^3)L^4}{384EI}$ = 2.52 mm & $Qu\triangle$= 0.73 mm

& Ws△= -2.81 mm OK

LT△= 2.5 mm < Limit = $\frac{span}{500}$ = 7.6 mm OK

ST△= 3.0 mm < Limit = $\frac{span}{300}$ = 12.7 mm OK

Reaction -: G = 2.95 kN max. Q = 0.86 kN max.
Wu= -4.86 kN max. Ws= -3.27 kN max.

USE 150x75PFC Steel Beam

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(D) Lintel beam over Entry Doorway. Span = 1.40 m max.

Loads	kN/m²	Trib. Width (m)	G (kN/m)		Qu (kN/m)	
Roof	0.75	2.4	1.80	0.25	0.60	
s/w	0.15	-	0.15		-	
			Σ 1.95	kN/m	Σ 0.60	kN/m
				Point Load Qc =	1.00	kN
Point Load Roof Beam C			G = 2.9	kN	Qu = 0.86	kN
			Wu= -4.86	kN	Wu= -3.27	kN

ULS a1 = 0.5 b1 = 0.9

$M^* = \frac{wL^2}{8}$ (1.2G+1.5Qu) = 0.8 $+\frac{Pab}{L}$ = 1.55 = 2.3 kNm - governs

$M^* = \frac{wL^2}{8}$ (1.2G+1.5Qu) = 0.6 $+\frac{PL}{4}$ = 0.53 $+\frac{Pab}{L}$ = 1.14 = 2.2 kNm

$M^* = \frac{wL^2}{8}$ (0.9G+Wu) = 0.4 $+\frac{Pab}{L}$ = -0.71 = -0.3 kNm

Try 140x90 Hy90 LVL Le= F.R.

$\therefore \phi M$= 7.52 kNm OK

SLS EI= 235 $x10^9$ Nmm^2

$G\triangle = \frac{5(wx10^3)L^4}{384EI}$ = 0.42 $+ \frac{(Px10^3)L^3(3(a/L)-4(a/L)^3)}{48EI}$ = 0.64 = 1.1 mm

& $Qu\triangle$ = 0.13 + 0.18 = 0.31 mm

& $Ws\triangle$ = -0.71 mm OK

$LT\triangle$ = 1.6 mm < Limit = $\frac{span}{500}$ = 2.8 mm OK

$ST\triangle$ = 1.8 mm < Limit = $\frac{span}{300}$ = 4.7 mm OK

Reaction -: G = 3.26 kN max. Q = 0.97 kN max.
G = 2.42 kN min. Q = 0.73 kN min.

USE 140x90 Hy90 LVL Beam

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(E) Main Roof Structure over Upper Storey.

i) Kingspan KS1000 roof panels.

From manufacturers charts, the following limit state loads are obtained. (Data sheet attached)
Double span 2.5m

Loads	kN/m²	Trib. Width (m)	G (kN/m)		Qu (kN/m)	
Roof	0.45	1.0	0.45		0.25	
			Σ 0.45	kN/m	Σ 0.25	kN/m
					Point Load Qc = 1.00	kN

Wu=(-0.9)(1.69)(1) = -1.51 kN/m Ws=(-0.9)(1.14)(1)= -1.03 kN/m

ULS

1.2G + 1.5 Qu =>	N*=	0.92	kPa	<	2.97	kPa OK
0.9G + Wu =>	N*=	-1.11	kPa	<	3.20	kPa OK

SLS

	G =	0.45	kPa	<	1.64	kPa OK
	Ws=	-1.03	kPa	<	1.41	kPa OK

Therefore Kingspan KS100 panels OK to span 2.5m over two spans.

ii) Check Posi-strut rafters @ 666mm c/c. span = 5.00 m

Check PS25-25x09 rafters.
From manufacturers charts (copy attached) -:

Very High wind, PS25-25x09 @ 600mm c/c max. span = 6.0m & @ 900mm c/c max. span = 5.1m.

Therefore at 666mm c/c max. span approx. 5.8m.

Actual wind load is approx. 7% greater than Very High.

If reduce max. span by 7% => Max. span approx. = 5.4m > 5.0m OK

Hence PS25-25x09 rafters @ 666mm c/c OK.

7A

KS1000 RW
Roof Span Tables

Roof Span Tables

Span capability of composite systems can depend on a number of external factors. The following table is based on typical light colour selections. For darker colours contact Kingspan Technical Services.

Single Span Condition L

Panel Thickness mm	Load Type	Span L in metres 1.8	2.2	2.6	3.0	3.4	3.8	4.2	4.6	5.0
		Uniformly distributed loads kN/m²								
		Ultimate Limit State (ULS)								
40mm	Pressure	3.72	2.67	2.00	1.53					
	Suction	4.94	3.54	2.51	1.88					
60mm	Pressure	5.19	3.89	2.97	2.33	1.86	1.50			
	Suction	6.90	4.52	3.20	2.40	1.88	1.52			
100mm	Pressure	7.55	5.94	4.74	3.83	3.12	2.60	2.18	1.83	1.56
	Suction	9.63	6.32	4.49	3.36	2.63	2.12	1.74	1.47	1.26
		Serviceability Limit State (SLS)								
40mm	Pressure	2.72	1.55	0.91	0.55					
	Suction	3.83	2.31	1.49	1.00					
60mm	Pressure	4.07	2.50	1.59	1.03	0.68	0.44			
	Suction	5.79	3.75	2.55	1.80	1.31	0.98			
100mm	Pressure	6.33	4.26	2.96	2.09	1.50	1.08	0.79	0.57	0.41
	Suction	9.14	6.32	4.49	3.36	2.63	2.12	1.70	1.38	1.13

Double Span Condition L L

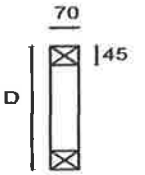
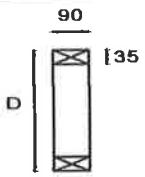
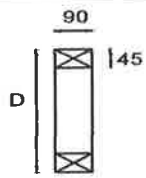
Panel Thickness mm	Load Type	Span L in metres 1.8	2.2	2.6	3.0	3.4	3.8	4.2	4.6	5.0
		Uniformly distributed loads kN/m²								
		Ultimate Limit State (ULS)								
40mm	Pressure	3.72	2.67	2.00	1.53	1.20	0.96	0.78	0.63	
	Suction	4.94	3.54	2.51	1.88	1.47	1.19	0.99	0.83	
60mm	Pressure	5.19	3.89	2.97	2.33	1.86	1.50	1.25	1.04	
	Suction	6.90	4.52	3.20	2.40	1.88	1.52	1.25	1.05	
100mm	Pressure	7.55	5.94	4.74	3.83	3.12	2.60	2.18	1.83	1.56
	Suction	9.63	6.32	4.49	3.36	2.63	2.12	1.74	1.47	1.26
		Serviceability Limit State (SLS)								
40mm	Pressure	2.57	1.83	1.38	1.07	0.86	0.70	0.56	0.40	
	Suction	1.94	1.45	1.14	0.94	0.80	0.69	0.61	0.54	
60mm	Pressure	2.96	2.15	1.64	1.30	1.05	0.87	0.73	0.61	0.50
	Suction	2.33	1.76	1.41	1.17	1.00	0.87	0.78	0.70	0.60
100mm	Pressure	3.53	2.60	2.01	1.61	1.32	1.10	0.93	0.80	0.61
	Suction	3.02	2.30	1.85	1.55	1.33	1.17	1.05	0.95	0.84

Notes:

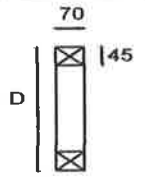
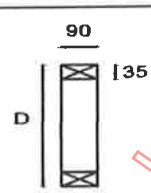
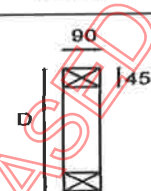
1. Values have been calculated in accordance with AS/NZS 1170.0, and also take into account the methods described in EN 14509:2006 titled 'Self-supporting double skin metal face insulating panels (Light coloured) - Factory made products - Specifications', taking imposed loads (excluding snow), temperature and creep into account.
2. The serviceability limit state is defined by local buckling, bending or crushing failure at an intermediate support or the exceedance of a specified deflection limit.
3. Deflection limit for pressure loading is L/200 and suction loading is L/150.
4. The allowable steelwork tolerance between bearing panels of adjacent supports is +/- 5mm, or L/600 whichever is the least.
5. The actual wind suction load resisted by the panel is dependant on the number of fasteners used and the support width as well as the fastener material. This table is based on a support width of 60mm.
6. For FM approved applications, a maximum span of 2000mm applies.
7. The fastener calculation should be carried out in accordance with the appropriate standards. For further advice please contact Kingspan Technical Services.
8. Load span tables for the panel specification not shown are available from Kingspan Technical Services.

Rafter Trusses

Maximum Span (m) at Spacing = S
Light Roof - Low/Medium Wind - Grade MSG8

	Truss Code	D mm	With Ceiling Spacing "S" mm 600	900	1200	1800	Without Ceiling Spacing "S" mm 900	1200	1800	2400
	PS20-21x07	217	5.2	4.5	3.8	3.2	5.3	4.6	3.7	3.3
	PS25-25x07	249	5.6	4.9	4.3	3.4	5.8	5.0	4.1	3.4
	PS30-30x07	303	6.3	5.6	4.8	3.8	6.5	5.6	4.5	4.0
	PS40-40x07	413	7.6	6.7	5.7	4.6	7.7	6.7	5.5	4.8
	PS20-19x09	197	5.0	4.4	3.8	3.1	5.2	4.5	3.6	3.2
	PS25-23x09	229	5.5	4.8	4.2	3.3	5.6	4.9	4.0	3.3
	PS30-28x09	283	6.2	5.5	4.8	**3.9**	6.4	5.6	4.5	3.9
	PS40-39x09	393	7.5	**6.6**	**5.7**	4.5	7.6	6.8	5.4	**4.8**
	PS20-21x09	217	5.5	5.0	4.4	3.6	5.7	5.2	4.3	3.7
	PS25-25x09	249	6.0	5.4	4.8	3.9	6.2	5.7	**4.7**	4.0
	PS30-30x09	303	6.7	6.1	5.5	4.4	6.9	6.4	**5.3**	**4.6**
	PS40-40x09	413	8.0	7.3	6.4	5.3	8.2	7.6	6.3	5.5

Maximum Span (m) at Spacing = S
Light Roof - High/Very High Wind - Grade MSG8

	Truss Code	D mm	With Ceiling Spacing "S" mm 600	900	1200	1800	Without Ceiling Spacing "S" mm 900	1200	1800	2400
	PS20-21x07	217	5.0	4.1	3.4	2.8	3.6	3.2	2.2	1.9
	PS25-25x07	249	5.5	4.4	3.8	3.1	3.9	3.4	2.7	2.0
	PS30-30x07	303	6.2	5.0	4.3	3.3	4.4	3.8	3.0	2.0
	PS40-40x07	413	7.2	5.7	5.0	**4.1**	5.3	4.5	**3.8**	**2.7**
	PS20-19x09	197	4.9	3.9	3.3	2.2	3.7	3.1	2.0	**1.3**
	PS25-23x09	229	5.4	4.3	3.7	2.7	4.1	3.3	2.1	**1.3**
	PS30-28x09	283	6.1	4.9	4.2	3.1	4.7	**3.9**	2.5	1.9
	PS40-39x09	393	7.1	5.5	4.7	**2.5**	5.3	**4.8**	**3.9**	**2.6**
	PS20-21x09	217	5.5	**4.7**	4.0	3.2	4.4	**3.9**	3.0	2.2
	PS25-25x09	249	6.0	5.1	4.4	3.4	4.8	4.1	3.2	2.6
	PS30-30x09	303	**6.7**	5.7	4.9	3.9	5.4	**4.7**	3.7	2.9
	PS40-40x09	413	8.0	6.9	5.9	4.2	**6.4**	5.4	**4.2**	**3.9**

(1) Spans in bold and shaded indicate double webs (DW) are required at ends (see page 21).

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iii) Roof Support beam midspan of rafters. Span = 0.66 m

Loads	kN/m^2	Trib. Width (m)	G (kN/m)		Qu (kN/m)
Roof	0.45	2.5	1.13	0.25	0.63
s/w	0.05	-	0.05		-
			Σ 1.18 kN/m		Σ 0.63 kN/m

Point Load Qc = 1.00 kN

Wu=(-0.9)(1.69)(2.5) = -3.78 kN/m Ws=(-0.9)(1.14)(2.5)= -2.57 kN/m

ULS

$M^* = \frac{wL^2}{8}$ (1.2G+1.5Qu) = 0.13 kNm

$M^* = \frac{wL^2}{8} + \frac{PL}{4}$ (1.2G+1.5Qu) = 0.1 + 0.25 = 0.32 kNm - governs

$M^* = \frac{wL^2}{8}$ (0.9G+Wu) = -0.1 kNm

Use 240x45 SG8 timber Le= F.R.

$\therefore \phi M$= (0.8)(0.8)(1.0)(14.0)x 0.432 = 3.87 kNm OK

SLS E= 4.4 MPa I = 51.8 x10^6 mm^3

$G\triangle = \frac{5(wx10^3)L^4}{384EI}$ = 0.01 mm & $Qu\triangle$= 0.01 mm

& $Ws\triangle$= -0.03 mm

Deflections OK by inspection.

Reaction -: G = 0.39 kN max. Q = 0.21 kN max.

USE 240x45 SG8 timber

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(F) Roof Support beam at High Point of rafters. (Adj. Grid B) Max. Span = 3.25 m

Loads	kN/m²	Trib. Width (m)	G (kN/m)		Qu (kN/m)
Roof	0.45	2.65	1.19	0.25	0.66
s/w	0.15	-	0.15		-
			Σ 1.34 kN/m		Σ 0.66 kN/m

Point Load Qc = 1.00 kN

Wu=(-0.9)(1.69)(2.65) = -4.01 kN/m Ws=(-0.9)(1.14)(2.65)= -2.72 kN/m

ULS

$M^* = \frac{wL^2}{8}$ (1.2G+1.5Qu) = 3.44 kNm

$M^* = \frac{wL^2}{8} + \frac{PL}{4}$ (1.2G+1.5Qu) = 2.1 + 1.22 = 3.35 kNm

$M^* = \frac{wL^2}{8}$ (0.9G+Wu) = -3.7 kNm - governs

Use 290x90 Hy90, LVL timber beam Le= F.R.

∴ϕM= (0.8)(33.8) = 27.0 kNm OK

SLS EI= 1881 $x10^9$ Nmm^2

$G\triangle = \frac{5(wx10^3)L^4}{384EI}$ = 1.04 mm & $Qu\triangle$ = 0.51 mm

& Ws△= -2.10 mm OK

LT△= 1.6 mm < Limit = $\frac{span}{500}$ = 6.5 mm OK

ST△= 1.9 mm < Limit = $\frac{span}{300}$ = 10.8 mm OK

Reaction -: G = 2.18 kN max. Q = 1.08 kN max.
Wu= -6.51 kN max. Ws= -4.42 kN max.

USE 290x90 Hy90, LVL timber beam

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(G) Roof Support beam at Low End of rafters. (Adj. Grid D) Max. Span = 4.90 m

Loads	kN/m²	Trib. Width (m)	G (kN/m)		Qu (kN/m)
Roof	0.45	2.65	1.19	0.25	0.66
s/w	0.15	-	0.15		-
			Σ 1.34 kN/m		Σ 0.66 kN/m

Point Load Qc = 1.00 kN

Wu=(-0.9)(1.69)(2.65) = -4.01 kN/m Ws=(-0.9)(1.14)(2.65)= -2.72 kN/m

ULS

$M^* = \frac{wL^2}{8}$ = 7.82 kNm (1.2G+1.5Qu)

$M^* = \frac{wL^2}{8} + \frac{PL}{4}$ = 4.8 + 1.84 = 6.67 kNm (1.2G+1.5Qu)

$M^* = \frac{wL^2}{8}$ = -8.4 kNm (0.9G+Wu) - governs

Use 290x90 Hy90, LVL timber beam Le= F.R.

∴ϕM= (0.8)(33.8) = 27.0 kNm OK

SLS EI= 1881 $x10^9$ Nmm^2

$G\triangle = \frac{5(wx10^3)L^4}{384EI}$ = 5.36 mm & $Qu\triangle$= 2.64 mm

& Ws△= -10.85 mm OK

LT△= 8.0 mm < Limit = $\frac{span}{500}$ = 9.8 mm OK

ST△= 9.9 mm < Limit = $\frac{span}{300}$ = 16.3 mm OK

Reaction -: G = 3.29 kN max. Q = 1.62 kN max.
Wu= -9.82 kN max. Ws= -6.66 kN max.

USE 290x90 Hy90, LVL timber beam

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(H) Plywood Roof Support Beam (Grid B) 7.3 m

Loads	kN/m²	Trib. Width (m)	G (kN/m)	kN/m²	Qu (kN/m)
Roof	0.75	0.5	0.38	0.25	0.13
s/w	0.8	1.2	0.96		-
		Σ	1.34 kN/m		Σ 0.13 kN/m
					Or Qc= 1.0 kN

Beam F Point loads G=(1.34)(3) = 4.02 kN Qu=(0.66)(3) = 2.0 kN
Wu=(-4.01)(3) = -12.03 kN Ws= (-2.72)(3) = -8.2 kN

This occurs at 2 locations

ULS a_1 = 2.45 b_1 = 4.85 a_2 = 1.85 b_2 = 5.45

M*= $\frac{wL^2}{8}$ = 11.92 kNm + $\frac{Pa_1b_1}{L}$ = 12.7 + $\frac{Pa_2b_2}{L}$ = 10.8
(1.2G+1.5Qu)
= 28.6 kNm at midspan - governs

M*= $\frac{wL^2}{8}$ = 8.0 + $\frac{Pa_1b_1}{L}$ = -13.7 + $\frac{Pa_2b_2}{L}$ = -11.6
(0.9G+Wu)
= -10.0 kNm at midspan

Timber Properties
E_f = 8000 MPa
F_t = 6 MPa
F_c = 18 MPa

Plywood Properties (F8)
E_w = 9100 MPa
F_b = 22.5 MPa
F_s = 4.2 MPa
F_r = 1.7 MPa

Section Properties
T = 140 mm D = 1200 mm B = 70 mm
b_{eff} = 6 mm (for 3 ply 9mm plywood.)

$nQ_w = \frac{n \times b_{eff} \times D^2}{(2 \times 4)}$ = 2.16E+06 mm³ $Q_f = B \times T \times (D-T)/2$ = 5.2E+06 mm³

$nI_w = \frac{n \times b_{eff} \times D^3}{(1\ 2)}$ = 1.73E+09 mm⁴ $I_f = \frac{B \times (D^3 - (D-2T)^3)}{(12)}$ = 5.5E+09 mm⁴

$EQ_p = E_fQ_f + nE_wQ_w$ = 6.12E+10 Nmm² $EI = E_fI_f + nE_wI_w$ = 6.0E+13 Nmm²

E_fQ_f = 4.16E+10 Nmm² $z = 2I_f/D$ = 9229422.22 mm³

ULS
Consider nailed beam, only. Check flange loading

∴ϕM= (0.8)(0.8)(6) x 9.23 = 35.44 kNm OK
Note if use 90x70 top chord then ϕM= 24.9 kNm > M*= -10 kNm. OK
Check stress in plywood.

∴ϕM= $\frac{(0.8)(0.8)F_bEIx2}{E_wD}$ = 158.31 kNm OK

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Shear

Check panel shear in the plywood, maximum at nuetral axis.

$\therefore \phi V = \frac{(0.8)(0.8)F_s bEI}{EQ_p}$ = 15.8 kN

> V= 15.0 kN OK

Joint strengths. flange/web shear.

$\tau b = \frac{VEQ_f}{EI}$ = 5.18 N/mm

Try 2.8mm diam. nails @ a maximum spacing of 80mm.

$\phi Qn = (0.8)(0.8)(1.4)(0.504)$ = 0.45 kN/nail $\therefore \phi Qn$ = 5.64 N/mm OK

SLS

$G\Delta = \frac{5(wx10^3)L^4}{384EI}$ = 0.8 mm + $\frac{(Px10^3)L^3(3(a/L)-4(a/L)^3)}{48EI}$ = 0.46 mm

(bending) + $\frac{(Px10^3)L^3(3(a/L)-4(a/L)^3)}{48EI}$ = 0.38 mm = 1.7 mm

& $Qu\Delta$ = 0.08 mm + 0.23 mm + 0.19 = 0.49 mm

& $Ws\Delta$ = 0.00 mm + 0.23 mm + 0.19 = 0.41 mm OK

Check shear deflection = $\frac{M^*}{G\,t\,D}$ = 4.1 mm

Bending & Shear Δ = 5.74 mm Allow 15% for nail slip. = 0.86 mm

Total LT Δ = 9.9 mm < $\frac{span}{500}$ = 14.6 mm

Total ST Δ = 10.2 mm < $\frac{span}{300}$ = 24.3 mm

Hence 9mm nailed plywood beam OK. (But glue as well.)

Reaction -:		
G = 8.56 kN	Q = 2.27 kN	
G = 9.22 kN	Q = 2.60 kN	
Wu = -13.02 kN	Ws = -8.83 kN	
Wu = -11.04 kN	Ws = -7.49 kN	

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(I) Master Bedroom End Wall Beam. (Adj. Grid R) Span = 5.30 m

Loads	kN/m^2	Trib. Width (m)	G (kN/m)		Qu (kN/m)
Wall	1.8	-	1.80	-	-
Floor	0.65	1.45	0.94	1.50	2.18
s/w	0.3	-	0.30		-
			Σ 3.04 kN/m		Σ 2.18 kN/m
					Or Qc= 1.8 (kN)

ULS M* = (1.2G+1.5Qu) $\frac{wL^2}{8}$ = 24.28 kNm - governs

M* = (1.2G+1.5Qc) $\frac{wL^2}{8}$ = 12.8 + $\frac{PL}{4}$ = 3.58 = 16.40 kNm

Try 200x75PFC Le= F.R.

∴ϕM= (0.9)(0.3)x 221 = 59.67 kNm OK

SLS E= 200 MPa I = 19.1 x10^6 mm^3

G△= $\frac{5(wx10^3)L^4}{384EI}$ = 8.18 mm & Qu△= 5.85 mm

& Qb△= $\frac{(Px10^3)L^3}{48EI}$ = 0.81 mm OK

LT△= 10.5 mm < Limit = $\frac{span}{500}$ = 10.6 mm OK

ST△= 12.3 mm < Limit = $\frac{span}{400}$ = 13.3 mm OK

Reaction -: G = 8.06 kN Q = 5.76 kN

USE 200x75PFC Steel Beam

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(J) Master Bedroom Floor Beam. (Between Grids R & Q) Span = 4.80 m

Loads	kN/m^2	Trib. Width (m)	G (kN/m)		Qu (kN/m)
Floor	0.65	2.50	1.63	1.50	3.75
s/w	0.3	-	0.30		-
			Σ 1.93 kN/m		Σ 3.75 kN/m
					Or Qc= 1.8 (kN)

ULS $M^*= \frac{wL^2}{8} = 22.85$ kNm (1.2G+1.5Qu) - governs

$M^*= \frac{wL^2}{8} = 6.7 + \frac{PL}{4} = 3.24 = 9.89$ kNm (1.2G+1.5Qc)

Try 200x75PFC Le= F.R.

$\therefore \phi M = (0.9)(0.3)x\ 221 = 59.67$ kNm OK

SLS E= 200 MPa I = 19.1 $x10^6$ mm^3

$G\triangle = \frac{5(wx10^3)L^4}{384EI} = 3.48$ mm & $Qu\triangle =$ 6.79 mm

& $Qb\triangle = \frac{(Px10^3)L^3}{48EI} =$ 0.60 mm OK

LT△= 6.2 mm < Limit = span/500 = 9.6 mm OK

ST△= 8.2 mm < Limit = span/400 = 12.0 mm OK

Reaction -: G = 4.62 kN Q = 9.00 kN

USE 200x75PFC Steel Beam

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(K) Floor Trimmer Beam Under Master Bedroom. (Adj. Grid C) Span = 4.90 m

Loads	kN/m²	Trib. Width (m)	G (kN/m)		Qu (kN/m)
Wall	1.8	-	1.80	-	-
Floor	0.65	0.30	0.20	1.50	0.45
s/w	0.2	-	0.20		-
			Σ 2.20 kN/m		Σ 0.45 kN/m
					Or Qc= 1.8 (kN)

Point Load Beam J G = 4.6 kN Qu = 9.00 kN

ULS a_1 = 2.3 b_1 = 2.6

$M^* = \frac{wL^2}{8} = 9.9 + \frac{Pa_1b_1}{L} = 23.2 = 33.2$ kNm

(1.2G+1.5Qu)

Try 200x75PFC Le= F.R.

$\therefore \phi M = (0.9)(0.3)x\ 221 = 59.67$ kNm OK

SLS E= 200 MPa I = 19.1 $x10^6$ mm^3

$G\triangle = \frac{5(wx10^3)L^4}{384EI} = 4.31 + \frac{(Px10^3)L^3(3(a/L)-4(a/L)^3)}{48EI} = 2.95$

= 7.26 mm

& $Qu\triangle$ = 0.88 + 5.74 = 6.63 mm

LT△= 9.9 mm approx. = Limit = $\frac{span}{500}$ = 9.8 mm OK

ST△= 11.9 mm < Limit = $\frac{span}{400}$ = 12.3 mm OK

Reaction -: G = 7.83 kN max. Q = 5.88 kN max.
G = 7.55 kN min. Q = 5.33 kN min.

USE 200x75PFC Steel Beam

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(L) Beam over Master Bedroom Wardrobe. Span = 1.70 m

Loads	kN/m^2	Trib. Width (m)	G (kN/m)		Qu (kN/m)
Floor	0.65	2.7	1.76	1.50	4.05
s/w	0.2	-	0.20		-
			Σ 1.96 kN/m		Σ 4.05 kN/m
				Or Qc=	1.8 (kN)

ULS

$M^*= \frac{wL^2}{8}$ = 3.0 kNm - governs
(1.2G+1.5Qu)

$M^*= \frac{wL^2}{8} + \frac{PL}{4}$ = 0.8 + 1.15 = 1.99 kNm
(1.2G+1.5Qc)

Use 200x75PFC Le= F.R.

$\therefore \phi M$= (0.9)(0.3)x 221 = 59.67 kNm OK

SLS E= 200 MPa I = 19.1 x10^6 mm^3

$G\triangle = \frac{5(wx10^3)L^4}{384EI}$ = 0.06 mm & $Qu\triangle$ = 0.12 mm

By inspection deflections are not an issue.

Reaction -: G = 1.66 kN max. Q = 3.44 kN max.

Beam is to be cut down to be web only for the last 250mm where the beam is to be fixed to the concrete Dincel wall.

Shear on 200x6mm web. V*= (1.2)(1.66)+(1.5)(3.44) = 7.15 kN

ϕVn= (0.75)(0.3) 1200 = 324 kN OK

USE 200x75PFC Steel Beam

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(M) Upper floor Support beams over Stairs & WC wall. Span = 2.20 m max.

Loads	kN/m²	Trib. Width (m)	G (kN/m)		Qu (kN/m)
Floor	0.65	3.25	2.11	1.50	4.88
s/w	0.12	-	0.12		-
			Σ 2.23 kN/m		Σ 4.88 kN/m
					Or Qc= 1.8 (kN)

Point Load Roof Beam C G = 5.0 kN Qu = 1.46 kN
Wu= -8.3 " Ws= -5.60 "

ULS a1 = 0.3 b1 = 1.9

$M^* = \frac{wL^2}{8} = 6.0 + \frac{Pab}{L} = 2.13 = 8.2$ kNm - governs
(1.2G+1.5Qu)

$M^* = \frac{wL^2}{8} = 1.2 + \frac{Pab}{L} = -2.15 = -0.9$ kNm
(0.9G+Wu)

Try 190x90 Hy90 LVL beam Le= F.R.

$\therefore \phi M =$ 12.80 kNm OK

SLS EI= 557 $x10^9$ Nmm^2

$G\triangle = \frac{5(wx10^3)L^4}{384EI} = 1.22 + \frac{(Px10^3)L^3(3(a/L)-4(a/L)^3)}{48EI} = 0.80 = 2.0$ mm

& $Qu\triangle$ = 2.67 + 0.23 = 2.90 mm

$LT\triangle$ = 4.8 mm Sl. > Limit = $\frac{span}{500}$ = 4.4 mm OK

$ST\triangle$ = 5.1 mm < Limit = $\frac{span}{400}$ = 5.5 mm OK

Reaction -: G = 6.81 kN max. Q = 6.63 kN max.
G = 3.14 kN min. Q = 5.56 kN min.

USE 190x90 Hy90 LVL beam

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(N) Upper floor Support beam over Laundry. Span = 2.20 m

Loads	kN/m²	Trib. Width (m)	G (kN/m)		Qu (kN/m)
Floor	0.65	1.80	1.17	1.50	2.70
s/w	0.12	-	0.12		-
			Σ 1.29	kN/m	Σ 2.70 kN/m
					Or Qc= 1.8 (kN)

Point Load Roof Beam H G = 9.4 kN Qu = 2.35 kN
Wu= -11.0 " Ws= -7.49 "

ULS a1 = 1.0 b1 = 1.2

$M^* = \frac{wL^2}{8} = 3.4 + \frac{Pab}{L} = 8.05 = 11.4$ kNm - governs
(1.2G+1.5Qu)

$M^* = \frac{wL^2}{8} = 0.7 + \frac{Pab}{L} = -6.02 = -5.3$ kNm
(0.9G+Wu)

Try 190x90 HySpan LVL beam Le= F.R.

∴ϕM= 19.20 kNm OK

SLS EI= 792 $x10^9$ Nmm^2

$G\triangle = \frac{5(wx10^3)L^4}{384EI} = 0.50 + \frac{(Px10^3)L^3(3(a/L)-4(a/L)^3)}{48EI} = 2.59 = 3.1$ mm

& $Qu\triangle$= 1.04 + 0.65 = 1.69 mm

LT△= 5.3 mm < Limit = $\frac{span}{300}$ = 7.3 mm OK

ST△= 5.8 mm Sl. > Limit = $\frac{span}{400}$ = 5.5 mm OK

Reaction -:

G =	6.53	kN max.	Q =	4.25	kN max.
G =	5.68	kN min.	Q =	4.04	kN min.
Wu=	-6.02	kN	Ws=	-4.09	kN
Wu=	-5.02	"	Ws=	-3.40	"

USE 190x90 HySpan LVL beam

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(O) Upper floor Support beam over Laundry. Span = 3.70 m

Loads	kN/m²	Trib. Width (m)	G (kN/m)		Qu (kN/m)
Floor	0.65	0.15	0.10	1.50	0.23
s/w	0.12	-	0.12		-
			Σ 0.22 kN/m		Σ 0.23 kN/m
				Or Qc=	1.8 (kN)

Point Load Beam N G = 6.5 kN Qu = 4.25 kN
Wu= -6.0 " Ws= -4.09 "

ULS a1 = 1.4 b1 = 2.3

$M^* = \frac{wL^2}{8} = 1.0 + \frac{Pab}{L} = 12.36 = 13.4$ kNm (1.2G+1.5Qu) - governs

$M^* = \frac{wL^2}{8} = 0.3 + \frac{Pab}{L} = -5.24 = -4.9$ kNm (0.9G+Wu)

Try 190x90 HySpan LVL beam Le= F.R.
∴φM= 19.20 kNm OK

SLS EI= 792 $x10^9$ Nmm^2

$G\triangle = \frac{5(wx10^3)L^4}{384EI} = 0.67 + \frac{(Px10^3)L^3(3(a/L)-4(a/L)^3)}{48EI} = 7.99 = 8.7$ mm

& $Qu\triangle$= 0.69 + 5.20 = 5.90 mm

LT△= 16.5 mm > Limit = $\frac{span}{500}$ = 7.4 mm OK

ST△= 17.1 mm > Limit = $\frac{span}{400}$ = 9.3 mm OK

Need 2/240x63 HySpan

Try 200x75PFC ∴φM= (0.9)(0.3)(221) = 59.67 kNm OK

SLS E= 200 MPa I = 19.1 $x10^6$ mm^3

$G\triangle = \frac{5(wx10^3)L^4}{384EI} = 0.14 + \frac{(Px10^3)L^3(3(a/L)-4(a/L)^3)}{48EI} = 1.66 = 1.8$ mm

& $Qu\triangle$= 0.14 + 1.08 = 1.22 mm

LT△= 2.3 mm < Limit = $\frac{span}{500}$ = 7.4 mm OK

ST△= 2.7 mm < Limit = $\frac{span}{400}$ = 9.3 mm OK

Reaction -: G = 4.46 kN max. Q = 3.06 kN max.
G = 2.87 kN min. Q = 2.02 kN min.

USE 2/240x63 HySpan LVL beam OR 200x75PFC

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(P) Upper floor Support beam over Hall. Span = 2.60 m

Loads	kN/m²	Trib. Width (m)	G (kN/m)		Qu (kN/m)
Floor	0.65	3.00	1.95	1.50	4.50
s/w	0.12	-	0.12		-
			Σ 2.07 kN/m		Σ 4.50 kN/m
					Or Qc= 1.8 (kN)

Point Load Beam O: G = 2.9 kN; Wu= -6.0 "; Qu = 2.02 kN; Ws= -4.09 "

Point Load Roof Beam C: G = 5.9 kN; Wu= -9.7 "; Qu = 1.71 kN; Ws= -6.55 "

ULS a1 = 0.3 b1 = 2.3

$M^* = \frac{wL^2}{8} = 7.8 + \frac{Pab}{L} = 4.28 = 12.1$ kNm - governs
(1.2G+1.5Qu)

$M^* = \frac{wL^2}{8} = 1.6 + \frac{Pab}{L} = -2.77 = -1.2$ kNm
(0.9G+Wu)

Try 200x75PFC Le= F.R.

$\therefore \phi M = (0.9)(0.3)(221) = 59.67$ kNm OK

SLS EI= 792 $x10^9$ Nmm^2

$G\Delta = \frac{5(wx10^3)L^4}{384EI} = 1.56 + \frac{(Px10^3)L^3(3(a/L)-4(a/L)^3)}{48EI} = 0.45 = 2.0$ mm

& $Qu\Delta$ = 3.38 + 0.32 = 3.70 mm

$LT\Delta$ = 5.2 mm > Limit = $\frac{span}{500}$ = 5.2 mm OK

$ST\Delta$ = 5.6 mm > Limit = $\frac{span}{400}$ = 6.5 mm OK

Need 2/240x63 HySpan

Try 200x75PFC $\therefore \phi M = (0.9)(0.3)(221) = 59.67$ kNm OK

SLS E= 200 MPa I = 19.1 $x10^6$ mm^3

$G\Delta = \frac{5(wx10^3)L^4}{384EI} = 0.32 + \frac{(Px10^3)L^3(3(a/L)-4(a/L)^3)}{48EI} = 0.29 = 0.6$ mm

& $Qu\Delta$ = 0.70 + 0.37 = 1.07 mm

$LT\Delta$ = 1.0 mm < Limit = $\frac{span}{500}$ = 5.2 mm OK

$ST\Delta$ = 1.4 mm < Limit = $\frac{span}{400}$ = 6.5 mm OK

Reaction -: G = 10.44 kN max. Q = 9.15 kN max.
G = 3.70 kN min. Q = 6.28 kN min.

USE 200x75PFC beam.

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Project:	New Dwelling for Corban Walls at 6 Island Bay Road, Birkdale		
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(Q) Upper floor Support beams over Laundry. Span = 1.90 m max.

Loads	kN/m²	Trib. Width (m)	G (kN/m)		Qu (kN/m)
Floor	0.65	2.30	1.50	1.50	3.45
s/w	0.12	-	0.12		-
			Σ 1.62 kN/m		Σ 3.45 kN/m
				Or Qc=	1.8 (kN)

ULS

$M^*= \frac{wL^2}{8}$ (1.2G+1.5Qu) = 3.2 kNm - governs

$M^*= \frac{wL^2}{8} + \frac{PL}{4}$ (1.2G+Qc) = 0.7 + 0.43 = 1.1 kNm

Try 190x90 Hy90 LVL beam Le= F.R.

$\therefore \phi M$= 12.80 kNm OK

SLS EI= 557 $\times 10^9$ Nmm²

$G\Delta = \frac{5(wx10^3)L^4}{384EI}$ = 0.49 mm & $Qu\Delta$ = 1.05 mm

LT△= 1.4 mm < Limit = $\frac{span}{500}$ = 3.8 mm OK

ST△= 1.5 mm < Limit = $\frac{span}{400}$ = 4.8 mm OK

Reaction -: G = 1.53 kN Q = 3.28 kN

USE 190x90 Hy90 LVL beam

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Project:	New Dwelling for Corban Walls at 6 Island Bay Road, Birkdale		
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(R) Main Beam over Garage. Span = 7.60 m

Loads	kN/m^2	Trib. Width (m)	G (kN/m)		Qu (kN/m)
Deck	0.8	3.2	2.56	2.00	6.40
s/w	0.3	-	0.30		-
			Σ 2.86 kN/m		Σ 6.40 kN/m

ULS

$M^* = \frac{wL^2}{8}$ = 94.1 kNm

Try 200UC59 Le= F.R.

$\therefore \phi M$= (0.9)(0.3)x 656 = 177.12 kNm OK

SLS E= 200 MPa I = 61.3 x10^6 mm^3

$G\triangle = \frac{5(wx10^3)L^4}{384EI}$ = 10.13 mm & $Qu\triangle$= 22.68 mm

& $Qb\triangle = \frac{(Px10^3)L^3}{48EI}$ = 0.75 mm OK

LT△= 19.2 mm > Limit = span/500 = 15.2 mm

ST△= 26.0 mm > Limit = span/400 = 19.0 mm

But XLAM floor will be fixed to top of beam and with will stiffen it. In addition there ia a 300mm cantilever at the front of the garage which will also reduce deflectuions slightly. Accept.

Reaction -: G = 10.87 kN Q = 24.32 kN

USE 200UC59 Steel Beam

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Project:	New Dwelling for Corban Walls at 6 Island Bay Road, Birkdale		
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(S) Secondary Beam over Garage. Span = 5.90 m

Loads	kN/m^2	Trib. Width (m)	G (kN/m)		Qu (kN/m)
Deck	0.8	2.9	2.32	2.00	5.80
s/w	0.6	-	0.60		-
			Σ 2.92 kN/m		Σ 5.80 kN/m
Load from above					
Roof	0.45	2.8	1.26	0.25	0.70
Wall	0.65	3.0	1.95	-	-
			Σ 3.21 kN/m		Σ 0.70 kN/m

ULS

$M^* = \frac{wL^2}{8}$ = 74.4 kNm

Try 200UC59 Le= F.R.

$\therefore \phi M = (0.9)(0.3)x$ 656 = 177.12 kNm OK

SLS E= 200 MPa I = 61.3 x10^6 mm^3

$G\triangle = \frac{5(wx10^3)L^4}{384EI}$ = 7.89 mm & $Qu\triangle$ = 8.37 mm

& $Qb\triangle = \frac{(Px10^3)L^3}{48EI}$ = 0.35 mm OK

LT△= 11.2 mm < Limit = span/500 = 11.8 mm

ST△= 13.7 mm < Limit = span/400 = 14.8 mm

Reaction -: G = 18.08 kN Q = 19.18 kN

USE 200UC59 Steel Beam

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Project: Carbon Walls	Page No: 24
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(T) Consider Supports to 250x90 LVL beams

Reaction from beams:

at End Clr - $N^* = 6.2$ kN ↓ or $N^* = 15.5$ kN ↑
(1.2G+1.5Q) (0.9G+1.0W↑)

To internal support wall
- $N^* = 6.2$ kN at end or 15.5kN ↑

Plus wall loads @ $N^* = 2.4$ kN/m ↓
as $N^* = -6.2$ kN/m ↑

Try steel brackets to connect LVL to walls (Clean)
Grid C worst case.

Wall 1.085m long, try bracket @ each end + @ 300mm c/c

∴ load/end bracket = $6.4 + (2.4)(\frac{3}{2}) = 6.6$ kN ↓

or $= (-15.4) + (-6.2)(\frac{3}{2}) = -16.4$ kN ↑

Try brackets 100 wide x 50 deep "Tee" (8mm thick)

$\Rightarrow Z = 7.035 \times 10^3$ mm^3

lever Arm $\doteq$ .115m $\Rightarrow M^* = (6.6)(.115) = 0.76$ kNm ↓

$\Rightarrow M^* = (-16.4)(.115 + .025) = 2.50$ kNm ↑

$\phi M_n = (0.9)(0.3)(7.035) = 1.9$ kNm > M^* ↓ but < M^* ↑.

However uplift load will be spread over at least 2 (+ most likely 3 or 4)

$\Rightarrow \phi M_n \doteq (2)(1.9) = 3.8$ kNm — OK.

SLS $\quad G\Delta \doteq \frac{(3.0 \times 10^3)(115)^3}{3(200)(0.3 \times 12)} = 0.02$ mm

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$w_s \Delta = \frac{(6.1)10^3 (0.153)^3}{(3)(200)(314)} = 0.12\text{mm}$ — OK.

Check bolted connection to LUL bracket

M12 bolts

1.2G+1.5Q: $\phi Q_{n\perp b} = (0.8)(0.7)(7.99) = 4.47$ kN/bolt.

⇒ Need min 2 M12 bolts for ↓ load

0.9G+1.5Q: $\phi Q_{n\perp} = (1.0)(0.7)(7.99) = 5.6$ kN

⇒ Need $\frac{16.4}{5.6} = 2.9$ bolts — use 4 M12's

Consider M8 coach screws into top of RHS wall

Embed 100mm ⇒ $\phi Q_{n\,pullout} = \frac{(1.0)(0.7)(96)(100)}{1000} = 6.7$ kN/1000 Δ screw.

As above load over two brackets — use 2 coach screws/bracket

⇒ $\phi Q = (2)(6.7)(2) = 26.8$ kN — OK.

(4) Consider Handrail to Deck Area

Handrail 1.0 m above decking & then requires approx 1.2m above support point.

$W_u = (1.0)(1.69) = 1.69$ kPa $W_s = 1.14$ kPa

Also loads from AS/NZS 1170 table 3.3

$Q_h = 0.75$ kN/m top edge $Q_{vert} = 0.75$ kN/m top edge

$Q_h = 0.6$ kN top edge

Infill $Q_h = 1.0$ kPa   or $Q_u = 0.5$ kN any direction

$\therefore Q_h = (1.5)(0.75) = 1.125$ kNm/m top edge →

or $Q_h = (0.6)(1.5) = 0.9$ kN   " "

or $Q_{h_{wind}} = 1.69$ kPa

$\therefore M^* = (1.125)(1.2) = 1.35$ kNm/m — governs.

or $M^* = (1.69)(1.2)(1.2/2) = 1.22$ kNm/m

75mm XLAM wall $\phi M_n = 11$ kNm/m >> M^* — OK

Check bolting through 80+10 L's

Lever arm to XLAM wall with 2M12 bolts - lever arm

≈ 105mm — 50mm sq washers to outer face

$\phi F_p = (0.8)(0.7)(8.9)(50+10)/1000 = 12.46$ kN/bolt.

$\Rightarrow \phi M_n = (12.46)(.105) = 1.30$ kNm/m.

Bolts @ 600mm c/c ∴ OK

Check connection to XLAM roof. Edge distance ≈ 45mm

$M_m = (4)(12) = 48$mm ∴ Reduce load capacity by 10%

$\phi Q_{n\perp} = (0.7)(0.8)(7.99)(.9) = 4.03$ kN/bolt. /0.6 = 6.7 kN/m — OK.

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Consider Connection of rear & side handrails.
These are to be bolted to 140x10 Joists. See detail 3
From previous page
$M^* = (1.25)(1.05) = 1.24$ kNm/m — governs
(No infill so this is an open balustrade handrail.)
Handrail design by others. Base connection only
covered by the design
Assume uprights are at 1.0m crs — $M^* = 1.24$ kNm/upright
Try 2M12 bolts face fixed. 50mm sq washers
$\Rightarrow \phi N_t^* = 12.4$ kN (from previous page)
lever Arm = 180 − 25 − 25 = 140 mm
$\rightarrow \phi M_n = (12.4)(.14) = 1.74$ kNm/upright — OK
Fix 2/140x65 bearing joists to joists to details
shown in Fig 7.4 of NZS 3604:2011.

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Project: Co-bar walls	Page No: 28
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(V) Consider XLAM walls.

Max span = 3.1m. Walls span between floors or floor & roof.

ULS

$W_u = (1.0)(1.69) = 1.69$ kN/m $W_s = 1.14$ kN/m

$M^* = \frac{(1.69)(3.1)^2}{8} = 2.03$ kNm/m

XLAM XL3/75mm min.

$\Rightarrow \phi M_n = 11$ kNm/m w.o.k. — OK.

SLS

$w_{s1} = \frac{5}{384}\frac{(1.14\times10^3)(3.1)^4}{(253)} = 5.4$mm

$< \frac{3100}{300} = 10.3$mm — OK

Consider max. vertical load to walls (upper)

Roof — $N^* = \frac{[(2)(6.5)+(2.4)](1.085)}{1.085} = 9.3$ kN/m to 1.085m wall.

From page 28B attached capacity = 236 kN/m $\Rightarrow N^*$

Consider max load to lower storey walls

Loads	G	Qu
Roof (0.45)(1)	= 0.45 kN/m	(.25)(1) = 0.25 kN/m
Wall (.6)(2.8)	= 1.74 "	
Floor (.65)(4.5)	= 1.46 "	(1.5)(4.5) = 3.375 "
s/w (.6)(2.7)	= 1.52 "	3.625 kN/m
	5.27 "	

$\Rightarrow N^* = (1.2)(5.27)+(1.5)(3.63) = 11.8$ kN/m

< 236 kN/m from above

— OK

Standard Panel Configurations
Radiata Pine

Page 28A

STANDARD PANEL CONFIGURATIONS - RADIATA PINE, NZ GROWN

Type	XL3/60	XL3/75	XL3/90	XL3/105	XL5/130	XL5/145	XL5/175	XL7/200
EI^{1m}_{eff} (Nmm²)	$1.39x10^{11}$	$2.53x10^{11}$	$4.81x10^{11}$	$7.44x10^{11}$	$1.33x10^{12}$	$1.78x10^{12}$	$2.84x10^{12}$	$4.25x10^{12}$
ϕM_n (per m width)	7.5kNm	11kNm	17kNm	23kNm	33kNm	40kNm	52kNm	69kNm

Thickness	60mm	75mm	90mm	105mm	130mm	145mm	175mm	200mm
Layer 1	R20-8	R20-8	R35-8	R35-8	R35-8	R35-8	R35-8	R35-8
Layer 2	R20-C	R35-C	R20-C	R35-C	R20-C	R20-C	R35-C	R20-C
Layer 3	R20-8	R20-8	R35-8	R35-8	R20-C	R35-C	R35-C	R35-C
Layer 4					R20-C	R20-C	R35-C	R20-C
Layer 5					R35-8	R35-8	R35-8	R35-C
Layer 6								R20-C
Layer 7								R35-8

Code	Thickness	Grade	Modulus of Elasticity
R20-8	20mm	G8	E_0 = 8000MPa
R20-C	20mm	<G8	E_0 = 6000MPa
R35-8	35mm	G8	E_0 = 8000MPa
R35-C	35mm	<G8	E_0 = 6000MPa

Wall Load Capacity Tables

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CLT WALLS – RADIATA PINE

- Fixing details of the walls require structural engineering design
- Fixing strength depends upon fixing type and foundation medium
- All load demands (wind & seismic) require engineering design

Panel Thickness	Height of Wall (m)	Axial Capacity P_r (kN/m)	Tensile Capacity P_t (kN/m)	Shear Capacity V_r (kN/m)	Bracing Capacity (BU/m)
XL3/60	1.0	527	282	66	1322
	2.0	314	282	17	336
	3.0	169	282	5	101
	5.0	75	282	2.1	42
XL3/75	1.0	535	282	73	1462
	2.0	416	282	22	432
	3.0	276	282	7.7	153
	5.0	107	282	2.1	42
XL3/90	1.0	936	493	131	2613
	2.0	751	493	48	950
	3.0	510	493	20	400
	5.0	205	493	4.4	87
XL3/105	1.0	936	493	131	2614
	2.0	862	493	53	1061
	3.0	645	493	24	484
	5.0	325	493	5.9	118
XL5/130	1.0	1204	634	168	3360
	2.0	1204	634	77	1530
	3.0	950	634	38	757
	5.0	550	634	11	224
XL5/145	1.0	1405	739	196	3917
	2.0	1405	739	94	1872
	3.0	1162	739	48	957
	5.0	706	739	15	308
XL5/175	1.0	1405	739	196	3917
	2.0	1405	739	98	1960
	3.0	1335	739	53	1065
	5.0	926	739	19	383
XL7/200	1.0	1872	986	261	5225
	2.0	1872	986	131	2614
	3.0	1821	986	77	1539
	5.0	1289	986	30	598

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Project: Corban Walk	Page No: 28
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(W)

Consider XLAM Floor & Deck.

(i) XLAM Floor to dwelling. using XLAM XL3/105

Assume single span but in actual case continuous spans will occur.

from manufacturers charts

XL3/105 with 2.0kPa live load will span 3.45m.

—Ok,

(ii) XLAM Floor over garage to act as roof deck.

Again assume as single span XL3/105

Max actual span = 3.4m ≤ max single span = 3.45m — Ok

Span Tables for Floors, Radiata Pine

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CLT FLOOR – RADIATA PINE - GRADE 8

- All loads are uniformly distributed over the element
- The spans correspond to a deflection limit of SPAN/400
- The cantilever back-span is assumed to be 1.25 x cantilever span (NZS 3604 7.1.5.3) with the backspan unloaded

Panel Thickness	Design Live Load (Q)	Single Span	Continuous Span	Cantilever Span
		Blue figures = Long term deflection governs	Red figures = Vibration limit governs	
XL3/60	2.0kPa	2.15m	2.35m	0.95m
	3.0kPa	1.95m	2.35m	0.80m
	4.0kPa	1.55m	2.35m	0.65m
	5.0kPa	1.45m	2.20m	0.60m
XL3/75	2.0kPa	2.55m	2.80m	1.10m
	3.0kPa	2.35m	2.80m	1.00m
	4.0kPa	1.90m	2.80m	0.80m
	5.0kPa	1.75m	2.70m	0.70m
XL3/90	2.0kPa	3.05m	3.35m	1.35m
	3.0kPa	2.90m	3.35m	1.25m
	4.0kPa	2.35m	3.35m	1.00m
	5.0kPa	2.20m	3.30m	0.90m
XL3/105	2.0kPa	3.45m	3.80m	1.55m
	3.0kPa	3.25m	3.80m	1.40m
	4.0kPa	2.70m	3.80m	1.10m
	5.0kPa	2.50m	3.80m	1.05m
XL5/130	2.0kPa	4.05m	4.45m	1.85m
	3.0kPa	3.90m	4.45m	1.70m
	4.0kPa	3.25m	4.45m	1.35m
	5.0kPa	3.05m	4.45m	1.30m
XL5/145	2.0kPa	4.40m	4.80m	2.00m
	3.0kPa	4.25m	4.80m	1.85m
	4.0kPa	3.60m	4.80m	1.50m
	5.0kPa	3.35m	4.80m	1.40m
XL5/175	2.0kPa	5.00m	5.50m	2.30m
	3.0kPa	4.80m	5.50m	2.10m
	4.0kPa	4.10m	5.50m	1.75m
	5.0kPa	3.85m	5.50m	1.60m
XL7/200	2.0kPa	5.60m	6.15m	2.60m
	3.0kPa	5.45m	6.15m	2.40m
	4.0kPa	4.65m	6.15m	2.00m
	5.0kPa	4.40m	6.15m	1.90m

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(X) i) Check connection of cantilever roof to ISOTEC PFC

Max loads - $N^* = 3.24$ kN/m ↓ or ↑

Try M12 coach screws @ 900 c/c embedded 90 mm

$\phi N_t = (0.8)(1)(110)(90)(10^{-3})/0.9 = 9.46$ kN/m — OK

ii) Check connection of XLAM wall to XLAM floor

Lateral loads - $w_t = (1.0)(1.69) = 1.69$ kN/m²

$\Rightarrow w_t$ lateral $= (1.69)(5.7/2) = 4.82$ kN/m

Try M12 coach screw @ 600 mm c/c

$\Rightarrow \phi N_t = \frac{9.44(0.5)}{0.6} = 14.2$ kN/m — OK

iii) Check base Connection

$V^* = (1.0)(1.69)(0.9)(7/2) = 2.3$ kN

12 mm ϕ, 60 mm embedment

$\rightarrow \phi N_t = (0.8)(0.5)(112)(60)10^{-3} = 3.96$ kN/anchor

∴ Use M12 @ 600 c/c $V^* = 1.5$ kN/anchor — OK

(Y) Consider lateral support to top of Garage doorway

$w_t = (1.69)(3/2) = 2.5$ kN/m. Span of beam between steel = 3.6 m.

$\Rightarrow M^* = \frac{(2.5)(3.6)^2}{8} = 4.05$ kNm

Check 90×90+P angle $w_{LC} = 14$ kN

$w_t = (2.5)(3.6) = 9.0$ kN — OK

$w_{s1} = 6.5$ kN > $w_s = (1.14)(3/2)(3.6) = 6.1$ kN — OK

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Project: Corbar Walls	Page No: 31
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(a) Consider Gutter Cantilever span 240 mm

$$M^* = \frac{(1.2)(0.3)(1)(0.24)^2}{2} + (1.5)(1)(0.2) = 0.31 \text{ kNm/m}$$

Use similar T section as previously, but only 150 mm wide.

$$\Rightarrow z \doteq 6.42 \times 10^6 \text{ mm}^3$$

$$\Rightarrow \phi M \doteq (0.9)(0.3)(6.42) = 1.73 \text{ kNm} \quad \text{— OK}$$

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Project:	New Dwelling for Corban Walls at 6 Island Bay Road, Birkdale		
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(AA) Posts and Pads.

Beam	C :	N*	=	1.2G+1.5Qu =	9.6	kN	75x6 CHS posts
Beam	D :	V* & N*	=	1.2G+1.5Qu =	5.4	kN	-2/90x45 studs -2M12 bolts
Beam	H :	N*	=	1.2G+1.5Qu =	24.5	kN	-4/90x45 studs
Beam	I :	N*	=	1.2G+1.5Qu =	18.3	kN	75x6 CHS posts
Beam	J :	V* & N*	=	1.2G+1.5Qu =	19.0	kN	-89x3.5 SHS posts
Beam	K :	N*	=	1.2G+1.5Qu =	17.0	kN	-3/90x45 studs
				I + K =	35.4		75x6 CHS posts
Beam	L :	N*	=	1.2G+1.5Qu =	7.2	kN	
				J + L =	26.2		-89x3.5 SHS posts
Beam	M :	V* & N*	=	1.2G+1.5Qu =	18.1	kN	-3/90x45 studs -2M12 bolts
Beam	N :	V* & N*	=	1.2G+1.5Qu =	14.2	kN	-3/90x45 studs -2M12 bolts
Beam	O :	V*	=	1.2G+1.5Qu =	9.9	kN	-2M12 bolts
Beam	P :	V* & N*	=	1.2G+1.5Qu =	26.3	kN	
					13.9	"	-2/90x45 studs
				O + P =	36.2		-2M12 bolts
Beam	Q :	V* & N*	=	1.2G+1.5Qu =	6.8	kN	-89x3.5 SHS posts -2M12 bolts
Beam	R :	N*	=	1.2G+1.5Qu =	49.5	kN	75x6 CHS posts
Beam	S :	N*	=	1.2G+1.5Qu =	28.8	kN	75x6 CHS posts

Check capacity of 2/90x45 timber studs Try N* max = 13.9 kN

Height approx. = 2.7 $\therefore S = \frac{2700}{90} = 30.0$ => $k_8 = 0.34$

$\therefore \phi N_c = (0.8)(0.8)(0.34)(18)(90x45x2)10^{-3} = 31.7$ kN OK

& $\phi M = (0.8)(0.8)(1.14)(14.0)(.121) = 1.2$ kNm

Apply an eccentricity of b/2. $\therefore$ **Me**= (13.9)(.09/2)= 0.6255 kNm OK

$$\left[\frac{N^*}{\phi N_c}\right] + \left[\frac{M^*}{\phi M}\right] = \frac{13.9}{31.7} + \frac{0.6255}{1.2} = 0.94 < 1.0 \text{ OK}$$

Jackson Clapperton & Partners Ltd
Consulting Engineers & Regd Surveyors
P.O. Box 71065, Rosebank Road, Auckland
Ph: (09) 8200-131 Fax: (09) 8200-133

Project:	New Dwelling for Corban Walls at 6 Island Bay Road, Birkdale		
Ref. No:	2003/004/h	Page No.	33
Date:	20/09/2016	Designed:	MD

Check capacity of 3/90x45 timber studs — Try N* max = 18.1 kN

Height approx. = 2.7 $\therefore$ S= $\frac{2700}{90}$ = 26.67 => k_8 = 0.34

$\therefore \phi N_c = (0.8)(0.8)(0.34)(18)(90x45x3)10^{-3}$ = 47.6 kN OK

& $\phi M = (0.8)(0.8)(1.2)(14.0)(.181)$ = 1.9 kNm

Apply an eccentricity of b/2. $\therefore$ **Me**= (18.1)(.09/2)= 0.8145 kNm OK

$$\left[\frac{N^*}{\phi N_c}\right] + \left[\frac{M^*}{\phi M}\right] = \frac{18.1}{47.6} + \frac{0.8145}{1.9} = 0.80 < 1.0 \text{ OK}$$

Check 75x6 CHS post. Max. N*= 49.5 kN under beam R

AISC tables 4.2-21 Le = 2.7m $\therefore \phi N$= 159 kN OK

Max. Me*= 49.5x.075/2 = 1.86 kNm

AISC tables 3.3-21 Le = 2.7m $\therefore \phi Mn$= 6.56 kNm OK

By inspection combined actions are OK.

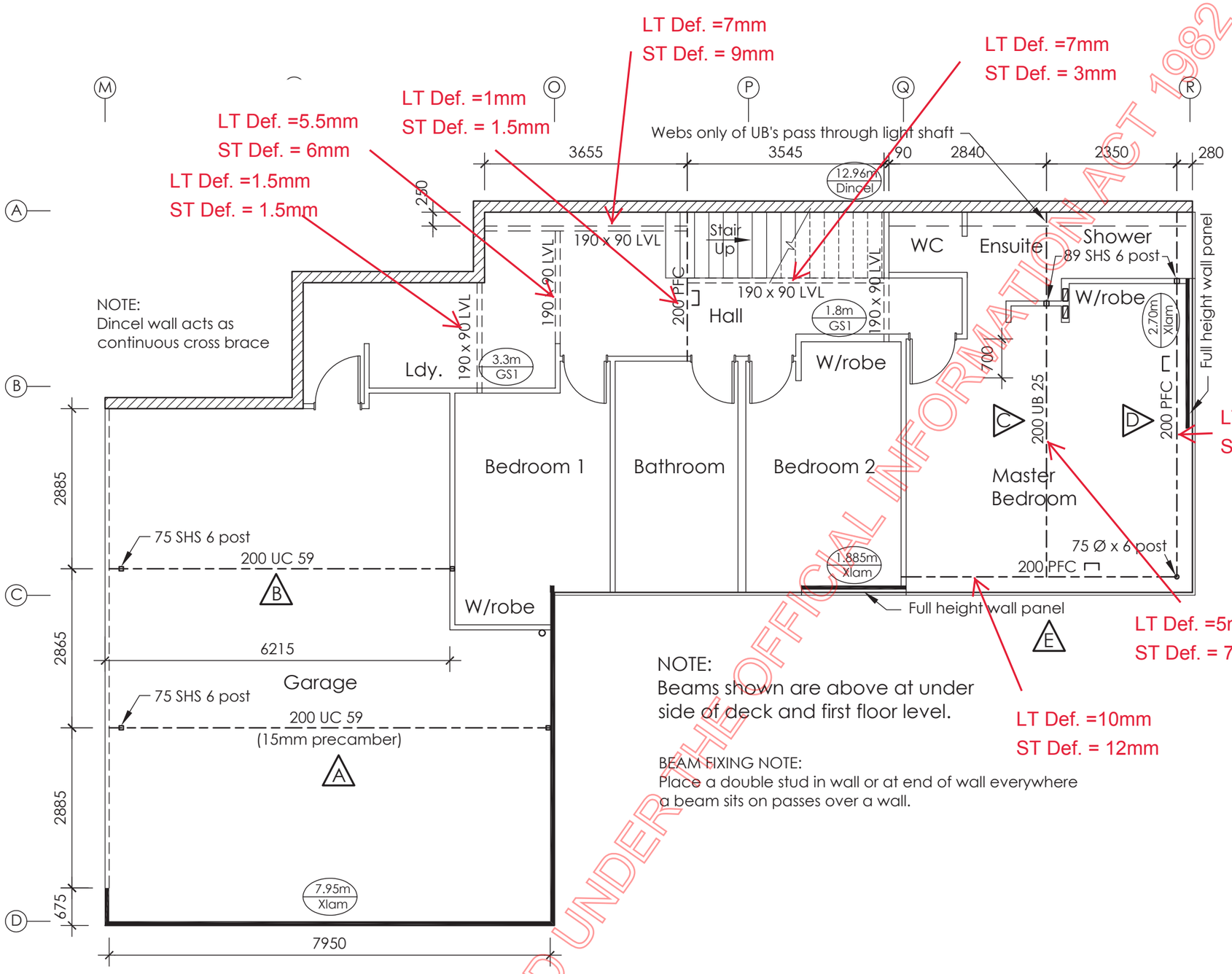
Check 89x89x6 SHS posts. Max. N*= 26.2 kN under intersection of L & J.

AISC tables 4.2-25 Le = 2.7m $\therefore \phi N$= 369.2 kN OK

Max. Me*= 26.2x0.089/2 = 1.17 kNm

AISC tables 3.3-24 Le = 2.5m $\therefore \phi Mn$= 17.8 kNm OK

By inspection combined actions are OK.



NOTE:
Beams shown are above at under side of deck and first floor level.

BEAM FIXING NOTE:
Place a double stud in wall or at end of wall everywhere a beam sits on passes over a wall.

wall legend:

- 200mm Dincel retaining wall
- 125mm thick exterior wall (75mm Xlam + 50mm insulation)
- 90mm thick internal wall
- 140mm thick internal wall

symbol legend:

- dp — 110mm Ø PVC downpipe
- Steel beam over to size stated
- Timber beam over to size stated
- Span direction of XLam floor units
- Steelwork elevation - located on S11
- 1.885 Xlam — Bracing wall - length and type
- Bracing line

GROUND FLOOR BEAM & COLUMN LAYOUT PLAN

INCLUDING BRACING

scale 1:100 @ A2

Form 2A

Memorandum from licensed building practitioner: Certificate of design work

Section 45 and Section 30C, Building Act 2004

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

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:	6 Island Bay Road		
Suburb:	Beach Haven		
Town/City	Auckland	Postcode:	0626

THE OWNER

Name(s):	Alexandra & Corban Walls		
Mailing address:	s 9(2)(a)		
Suburb:		PO Box/Private Bag:	
Town/City:		Postcode:	
Phone number:		Email address:	s 9(2)(a)

BASIS FOR PROVIDING THIS MEMORANDUM

I am providing this memorandum in my role as the: Please tick the option that applies (√)	
( )	**sole** designer of all of the RBW design outlined in this memorandum – I carried out all of the RBW design myself – no other person will be providing any additional memoranda for the project
( )	**lead** designer who carried out some of the RBW design myself but also supervised other designers – this memorandum covers their RBW design work as well as mine, and no other person will be providing any additional memoranda for the project
( )	**lead** designer for all but specific elements of RBW – this memorandum only covers the RBW design work that I carried out or supervised and the other designers will provide their own memoranda relating to their specific RBW design
(✓)	**specialist** designer who carried out specific elements of RBW design work as outlined in this memorandum – other designers will be providing a memorandum covering the remaining RBW design work

IDENTIFICATION OF DESIGN WORK THAT IS RESTRICTED BUILDING WORK (RBW)

I s 9(2)(a) ~~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**
Tick(√)if included *Cross (X) if excluded*	*[If appropriate, provide details of the restricted building work]*	*[Specify whether you carried out this design work or supervised someone else carrying*	*[If appropriate, specify references]*

		out this design work]		
Primary structure				
All RBW Design work relating to B1	( )		( ) Carried out ( ) Supervised	
Foundations and subfloor framing	( )		( ) Carried out ( ) Supervised	
Walls	(✓)	XLAM walls	( ) Carried out (✓) Supervised	S-02, S-03, S-04, S-05, S-06, S-07, S-08, S-09, S-10.
Roof	(✓)	Roof structure	( ) Carried out (✓) Supervised	S-03, S-04, S-05, S-06 S-07 , S08, S-09.
Columns and beams	(✓)	Beams & Columns supporting roof & floor beams & connections.	( ) Carried out (✓) Supervised	S-02, S-03, S-04, S-05, S-06, S-07, S-08, S-09, S-10, S-11 & S-12.
Bracing	(✓)	Wall bracing.	( ) Carried out (✓) Supervised	S-03.
Other	(✓)	XLAM floors, decks & handrails.	( ) Carried out (✓) Supervised	S-03,S-04, S-05, S-06 S-07, S-08, S-09, S-10 & S-11.
EXTERNAL MOISTURE MANAGEMENT SYSTEMS: E2				
All RBW design work relating to E2	( )		( ) Carried out ( ) Supervised	
Damp proofing	( )		( ) Carried out ( ) Supervised	
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: C1 – C6				
Emergency warning systems, evacuation and fire service operation systems, suppression or control systems, or	( )		( ) Carried out ( ) Supervised	

other			

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.

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**
[List relevant clause numbers of building code]	*[Specify nature of waiver or modification of building code]*

Note: continue on another page if necessary.

ISSUED BY

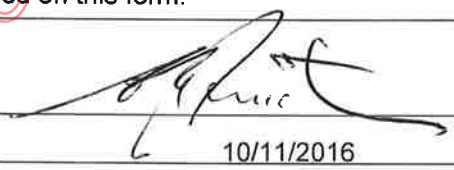
Name: s 9(2)(a)	LBP or Registration number: CP Eng. 7518
The practitioner is a: ( ) Design LBP ( ) Registered architect (✓) Chartered professional engineer	
Design Entity or Company (optional): Jackson Clapperton & Partners Ltd	
Mailing address (if different from below): P.O. Box 71065	
Street address / Registered office: 16A Saunders Place	
Suburb: Avondale	Town/City: Auckland
PO Box/Private Bag: P.O. Box 71065	Postcode: 1348
Phone number: 09 8200131	Mobile:
After Hours:	Fax: 09 8200133
Email address: jcp.ltd@xtra.co.nz	Website:

DECLARATION

I s 9(2)(a) [*name of practitioner*] , LBP,

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

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

Signature: 

Date: 10/11/2016

euroglass

A division of the Viridian Glass Limited Partnership

RFI 3d, 14a, 14b & 14c

Quote	567825
Date:	24/11/2016
Page:	1 of 1
Your Ref:	Island Bay Rd

s 9(2)(a)

Contacts:
Mobile: s 9(2)(a)

Quantity	Description	Size	Rate	Amount
1	Glass make up options Glass type Performa Tech IGU Low E & Laminate OPTIONS based on a glazing height of 3.0m 1: 3000 x 1300mm O/All thickness 27mm approx' $524.29/m2 2 : 3000 x 1700mm 29mm approx' $561.38/m2 3 : 3000 x 2000mm 33mm approx' $683.88/m2 Prices are for glass supply only no glazing has been allowed based on glazing being considered as 4 edge support subject to site engineers calculations a min' silicone bite of 10mm is required (TBC) performance = 40% energy reflection SC = 0.37 Light transparence 60%			

Quoted By: s 9(2)(a)

Acceptance of Quotation:

I / we hereby acknowledge and agree that:

1. Viridian Glass Limited Partnership, through its general partner, Viridian Glass GP Limited ("the Partnership"), trading as Euroglass Auckland has either provided me / us with a copy of its standard terms and conditions or advised me / us that its standard terms and conditions are available on the website www.euroglass.co.nz ; and
2. This quote is subject to The Partnership's standard terms and conditions, and that by accepting this quote I / we shall be deemed to have agreed to be bound by The Partnership's standard terms and conditions.
3. I / we acknowledge that it is our sole responsibility to ensure that the structure to which The Partnership's goods are affixed is suitable for this purpose and that I / we indemnify The Partnership against all losses, costs, penalties, liabilities and expenses which arise as a result of the structure to which the goods are affixed not being suitable for this purpose.

Signature of acceptance: _____ Date: _____ Total Value $ _____

Print Name: _____

Prices are subject to requote after 60 days
50% ($0.00) deposit required before work can proceed
Payment due within 7 day(s) of invoice

Bank A/C No. 12-3113-0128899-01

Subtotal:	0.00
Total:	**$0.00**

Viridian Glass Limited Partnership t/a Euroglass Auckland. PO Box 27 337, Mt. Roskill, Auckland, New Zealand 1440.
58 Dornwell Rd, Mt. Roskill. Phone: (09) 624 0610 Fax: (09) 624 0614 www.euroglass.co.nz

Viridian
New World Glass

VERTICAL IGU SUPPORTED ALONG 4 EDGES: NZS 4223.4:2008

16/12/2016

DESIGN INPUT		
ULS wind pressure (kPa)	1.76	
SLS wind pressure (kPa)	1.25	
IGU make-up	**Outer pane**	**Inner pane**
	Monolithic	Laminated
	Toughened	Annealed
Glass thickness selected (mm)	**6**	**12**
Load share - ultimate	0.24	1.76
Load share - serviceability	0.17	1.25
Long side of panel (mm)	3000	
Short side of panel (mm)	2000	
AR	1.5	

MINIMUM GLASS THICKNESS REQUIRED FOR STRENGTH		
Nominal thickness (interlayer excluded)	**4**	**8**

Glass selected has sufficient strength

Return to Design Input

CHECK DEFLECTION OF GLASS SELECTED		
Glass thickness selected	**6**	**12**
Minimum thickness	5.8	11.6
Slenderness factor	344.9	172.5
Slenderness factor from Figure 35 of NZS 4223.4	1892.9	336.8
Deflection ≤ Span / 60	**OK**	**OK**
Estimated deflection mm	14	
IGUMA recommended deflection limit (1.5 times airspace)	21	
Thickness check if safety glass is required by NZS 4223.3:1999	**OK**	**OK**

Viridian
New World Glass

VERTICAL IGU SUPPORTED ALONG 4 EDGES: NZS 4223.4:2008

16/12/2016

DESIGN INPUT		
ULS wind pressure (kPa)	1.36	
SLS wind pressure (kPa)	0.97	
IGU make-up	**Outer pane**	**Inner pane**
	Monolithic	Laminated
	Toughened	Annealed
Glass thickness selected (mm)	**6**	**8**
Load share - ultimate	0.52	1.18
Load share - serviceability	0.37	0.84
Long side of panel (mm)	3000	
Short side of panel (mm)	1700	
AR	1.77	

MINIMUM GLASS THICKNESS REQUIRED FOR STRENGTH		
Nominal thickness (interlayer excluded)	**4**	**6**

Glass selected has adequate strength

Return to Design Input

CHECK DEFLECTION OF GLASS SELECTED		
Glass thickness selected	**6**	**8**
Minimum thickness	5.8	7.6
Slenderness factor	293.2	223.7
Slenderness factor from Figure 35 of NZS 4223.4	535.7	337.5
Deflection ≤ Span / 60	**OK**	**OK**
Estimated deflection mm	17	
IGUMA recommended deflection limit (1.5 times airspace)	21	
Thickness check if safety glass is required by NZS 4223.3:1999	**OK**	**OK**

Viridian
New World Glass

VERTICAL IGU SUPPORTED ALONG 4 EDGES: NZS 4223.4:2008

16/12/2016

DESIGN INPUT		
ULS wind pressure (kPa)	1.36	
SLS wind pressure (kPa)	0.97	
IGU make-up	**1st pane**	**2nd pane**
	Monolithic	Monolithic
	Toughened	Toughened
Glass thickness selected (mm)	**6**	**6**
Load share - ultimate	0.85	0.85
Load share - serviceability	0.61	0.61
Long side of panel (mm)	3000	
Short side of panel (mm)	1300	
AR	2.31	

MINIMUM GLASS THICKNESS REQUIRED FOR STRENGTH		
Nominal thickness (interlayer excluded)	**4**	**4**

Glass selected has sufficient strength

Return to Design Input

CHECK DEFLECTION OF GLASS SELECTED		
Glass thickness selected	**6**	**6**
Minimum thickness	5.8	5.8
Slenderness factor	224.2	224.2
Slenderness factor from Figure 35 of NZS 4223.4	306.4	306.4
Deflection ≤ Span / 60	**OK**	**OK**
Estimated deflection mm	13	
IGUMA recommended deflection limit (1.5 times airspace)	21	
Thickness check if safety glass is required by NZS 4223.3:1999	**OK**	**OK**

Viridian
New World Glass

IGU - UPPER PANE

DESIGN INPUT - 2 EDGE SUPPORT		
ULS wind +	0.00	kPa
SLS wind +	0.00	kPa
ULS wind -	2.60	kPa
SLS wind -	1.85	kPa
Snow	0.00	kPa
Unsupported span	350	mm
Height of glazing above floor	3600	mm

16/12/2016

Return to Design Input page

GLASS OPTIONS FOR WIND, SNOW & 0.5 KN POINT LOAD			
Nominal thickness mm (excluding interlayer)	**Toughened**	**Annealed Laminate**	**Toughened Laminate**
6	yes	no	
8	yes	no	yes
10	yes	no	yes
12	yes	yes	yes
15	yes		
16		yes	yes
19	yes		
20		yes	yes

DEFLECTION CHECK			
Nominal glass thickness	**6**	**6**	**NA**
Minimum thickness	5.8	5.6	
Slenderness factor	60.4	62.5	
Slenderness factor from Figure 35 of NZS 4223.4	163.5	162.7	
Estimated deflection			
Self-weight	1	1	
Self-weight + snow	1	1	
Self-weight + wind down	1	1	
Self-weight + wind up	1	1	

Viridian
New World Glass

IGU - LOWER PANE

DESIGN INPUT - 2 EDGE SUPPORT		
ULS wind +	0.00	kPa
SLS wind +	0.00	kPa
ULS wind -	0.77	kPa
SLS wind -	0.55	kPa
Snow	0.00	kPa
Unsupported span	350	mm
Height of glazing above floor	3600	mm

16/12/2016

Return to Design Input page

GLASS OPTIONS FOR WIND & SNOW			
Nominal thickness mm (excluding interlayer)	**Toughened**	**Annealed Laminate**	**Toughened Laminate**
4	yes		
5	yes		
6	yes	yes	
8	yes	yes	yes
10	yes	yes	yes
12	yes	yes	yes
15	yes		
16		yes	yes
19	yes		
20		yes	yes

DEFLECTION CHECK			
Nominal glass thickness	**4**	**NA**	**NA**
Minimum thickness	3.8		
Slenderness factor	92.2		
Slenderness factor from Figure 35 of NZS 4223.4	253.9		
Estimated deflection			
Self-weight	1		
Self-weight + snow	1		
Self-weight + wind down	1		
Self-weight + wind up	1		

Memorandum from licensed building practitioner: Certificate of design work

Section 45 and section 30C, Building Act 2004

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

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

THE BUILDING			
Street address:	6 Island Bay Road		
Suburb:	Beach Haven		
Town/City:	Auckland	Postcode:	0626

THE OWNER(S)			
Name(s):	Corban Walls		
Mailing address:	s 9(2)(a)		
Suburb:	s 9(2)(a)	PO Box/Private Bag:	
Town/City:	s 9(2)(a)	Postcode:	s 9(2)(a)
Phone number:	s 9(2)(a)	Email address:	s 9(2)(a)