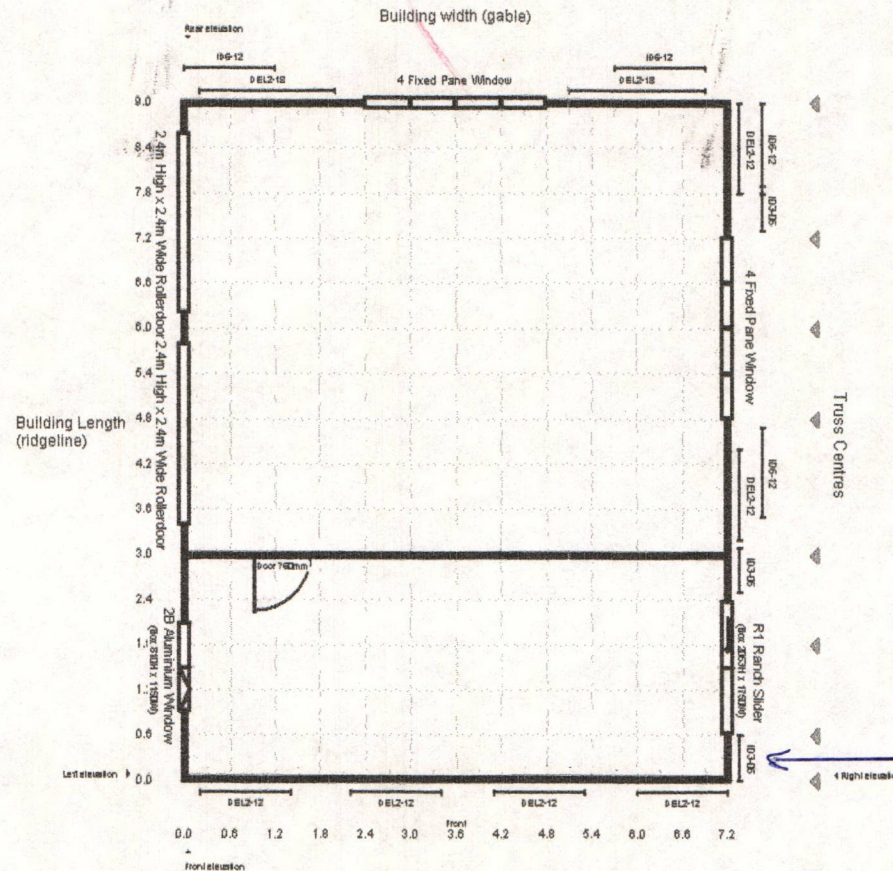


IDEAL Buildings Classic Floor Plan
 Customer: Anne & Dave Barraclough
 Site Address: 610 Stanley Rd, R D 2, OPOTIKI
 Reference: Logistics-4
 Contact: Donna Walker, Eastern BOP, 07 304 9468



*This room lined
 10mm gip board to walls & ceilings
 Ceiling to be fixed to 70x35 ceiling battens @
 400 centres max.
 Insulation - exterior walls R1.8 wall batts
 - ceiling R0.2 wall batts.*

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 Date: 4 Feb 2008

● ALL BRACING - ACHIEVED ●

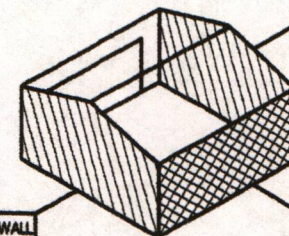
JOB DETAILS

JOB No	4
CLIENT NAME	Barraclough
PRODUCT TYPE	Classic
LENGTH x WIDTH	9000 x 7200
NOMINAL HEIGHT	3000
CLADDING TYPE	Deluxe
WIND ZONE	High
NOMINAL ROOF PITCH	15 degs

Bracing units required ratings are derived from the 'Wall Bracing - Required' section of the 'Ideal Buildings Producer Statement'.

Bracing units achieved ratings are derived from the 'Wall Bracing - Cladding Element' and the 'Wall Bracing - Hardware Element' sections of the 'Ideal Buildings Producer Statement'.

All bracing elements shall be installed in accordance with the 'Wall Bracing - Cladding Element' and the 'Wall Bracing - Hardware Element' sections of the 'Ideal Buildings Producer Statement'.



BU's REQUIRED REAR WALL

175

BU's REQUIRED FRONT WALL

175

BU's REQUIRED RIGHT WALL

398

FRONT END WALL

CLADDING BRACING ELEMENTS	BU's	QTY	SUB TOTAL
DEL2-12	45	4	180
HARDWARE BRACING ELEMENTS	BU's	QTY	SUB TOTAL
TOTAL BU's ACHIEVED			180

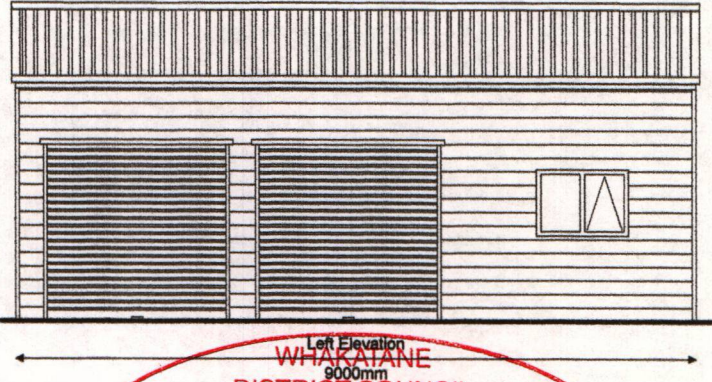
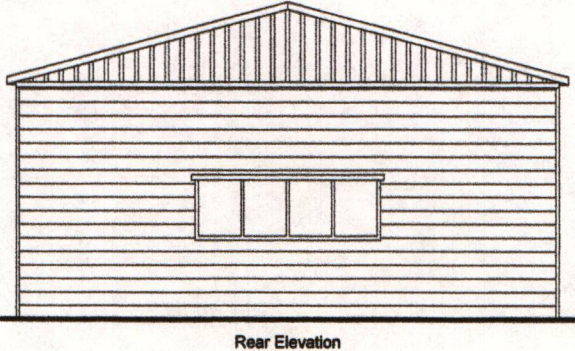
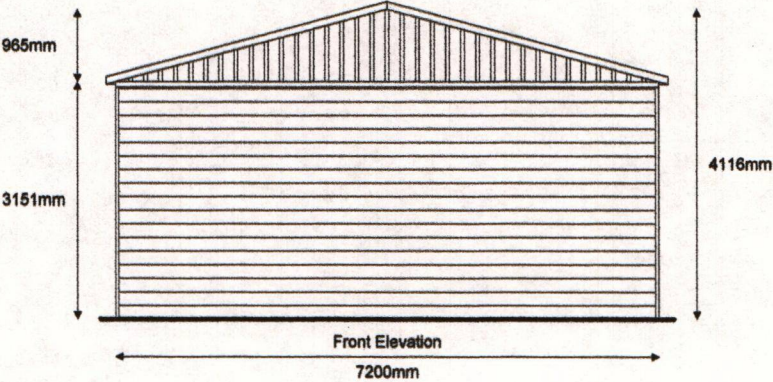
REAR END WALL

CLADDING BRACING ELEMENTS	BU's	QTY	SUB TOTAL
DEL2-18	65	2	130
HARDWARE BRACING ELEMENTS	BU's	QTY	SUB TOTAL
ID6-12	30	2	60
TOTAL BU's ACHIEVED			190

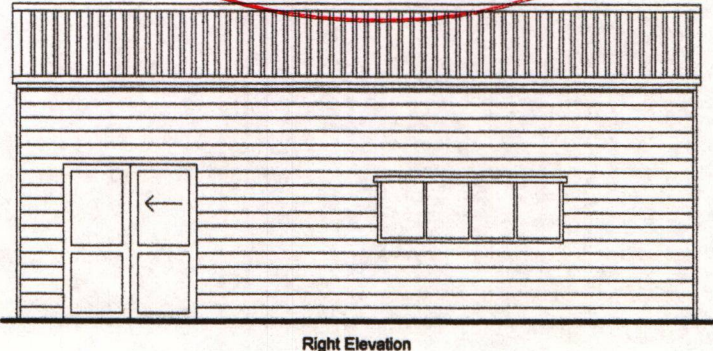
RIGHT SIDE WALL

CLADDING BRACING ELEMENTS	BU's	QTY	SUB TOTAL
DEL2-12	45	2	90
DEL2-18	65	1	65
HARDWARE BRACING ELEMENTS	BU's	QTY	SUB TOTAL
SB1-24	70	2	140
ID3-06	20	3	60
ID6-12	30	2	60
TOTAL BU's ACHIEVED			415

IDEAL Buildings Classic Elevations
Customer: Anne & Dave Barraclough
Site Address: 610 Stanley Rd, R D 2, OPOTIKI
Reference: Logistics-4
Contact: Donna Walker, Eastern BOP, 07 304 9468



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IDEAL Buildings Classic Specifications

Customer: Anne & Dave Barraclough

Site Address: 610 Stanley Rd, R D 2, OPOTIKI

Reference: Logistics-4

Contact: Donna Walker, Eastern BOP, 07 304 9468

Model:	Classic IDEAL
Size & Stud Height:	9.0m long x 7.2m wide, with 3.0m stud height
Floor Type:	Concrete floor
Roof Details:	15 degree pitch
Wind Zone:	High wind zone
Cladding Type:	Deluxe
Gable Cladding:	BD and Batten (Old Style 15 degs) profile
Gable Soffit:	None
Downpipes Location:	Front of building

Notes:

GENERAL

Construction to comply with the Mitek Structural Design Details specific to Ideal Buildings, and the NZ Building Code 2004.

Check and verify all levels and dimensions on site before starting any work.

HEALTH AND SAFETY IN EMPLOYMENT ACT 1992 AND CONSTRUCTION SAFETY

The provision of the Health and Safety in Employment Act 1992 and regulations and the DBH Approved Documents NZBC F5/AS1 Construction and Demolition Hazards are deemed to be part of the Contract.

WORKMANSHIP

All work shall be carried out in accordance with good New Zealand trade practice and to the relevant codes, in strict conformity with the approved building consent plans and specifications and to the satisfaction of the Owner. All work is to be level, plumb, and true to line and face. Only experienced and competent workpeople shall be utilised on the Contract.

DRAINAGE - Applies if this forms part of the Ideal contract, otherwise to be organised by the Owner.

The whole of the drainlaying work shall be carried out by a registered drainlayer in accordance with the NZBC.

The drainlayer must liaise with the main contractor and arrange with him to carry out his work in such a manner to cause minimum inconvenience and delays.

Materials to be first grade PVC piping with fittings and gullies to suit.

All stormwater and sewer pipes, where possible, are to be run in the same trench.

On completion the drainage systems are to be tested to the satisfaction of the building inspector, and any defects made good before backfilling. Backfilling to be as original ground level.

MATERIALS

Cladding & Roofing to be a minimum 0.4BMT Colorsteel Endura cold rollformed to standard Ideal tolerances. Fixings to be appropriate for material, and location in building element.

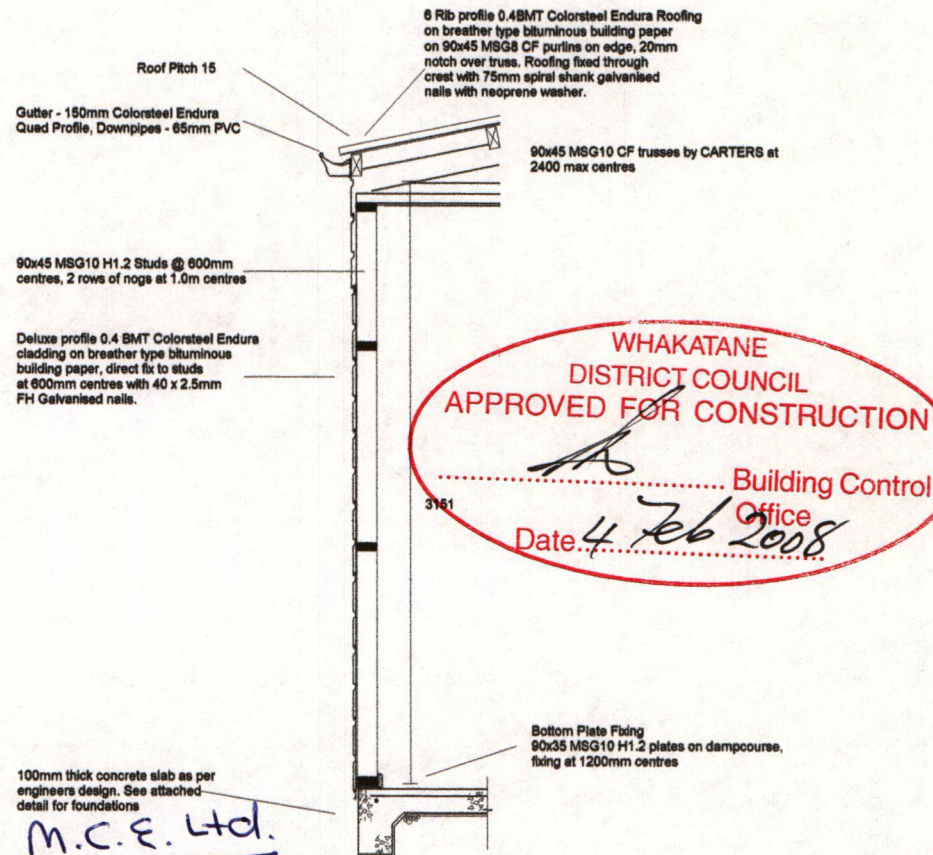
Timber to be treated to levels required by NZS3602:2003, and be kiln-dried to a moisture level of 18% or less. Framing to be MSG10 grade. Plates to have Supercourse DPC under Proprietary nail plates and straps as required.

Foundations: Concrete to be a minimum of 17.5Mpa, 100mm thick, footing as detailed.

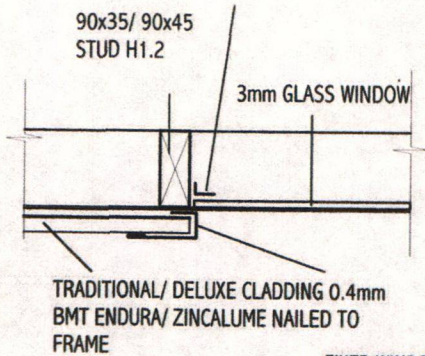
BRACING

Roof bracing- for all buildings fix Lumberlock galvanised plan brace as detailed in the plans, refer Mitek Structural Design Details for fixing

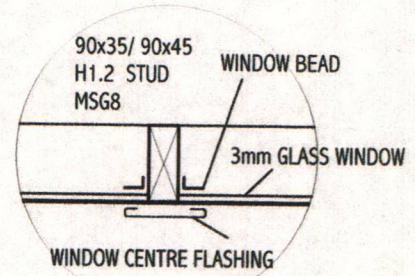
Wall bracing- brace panels to be noted on plans and fixed in accordance with Mitek Structural Design details



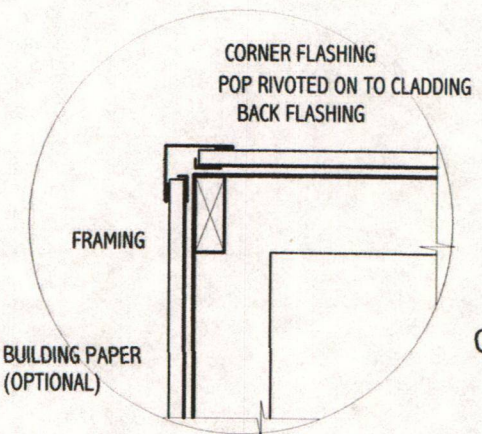
Classic IDEAL - Construction Detail
Unlined Building



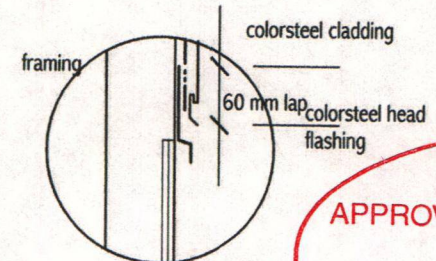
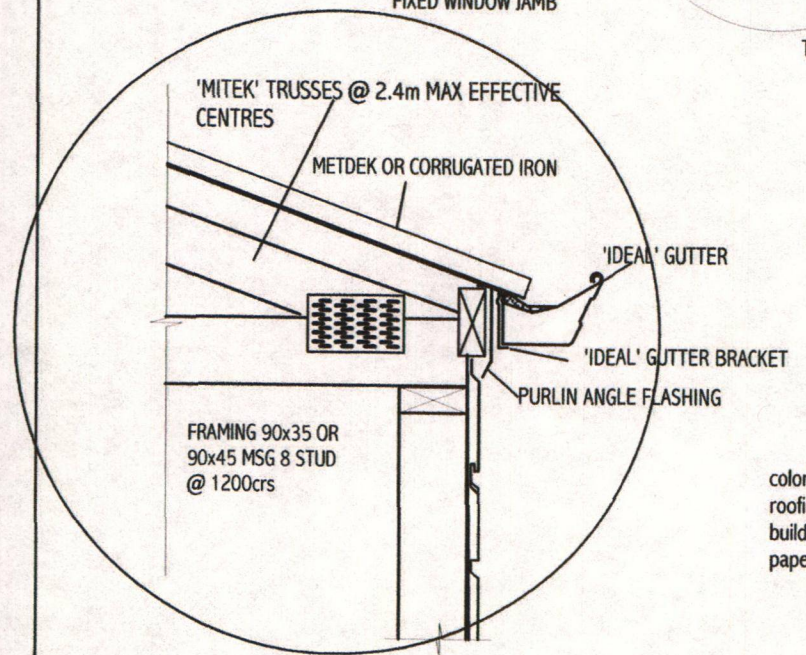
FIXED WINDOW JAMB



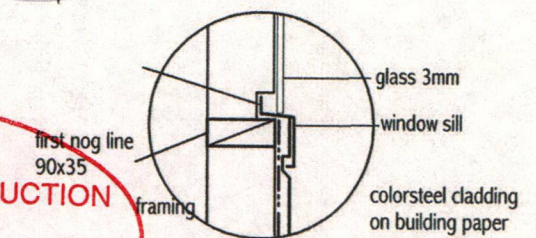
TWO FIXED WINDOWS



CORNER



FIXED WINDOW HEAD

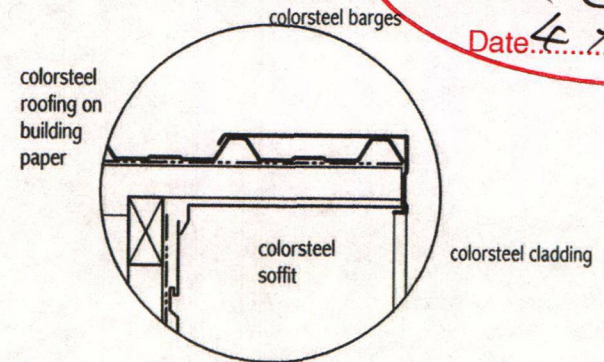


FIXED WINDOW SILL

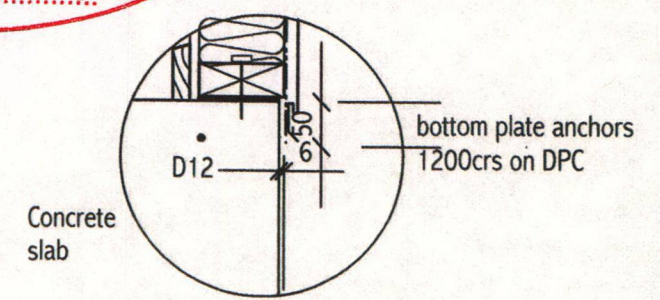
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SOFFIT - optional



BASE

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Penrose: 95 Gavin Street
Henderson: 18 Bruce McLaren Road
Auckland, New Zealand

PHONE
(09) 579 6165 PENROSE
(09) 837 6161 HENDERSON

All plans and specifications are subject to Ideal Copyright

Flashing Details - Classic Garages

Date 9.8.06 Drawn AS
Scale 1:20
Council
Ref:

07 304 9473

90x45 'Pryda' Nail Plate Laserframe - kiln dried timber trusses manufactured under Licence by 'Ideal Garages Limited', extend top chord past wall 1000mm max to form cantilevered verandah roof

colorsteel roofing,
selected profile on building
paper

90x45 purlins spaced as per Ideal
specifications, notched 20mm over
truss top chord

colorsteel eaves lining on
70x35 (min) nogging

Insulation to Wall Cavity
and Ceiling Cavity min
R1.8 (extent of habitable
space)

colorsteel cladding on
breather type building
paper

Laserframe - kiln
dried timber framing

lining (habitable)

100 thick concrete slab on
polythene compacted Gap40
Basecourse (habitable)

Bottom Plate fixing to Ideal
standard specification on
Damp proof membrane

250dia bored or 250x250
concrete piles at each corner of
building and at 2m max ctrs

engineered footing

MATERIAL SCHEDULE

FLOOR SLAB:

100 THICK CONCRETE SLAB WITH 668 MESH
REINFORCING, 30MM MIN COVER, ON
POLYTHENE 50 MM COMPACTED FILL, GAP 40

TIMBER FRAMING:

90x35 LASERFRAME STUDS @ 600 CTRS WITH
2 ROWS OF NOGS @ 800 CTRS.



INSULATION:

EXTERIOR WALLS - R1.8 FIBREGLASS BATTS
CEILING - R1.8 FIBREGLASS BATTS

R2.2



LINING:

EXTERNAL WALLS - 9.5MM GIBBOARD
CEILING - 9.5MM GIBBOARD ON 70x35 CEILING
BATTENS @ 450 MAX CTRS
140x35 PERIMETER BATTEN RIGHT ROUND

CLADDING:

EXTERNAL WALLS - 4 BMT GALV. STEEL /
COLORSTEEL G2 TRADITIONAL 100MM W/B /
SUPER CLAD W/B / TRIMLINE VERTICAL
PROFILE ON BUILDING PAPER
ROOFING - 4 BMT GALV. STEEL / COLORSTEEL
G2 CORRUGATE / METDEK PROFILE ON
BUILDING PAPER

ROOF FRAMING:

90x45 PURLINS ON FLAT @ 900 MAX CTRS ON
90x45 'PRYDA' NAILPLATE TRUSSES BY 'IDEAL
GARAGES LTD' @ SELECTED PITCH @ 1200
CTRS



Scale 1:20

IDEAL Buildings Classic IDEAL Series Concrete Plan

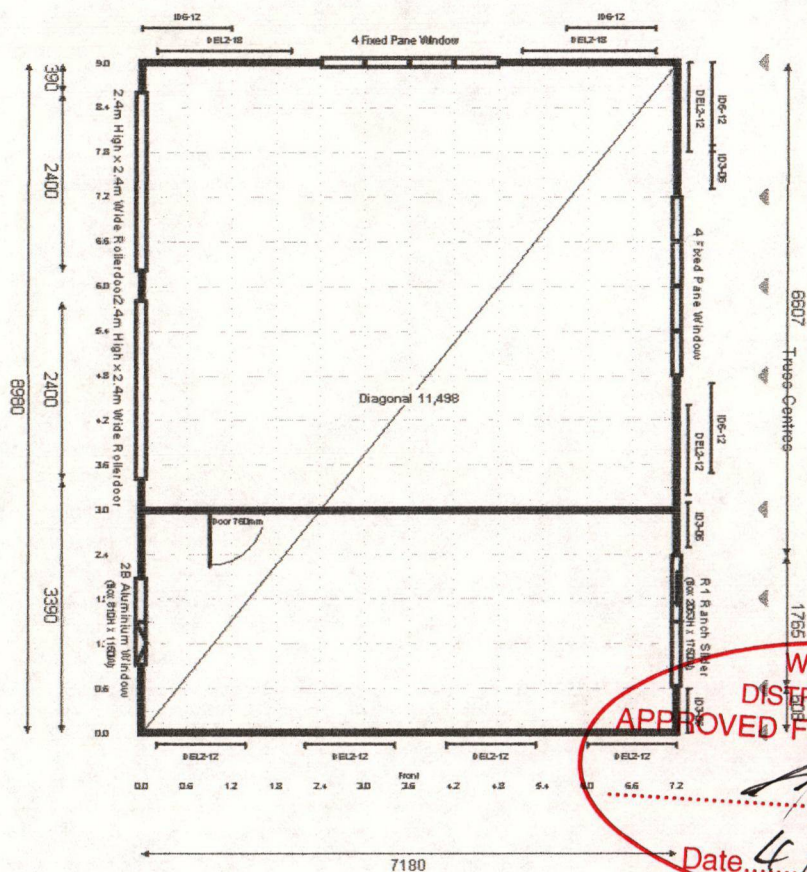
Job No.: Logistics-4
 Customer: Anne & Dave Barraclough
 Site Address: 610 Stanley Rd, R D 2, OPOTIKI
 Customer Phone: 3088117 (Work)
 Contact: Donna Walker, Eastern BOP, 07 304 9468
 Building Size: 9.0m long x 7.2m wide
 Stud Centres: 600mm
 Foundation Type: N/A

M.E.E. Ltd

Notes:

(notes to go here)

Slab Size 8980 x 7180



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 Office
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IDEAL BUILDINGS

STRUCTURAL DESIGN DETAILS

CONTENTS

Producer Statement
Design Load Information
Manufacturer Durability Statement
Fixing Details
Construction Tolerances
Standard Truss Design Summary
Standard Truss Designs
Wall Framing Detail
Bracing Design Parameters
Roof Bracing Detail
Wall Bracing - Wind Demand
Wall Bracing - Cladding Elements

CLIENT

Anne & Dave Barraclough
610 Stanley Rd, R D 2, OPOTIKI



MiTek New Zealand Ltd.

HOME OF GANG-NAIL® BUILDING SYSTEMS



PRODUCER STATEMENT

MiTek New Zealand Ltd has been engaged by Ideal Buildings to provide engineering design services in respect of the requirements of clause(s) B1 of the Building Regulations 1992 for that part of the building work as specified. The design has been prepared in accordance with NZS4203, NZS3603, NZS3604, and approved documents of the NZ Building Code and the work as described on the MiTek New Zealand Ltd drawings titled IDEAL BUILDINGS STRUCTURAL DESIGN DETAILS ATTACHED.

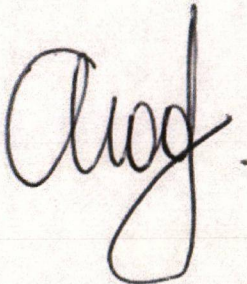
As an independent design professional covered by a current policy of Professional Indemnity Insurance to a minimum value of \$500,000, I believe on reasonable grounds that subject to:

The verification of the following design assumptions within the Ideal Garages Ltd. documentation.

All proprietary products meeting the performance specification requirements,

The drawings, specifications, and other documents according to which the building is proposed to be constructed, comply with the relevant provisions of the building code.

For and on behalf of MiTek Zealand Ltd.



Claude Antony Carter Cook

December 2007



DESIGN INFORMATION

TIMBER GRADE

- All structural timber to be timber grades as defined by NZS3603:1993 Amendment 4 and specified in the relevant sections of this design booklet.
- All other timber of a non-structural nature can be non-standard grade.

TIMBER DURABILITY

- All treated timber to be as defined in NZS3602:2003.
- A minimum standard of H1.2 as defined in NZS3602:2003 to be used in frame situations.

DESIGN LOADS

- Dead loads for light roof - 0.20kPa (includes weight of purlins, associated framing and galvanized iron roof).
- Live loads - 1.0kN concentrated load, 0.25kPa uniform load.
- Wind loads - buildings designed for up to Very High wind conditions as per attached drawings and as defined by NZS3604:1999.
- Snow loads - buildings designed for ground snow loads of up to $S = 0.50\text{kPa}$ on Thrifty designs and $S = 1.0\text{kPa}$ on Classic designs
- Refer to MiTek New Zealand Ltd. for any design modifications required for those specified.
- Buildings designed for Category IV to NZS4203:1992 table 2.3.1 on the Sleepouts sections included within the garage area.
- Buildings designed for Category V to NZS4203:1992 table 2.3.1 - Buildings of a Secondary Nature.
- Location defined as Sheltered Rural & Open and Exposed Urban condition.

WALL CLADDING DETAILS

Traditional - 2.4m max width x 1.075m max height x 0.4mm BMT Colorsteel Endura 100mm x 108mm bevel back weather board profile fixed to studs with 40X2.5mm FH Galvanised nails.
Can be used for bracing, see wall bracing details for TRAD1, TRAD2 panels.

Deluxe/Line Deluxe - 3.05m max width x 1.075m max height x 0.4mm BMT Colorsteel Endura 180mm 'rusticated' weatherboard fixed to studs with 40X2.5mm FH Galvanised nails.
Can be used for bracing, see wall bracing details for DEL1, DEL2 panels

6 Rib/Corrugate - Vertical cladding 735mm x 0.4mm BMT Colour Steel, fixed to studs with 75mm Galvanised roofing nails with Neoprene washer. Not used as bracing, other means of wall bracing required eg. Flexibrace, Strip Brace, Multibrace.

Superclad - 6.6m max x 0.3m max height x 0.4 BMT Colorsteel Endura 300mm 'hidden nail type' weatherboard fixed to studs with 40X2.5mm FH Galvanised nails. Can be used for bracing, see wall bracing details for SC1 panels

DESIGN REFERENCES

NZS3603:1993 Amendment 4

NZS3604:1999

NZS4203:1992

BUILDING ERECTION

Proper bracing must be installed to hold the components true and plumb and in a safe condition until permanent bracing is fixed. All permanent bracing and fixings must be installed before applying any loads.

LOAD DETAILS

These drawings have been prepared using the above design loads.
It is the responsibility of the user to ensure that the design data and loads are still correct at the time of construction.

PRODUCT SPECIFICATION

These details have been designed using specific GANG-NAIL, LUMBERLOK and BOWMAC products and the performance of the building and validity of the Producer Statement is reliant on the correct choice of product.

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Office
Date 4 Feb 2008

MANUFACTURER DURABILITY STATEMENT

The building designs in this producer statement have been designed using the external metal cladding on the walls to assist in their structural stability.

To satisfy the requirements of Clause B2: "Durability" of the New Zealand Building Code and to ensure the cladding material meets a 50-year durability life the following provisions must apply:

Range of Product and Use

Specification.....	AS1397: 2001
Coating Type.....	Zinc/Aluminium & painted
Steel thickness range	0.35mm - 0.95mm BMT
Steel grade range.....	G300 - G550
Application.....	Standard Ideal Walls on Class V Building category as per NZS4203:1992
Fasteners.....	Heavy Zinc or Zinc-tin coated clouts to comply with AS3566.2-2002 Classes 3 & 4 Aluminium rivets for all steel components. IFI 114:1986

Requirements, Limitations and Exclusions

- Applicable to buildings in Sea-Spray zone and exposure zones 1,2,3 & 4 in accordance with Clause 4, Durability, NZS 3604:1999 which is an acceptable solution under clause B2 of the NZBC.
- Fixing and installation of the cladding must be done exactly in accordance with Ideal Buildings Producer statement
- Normal and regular maintenance must be carried out on the exterior surface of the cladding and the following guide must be followed to ensure the durability requirements are met.

Regular Maintenance

- **Exposure Zones 1, 2, 3 & 4. (All areas other than sea spray zones - see below)**
Rain washing only required on exposed sections, sheltered or protected areas such as under spouting, top cladding boards and tops of doors require washing every 3 months.
- **Sea Spray Zones (Within 500m from the sea or 100m from sheltered harbours or inlets) and areas of Geothermal Activity**
Rain-washing only required on exposed areas. Sheltered and protected areas such as under spouting, top cladding boards and tops of doors require washing down every month and whenever corrosive salts are present.

Extended Maintenance, Painting or Repainting

- **Extended Durability**
Once the metallic coating or the paint system has weathered away, signs of red rust for bare material or signs of the metallic coating for painted material, painting of the entire surface is required to extend the life of the cladding product. Paint manufactures recommendations are to be followed for surface preparation and paint type to be used.
- **Evident Corrosion**
Areas that show signs of white or red rust/corrosion (typically in unwashed areas) require cleaning back with a stiff brush and cleaner to remove all dust, surface contaminants and corrosion products and present a sound substrate for painting. Priming of the surface and application of two coats of paint as per the Paint Manufacturer's recommendations is then required. Particular attention needs to be paid to laps (side, end, flashing etc) where earlier corrosion may start due to moisture and dirt entrapment. If evident corrosion is not treated quickly rapid deterioration of the sheet may occur which could result in perforation. At this stage replacement of the affected sheet is the best option.

References

1. NZS 3604:1999, clause 4, Durability.
2. Ideal Buildings Assembly Instructions
3. New Zealand Building Code 2004

Jeffrey Geayley for

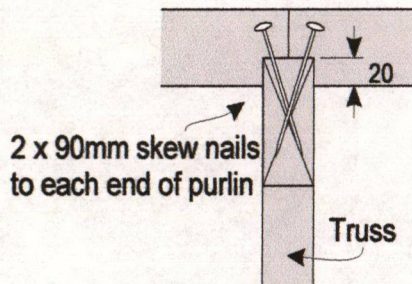
Spanbild NZ Ltd
112 Waterloo Road
Christchurch
New Zealand

Dated: 6 December 2007

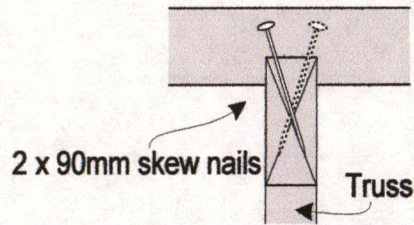


FIXING DETAILS

Purlin Fixing Detail

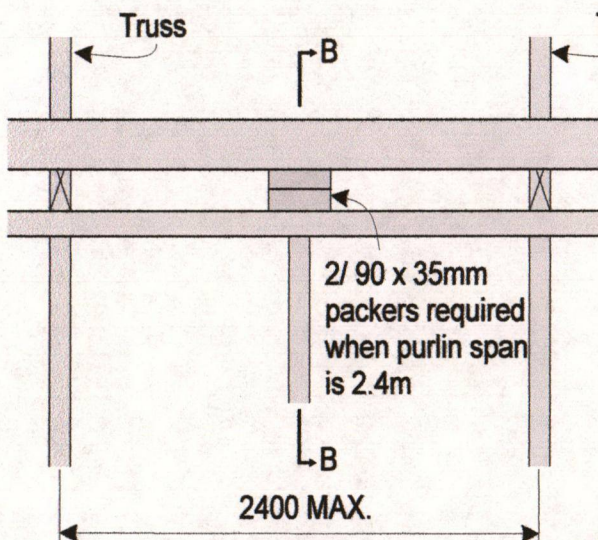
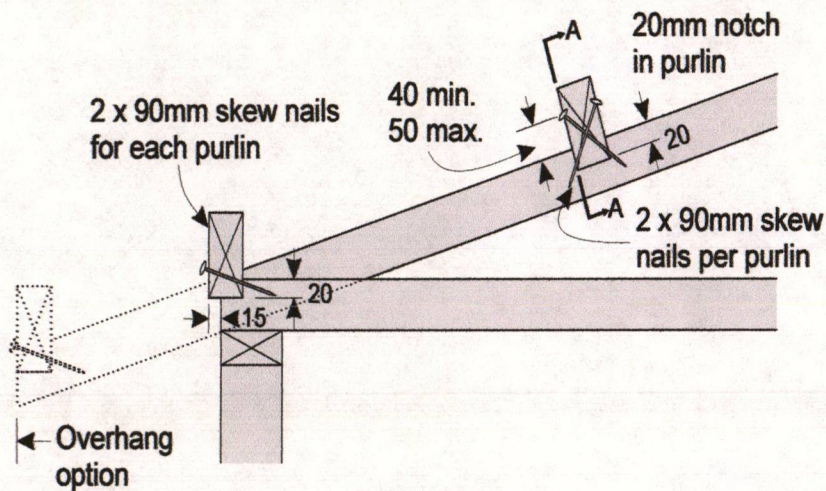


PURLIN JOINT

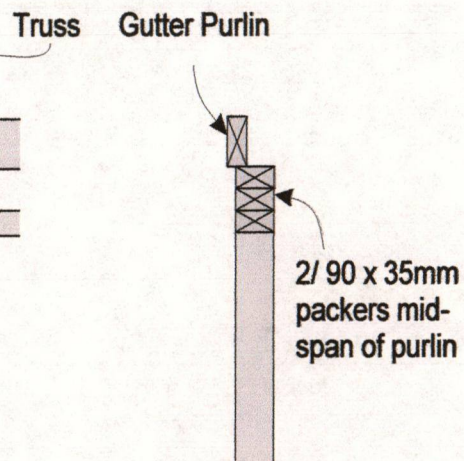


SECTION A-A

PURLIN CONTINUOUS OVER TRUSS



2400 TRUSS SPACING GUTTER PURLIN SUPPORT



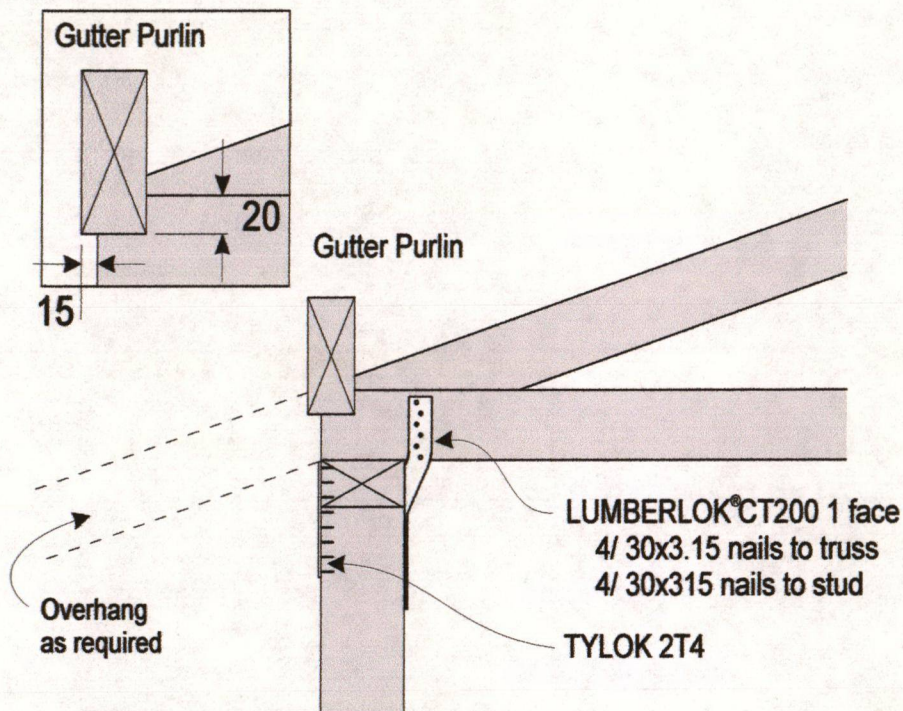
SECTION B-B
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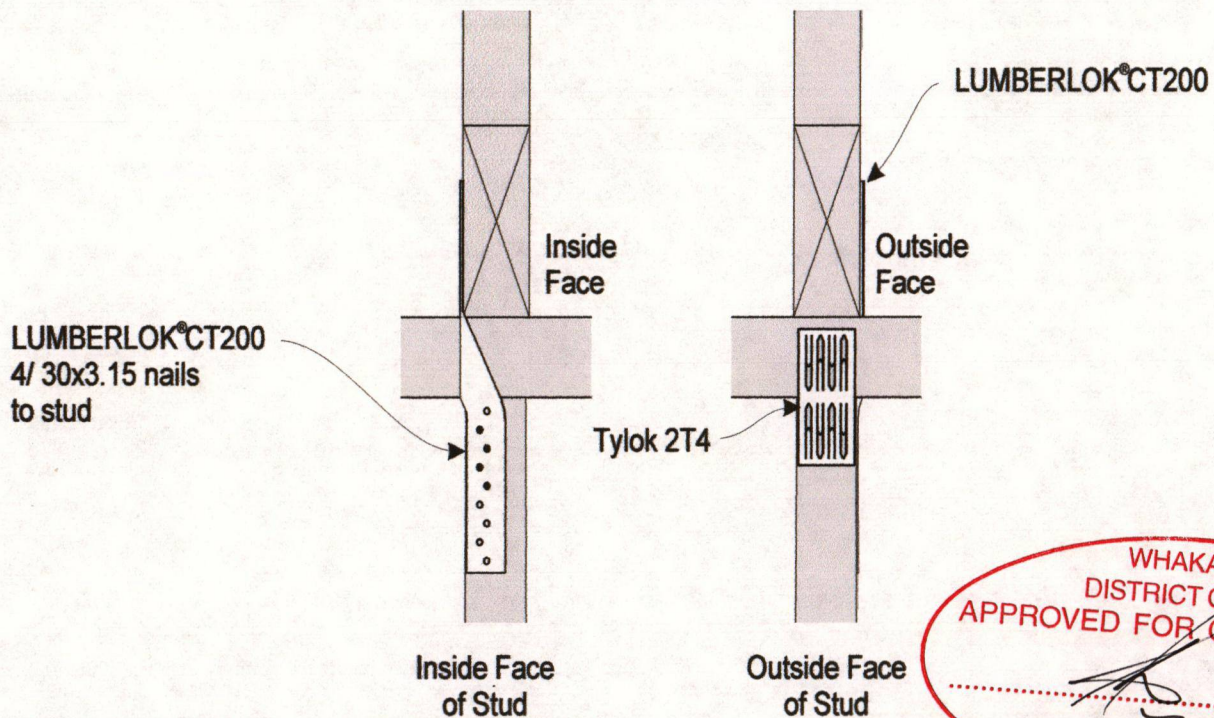
Date 4/02/08

FIXING DETAILS

Truss Fixing Details - Intermediate Truss (no ceiling)



CROSS SECTION

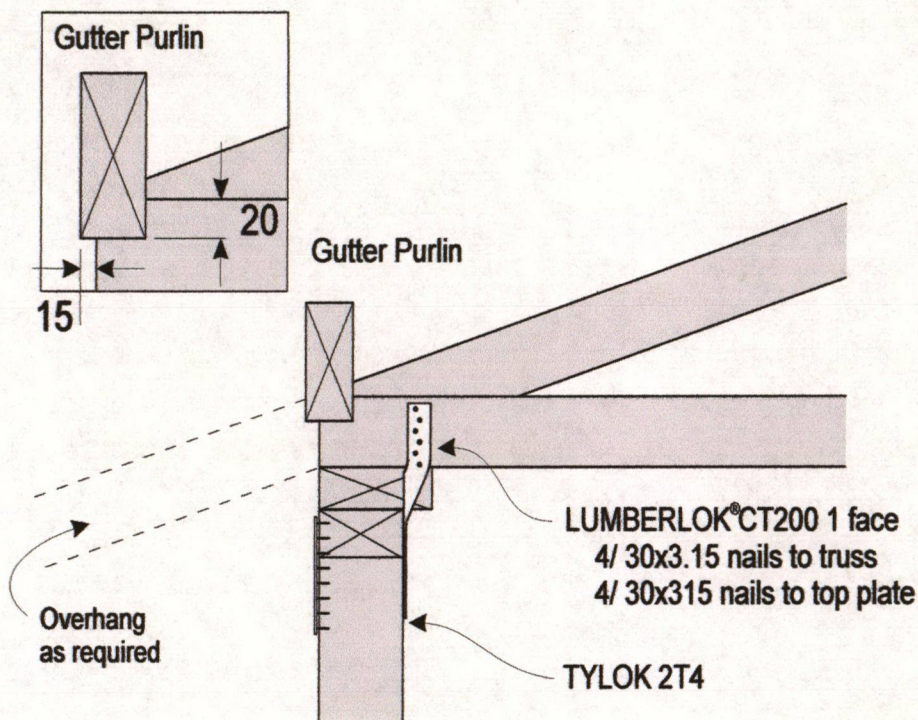


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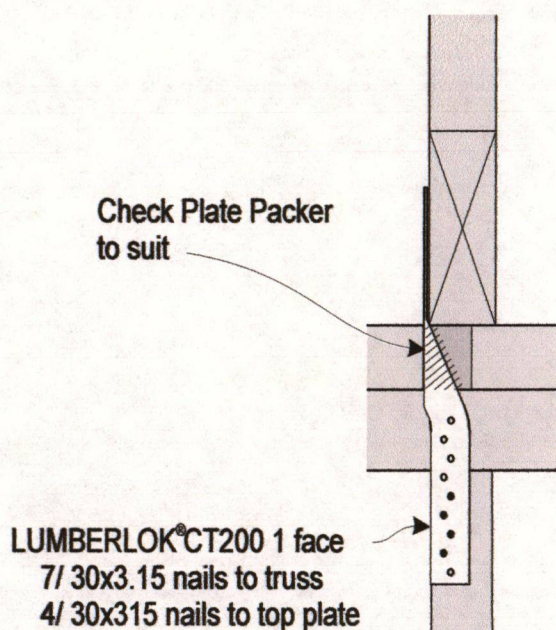
Building Control
Office
Date: 4 Feb 2008

FIXING DETAILS

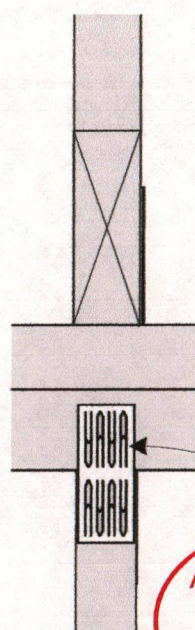
Truss Fixing Details - Intermediate Truss (with ceiling)



CROSS SECTION



Inside Face
of Stud



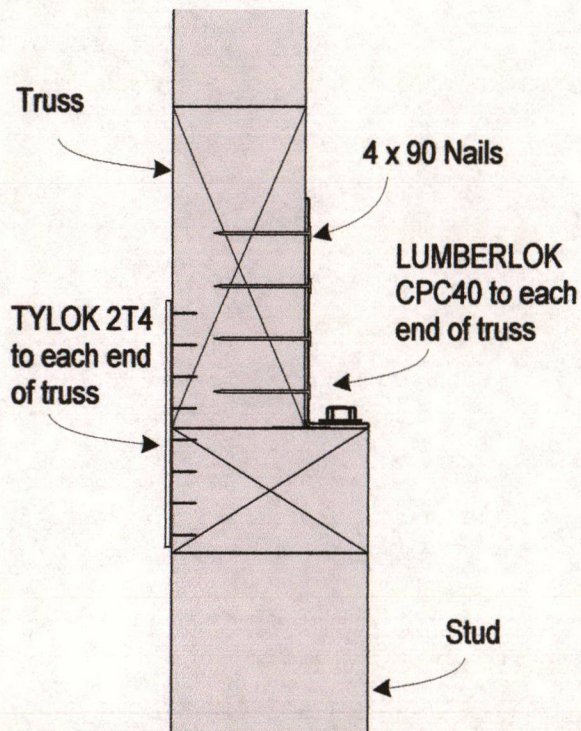
Outside Face
of Stud

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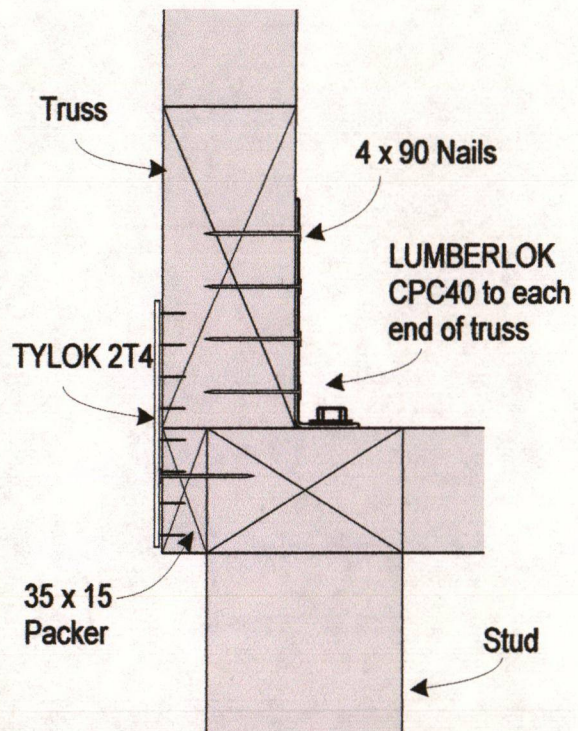
Building Control
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Date: 4 Feb 2008

FIXING DETAILS

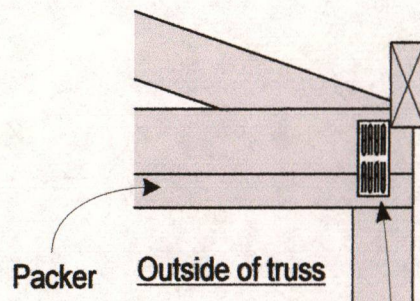
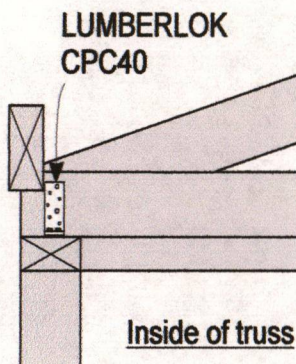
Truss Fixing Details - Gable Truss



CLADDING UP GABLE



BOARD & BATTEN GABLE



TYLOK 2T4 WHAKATANE
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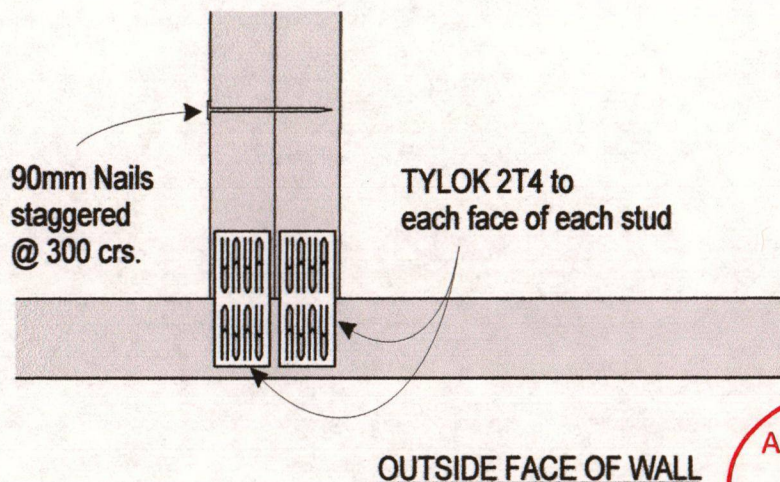
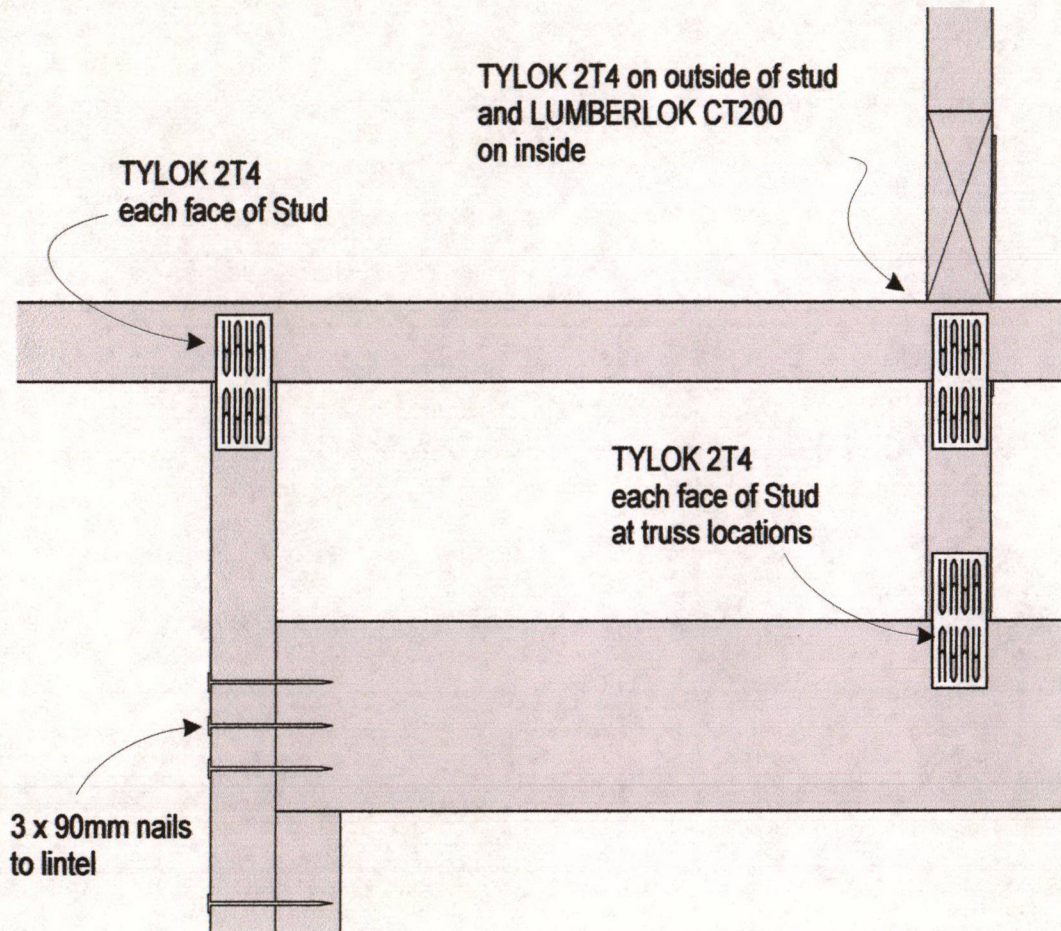
Office

Date: 14/03/2008

IDEAL
Putting Quality First

FIXING DETAILS

Lintel Details - Jack Stud Lintel (extended height)

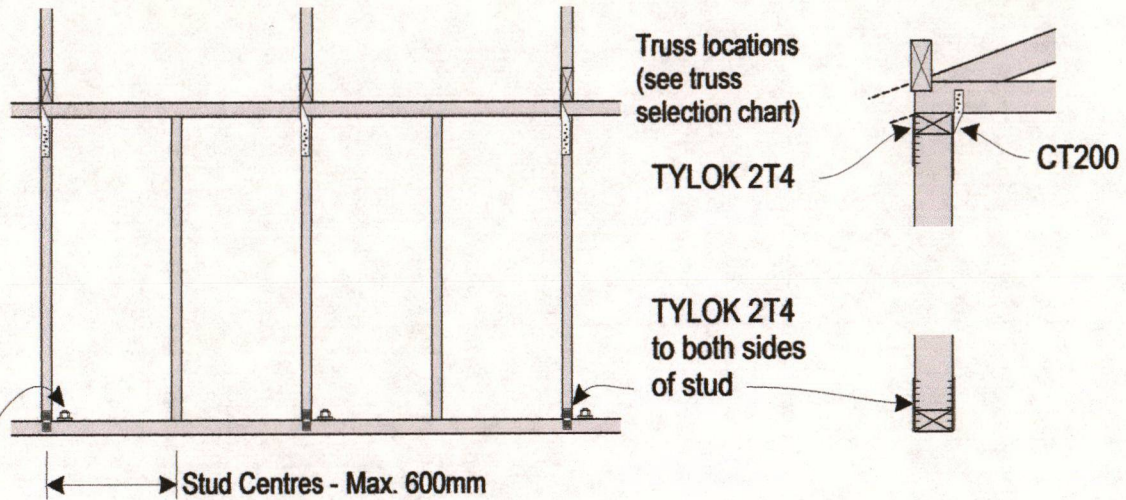


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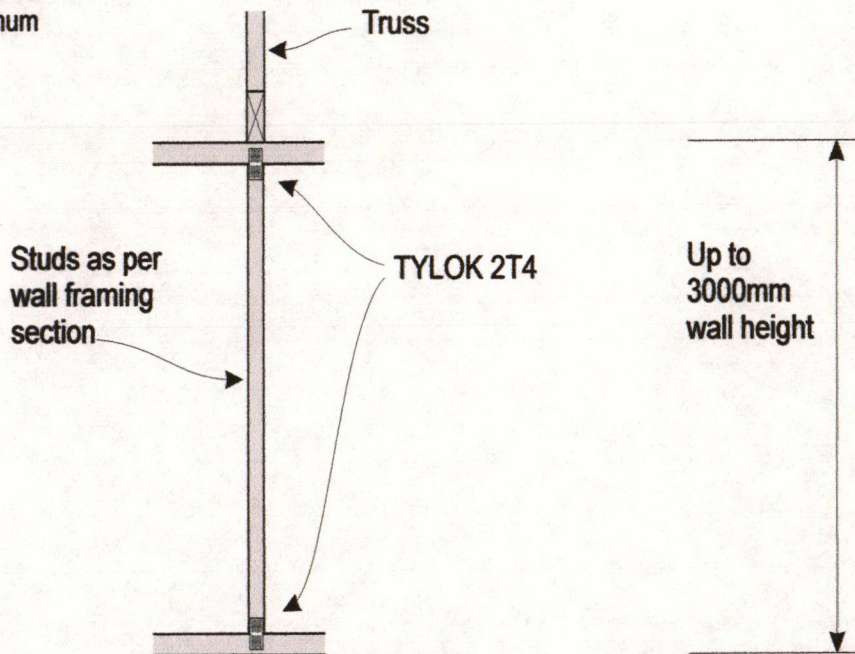
FIXING DETAILS

Wall Frame Fixing for Classic



Fix bottom plate to slab
with M12 Galvanised Thru-bolts
and 50x50x3 washer at
1200mm c/s maximum

INSIDE FACE OF WALL



Load Details: up to Very High wind load
and max. truss span 9 metres

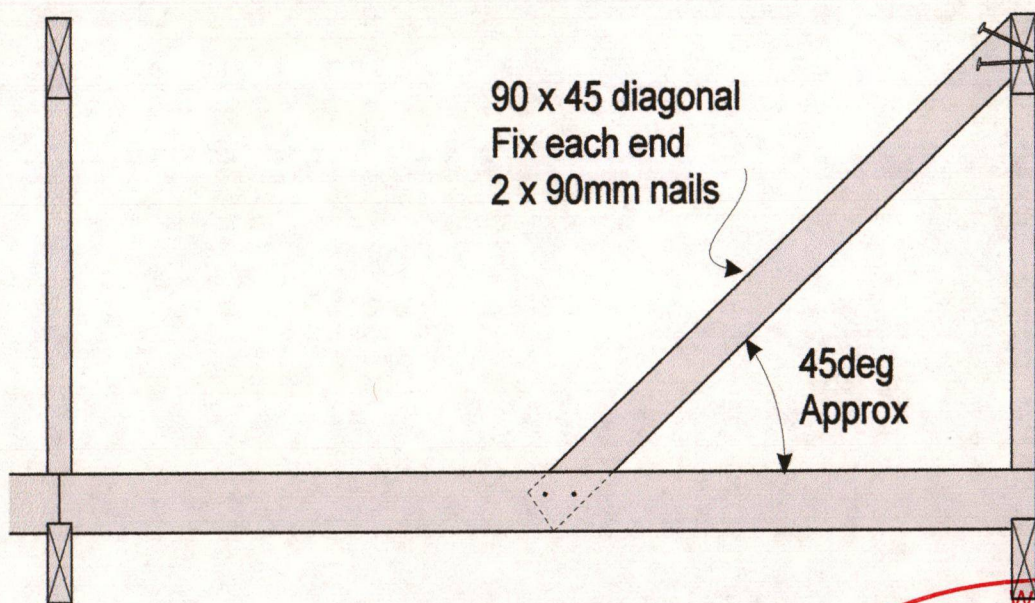
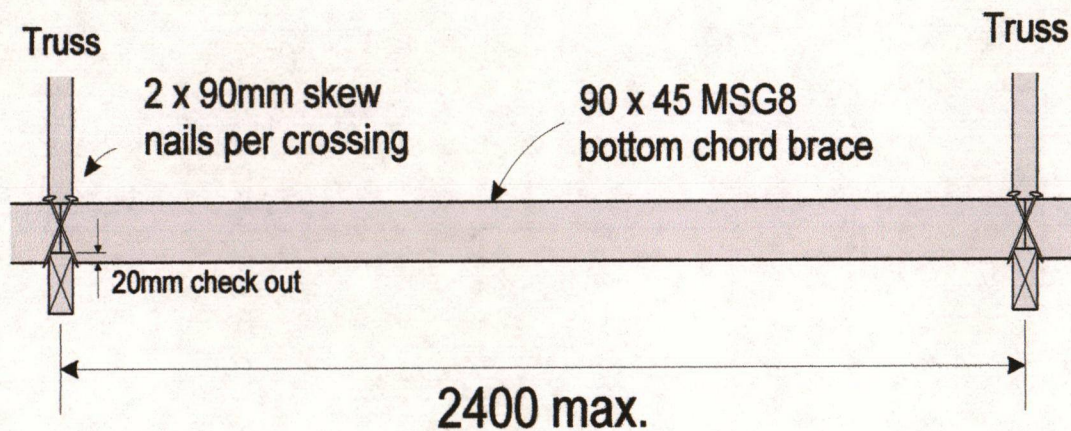
OUTSIDE FACE OF WALL

WHAKATANE
DISTRICT COUNCIL
APPROVED FOR CONSTRUCTION

Building Control
Office
Date: 4 Feb 2008

FIXING DETAILS

Truss Bottom Chord Bracing (applicable only in no ceiling areas)



Note: Diagonal brace at each gable end apart from sectional door detail.



TOLERANCES

PLATE LOCATION DIMENSIONS

A - Two member joints, (splice joints) including Heel, Splice, Apex and Combination Splice Joints, but exceeding 1mm single web to chord joints.

±10mm parallel to the longitudinal plate axis.

±5mm perpendicular to the longitudinal plate axis.

B - Three or more member joints: (panel point joints)

Exceeding Apex and Combination Splice joints, ±5mm parallel and perpendicular in the longitudinal plate axis.

Note - The plate axis must be located in the specified or indicated direction.

JOINT FIT

Any gap between butted surfaces must not exceed 3mm at time of fabrication and there must be light timber-to-timber contact at at least one point.

Note - At E.M.C the maximum gap between butted surfaces should not exceed 6mm.

PLATE PRESSING

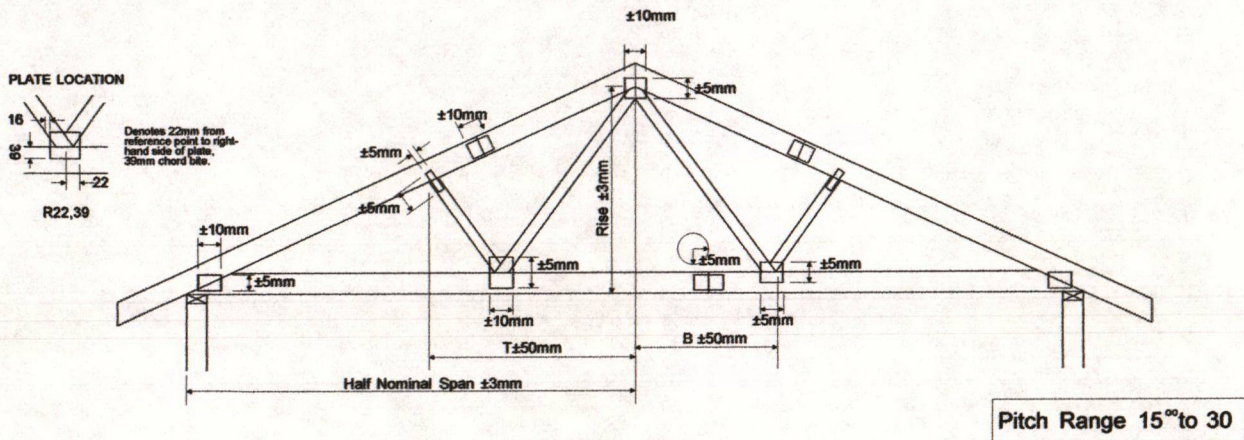
Plates shall be pressed home over their complete area such that the plate is flat and not creased. Teeth shall be fully embedded such that an "L" shaped gauge, bent from a 2mm wide strip of 1mm thick steel, will not pass between the plate and the timber on more than 10% of the tooth slots.

COMPONENT DIMENSIONS

1 - Variations in the dimensions which govern the outside profile of a component or the position of the component supports are not to exceed ±3mm.

2 - Variations in dimensions which govern the position of panel points, except those required by 1 above, are not to exceed ±50mm.

Note - Where panel point dimension tolerances exceed ±3mm in standard trusses, check web lengths and rise of top chord panel points.



TRUSS SPAN CHARTS

MAX. WIND ZONE	MAX. GROUND SNOW LOAD	MAX. TRUSS SPAN	MAX. TRUSS CRS
VERY HIGH	1.00 kPa	9000	1800
VERY HIGH	0.50 kPa	7200	2400

Load Chart

Live Load = 0.25 kPa (Dist.)
= 1.00 kPa (Conc.)

Dead Load = 0.20 kPa Top Chord

Wind Load = $C_p = 0.5$
= $C_{pe} = 0.8$

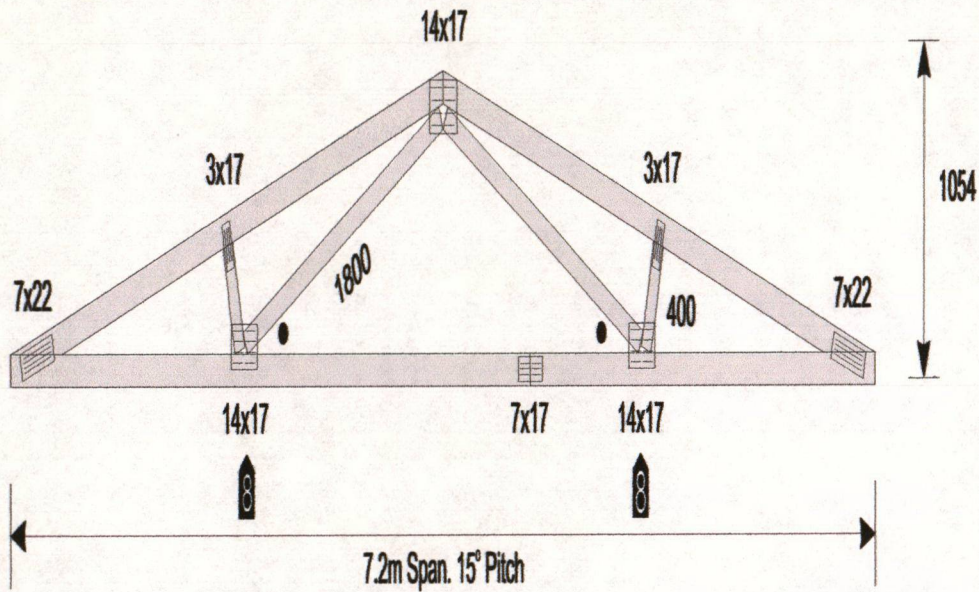
Purlin Spacing = 1000mm max.

Bottom chord restraint locations are indicated on the truss drawings.

NOTE: Where 0.20 kPa Plasterboard (or other) ceiling attached to bottom chord for sleepouts. All truss centres to be max 1200mm for all span and load conditions.



TRUSSES



Truss suitable for loads & centres
as established via Truss Span Chart
entitled
"IDEAL BUILDINGS STANDARD
TRUSS DESIGN SUMMARY"
of this manual.

All dimensions in millimetres

• TIMBER SPECIFICATION

Top & Bottom Chords 90 x 45 MSG 10
Webs - 70 x 45 MSG8

• CAMBER



Indicates Camber in millimetres

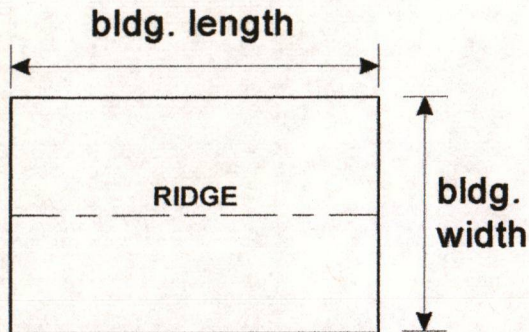
• BOTTOM CHORD RESTRAINTS

Indicated by ●
on truss bottom chords



BRACING DESIGN PARAMETERS

Building Dimension Rules



1. Max. building dimensions must not exceed 9m in width and 12m in length for open plan buildings.
2. Max. building dimensions must not exceed 9m in width and 18m in length for buildings incorporating an internal braced wall across the building width within the ratios as per note 3.
3. Max. building ratios:
 - a. up to 2400 stud heights:

VH Wind.....	- max. ratio = 1 to 1.5
L, M & H Wind	- max. ratio = 1 to 2
 - b. up to 3000 stud heights:

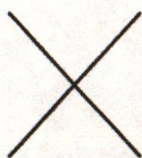
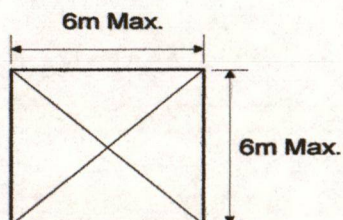
All wind load cases - max. ratio = 1 to 1.5



ROOF BRACING DETAIL

Roof bracing layouts

Wind Zone: High
Height: 3151
Width: 7200
Length: 9000

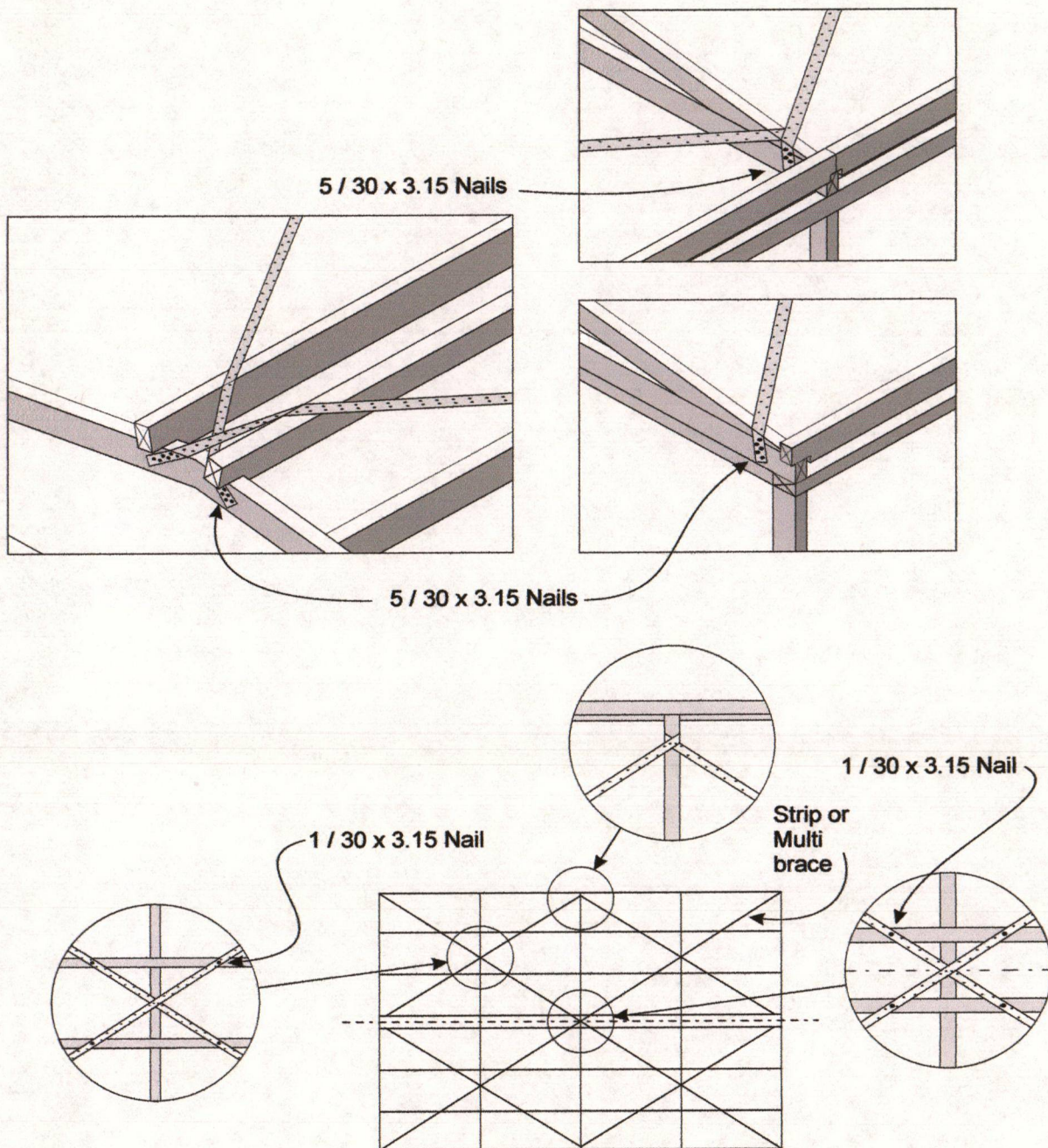


Indicates single row of tensioned strip brace over purlins.
Fix each end 5/30 x 3.15 nails and 1/30 x 3.15 nails at each
purlin nearest the crossing point (see brace fixing detail).



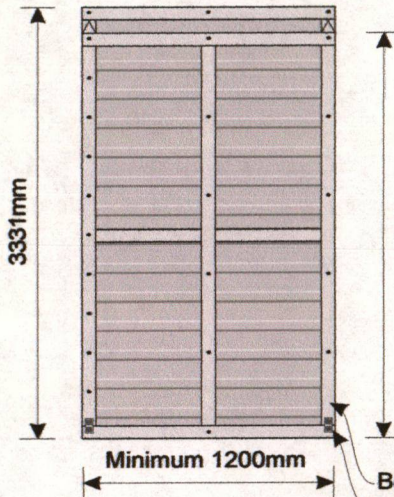
ROOF BRACING DETAIL

Brace Fixing Detail



WALL BRACING - CLADDING ELEMENTS

(LINE) DELUXE CLADDING



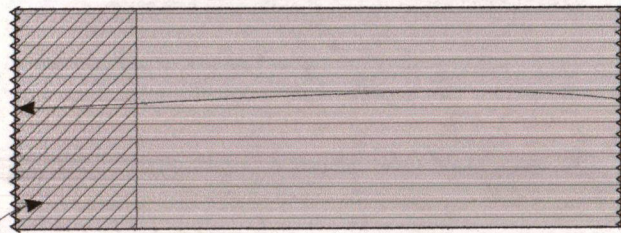
Nominal wall height 3000

BRACING ELEMENT **DEL2**

WIND BU's total = 45 for 1200 long panel
= 65 for 1800 long panel

Boards nailed off as below
Tylok 2T4's each side

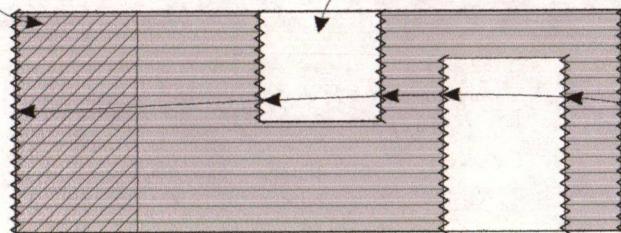
NOTE: Any wall using a panel or wall cladding as a bracing element must have the following perimeter nailing pattern.



These lines must be nailed off at 180mm crs.
All other internal lines can be nailed off at 360mm crs.

Braced Panel

Window or side door opening



These lines must be nailed off at 180mm crs.
All other internal lines can be nailed off at 360mm crs.

WHAKATANE
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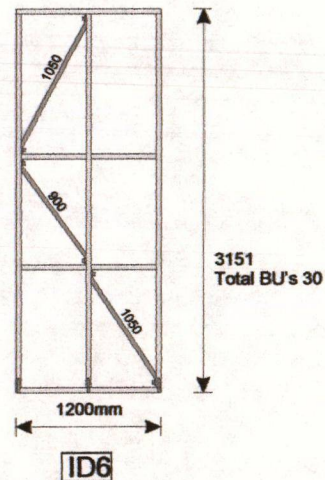
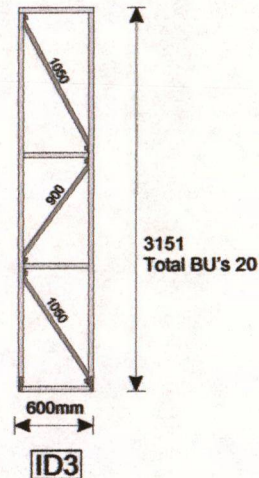
..... Building Control
Office
Date 4 Feb 2008

WALL BRACING - HARDWARE ELEMENTS

FLEXIBRACE OPTIONS

Note:

- Can be used as stand-alone brace
- Can be used in conjunction with IDEAL cladding options
- Alternative claddings can be installed but will have no assigned bracing values
- Only applies to the Classic Garage series
- Timber minimum size and grade 90 x 35 MSG8



**Engineering Soils Investigation Report for
Proposed Garage
610, 560 Stanley Road
Whakatane**



CLIENT: Dave Barraclough & Anne Bennett

**File ref. 574.2
30 October 2007**

Contents	page
1.0 Report Limitations and Scope.....	1
2.0 Background.....	2
3.0 Site Notes.....	2
4.0 Building Foundations.....	2

1.0 Report Limitations and Scope

This report reviews the foundation soils at the location of the proposed garage and has been prepared at the specific instruction of Dave Barraclough and Anne Bennett and supports a building consent application to the Whakatane District Council, and should not be used for any other purpose, or by any other party. As factual evidence has been obtained from visual inspections, five scala penetrometer, shear vane and borelog test sites, which by their nature only provide information about a relatively small volume of subsoil, there may be special conditions pertaining to the building site which have not been disclosed and which have not been taken into account in the report.

This review has been limited to the area identified on the attached site notes plan.

This report does not preclude the need for normal foundation inspections (by the District Council) in regard to verification of required footing geometry and reinforcement at the time of construction.

Restrictions to building arising from the proximity of property boundaries, archaeological issues, and the like, have not been investigated

Manktelow Consulting Engineers Limited (MCE) geotechnical report dated 14/5/2004 outlines development options for this building site including minimum building setbacks from the top of slopes. A reference copy of this is included herein. The proposed garage is within the designated permitted building area as defined in the report. The report concludes that soils softer than permitted in NZS 3604:1999 exist on the building platform. MCE have previously completed specific foundation soils investigation and foundation design for the dwelling that is nearing completion.

Our specific design is limited to a review of the applied soil bearing pressures from the proposed construction and is based on information obtained from information provided by the client regarding the proposed garage. All other areas of this project, including weatherproofing, proprietary systems and elements within the scope of the non-specific design codes NZS 3604 and NZS 4229 are specifically excluded from our review. The performance of the various specified proprietary systems are not covered by these calculations. Guarantees should be sought from the manufacturer if required.

Refer to the attached specific design specification notes; these outline some of the design assumptions. It is assumed that the Territorial Authority, being the building control authority, will undertake the necessary inspections to confirm the design assumptions and that the elements designed herein are installed in accordance with the intentions of the details shown. Any variation should be reported to the designer for a design review and alternative detailing.

2.0 Background

Specific engineering soil investigation has been requested at the site of the proposed garage.

It is proposed to construct a 7.2m x 9.0 m light timber framed Ideal garage. Colorsteel claddings are proposed with a 3m high exterior light timber framed walls. The garage is shown founded on a conventional ground bearing concrete slab.

3.0 Site Notes

We have visited the site and completed five hand penetrometer and shear vane test sites and augured borelogs. Scala penetrometer testing has generally been undertaken per the procedure as outlined in NZS 4402 Test 6.5.2 with results expressed as penetration mm/blow and a 50 mm diameter hand auger has been used to reveal soil types.

The ground is relatively level across the site with the nearly completed residence located 4m toward the north. It is proposed to locate the garage 3m back from the house wall adjacent to the slopes. The attached location plan shows the proposed garage position in relation to the dwelling.

Borelogs reveal that silt and clayey sand ash deposits underlay this site down to the investigation depth of 2.5 m.

Poor scala penetrometer results were recorded for the near surface. Serviceability allowable bearing pressures as low as 36 kPa was recorded at one of the test sites. Better relative densities were recorded at the other site sites and at depth.

The attached site notes plan and soil results sheets refer.

4.0 Building Foundations

Soil investigation results confirm that soils softer than permitted by NZS 3604:1999 (Timber Framed Buildings) exist at this site.

We have reviewed the proposed exterior footing systems for the measured reduced bearing pressures at a depth of 0.45 m below ground level and slab and 150mm slab sub-base fill on grade.

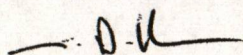
Because there is some variance in penetrometer resistance, some differential settlement of building foundations can be expected. The design procedure outlined in "Determination of allowable bearing pressure under small structures" MJ Stockwell 06/1977, suggests that differential settlement might be in the order of 20mm if applied pressures are less than measured values. This paper concludes, "These deflections are regarded as the acceptable limits a modern building can withstand without distress".

A review using this procedure shows the applied pressures from 200 mm wide footing bearing at 450 mm and 100mm slab on 150mm fill are indeed less than measured theoretical values.

This suggests that the underlying soil is suitable to support the modified shallow bearing foundation system as shown herein, and the risk of differential settlement greater than mentioned above is low. Our calculations and sketch details are attached.

The garage downpipes should be connected into the property stormwater disposal system that discharges at the base of the slope. No stormwater should be permitted to discharge onto the building platform or slopes below the building platform.

Manktelow Consulting Engineers Limited

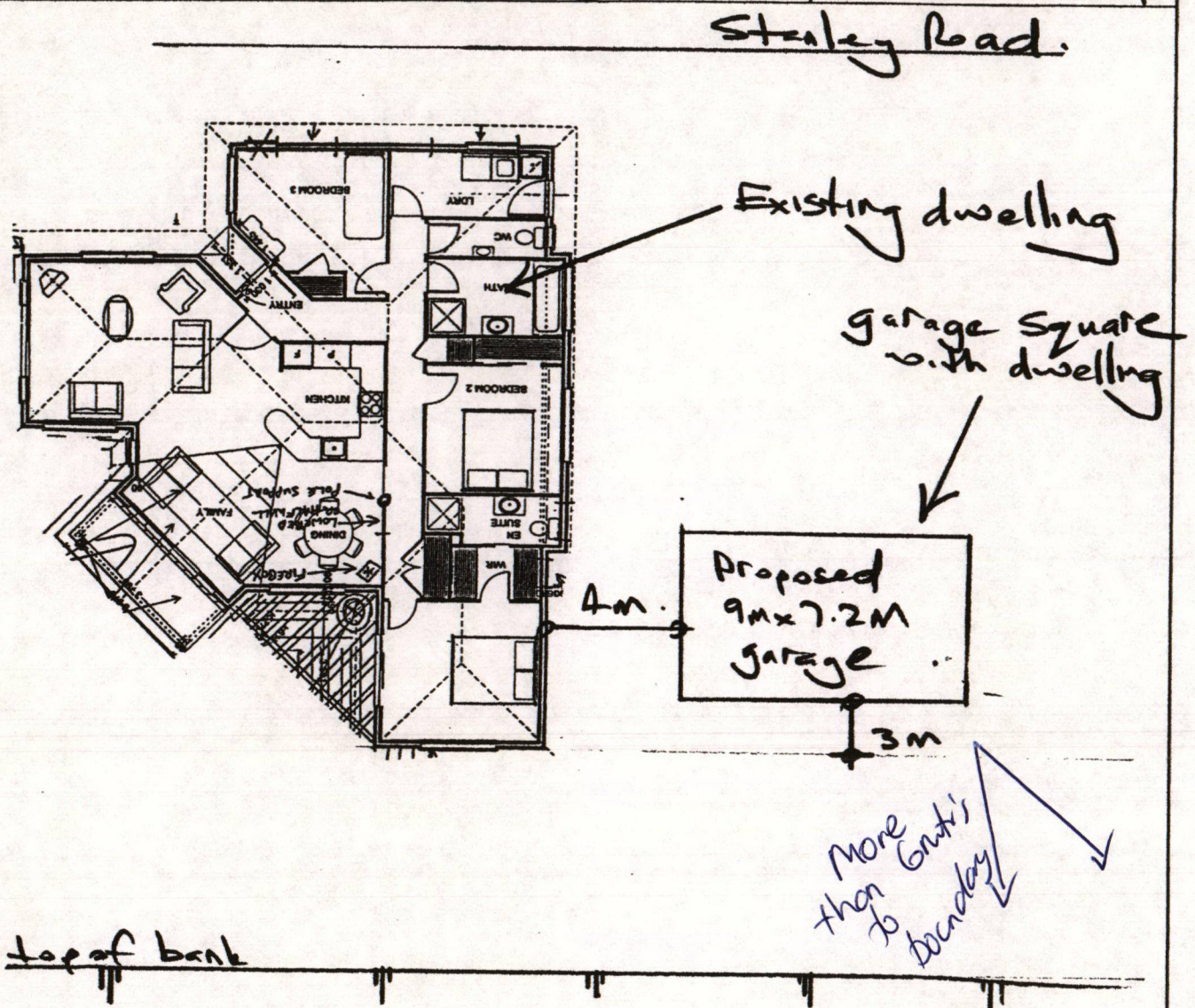


Craig Manktelow BE (Hons) MIPENZ

Enclosed: 5 sheets of sketch details and specific design specification notes
Site notes plan
Ideal Garages summary sheet
4 sheets of structural calculations
5 sheets of soil test results sheet
Copy of MCE geotechnical report 14/5/2004

Project Barracough & Bennett
Garage at 580 Stanley Rd,
Waikeata

file 51420
date 30/10/07
page Sketch - 01



LOCATION PLAN NTS

Note: Connect garage roof down pipes
into the designated piped stormwater
disposal system.

Project Barracough & Bennett
Proposed Garage
560 Stanley Road, Whakatane

file 574.20
 date 30/10/07
 page Sketch-02

D10 slab starters
 hook 150 around
 footing bars, lay mesh
 500

HRC 66S mesh central
 in 100mm concrete slab
 on 2.25mm polythene
 on 150mm min compacted
 hard fill

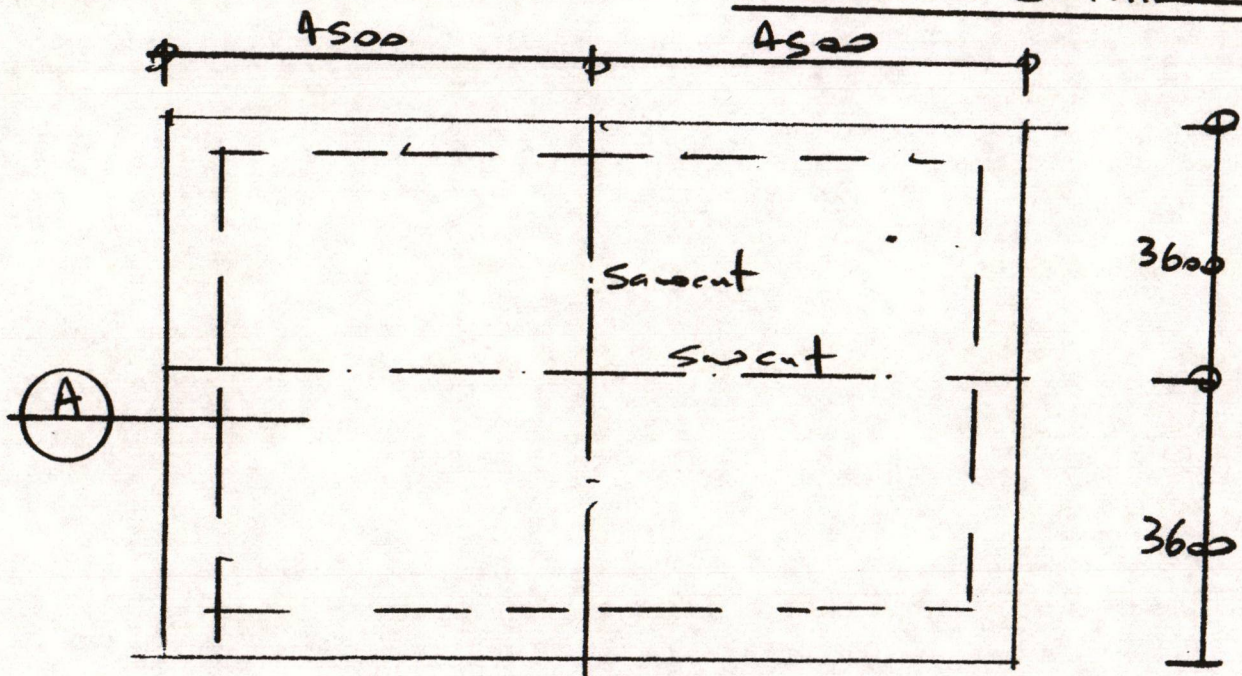
225 min
 600 max

450
 deep

3 D12 footing bars
 central in footing
 and 85 bottom
 cover.

200

TYPICAL EXTERIOR
 FOOTINGS DETAIL



SLAB PLAN

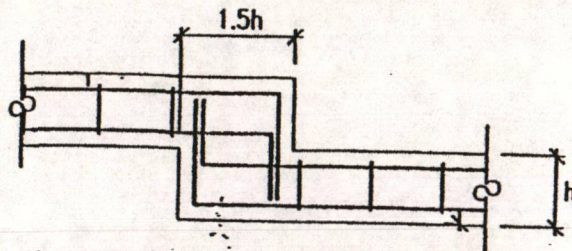
NTS

Refer attached
 construction notes

Manktelow Consulting Engineers Limited

Project **Barracough & Bennett**
Garage at 560 Stratford Road
Whakatane

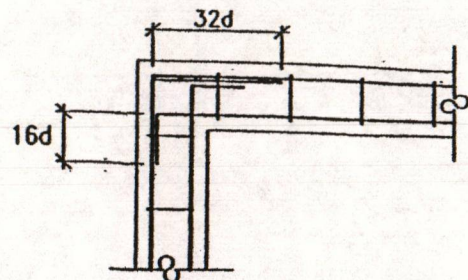
file **SYA.2**
 date **30/10/07**
 page **Sketch 02**



ELEVATION - FOUNDATION STEP

d = bar diameter

FOUNDATION DETAILS



PLAN - FOUNDATION CORNER

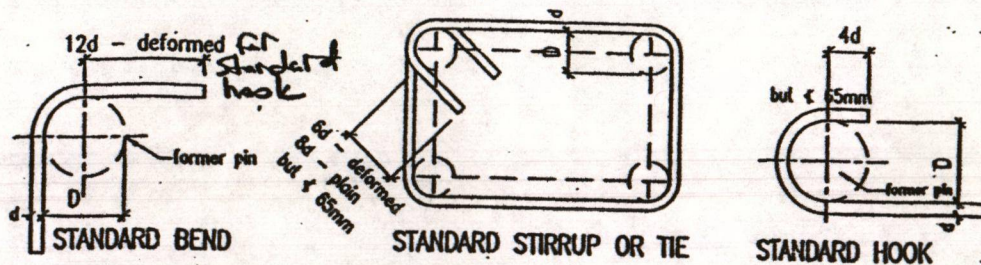


FIG. 1. STANDARD BEND, HOOK & STIRRUP d = bar diameter

MINIMUM RECOMMENDED BEND (PIN) DIAMETER = D

	REBAR TYPE	bar diameter = b					
		6	10	12	16	20	25
	plain bars	30	50	60	80	100	150
	deformed bars	30	50	60	80	100	150
	plain bars (stirrups & ties)	20	20	30	40	40	80
	deformed bars (stirrups & ties)	30	40	50	70	80	150

ALL REINFORCEMENT SHALL BE COLD BENT ONLY

SPECIFIC DESIGN CONSTRUCTION SPECIFICATION

1.0 General

- 1.1 Check all the dimensions and levels on site before fabrication. Locate and protect any existing services before commencement of any excavation.
- 1.2 Proprietary systems and products shall be installed strictly in accordance with manufacturers' recommendations. Garage superstructure shall be constructed in accordance with building consented plans and specifications. Slab and footing construction is to be in accordance with attached sketch detailing (sketch 01-03).
- 1.3 The attached sketch detailing is diagrammatic and intended only to convey specific engineering design conclusions. Read in conjunction with the building consented architectural drawings and specifications. It is assumed that the Territorial Authority, being the building control authority, will undertake the necessary inspections to confirm that the elements are constructed in accordance with the attached detailing and elements not covered by our review are installed in accordance with NZS 4229 and NZS 3604:1999 and building consented drawings. Any variation should be reported to the designer for a design review and alternative detailing.
- 1.4 Light timber framed construction shall be in accordance with the latest amendment of NZS 3604:1999 unless specified otherwise in the engineering design.
- 1.5 Corrosion protection for steel components shall be as required by the proprietary system manufacturer and NZS 3604:1999 for the appropriate corrosion zone.
- 1.6 Bolts shall be fitted with washers on all timber faces. For M12 use 50 square x 3 mm; M16 use 65 square x 5 mm.

2.0 Concrete

- 2.1 Prior to concrete pour footing trenches shall be clear of any loose debris and ground water.
- 2.2 Concrete construction shall be in accordance with NZS 3109 and NZS 3101. Concrete shall be Ordinary Grade unless mentioned otherwise. Concrete strength at 28 days shall be 20MPa. Concrete slump shall be the lowest possible to allow thorough compaction of the concrete. The slump however shall not exceed 75 mm.
Slump and compression tests shall be regularly conducted in accordance with procedure outlined in NZS 3112: 1986 Methods of Test for Concrete parts 1, 2 and 4. Test results shall be forwarded to the Territorial Authority.
- 2.3 The contractor shall protect the floor slabs against early plastic and thermal cracking. The slab shall be cured by water ponding for at least 5 days starting immediately after the slab has been finished. The attached sketch details show the location and depth of the slab shrinkage control joints. Sawcuts shall be 6mm wide x 33mm deep. The timing of sawcutting is critical; cutting too early should be avoided to reduce the risk of spalling the joint edge; however cutting shall take place no later than 8 to 24 hrs, depending on the ambient conditions, after the slab has been finished. Cutting with a 'wet-type' saw immediately after slab finishing is recommended. Whilst care has been taken in the location of these joints no guarantees are provided that uncontrolled cracking will not occur.

- 2.4 Reinforcement specified as HD shall be Pacific Steel Seismic Grade 500E[®]E MA; D or R shall be Grade 300. Reinforcement shall comply with AS/NZS 4671 and NZS 3402:1989, with construction, including bar fabrication, in accordance with NZS 3109:1997. Reinforcement shall be 'cold-bent' with minimum former pin diameters as shown on the attached standard details. Welding of reinforcement is not allowed. The construction reviewers shall satisfy themselves that reinforcement does comply with these standards.
- 2.5 Minimum lap lengths for reinforcement shall be; 600mm for D12, unless shown otherwise on the drawings. Lap and tie mesh 305 mm minimum.
- 2.6 NO IMPORTED REINFORCING STEEL IS TO BE USED IN THIS PROJECT.
- 2.7 Refer to the attached standard details sheet for construction of footing junctions and any steeping of the footing.
- 2.8 Surface finishes shall be per the building consented specification or as directed by the client.

3.0 Slab Sub-Base Filling

- 3.1 The existing soil shall be removed to achieve at least a 150mm and maximum of 600mm depth of compacted hardfill below slab. The area to be filled shall be benched so that fill is placed on a level surface. This shall be undertaken during the time of the year when the watertable is well below the excavated depth.
- 3.2 Backfill shall be placed in layers not exceeding 150mm loose depth and shall be compacted in place prior to the placement of successive layers with a heavy ride-on vibrating roller to achieve either 96% relative standard compaction to NZS 4402 test 6.5.2, or no more than 25 mm/blow with a scala penetrometer and undrained shear vane strength of at least 240kPa. Depending on fill type, it is likely that at least 6 slow passes of the roller per layer will be required to achieve this compaction. Care will be required close to the slab edge, such that damage or overstressing of the wall does not occur.
- 3.3 Backfill material shall be a well-graded pumice material or an approved equivalent (up to 100mm maximum particle size). The finished surface shall be blinded and levelled with fine sands that will not damage the d.p.c.