Telephone 1300 663 215
Facsimile (02) 9659 1633
PO Box 6160
Baulkham Hills BC NSW 2153

R Moy & Associates Pty Ltd
T/as Greenfield Accredited Certifiers
ACN 100 924 605
ABN 23 100 924 605

Construction Certificate

CONSTRUCTION CERTIFICATE NUMBER CC2006-06961

Issued in accordance with the Environmental Planning & Assessment Act 1979 under sections 109C(1)(b) and 109F.

COUNCIL: PITTWATER

APPLICANT

Name	Nu-Steel Homes
Address	Po Box 547, RIVERSTONE 2765
Contact no (telephone/fax)	

OWNER

Name	Everson, Josie
Address	BOX 1515, WARRIEWOOD

SUBJECT LAND

Address	172 Mona Vale Road, INGLESIDE 2101
	Lot No
	DP – 1053738

Received 25/1/06
Receipt No 185388

DESCRIPTION OF DEVELOPMENT

Type of Work ☑ Building work ☐ Subdivision work

Description Alterations & Additions to Existing Dwelling

COUNCIL'S D/A CONSENT

Development Consent No NO491/05

D.A Approval Date 18/10/2005

BUILDING CODE OF AUSTRALIA

BUILDING CLASSIFICATION 1a

BUILDER or OWNER/BUILDER

Name C D M Steelbuild Pty Ltd

Contractor Licence No. or

Owner Builder Permit No. 165483c

$ VALUE OF WORK

Building/Subdivision $220,000.00

DATE CC APPLICATION RECEIVED

Date Received 6/12/2005

DETERMINATION

Decision Approved

Date of Decision 20/01/2006

ATTACHMENTS

$30.00 Council Submission Cheque

Land Owners/PCA Form

Council Receipts

Home Warranty Insurance - HIA Insurance Services Pty Ltd

PLANS AND SPECIFICATIONS

APPROVED

List plan no(s) and specifications

Reference: Job No. 050203. Plan No. B, C, D, E, F, G Revision 2 dated 9/1/06

RIGHT OF APPEAL *under S109K where the Certifying Authority is a Council an applicant may appeal to the Land and Environmental Court against the refusal to issue a Construction Certificate within 12 months from the date of the decision.*

ACCREDITATION BODY DIPNR, 20 Lee Street, Sydney 2000.

CERTIFICATION

I, Peter Dewick, as the certifying authority am satisfied that:

(a) the requirements of the regulations referred to in s81A(5) have been complied with. That is, work completed in accordance with documentation accompanying the application for this certificate (with such modifications verified by the certifying authority as may be shown on that documentation) will comply with the requirements of the Regulation as are referred to in section 81A (5) of the Act, and

(b) long service levy has been paid where required under s34 of the Building and Construction Industry Long Service Payments Act 1986.

CERTIFYING AUTHORITY

Name of Certifying Authority	Greenfield Accredited Certifiers
Name of Accredited Certifier	Peter Dewick
Accreditation No	P0126
Contact No	1300 663 215
Address	PO Box 6160 Baulkham Hills BC 2153.
SIGNED	P Dewick
DATED	20/01/2006

INFORMATION ON REQUIRED INSPECTIONS

Please find your Construction Certificate CC2006-06961 enclosed for:

[Lot] 172 Mona Vale Road, INGLESIDE 2101

We will be required to carry out the following critical stage inspections:

- **Commencement**
- **Stormwater**
- **Framework**
- **Wet Area**
- **Final**

Please note that you will need to arrange for an ENGINEER accredited under the IEAust Accreditation Scheme to carry out the following critical stage inspections:

- **Piers, footings and slab**

TO BOOK AN INSPECTION CALL US ON 1300 663 215 AND ASK FOR "INSPECTION BOOKINGS"

PLEASE BOOK INSPECTIONS BEFORE 3.00PM THE DAY PRIOR TO THE INSPECTION

Contact Personnel

Linda Wotherspoon

To check the status of your job contact:

For technical enquiries contact:
Peter Dewick

COUNCIL COPY

PITTWATER COUNCIL
APPROVED DEVELOPMENT CONSENT PLANS

SYDNEY WATER APPROVED

1. Position of structure in relation to Sydney Water's assets is satisfactory.
2. Connections to Sydney Water sewer/water services may only be made following the issue of a permit to a licensed plumber/drainer.
3. It is the owner's responsibility to ensure that all proposed fittings will drain to Sydney Water's sewer.
4. Any Plumbing and/or Drainage Work to be carried out in accordance with the Sydney Water Act 1994, AS 3500 and the NSW Code of Practice.
5. Gullies, Inspection Shafts and Boundary Traps shall not be placed under any Roof, Balcony, Verandah, Floor or other cover unless otherwise approved by Sydney Water.
6. Property No. 3435870

Per: Reece 20/12/05

Reece, Mona Vale
Quick Check Agent on behalf of
SYDNEY WATER

62700

NEW WATER TANK

PROPOSED CARPORT

7300

EXISTING DRIVEWAY

19880

1.8 HIGH BRICK FENCE

REMOTE CONTROL SWING GATE

CONNECT EXISTING CYCLONE FENCING

NOTE: THESE PLANS MUST BE READ IN CONJUNCTION WITH THE CONDITIONS OF DEVELOPMENT CONSENT

PROPOSED FIRST FLOOR ADDITION & ALTERATIONS

EXISTING RESURFACED CONC. VERANDAH FLOOR TO BE FITTED WITH A BULLNOSE COLORBOND ROOF & CATPROOF MESH

APZ

POND

RELANDSCAPED

EXISTING HOT WATER SYSTEM

EXISTING WATER TANK TO BE MOVED HERE

EXISTING WATER TANK

EXISTING SHED

LOT 5
DP 1053738
H/No. 172

EXISTING PUMPOUT SEWER

1975.5sqm

2100 H MASONRY FIRE BARRIER

67100

30500

VALE ROAD

MONA

SITE PLAN – ASSET PROTECTION ZONE

SCALE 1:200

DO NOT SCALE.
IF IN DOUBT, ASK.

NU-STEEL HOMES CASTLE HILL
PHONE 029627 2322
FAX 029627 5727
EMAIL nusteel@hawknet.com.au

DRAWN	DATE DRAWN	DWG FILE	SCALE	VIEW NAME
INGRID	09-08-2005	EVERSONda	1:100	G

JOB DETAILS
MS EVERSON
172 MONA VALE ROAD
INGLESIDE NSW 2101

JOB REFERENCE 050203

REVISION 1

DCP 21

COUNCIL COPY

D6.3 Building Colours, Materials and Construction

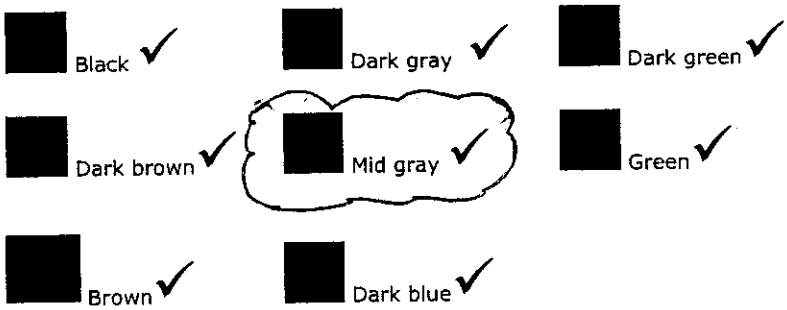
Outcomes
Achieve the desired future character of the Locality.
The development enhances the visual quality and identity of the streetscape. (S)
The colours and materials of the development harmonise with the natural environment. (En, S)
The visual prominence of the development is minimised. (S)
Damage to existing native vegetation and habitat is minimised. (En)

Land to which this control applies
Ingleside Locality (MDCP 350)

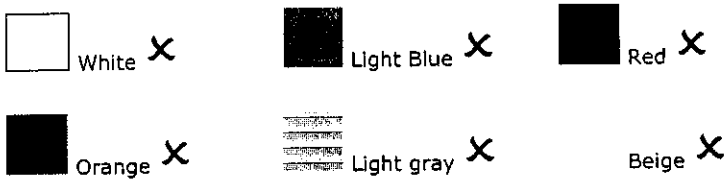
Development to which this control applies

- *Specified Residential Development*
  Dwelling house (new)
  Dwelling house (alterations & additions)
  Attached dual occupancy
  Detached dual occupancy
  Multi-unit housing
  Shop-top housing (residential portion only)
- *Unspecified Residential Development*
  Includes all other residential development not individually specified above
- *Business Development*
- *Light Industrial Development*
- ~~*Land Subdivision*~~
- *Other Development*
  Includes development not included in residential development, business development, light industrial development, or land subdivision.

Controls
External colours and materials shall be dark and earthy tones as shown below:



White, light coloured, red or orange roofs and walls are not permitted:



Finishes are to be of a low reflectivity.

Home Warranty

COUNCIL COPY

certificate of insurance

HIA INSURANCE SERVICES P/L
ABN 84 076 460 967
An associated company of
Aon Risk Services Australia Ltd
PO Box 883
North Ryde BC 1670
Telephone (02) 9808 7222
Facsimile (02) 9808 7233
CLAIMS ENQUIRY LINE
1800 554 255

C D M Steelbuild Pty Ltd
P O Box 547
RIVERSTONE NSW 2765

Certificate No: 382379
Local Authority Copy
Issue Date 12/01/2006

FORM 2

HOME BUILDING ACT 1989

Section 93

Certificate in respect of insurance

SUPPLY OF KIT HOME

A contract of insurance complying with Section 93 of the Home Building Act 1989 has been issued by: Vero Insurance Limited ABN 48 005 297 807

Aon Risk Services Australia Ltd ABN 17 000 434 720 act as Broker for the Builder. A Tax Invoice has been issued by HIA Insurance Services Pty Ltd ABN 84 076 460 967, as authorised representative of Aon Risk Services.

In Respect Of: Kit Home

At: Lot No: Unit No: House No: 172
Mona Vale Rd
INGLESIDE NSW 2101

Carried Out By: C D M Steelbuild Pty Ltd
Licence No: 165483C
ABN: 61 107 284 971

Subject to the Act and the Home Building Regulation 1997 and the conditions of the insurance contract, cover will be provided to a beneficiary described in the contract and successors in title to the beneficiary.

Issued by Vero Insurance Limited:

RECEIVED
16 JAN 2006
BY:.....

Insurer:

- Vero Insurance Limited
ABN 48 005 297 807

HIA Insurance services
YOUR INSURANCE PARTNER

AON

vero warranty

Unit 1, Second Floor
42 Birnie Avenue
Lidcombe NSW 2141

Tel: (02) 9646 5811
Fax: (02) 9646 2311

Directors:
John D'Amici B.E.,MIE Aust. CPEng, NPER
Robert Colombo B.E.,MIE Aus.t CPEng, NPER

D'Amici Colombo Pty Ltd
Consulting Structural Engineers
A.C.N. 055 912 733

eMail: damcol@damcol.com.au

COUNCIL COPY

Date: 20th December 2005
Our Ref: 17029

TO WHOM IT MAY CONCERN

RE: Existing Structure Inspection at 172 Mona Vale Road, Ingleside. NSW.

An engineer from this company performed an inspection of an existing structure at the above address on 19th December 2005. The purpose of the inspection was to determine the structural adequacy of the existing structure to support a proposed light weight steel frame first floor addition, as per CDM Steelbuilt Pty Ltd, drawing dated 1/12/2005.

During the inspection, it was noted the structure is a single story block wall construction, consisting of a single skin hollow block wall with engaged pier around the perimeter, supported on a concrete slab, with metal sheet and timber trusses for the roof. It was constructed some 15+ years ago.

The footing is a concrete slab founded on natural clay/ shallow bed rock. The concrete slab appears to be performing satisfactory, minor shrinkage cracking was observed on the concrete slab surface, few diagonal cracks in the blockwork was apparent above some of the windows and external corners. No significant movement was noted in the articulation joint.

Without the benefit of having an in-depth knowledge of the structure's history and design, it is our opinion that the cracks in the block walls is a result of concrete block shrinkage and minor differential footing movement.

Recommendations:
In view of the above observation and comments it is our opinion that, given the absence of significant cracking within the block walls and noting their footing/founding arrangements, the additional loading imposed by the proposed first floor addition will not have an adverse effect upon the existing walls and footing. It should be noted, however, that any additional loading upon the existing block walls may result in the formation of minor cracks due to redistribution of stresses.

Information on good site maintenance principles is contained in the attached CSIRO brochure.

In concluding, the existing dwelling will, we believe, be structurally adequate to support the additional loading imposed by the proposed addition.

This document shall not be construed as relieving any other party of their responsibilities, liabilities or contractual obligations. Should you require further information or clarification regarding the above, please do not hesitate to contact this office.

Yours Faithfully

For and on behalf of D'Amici Colombo Pty Limited

Foundation Maintenance and Footing Performance:
A Homeowner's Guide

CSIRO

BTF 18
replaces
Information
Sheet 10/91

Buildings can and often do move. This movement can be up, down, lateral or rotational. The fundamental cause of movement in buildings can usually be related to one or more problems in the foundation soil. It is important for the homeowner to identify the soil type in order to ascertain the measures that should be put in place in order to ensure that problems in the foundation soil can be prevented, thus protecting against building movement.

This Building Technology File is designed to identify causes of soil-related building movement, and to suggest methods of prevention of resultant cracking in buildings.

Soil Types

The types of soils usually present under the topsoil in land zoned for residential buildings can be split into two approximate groups – granular and clay. Quite often, foundation soil is a mixture of both types. The general problems associated with soils having granular content are usually caused by erosion. Clay soils are subject to saturation and swell/shrink problems.

Classifications for a given area can generally be obtained by application to the local authority, but these are sometimes unreliable and if there is doubt, a geotechnical report should be commissioned. As most buildings suffering movement problems are founded on clay soils, there is an emphasis on classification of soils according to the amount of swell and shrinkage they experience with variations of water content. The table below is Table 2.1 from AS 2870, the Residential Slab and Footing Code.

Causes of Movement

Settlement due to construction
There are two types of settlement that occur as a result of construction:

- Immediate settlement occurs when a building is first placed on its foundation soil, as a result of compaction of the soil under the weight of the structure. The cohesive quality of clay soil mitigates against this, but granular (particularly sandy) soil is susceptible.
- Consolidation settlement is a feature of clay soil and may take place because of the expulsion of moisture from the soil or because of the soil's lack of resistance to local compressive or shear stresses. This will usually take place during the first few months after construction, but has been known to take many years in exceptional cases.

These problems are the province of the builder and should be taken into consideration as part of the preparation of the site for construction. Building Technology File 19 (BTF 19) deals with these problems.

Erosion
All soils are prone to erosion, but sandy soil is particularly susceptible to being washed away. Even clay with a sand component of say 10% or more can suffer from erosion.

Saturation
This is particularly a problem in clay soils. Saturation creates a bog-like suspension of the soil that causes it to lose virtually all of its bearing capacity. To a lesser degree, sand is affected by saturation because saturated sand may undergo a reduction in volume – particularly imported sand fill for bedding and blinding layers. However, this usually occurs as immediate settlement and should normally be the province of the builder.

Seasonal swelling and shrinkage of soil
All clays react to the presence of water by slowly absorbing it, making the soil increase in volume (see table below). The degree of increase varies considerably between different clays, as does the degree of decrease during the subsequent drying out caused by fair weather periods. Because of the low absorption and expulsion rate, this phenomenon will not usually be noticeable unless there are prolonged rainy or dry periods, usually of weeks or months, depending on the land and soil characteristics.

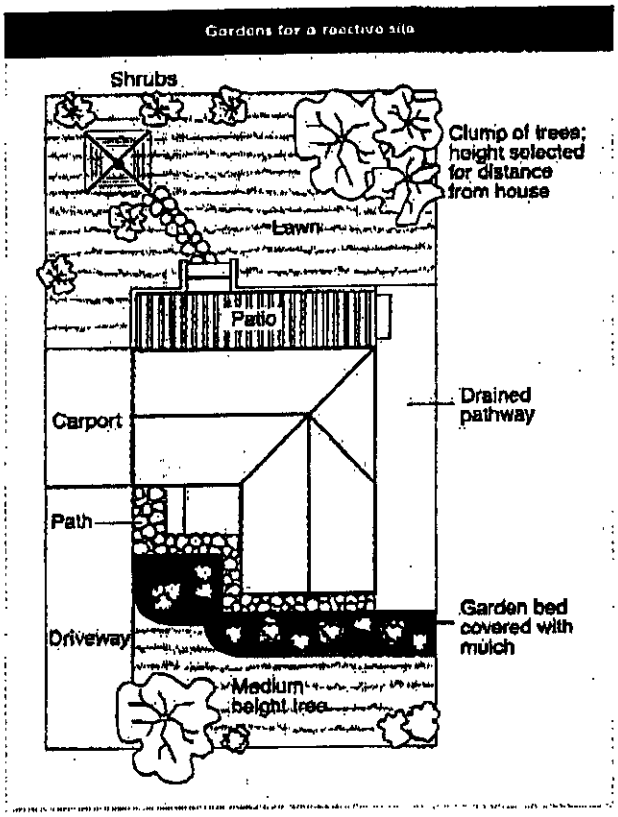
The swelling of soil creates an upward force on the footings of the building, and shrinkage creates subsidence that takes away the support needed by the footing to retain equilibrium.

Shear failure
This phenomenon occurs when the foundation soil does not have sufficient strength to support the weight of the footing. There are two major post-construction causes:

- Significant load increase.
- Reduction of lateral support of the soil under the footing due to erosion or excavation.
- In clay soil, shear failure can be caused by saturation of the soil adjacent to or under the footing.

GENERAL DEFINITIONS OF SITE CLASSES

Class	Foundation
A	Most sand and rock sites with little or no ground movement from moisture changes
S	Slightly reactive clay sites with only slight ground movement from moisture changes
M	Moderately reactive clay or silt sites, which can experience moderate ground movement from moisture changes
H	Highly reactive clay sites, which can experience high ground movement from moisture changes
E	Extremely reactive sites, which can experience extreme ground movement from moisture changes
A to P	Filled sites
P	Sites which include soft soils, such as soft clay or silt or loose sands; landslip; mine subsidence; collapsing soils; soils subject to erosion; reactive sites subject to abnormal moisture conditions or sites which cannot be classified otherwise



should extend outwards a minimum of 900 mm (more in highly reactive soil) and should have a minimum fall away from the building of 1:60. The finished paving should be no less than 100 mm below brick vent bases.

It is prudent to relocate drainage pipes away from this paving, if possible, to avoid complications from future leakage. If this is not practical, earthenware pipes should be replaced by PVC and backfilling should be of the same soil type as the surrounding soil and compacted to the same density.

Except in areas where freezing of water is an issue, it is wise to remove taps in the building area and relocate them well away from the building – preferably not uphill from it (see BTF 19).

It may be desirable to install a grated drain at the outside edge of the paving on the uphill side of the building. If subsoil drainage is needed this can be installed under the surface drain.

Condensation

In buildings with a subfloor void such as where bearers and joists support flooring, insufficient ventilation creates ideal conditions for condensation, particularly where there is little clearance between the floor and the ground. Condensation adds to the moisture already present in the subfloor and significantly slows the process of drying out. Installation of an adequate subfloor ventilation system, either natural or mechanical, is desirable.

Warning: Although this Building Technology File deals with cracking in buildings, it should be said that subfloor moisture can result in the development of other problems, notably:

- Water that is transmitted into masonry, metal or timber building elements causes damage and/or decay to those elements.
- High subfloor humidity and moisture content create an ideal environment for various pests, including termites and spiders.
- Where high moisture levels are transmitted to the flooring and walls, an increase in the dust mite count can ensue within the living areas. Dust mites, as well as dampness in general, can be a health hazard to inhabitants, particularly those who are abnormally susceptible to respiratory ailments.

The garden

The ideal vegetation layout is to have lawn or plants that require only light watering immediately adjacent to the drainage or paving edge, then more demanding plants, shrubs and trees spread out in that order.

Overwatering due to misuse of automatic watering systems is a common cause of saturation and water migration under footings. If it is necessary to use these systems, it is important to remove garden beds to a completely safe distance from buildings.

Existing trees

Where a tree is causing a problem of soil drying or there is the existence or threat of upheaval of footings, if the offending roots are subsidiary and their removal will not significantly damage the tree, they should be severed and a concrete or metal barrier placed vertically in the soil to prevent future root growth in the direction of the building. If it is not possible to remove the relevant roots without damage to the tree, an application to remove the tree should be made to the local authority. A prudent plan is to transplant likely offenders before they become a problem.

Information on trees, plants and shrubs

State departments overseeing agriculture can give information regarding root patterns, volume of water needed and safe distance from buildings of most species. Botanic gardens are also sources of information. For information on plant roots and drains, see Building Technology File 17.

Excavation

Excavation around footings must be properly engineered. Soil supporting footings can only be safely excavated at an angle that allows the soil under the footing to remain stable. This angle is called the angle of repose (or friction) and varies significantly between soil types and conditions. Removal of soil within the angle of repose will cause subsidence.

Remediation

Where erosion has occurred that has washed away soil adjacent to footings, soil of the same classification should be introduced and compacted to the same density. Where footings have been undermined, augmentation or other specialist work may be required. Remediation of footings and foundations is generally the realm of a specialist consultant.

Where isolated footings rise and fall because of swell/shrink effect, the homeowner may be tempted to alleviate floor bounce by filling the gap that has appeared between the bearer and the pier with blocking. The danger here is that when the next swell segment of the cycle occurs, the extra blocking will push the floor up into an accentuated dome and may also cause local shear failure in the soil. If it is necessary to use blocking, it should be by a pair of fine wedges and monitoring should be carried out fortnightly.

This BTF was prepared by John Lewer FAIB, MIAMA, Partner, Construction Diagnosis.

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The normal structural arrangement is that the inner leaf of brickwork in the external walls and at least some of the internal walls (depending on the roof type) comprise the load-bearing structure on which any upper floors, ceilings and the roof are supported. In these cases, it is internally visible cracking that should be the main focus of attention, however there are a few examples of dwellings whose external leaf of masonry plays some supporting role, so this should be checked if there is any doubt. In any case, externally visible cracking is important as a guide to stresses on the structure generally, and it should also be remembered that the external walls must be capable of supporting themselves.

Effects on framed structures
Timber or steel framed buildings are less likely to exhibit cracking due to swell/shrink than masonry buildings because of their flexibility. Also, the doming/dishing effects tend to be lower because of the lighter weight of walls. The main risks to framed buildings are encountered because of the isolated pier footings used under walls. Where erosion or saturation cause a footing to fall away, this can double the span which a wall must bridge. This additional stress can create cracking in wall linings, particularly where there is a weak point in the structure caused by a door or window opening. It is, however, unlikely that framed structures will be so stressed as to suffer serious damage without first exhibiting some or all of the above symptoms for a considerable period. The same warning period should apply in the case of upheaval. It should be noted, however, that where framed buildings are supported by strip footings there is only one leaf of brickwork and therefore the externally visible walls are the supporting structure for the building. In this case, the subfloor masonry walls can be expected to behave as full brickwork walls.

Effects on brick veneer structures
Because the load-bearing structure of a brick veneer building is the frame that makes up the interior leaf of the external walls plus perhaps the internal walls, depending on the type of roof, the building can be expected to behave as a framed structure, except that the external masonry will behave in a similar way to the external leaf of a full masonry structure.

Water Service and Drainage

Where a water service pipe, a sewer or stormwater drainage pipe is in the vicinity of a building, a water leak can cause erosion, swelling or saturation of susceptible soil. Even a minuscule leak can be enough to saturate a clay foundation. A leaking tap near a building can have the same effect. In addition, trenches containing pipes can become watercourses even though backfilled, particularly where broken rubble is used as fill. Water that runs along these trenches can be responsible for serious erosion, interstrata seepage into subfloor areas and saturation.

Pipe leakage and trench water flows also encourage tree and shrub roots to the source of water, complicating and exacerbating the problem.
Poor roof plumbing can result in large volumes of rainwater being concentrated in a small area of soil:

- Incorrect falls in roof guttering may result in overflows, as may gutters blocked with leaves etc.
- Corroded guttering or downpipes can spill water to ground.
- Downpipes not positively connected to a proper stormwater collection system will direct a concentration of water to soil that is directly adjacent to footings, sometimes causing large-scale problems such as erosion, saturation and migration of water under the building.

Seriousness of Cracking

In general, most cracking found in masonry walls is a cosmetic nuisance only and can be kept in repair or even ignored. The table below is a reproduction of Table C1 of AS 2870.

AS 2870 also publishes figures relating to cracking in concrete floors, however because wall cracking will usually reach the critical point significantly earlier than cracking in slabs, this table is not reproduced here.

Prevention/Cure

Plumbing
Where building movement is caused by water service, roof plumbing, sewer or stormwater failure, the remedy is to repair the problem. It is prudent, however, to consider also rerouting pipes away from the building where possible, and relocating taps to positions where any leakage will not direct water to the building vicinity. Even where gully traps are present, there is sometimes sufficient spill to create erosion or saturation, particularly in modern installations using smaller diameter PVC fixtures. Indeed, some gully traps are not situated directly under the taps that are installed to charge them, with the result that water from the tap may enter the backfilled trench that houses the sewer piping. If the trench has been poorly backfilled, the water will either pond or flow along the bottom of the trench. As these trenches usually run alongside the footings and can be at a similar depth, it is not hard to see how any water that is thus directed into a trench can easily affect the foundation's ability to support footings or even gain entry to the subfloor area.

Ground drainage
In all soils there is the capacity for water to travel on the surface and below it. Surface water flows can be established by inspection during and after heavy or prolonged rain. If necessary, a grated drain system connected to the stormwater collection system is usually an easy solution.

It is, however, sometimes necessary when attempting to prevent water migration that testing be carried out to establish watertable height and subsoil water flows. This subject is referred to in BTF 19 and may properly be regarded as an area for an expert consultant.

Protection of the building perimeter
It is essential to remember that the soil that affects footings extends well beyond the actual building line. Watering of garden plants, shrubs and trees causes some of the most serious water problems.

For this reason, particularly where problems exist or are likely to occur, it is recommended that an apron of paving be installed around as much of the building perimeter as necessary. This paving

CLASSIFICATION OF DAMAGE WITH REFERENCE TO WALLS

Description of typical damage and required repair	Approximate crack width limit (see Note 3)	Damage category
Hairline cracks	<0.1 mm	0
Fine cracks which do not need repair	<1 mm	1
Cracks noticeable but easily filled. Doors and windows stick slightly	<5 mm	2
Cracks can be repaired and possibly a small amount of wall will need to be replaced. Doors and windows stick. Service pipes can fracture. Weathertightness often impaired	5–15 mm (or a number of cracks 3 mm or more in one group)	3
Extensive repair work involving breaking-out and replacing sections of walls, especially over doors and windows. Window and door frames distort. Walls lean or bulge noticeably, some loss of bearing in beams. Service pipes disrupted	15–25 mm but also depend on number of cracks	4

Tree root growth
Trees and shrubs that are allowed to grow in the vicinity of footings can cause foundation soil movement in two ways:

- Roots that grow under footings may increase in cross-sectional size, exerting upward pressure on footings.
- Roots in the vicinity of footings will absorb much of the moisture in the foundation soil, causing shrinkage or subsidence.

Unevenness of Movement

The types of ground movement described above usually occur unevenly throughout the building's foundation soil. Settlement due to construction tends to be uneven because of:

- Differing compaction of foundation soil prior to construction.
- Differing moisture content of foundation soil prior to construction.

Movement due to non-construction causes is usually more uneven still. Erosion can undermine a footing that traverses the flow or can create the conditions for shear failure by eroding soil adjacent to a footing that runs in the same direction as the flow.

Saturation of clay foundation soil may occur where subfloor walls create a dam that makes water pond. It can also occur wherever there is a source of water near footings in clay soil. This leads to a severe reduction in the strength of the soil which may create local shear failure.

Seasonal swelling and shrinkage of clay soil affects the perimeter of the building first, then gradually spreads to the interior. The swelling process will usually begin at the uphill extreme of the building, or on the weather side where the land is flat. Swelling gradually reaches the interior soil as absorption continues. Shrinkage usually begins where the sun's heat is greatest.

Effects of Uneven Soil Movement on Structures

Erosion and saturation
Erosion removes the support from under footings, tending to create subsidence of the part of the structure under which it occurs. Brickwork walls will resist the stress created by this removal of support by bridging the gap or cantilevering until the bricks or the mortar bedding fail. Older masonry has little resistance. Evidence of failure varies according to circumstances and symptoms may include:

- Step cracking in the mortar beds in the body of the wall or above/below openings such as doors or windows.
- Vertical cracking in the bricks (usually but not necessarily in line with the vertical beds or perpends).

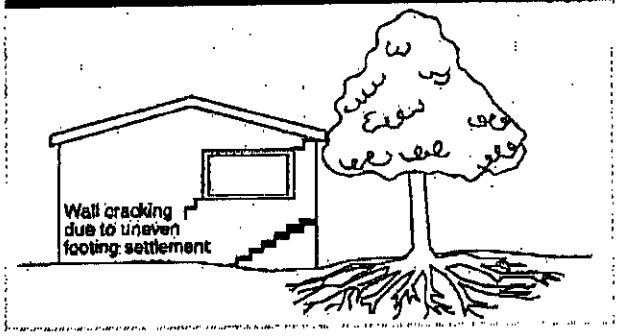
Isolated piers affected by erosion or saturation of foundations will eventually lose contact with the bearers they support and may tilt or fall over. The floors that have lost this support will become bouncy, sometimes rattling ornaments etc.

Seasonal swelling/shrinkage in clay
Swelling foundation soil due to rainy periods first lifts the most exposed extremities of the footing system, then the remainder of the perimeter footings while gradually permeating inside the building footprint to lift internal footings. This swelling first tends to create a dish effect, because the external footings are pushed higher than the internal ones.

The first noticeable symptom may be that the floor appears slightly dished. This is often accompanied by some doors binding on the floor or the door head, together with some cracking of cornice mitres. In buildings with timber flooring supported by bearers and joists, the floor can be bouncy. Externally there may be visible dishing of the hip or ridge lines.

As the moisture absorption process completes its journey to the innermost areas of the building, the internal footings will rise. If the spread of moisture is roughly even, it may be that the symptoms will temporarily disappear, but it is more likely that swelling will be uneven, creating a difference rather than a disappearance in symptoms. In buildings with timber flooring supported by bearers and joists, the isolated piers will rise more easily than the strip footings or piers under walls, creating noticeable doming of flooring.

Trees can cause shrinkage and damage



As the weather pattern changes and the soil begins to dry out, the external footings will be first affected, beginning with the locations where the sun's effect is strongest. This has the effect of lowering the external footings. The doming is accentuated and cracking reduces or disappears where it occurred because of dishing, but other cracks open up. The roof lines may become convex.

Doming and dishing are also affected by weather in other ways. In areas where warm, wet summers and cooler dry winters prevail, water migration tends to be toward the interior and doming will be accentuated, whereas where summers are dry and winters are cold and wet, migration tends to be toward the exterior and the underlying propensity is toward dishing.

Movement caused by tree roots
In general, growing roots will exert an upward pressure on footings, whereas soil subject to drying because of tree or shrub roots will tend to remove support from under footings by inducing shrinkage.

Complications caused by the structure itself
Most forces that the soil causes to be exerted on structures are vertical – i.e. either up or down. However, because these forces are seldom spread evenly around the footings, and because the building resists uneven movement because of its rigidity, forces are exerted from one part of the building to another. The net result of all these forces is usually rotational. This resultant force often complicates the diagnosis because the visible symptoms do not simply reflect the original cause. A common symptom is binding of doors on the vertical member of the frame.

Effects on full masonry structures
Brickwork will resist cracking where it can. It will attempt to span areas that lose support because of subsided foundations or raised points. It is therefore usual to see cracking at weak points, such as openings for windows or doors.

In the event of construction settlement, cracking will usually remain unchanged after the process of settlement has ceased.

With local shear or erosion, cracking will usually continue to develop until the original cause has been remedied, or until the subsidence has completely neutralised the affected portion of footing and the structure has stabilised on other footings that remain effective.

In the case of swell/shrink effects, the brickwork will in some cases return to its original position after completion of a cycle, however it is more likely that the rotational effect will not be exactly reversed, and it is also usual that brickwork will settle in its new position and will resist the forces trying to return it to its original position. This means that in a case where swelling takes place after construction and cracking occurs, the cracking is likely to at least partly remain after the shrink segment of the cycle is complete. Thus, each time the cycle is repeated, the likelihood is that the cracking will become wider until the sections of brickwork become virtually independent.

With repeated cycles, once the cracking is established, if there is no other complication, it is normal for the incidence of cracking to stabilise, as the building has the articulation it needs to cope with the problem. This is by no means always the case, however, and monitoring of cracks in walls and floors should always be treated seriously.

Upheaval caused by growth of tree roots under footings is not a simple vertical shear stress. There is a tendency for the root to also exert lateral forces that attempt to separate sections of brickwork after initial cracking has occurred.

22 NOV 2005

Greenfield Accredited Certifiers

Construction/Complying Development Certificate Application Form

Issued under the Environmental Planning & Assessment Act 1979

R Moy & Associates Pty Ltd
Trading as Greenfield Accredited Certifiers
ACN 100 924 605
ABN 23 100 924 605

Postal Address: PO Box 6160 Baulkham Hills BC NSW 2153

Telephone **1300 663 215**
Facsimile **9659 1633**

Email enquiries@greenfieldcertifiers.com.au
Website www.greenfieldcertifiers.com.au

Privacy Policy – The information you provide in this application will enable your application to be assessed by the certifying authority under the Environmental Planning and Assessment Act 1979. If the information is not provided, your application may not be accepted. The application can potentially be viewed by members of the public. Please contact Greenfield Accredited Certifiers if the information you have provided in your application is incorrect or requires modification..

CHECKLIST – DOCUMENTS TO ACCOMPANY THIS APPLICATION

For Construction Certificate Applications:

- ☐ Complete & sign this Application form – builder can sign
- ☐ Completion of Land Owners Form to be signed by ALL owners
- ☐ 1 copy of Council DA approved plans
- ☐ 1 copy of Council development consent
- ☐ 3 copies of architectural plans with amendments satisfying conditions
- ☐ 3 copies of building specifications
- ☐ If using a licensed builder - copy of Home Owners Warranty insurance if work is valued over $12,000 (N/A for commercial or industrial development)
- ☐ If not using a licensed builder - copy of Owner-Builder permit if work is valued over $5,000 (N/A for commercial or industrial development)
- ☐ Proof of payment of Long Service Levy if work is valued $25,000 or over
- ☐ Cheque made payable to Council for Certificate Registration Fee – schedule of Council fees can be provided on request.

For Complying Development Applications:

- ☐ Complete & sign this Application form – builder can sign
- ☐ Completion of Land Owners Form to be signed by ALL owners
- ☐ 3 copies of architectural plans
- ☐ 3 copies of building specifications
- ☐ If using a licensed builder - copy of Home Owners Warranty insurance if work is valued over $12,000 (N/A for commercial or industrial development)
- ☐ If not using a licensed builder - copy of Owner-Builder permit if work is valued over $5,000 (N/A for commercial or industrial development)
- ☐ Long Service Levy will apply if work is valued $25,000 or over
- ☐ Copy of relevant Water Authority Approval (if applicable)
- ☐ Cheque made payable to Council for Certificate Registration Fee – schedule of Council fees can be provided on request.

1. TYPE OF APPLICATION

I wish to make an application for a:

☐ Complying Development Certificate
Issued under the Environmental Planning & Assessment Act 1979 sections 85 and 85A

☑ Construction Certificate
Issued under the Environmental Planning & Assessment Act 1979 sections 109C(1)(b), 81A(2) & 81A(4)

Class of building under the Building Code of Australia	1
Development application no.	N0491/05
Date which development consent was granted	18 OCT. 05

2. DETAILS OF THE APPLICANT

Applicant Name	ALAN BATES		
Or Company	NV-STEEL HOMES		
Applicant Address	PO BOX 547 RIVERSTONE		
	NSW	Postcode 2765	
Phone: 02 96272322	Fax: 02 96275727	Email: alan@nvsteelnsw.com.au	

3. BILLING DETAILS (if different from Applicant)

Bill To:	
Billing Address:	

Note: Applicant will be liable for payment of our fees if funds cannot be recovered from the above

4. DETAILS OF THE OWNER(S)

Owner/s Name	JOSIE EVERSON		
Or Company			
Owners Address	BOX 1515 WARRIEWOOD SQU		
	WARRIEWOOD	Postcode 2102	
Phone: 02 9970 8276	Fax: SAME	Email: JTREMAIN1@OPTUS.COM.AU	

5. IDENTIFY THE LAND YOU PROPOSE TO DEVELOP

Site Address	172 MONA VALE ROAD INGLESIDE		
	NSW	Postcode 2101	
Lot no. 5		DP/SP no. 1053738	
Council Area	PITTWATER		

6. DETAILS OF THE PROPOSED DEVELOPMENT

Description of work to be carried out	ADDITIONS AND ALTERATIONS TO EXISTING DWELLING
Estimated cost of development including GST	$ 220,000

7. DETAILS OF THE BUILDER

Licensed Builder Name, or Owner Builder Name	TBA		
Builder License No. or Owner Builder Permit No.			
Builders Address			
		Postcode	
Phone:	Fax:	Email:	

8. PLANS & SPECIFICATIONS

List plan numbers & specification reference details included in this application:	JOB REF. : 050203 - A TO G STEEL SPECIFICATIONS.

Please continue to next page for signing

AUSTRALIAN BUREAU OF STATISTICS SCHEDULE – compulsory

Please complete this schedule. The information will be sent to the Australian Bureau of Statistics.

All new buildings

• Number of storeys (incl underground floors)	2
• Gross floor area of new building (m^2)	334.8
• Gross site area (m^2)	1975.5

Residential buildings only

• No. of dwellings to be constructed	1
• No. of pre-existing dwellings on site	1
• No. of dwellings to be demolished	0
• Will the new dwelling/s be attached to other new buildings ?	NO
• Will the new building(s) be attached to existing buildings ?	YES (ADDITION)
• Does the site contain a dual occupancy ?	NO

Materials – Residential Buildings

WALLS		ROOF		FRAME		FLOOR	
Brick Veneer		Aluminium		Timber		Concrete	✓
Full Brick		Concrete		Steel	✓	Timber	
Single Brick		Concrete Tiles		Aluminium		Other (describe)	
Concrete Block	✓	Fibrous Cement		Other (describe)			
Concrete Masonry		Fibreglass					
Concrete		Masonry Shingle					
Steel		Terracotta Shingle					
Fibrous Cement	✓	Tiles – other					
Hardiplank		Slate					
Timber/Weatherboard		Steel Colorbond	✓				
Cladding/Aluminium		Terracotta Tiles					
Curtain Class		Other (describe)					
Other (describe below)							

CC/CDC No. 06/0961 DA No. ND491/05

SIGNATURES

The applicant must sign the application.

Applicant Signature

X

Date

18.11.05

OFFICIAL RECEIPT

23/06/2005 Receipt No 170017

To JOSEPHINE EVERSON

172 MONA VALE ROAD
INGLESIDE

Qty/ Applic	Reference	Amount
	TDEV-DA F	$970.80
GL Rec	DA N0348/05:172 MONA VALE ROAD	
1	TADV-T/RL	$59.09
GL Rec	1 X DA N0348/05 :172 MONA VALE RD	
	GST	$5.91
GL Rec		
1	RNID-Rord	$25.00
GL Rec	1 X DA N0348/05:172 MONA VALE RD	
	GST	$2.50
GL Rec		
1	TDER-Cons	$541.75
GL Rec	1 X DC @ DA N0348/05:172 MONA VALE RD	
	GST	$54.18
GL Rec		
1	HKER-RR A	$180.00
GL Rec	1 X DA N0348/05:172 MONA VALE RD	
	GST	$18.00
GL Rec		
1	NSDP-Noti	$20.00
GL Rec	1 X DA N0348/05:172 MONA VALE RD	
	GST	$2.00
GL Rec		
	BLSL-Bull	$440.00
GL Rec	LSL @ DA N0348/05:172 MONA VALE RD	
To GL Receipt:		

Long Service Levy

Total Amount:	$2,429.23
Includes GST of:	$92.39

cheque Return
less $600

Amounts Tendered

Cash	
Cheque	$2,429.23
Card	
Money Order	
Amount Rec	

Hawkesbury Council
ABN: 61340837871

TAX INVOICE
OFFICIAL RECEIPT

22/08/2005 Receipt No 173771

To JOSIE EVERSON

BOX 151
WARRIEWOOD

Qty/ Applic	Reference	Amount
	TDEV-DA F	$970.80
GL Rec	1 X N0491/05	
1	TADV-T/RL	$63.64
GL Rec	1 X N0491/05	
	GST	$6.36
GL Rec		
1	RNID-Rord	$25.00
GL Rec	1 X N 0491/05	
	GST	$2.50
GL Rec		
1	HKER-RR A	$180.00
GL Rec	1 X N0491/05	
	GST	$18.00
GL Rec		
To GL Receipt:		

Total Amount:	$1,266.30
Includes GST of:	$26.86

Amounts Tendered

Cheque	$1,266.30
Total	$1,266.30
Rounding	$0.00
Change	$0.00
Nett	$1,266.30

Printed 22/08/2005 12:17:49 PM
Cashier KRobinson

STRUCTURAL DESIGN CERTIFICATE

The following details provide the structural requirements for a steel framed residence and have been designed in accordance with the principles of structural mechanics.

Building constructed to comply with these details shall be capable of sustaining the combination of loads to which it will be subjected in accordance with the provisions of relevant codes and Australian Standards

References utilised in the design are:

AS1155, AS1170 - 1 and 2, AS2870, AS1250, AS1538, AS1720, AS4055, AS1170.4, Australian Domestic Construction Manual and other design/construction manuals from respective material manufacturers (ie Lysaght, CSR, Hardies etc).

The Design Criteria and Standard House Parameters are

Standard House Parameters

1. Plan - basic rectangle, L shape or combination
2. Upper level of 2 storey or single level dwelling
3. 20 degree roof pitch - sheet metal roof
   Maximum truss span 12.0m with maximum 1.2m truss spacing
4. 20 degree roof pitch - tiled roof maximum truss span 9.15m with maximum 0.9m truss spacing
5. Maximum 2.4m wide, 7 1/2 degree pitch attached verandah (Sheet metal roofs only)
6. Wall height 2.4m, 2.7m.

Design Criteria

The wind load criteria used is based on the following information derived from AS 1170.2 - 1989 Wind Loads

Design Gust Wind Speed	= 41m/s
Dynamic Wind Pressure (q_z)	= 1.0kPa
Height To Eaves	= 6m
Internal Pressure Coefficient	= +0.2 -0.3
Wind Direction Factor	= 0.95
Structure Importance Factor	= 1.0
Earthquake Design Category	= H2 maximum
Snow Loads	= A snow load of .5kPa is allowable for sheet metal roof provided trusses are a maximum 9.0m span and at maximum 0.9m spacings

Design Selection Table

The Design Gust Wind Speed required for a particular residence is dependent on the Region, terrain, shielding and topography factors relevant to that site as defined in Australian Standard AS1170.2 1989.

This design (N3) is applicable to the combinations of Region, terrain, topography and shielding shown in the following Table. Refer AS4055

REGION	TERRAIN CATEGORY	WIND CLASSIFICATIONS														
		TOPOGRAPHIC CLASSIFICATION														
		T1			T2			T3			T4			T5		
		SHIELDING CLASSIFICATION														
		FS	PS	NS	FS	PS	NS	FS	PS	NS	FS	PS	NS	FS	PS	NS
A	3	N3	N3	N3	N3	N3	N3	N3	N3	N3	N3	N3	N3	N3		
	2.5	N3	N3	N3	N3	N3	N3	N3	N3	N3	N3			N3		
	2	N3	N3	N3	N3	N3	N3	N3	N3		N3					
	1	N3	N3	N3	N3											
B	3	N3	N3	N3	N3	N3	N3	N3	N3		N3					
	2.5	N3	N3	N3	N3	N3		N3								
	2	N3	N3	N3	N3											
	1	N3														

TOPOGRAPHIC MULTIPLIERS: T1 = 1.0, T2 = 1.15, T3 = 1.25, T4 = 1.4, T5 = 1.55

SHIELDING MULTIPLIERS: FS = .085, PS = 0.95, NS = 1.0

06/696/

Some of the sheets refer to openings in external walls and bracing for 2.4m and 2.7m high walls. If a particular wall height is not relevant for a dwelling, sheets for that wall height may be omitted. If verandahs are not attached to dwelling, Sheet 11 may be omitted.

The sheets in this design are:

Sheet 1	Certificate
Sheet 2	General wall framing requirements
* Sheet 3	2.4m wall openings (325mm deep)
* Sheet 4	2.4m wall openings (240 - 290mm deep)
* Sheet 5	2.7m wall openings (600mm deep)
* Sheet 6	2.4m wall bracing
* Sheet 7	2.7m wall bracing
Sheet 8	Roof framing details
Sheet 9	Wall & truss tie down details
Sheet 10	Gable end framing and general details
* Sheet 11	Verandah details

* marks sheets which can be omitted for particular houses which do not have all features.

This design was prepared by W.J. Dalton B.E. MIE (Aust) RPEQ 1490 of W.J. Dalton and Associates Pty Ltd.

W.J. DALTON 2nd November 1994

NU-STEEL HOMES

STEEL FRAMED RESIDENCE - STRUCTURAL DESIGN.
DESIGN- 2400 AND 2700 HIGH WALLS 20 deg. ROOF
TRUSS SPANS - MAX. 12m METAL SHEET ; MAX. 9.0m TILED
REGION A & B ; D.G.W.S.- 41m/sec.
SINGLE OR UPPER LEVEL OF 2 STOREY.

CONSULTING ENGINEERS.
W.J. DALTON & ASSOCIATES pty ltd.,
5/91 LANDSBOROUGH AVENUE,
SCARBOROUGH Q 4020

DRAWN BY C.McKELVEY
DATE: 02/11/1994

DESIGN CHECKED BY
W.J. DALTON B.E. MIE. (AUST).
RPEQ 1490

DESIGN No. N3-S20
SHEET 1 OF 11

A.C.N. 009 725 106
163 INGRAM ROAD, ACACIA RIDGE, 4110
PHONE (07) 344 3199

MATERIAL SPECIFICATION

The major framing materials referred to are to be Zinc-coated (class Z200) or Zincalume coated (class AZ150)

Stiffened Top Plate	450mPa	79x75x1.6mm	
Stud 1.2	300mPa	75x32x1.2mm	Punched or Unpunched
Stud 1.0	550mPa	75x32x1.0mm	Punched or Unpunched
Nogging	300mPa	72x34x1.2mm	Punched or Unpunched
Plate 1.2	300mPa	78x31x1.2mm	Punched or Unpunched
Plate 1.0	550mPa	78x31x1.0mm	Punched or Unpunched
Trim Angle	300mPa	32x32x1.2mm	
Hip Rafter Channel	300mPa	104x35x1.6mm	

WALL FRAMING DESIGN REQUIREMENTS

Table 1. All External Walls and Internal Loadbearing Walls

FRAMING MEMBER	WALL HEIGHT	MATERIAL	SPACING	WELDING
TOP PLATE	2.4m & 2.7m	Stiffened Top Plate	-	-
BOTTOM PLATE	2.4m & 2.7m	Plate 1.0	-	-
STUDS	2.4m	Stud 1.2	600mm max ctrs	55mm each end
	2.7m (supporting trusses to 10.95m)	Stud 1.2	600mm max ctrs	
	2.7m (supporting trusses 11.0m to 12.0m)	Stud 1.2	500mm max ctrs	
NOGGING	-	Nogging	wall centre	50mm each end

Table 2. Internal Non-loadbearing Walls

FRAMING MEMBER	MATERIAL	SPACING	WELDING
TOP PLATE	Plate 1.0	-	-
BOTTOM PLATE	Plate 1.0	-	-
STUDS (Punched)	*Stud 1.0	600mm max ctrs	55mm each end
NOGGING	Nogging	40mm below wall centre	50mm each end

* Stud 1.2 required as vertical stud each end of bracing bay.

Table 3. Stud Configurations Beside Openings

		NO. OF STUDS REQUIRED Refer Tables 7, 8, and 9.			
		1	2	3	4
STANDARD (Using Stud Material)					
ALTERNATIVES	Using STUD & NOGGING	-	 or 	or 	
	RHS (Grade 350mPa)	-		 75x50x3.0	75x75x3.0

TIE DOWN REQUIREMENTS

Table 4. Hold Down Bolts to External Loadbearing Walls (Refer Diagrams 1, 2)

LOCATION OF BOLTS	TYPE OF BOLT		MAXIMUM DISTANCE FROM STUD FACE
	FIXING TO CONCRETE SLAB	FIXING TO NU-STEEL FLOOR SYSTEM	
At sides of openings (Table 7,8,9) At ends of braces (Table 12) Elsewhere at 1200mm max ctrs	M10 x 125mm (grade 8.8) cranked, zinc plated, cast 100mm into slab with a 32mm dia x 2mm washer	M10 x 50mm (grade 8.8) bolt with 2/ 32mm dia x 2mm washer	50mm

Table 5. Hold Down Bolts to Internal Non-Loadbearing Walls (Refer Diagram 2)

LOCATION OF BOLTS	TYPE OF BOLT		MAXIMUM DISTANCE FROM STUD FACE
	FIXING TO CONCRETE SLAB	FIXING TO NU-STEEL FLOOR SYSTEM	
At ends of braces (Table 13)	Minimum M16 x 64mm expanding anchor eg. Ramset Dynabolt	M10 x 50mm (grade 8.8) bolt with 32mm dia. 2mm washer	50mm
1 at each side of openings Elsewhere at 1200mm max ctrs	Minimum M6 x 25mm expanding anchor OR Power Actuated Drive Pin eg Ramset PT32745A or 2327-1144D	No. 14x20 Hex head self drilling screw into 22mm flooring	50mm

WALL FRAME CONNECTIONS

Table 6. Wall Connections

1. **T Intersections** - 2/No. 10x16mm Hex Head self drilling screws - at top & bottom plate & nogging rail
2. **External Corners** - 9/No. 10x16mm Hex Head self drilling screws - one at top & bottom plates and remainder equally spaced.
3. **Internal corners** - 5/No. 10x16mm Hex Head self drilling screws - one at top & bottom plates and remainder equally spaced.
4. **Butt Intersections** - 10/No. 10x16mm Hex Head self drilling screws - two at top & bottom plates and remainder equally spaced in pairs.
5. **Internal Bracing Walls abutting external walls** - end stud fixed to a nogging in external wall, 120mm down from top plate, with 1/M10x25mm (grade 8.8) bolt nut and 2/32mm dia. x 2mm washers. (Refer Diagram 4).
6. **Internal Bracing Walls not abutting external walls** - blocking pieces fixed to top of internal wall either side of truss or nogging between trusses (Refer to Diagrams 11, 12).
7. **One Hold Down Bolt** is required on one side only of external wall frame butt joins.

NU-STEEL HOMES

STEEL FRAMED RESIDENCE- STRUCTURAL DESIGN.
DESIGN- 2400 AND 2700 HIGH WALLS 20 deg. ROOF
TRUSS SPANS-MAX. 12m METAL SHEET ; MAX. 9.0m TILED
REGION A & B ; D.G.W.S.- 41m/sec.
SINGLE OR UPPER LEVEL OF 2 STOREY.

CONSULTING ENGINEERS.
W.J.DALTON & ASSOCIATES pty. ltd.,
5/91 LANDSBOROUGH AVENUE,
SCARBOROUGH Q. 4020

DRAWN BY C.McKELVEY
DATE: 02/11/1994

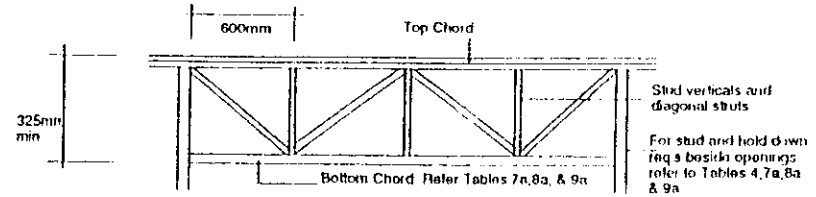
DESIGN CHECKED BY
W.J.DALTON B.E. MIE. (AUST)
RPEQ. 1490

DESIGN No. N3-S20
SHEET 2 OF 11

OPENINGS IN LOADBEARING WALLS - HEAD DEPTH - 325mm (FOR 2.4m WALLS)

Note: These heads may be used in 2.7m walls but for studs each side of openings refer to 600mm heads (Sheet 5)

For All Openings
Top Chord = Stiffened Top Plate Sill = Plate Head & Sill Stud/Strut = Stud at 600mm centres



BOTTOM CHORD OF HEAD

Head Type		Head Type	
A	Plate	D	75 x 75 x 3.0 mm RHS G350
B	Stiffened Plate	E	75 x 75 x 3.5 mm RHS G350
C	Plate nested into stiffened plate	F	75 x 75 x 4.0 mm RHS G350

HEAD OVER OPENINGS SELECTION TABLES

Tables 7a, 8a, and 9a define maximum truss spans capable of being supported by each Head Type. The tables also define number of studs and hold down bolts beside openings.
Table 8a applies to heads for wide openings where the bottom chord can be stabilised by tying the head to the tail of trusses (see Diagram 5). The maximum distance between support points is half the width of the opening.
Table 9a is applicable to wide openings which are not subjected to any lateral load. This is the case for heads over garage doors, porch heads and internal walls supporting trusses.

Table 7a. Standard Heads - used for all window openings and door openings (other than garage)

HEAD TYPE	UP TO 1300 mm	1301 - 1900 mm	1901 - 2200 mm	2201 - 2500 mm	2501 - 2800 mm	2801 - 3100 mm	3101 - 3700 mm
A	12.0m	12.0m	11.4m	8.8m	N/A	N/A	N/A
B			12.0m	12.0m	6.2m	3.8m	N/A
C					12.0m	7.5m	3.0m
D						12.0m	10.6m
E							12.0m
F							12.0m
STUDS EACH SIDE	1	2	2	2	2	3	3
BOLTS EACH SIDE	1	1	1	1	1	1	1

Table 8a. Heads - Tied to Truss Tails for window and door heads. (Refer Diagram 5)

HEAD TYPE	2501-2800mm	2801-3100mm	3101-3700mm	3701-4800mm
A	8.6m	7.8m	6.0m	N/A
B	10.2m	9.9mm	9.0m	7.1m
C	12.0m	12.0m	9.6m	8.1m
D			12.0m	12.0m
STUDS EACH SIDE #	2	3	3	4
BOLTS EACH SIDE	1	1	1	2**

Table 9a. Heads - No Lateral Loads

HEAD TYPE	2501-2800mm	2801-3100mm	3101-3700mm	3701-4800mm
A	6.3m	4.6m	3.0m	N/A
B	11.2m	8.4m	5.2m	2.5m
C	12.0m	12.0m	8.6m	4.3m
D			12.0m	8.6m
E				9.6m
F				10.6m
STUDS EACH SIDE #	2	3	3	4
BOLTS EACH SIDE	1	1	1	2**

** For truss spans less than 9.7m use 1 bolt
# 2 studs only for openings in internal walls supporting trusses

WELDING REQUIREMENTS

Table 10 gives weld length requirements for openings. To achieve required weld length for first diagonal from jamb stud on wide openings a 1.2mm thick gusset plate may be needed for required weld length greater than 115mm. (Refer Diagram 9.)

Table 10a. Welding (mm) required each end of Jamb Studs

No. of Studs Required	1	2	3	4
Welding (mm)	55	75	100	100

Table 10b. Welding (mm) required each end of:

Welding each end of	Length (mm)
Bottom Chord of Head	60
Sill	60
Verticals in Head	60
Diagonals other than first from each end	75

Table 10c. Welding First Diagonal from Jamb Stud

MAXIMUM TRUSS SPAN	WELDING EACH END OF FIRST DIAGONAL				
	OPENING WIDTH				
	UP TO 1900	1901 TO 2500	2501 TO 3100	3101 TO 3700	3701 TO 4800
6m	75	75	75	90	115
7.5m	75	85	115	135*	170*
9.0m	75	115	150*	180*	230*

* May require gussel plate (Refer Diagram 9)

NU-STEEL HOMES

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TRUSS SPANS-MAX. 12m METAL SHEET ; MAX. 9.0m TILED
REGION A & B ; D.G.W.S.- 41m/sec.
SINGLE OR UPPER LEVEL OF 2 STOREY.

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SHEET 3 OF 11

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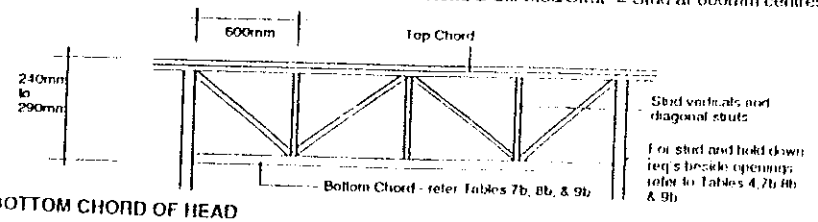
OPENINGS IN LOADBEARING WALLS - HEAD DEPTH 240mm - 290mm FOR 2.4m WALLS

Note: These heads may be used in 2.7m walls but for studs each side of openings refer to 600mm heads (Sheet 5).

For All Openings

Top Chord = Stiffened Top Plate Sill = Plate Head & Sill Stud/Strut = Stud at 600mm centres



BOTTOM CHORD OF HEAD

Head Type

A	Plate	
B	Stiffened Plate	
C	Plate nested into stiffened plate	

Head Type

D	75 x 75 x 3.0 mm RHS G350	
E	75 x 75 x 3.5 mm RHS G350	
F	75 x 75 x 4.0 mm RHS G350	

HEAD OVER OPENINGS SELECTION TABLES

Tables 7b, 8b, and 9b define maximum truss spans capable of being supported by each Head Type. The tables also define number of studs and hold down bolts beside openings.

Table 8b applies to heads for wide openings where the bottom chord can be stabilised by tying the head to the tail of trusses (see Diagram 5). The maximum distance between support points is half the width of the opening.

Table 9b is applicable to wide openings which are not subjected to any lateral load. This is the case for heads over garage doors, porch heads and internal walls supporting trusses.

Table 7b. Standard Heads - used for all window openings and door openings (other than garage)

HEAD TYPE	UP TO 1300 mm	1301 - 1900 mm	1901 - 2200 mm	2201 - 2500 mm	2501 - 2800 mm	2801 - 3100 mm	3101 - 3700 mm
A	12.0m	9.4m	8.0mm	6.2m	N/A	N/A	N/A
B		12.0m	12.0m	10.8m	4.2m	2.6m	N/A
C				12.0m	7.7m	5.0m	N/A
D					12.0m	12.0m	7.1mm
E							8.5m
F							9.9mm
STUDS EACH SIDE	1	2	2	2	2	3	3
BOLTS EACH SIDE	1	1	1	1	1	1	1

Table 8b. Heads - Tied to Truss Tails for window and door heads. (Refer Diagram 5)

HEAD TYPE	2501-2800mm	2801-3100mm	3101-3700mm	3701-4800mm
A	8.6m	7.8m	6.0m	N/A
B	10.2m	9.9mm	9.0m	7.1m
C	12.0m	10.5m	9.6m	8.1m
D		12.0	12.0m	12.0m
STUDS EACH SIDE	2	3	3	4
BOLTS EACH SIDE	1	1	1	2**

Table 9b. Heads - No Lateral Loads

HEAD TYPE	2501-2800mm	2801-3100mm	3101-3700mm	3701-4800mm
A	4.5m	3.4m	2.0m	N/A
B	7.6m	5.7m	3.5m	N/A
C	12.0m	9.4m	5.9m	3.0m
D		12.0m	12.0m	5.8m
E				6.4m
F				7.2m
STUDS EACH SIDE #	2	3	3	4
BOLTS EACH SIDE	1	1	1	2**

** For truss spans less than 9.7m use 1 bolt

2 studs only for openings in internal walls supporting trusses

WELDING REQUIREMENTS

Table 10 gives weld length requirements for openings. To achieve required weld length for first diagonal from jamb stud on wide openings a 1.2mm thick gusset plate may be needed for required weld length greater than 115mm. (Refer Diagram 9.)

Table 10d. Welding (mm) required each end of Jamb Studs

No. of Studs Required	1	2	3	4
Welding (mm)	55	75	100	100

Table 10e. Welding (mm) required each end of:

Welding each end of	Length (mm)
Bottom Chord of Head	60
Sill	60
Verticals in Head	60
Diagonals other than first from each end	75

Table 10f. Welding First Diagonal from Jamb Stud

MAXIMUM TRUSS SPAN	WELDING EACH END OF FIRST DIAGONAL				
	OPENING WIDTH				
	UP TO 1900	1901 TO 2500	2501 TO 3100	3101 TO 3700	3701 TO 4800
6m	75	75	75	90	115
7.5m	75	85	115	135*	170*
9.0m	75	115	150*	180*	230*

* May require gusset plate (Refer Diagram 9)

NU-STEEL HOMES

STEEL FRAMED RESIDENCE- STRUCTURAL DESIGN.
DESIGN- 2400 AND 2700 HIGH WALLS 20 deg. ROOF
TRUSS SPANS-MAX. 12m METAL SHEET ; MAX. 9.0m TILED
REGION A & B ; D.G.W.S.- 41m/sec.
SINGLE OR UPPER LEVEL OF 2 STOREY.

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SHEET 4 OF 11

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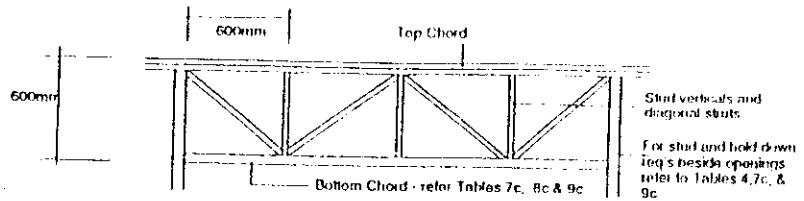
OPENINGS IN LOADBEARING WALLS - HEAD DEPTH 600mm for 2.7m WALLS

For All Openings

Top Chord = Stiffened Top Plate Sill = Plate Head & Sill Stud/Strut = Stud at 600mm centres



BOTTOM CHORD OF HEAD

Head Type

A	Plate	D	75 x 75 x 3.0 mm RHS G350
B	Stiffened Plate	E	75 x 75 x 3.5 mm RHS G350
C	Plate nested into stiffened plate	F	75 x 75 x 4.0 mm RHS G350

HEAD OVER OPENINGS SELECTION TABLES

Tables 7c, and 9c define maximum truss spans capable of being supported by each Head Type. The tables also define number of studs and hold down bolts beside openings.
Table 8c applies to heads for wide openings where the bottom chord can be stabilised by tying the head to the tail of trusses (see Diagram 5). The maximum distance between support points is half the width of the opening. (Not Applicable)
Table 9c is applicable to wide openings which are not subjected to any lateral load. This is the case for heads over garage doors, porch heads and internal walls supporting trusses.

Table 7c. Standard Heads - used for all window openings and door openings (other than garage)

HEAD TYPE	UP TO 650	651 - 1600 mm	1601 - 1900 mm	1901 - 2500 mm	2501 - 2800 mm	2801 - 3100 mm	3101 - 3700 mm
A	12.0m	12.0m	12.0m	12.0m	N/A	N/A	N/A
B					12.0m	7.8m	2.9m
C						12.0m	6.3m
D							12.0m
STUDS EACH SIDE	1	2	3*	3	3	3	4
BOLTS EACH SIDE	1	1	1	1	1	1	1

* May be reduced by 1 stud for truss spans less than 9.2m.

Table 9c. Heads - No Lateral Loads

NOTE: There is no Table 8c for 2.7m walls

HEAD TYPE	2501-2800mm	2801-3100mm	3101-3700mm	3701-4800mm
A	12.0m	9.4m	5.8m	2.8m
B		12.0m	10.6m	5.2m
C			12.0m	9.0m
D				12.0m
STUDS EACH SIDE #	3	3	4	5 or 75x75x3 RHS
BOLTS EACH SIDE	1	1	1	2**

** For truss spans less than 9.7m use 1 bolt
\# 2 studs only for openings in internal walls supporting trusses

WELDING REQUIREMENTS

Table 10 gives weld length requirements for openings. To achieve required weld length for first diagonal from jamb stud on wide openings a 1.2mm thick gusset plate may be needed for required weld length greater than 115mm. (Refer Diagram 9.)

Table 10g. Welding (mm) required each end of Jamb Studs

No. of Studs Required	1	2	3	4
Welding (mm)	55	75	100	100

Table 10h. Welding (mm) required each end of:

Welding each end of	Length (mm)
Bottom Chord of Head	60
Sill	60
Verticals in Head	60
Diagonals other than first from each end	60

Table 10i. Welding First Diagonal from Jamb Stud

MAXIMUM TRUSS SPAN	WELDING EACH END OF FIRST DIAGONAL			
	OPENING WIDTH			
	UP TO 2500	2501 TO 3100	3101 TO 3700	3701 TO 4800
6m	60	60	60	60
7.5m	60	60	75	100
9.0m	60	75	100	125

* May require gusset plate (Refer Diagram 9)

NU-STEEL HOMES

STEEL FRAMED RESIDENCE - STRUCTURAL DESIGN.
DESIGN - 2400 AND 2700 HIGH WALLS 20 deg. ROOF
TRUSS SPANS - MAX. 12m METAL SHEET ; MAX. 9.0m TILED
REGION A & B ; D.G.W.S. - 41m/sec.
SINGLE OR UPPER LEVEL OF 2 STOREY.

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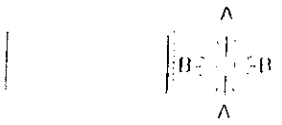
Table 11a . Wind Forces to be Resisted by Wall Bracing - to Resist wind in Direction A & B.
Figures from Australian Domestic Construction Manual (A D C M)have been reduced by 9% for 2 4m high walls and interpolation has been used



HOUSE WIDTH	WALL BRACING REQUIREMENTS DIRECTION A kN PER METRE	DIRECTION B GABLE TOTAL kN	DIRECTION B HIP TOTAL kN
2.4m	1.5	6.5	6.1
3.0m	1.5	6.5	6.1
3.6m	1.5	6.5	6.1
4.2m	1.5	7.4	6.8
4.8m	1.5	8.9	8.0
5.4m	1.6	10.4	9.1
6.0m	1.7	11.9	10.2
6.6m	1.8	13.5	11.5
7.2m	1.9	15.2	12.8
7.8m	2.0	17.0	14.2
8.4m	2.1	19.1	15.7
9.0m	2.1	21.3	17.3
9.6m	2.1	23.7	19.0
10.2m	2.2	26.1	20.6
10.8m	2.3	28.6	22.2
11.4m	2.3	31.3	23.8
12.0m	2.4	34.1	25.6

NOTES:

1. Figure 1 "Spacing of Structural Bracing Walls" indicates the maximum spacing allowable for structural wall bracing to resist wind blowing from either Direction A or B
2. Structural bracing must be selected from Tables 12a & 13a to provide at least 40% of the requirements of Table 11a in both directions. Structural bracing must be located at external walls and evenly spaced across the house. At least one structural brace is required in or close to each external wall (As per A D C M)
3. Nominal bracing walls being walls sheeted with plasterboard or fibrous cement sheets can be used to provide a maximum of 60% of totals required in Table 11a in both directions. Walls sheeted one side = 0.3kN/m, walls sheeted both sides = 0.5kN/m (As per A D C M)
4. Totals given in Table 11a represent wall bracing requirements for given widths of houses, for single level or upper level of 2 storey houses

Table 12a. External Wall Structural Braces

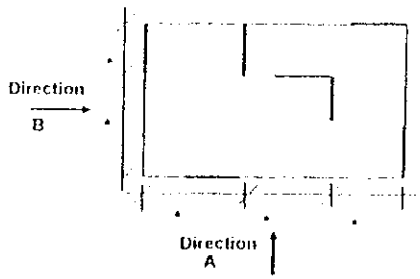
BRACE TYPE	CONFIGURATION	MATERIAL	DIMENSIONS HEIGHT	DIMENSIONS WIDTH	H.D. BOLTS AT EACH END	DESIGN STRENGTH
A		32 x 1.2mm TENSIONED STRAP	2450mm	1200mm	1	3.46 kN
B		75 x 32 x 1.2mm PUNCHED STUD	2450mm	B1 450mm	1	1.8kN
				B2 600mm		2.37kN
C		75 x 32 x 1.2mm PUNCHED STUD	2450mm	C1 900mm	1	3.15kN
				C2 1200mm		3.78 kN
D	OPENING	75 x 32 x 1.2mm PUNCHED STUD	2450mm	D1 900mm	1	2.4kN
				D2 1200mm		2.9 kN

Table 13a. Internal Wall Structural Braces

BRACE TYPE	CONFIGURATION	MATERIAL	DIMENSIONS HEIGHT	DIMENSIONS WIDTH	H.D. BOLTS AT EACH END	DESIGN STRENGTH
X		32 x 1.2 mm TENSIONED STRAP	2400mm	1800mm	1	4.64 kN
Y		32 X 1.2 mm TENSIONED STRAP	2400mm	1200mm	1	3.46 kN
Z		75 x 32 x 1.2 mm PUNCHED STUD	2400mm	1200mm	1	3.78 kN

Note: Studs and diagonals to bracing panels to be 1.2mm material

Figure 1. Spacing of Structural Bracing Walls



NOTE: To achieve the values the area above the lining must be glued or screwed to the diagonal member at midspan

Spacing between bracing walls (9.0m maximum spacing)

Structural bracing walls

Wind Direction

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STEEL FRAMED RESIDENCE- STRUCTURAL DESIGN.
DESIGN- 2400 AND 2700 HIGH WALLS 20 deg. ROOF
TRUSS SPANS-MAX. 12m METAL SHEET ; MAX. 9.0m TILED
REGION A & B ; D.G.W.S.- 41m/sec.
SINGLE OR UPPER LEVEL OF 2 STOREY.

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Table 11b. Wind Forces to be Resisted by Wall Bracing - to Resist Wind in Direction A & B. (2.7m Walls) Figures from Australian Domestic Construction Manual (A.D.C.M.)

HOUSE WIDTH	WALL BRACING REQUIREMENTS		
	DIRECTION A kN PER METRE	DIRECTION B GABLE TOTAL kN	DIRECTION B EBP TOTAL kN
2.4m	1.7	7.2	6.8
3.0m	1.7	7.2	6.8
3.6m	1.7	7.2	6.8
4.2m	1.7	8.1	7.5
4.8m	1.7	9.8	8.7
5.4m	1.8	11.4	10.0
6.0m	1.8	13.0	11.3
6.6m	2.0	14.9	12.6
7.2m	2.1	16.7	14.1
7.8m	2.2	18.6	15.6
8.4m	2.2	21.0	17.3
9.0m	2.3	23.5	19.1
9.6m	2.3	26.0	20.9
10.2m	2.4	28.7	22.6
10.8m	2.5	31.5	24.4
11.4m	2.6	34.5	26.2
12.0m	2.6	37.5	28.1

NOTES:

1. Figure 1 "Spacing of Structural Bracing Walls" indicates the maximum spacing allowable for structural wall bracing to resist wind blowing from either Direction A or B.
2. Structural bracing must be selected from Tables 12b & 13b to provide at least 40% of the requirements of Table 11b in both directions. Structural bracing must be located at external walls and evenly spaced across the house. At least one structural brace is required in or close to each external wall. (As per A.D.C.M.)
3. Nominal bracing walls being walls sheeted with plasterboard or fibrous cement sheets can be used to provide a maximum of 60% of totals required in Table 11b in both directions. Walls sheeted one side = 0.3kN/m, walls sheeted both sides = 0.5kN/m (As per A.D.C.M.)
4. Totals given in Table 11b represent wall bracing requirements for given widths of houses, for single level or upper level of 2 storey houses.

Table 12b . External Wall Structural Braces

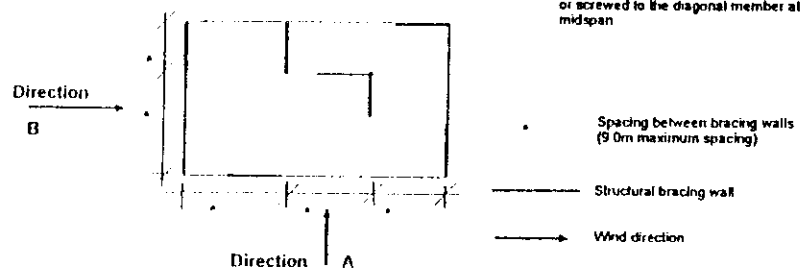
BRACE TYPE	CONFIGURATION	MATERIAL	DIMENSIONS		H.D. BOLTS AT EACH END	DESIGN STRENGTH
			HEIGHT	WIDTH		
A		32 x 1.2mm TENSIONED STRAP	2700mm	1200mm	1	3.14 kN
B		75 x 32 x 1.2mm PUNCHED STUD	2700mm	B1 450mm	1	1.58kN
				B2 600mm		2.1kN
C		75 x 32 x 1.2mm PUNCHED STUD	2700mm	C1 900mm	1	2.43kN
				C2 1200mm		2.96 kN
D		75 x 32 x 1.2mm PUNCHED STUD	2700mm	D1 900mm	1	1.9kN
				D2 1200mm		2.3 kN

Table 13b. Internal Wall Structural

BRACE TYPE	CONFIGURATION	MATERIAL	DIMENSIONS		H.D. BOLTS AT EACH END	DESIGN STRENGTH
			HEIGHT	WIDTH		
X		32 x 1.2 mm TENSIONED STRAP	2700mm	1800mm	1	4.29 kN
Y		32 X 1.2 mm TENSIONED STRAP	2700mm	1200mm	1	3.14 kN
Z		75 x 32 x 1.2 mm PUNCHED STUD	2700mm	1200mm	1	2.96 kN

Note: Studs and diagonals to bracing panels to be 1.2mm material.

Figure 1. Spacing of Structural Bracing Walls



NOTE: To achieve the values the area above the lining must be glued or screwed to the diagonal member at midspan

STEEL FRAMED RESIDENCE- STRUCTURAL DESIGN.
DESIGN- 2400 AND 2700 HIGH WALLS 20 deg. ROOF TRUSS SPANS-MAX. 12m METAL SHEET ; MAX. 9.0m TILED REGION A & B ; D.G.W.S.- 41m/sec. SINGLE OR UPPER LEVEL OF 2 STOREY.

CONSULTING ENGINEERS.
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ROOF BATTEN SPACINGS (METAL SHEET ROOF)

Batten spacings listed are for use with "Trimdek" Hi-Ten or Custom Orb (TCT 0.47mm only)
ES = END SPAN IS = INTERMEDIATE SPAN

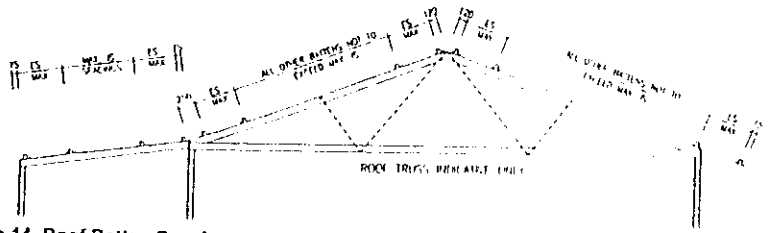


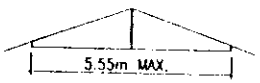
Table 14. Roof Batten Spacings

BATTEN TYPE	ALLOWABLE SPACINGS (mm)		FIXING
	END SPAN (E.S.)	INTERMEDIATE SPAN (I.S.)	
50mm x 0.75m G550	900mm MAX *	1200mm MAX	2/NO. 14 10x20 Hex Head Tek screws at each chord
40mmx0.6mm G550	900mm MAX *	1200mm MAX	

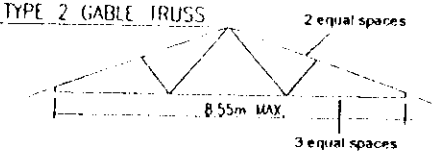
* For truss spans greater than 10m first two batten spacings from apex & gutter are to be considered as end spans.

GABLE ROOF TRUSS CONFIGURATIONS

TYPE 1 GABLE TRUSS



TYPE 2 GABLE TRUSS



Type 1, 2, & 3 Gable Trusses suit tiled roofs, providing trusses are spaced at maximum 0.9m centres. Maximum span to be used with this wall engineering is 9.15m span

TYPE 3 GABLE TRUSS

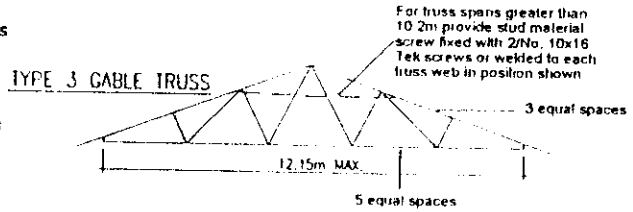


Table 15. Gable Roof Truss Materials

TRUSS TYPE	MAX. SPAN	TRUSS CHORDS	TOP CHORD PITCH	TRUSS WEBS
1	5.55m	Z 100 10	20 DEGREES	STUD
2	8.55m	Z 100 10	20 DEGREES	STUD
3	12.15m	Z 100 10	20 DEGREES	STUD

TRUSS WELDING

Table 16. Gable Truss Welding - All Truss Types

1. Apex Joint - Fully weld flanges and web from one side (approximately 240mm weld).
2. Knee Joint - Fully weld knee intersection from one side (approximately 200mm weld).
3. Truss Bracket - 1. Weld sides of "U" bracket onto rafter (approximately 2 x 60mm of weld).
   2. Weld horizontal stiffener to rafter with 3 x 30mm of weld.
4. All Webs - 60mm of weld each end.

ROOF SHEET FIXING

Table 17. Fixing of Steel Sheet Roof

SHEETING	ROOF SCREW (with neo washer)	No. OF FASTENERS PER SHEET FOR EACH SUPPORT	
		END SUPPORTS & LAPS	INTERNAL SUPPORTS
Trimdek Hi-Ten (0.47 TCT)	12-11x45mm Hex Tek OR 12-11x50mm Type 17	4	4
Custom Orb (0.47 TCT)	12-14x35mm Hex Tek OR 12-11x40mm Type 17	5	3

GABLE END FRAMES AND END WALLS

Gable End Frames are bolted at each end into the top plate of the side wall and fixed with 2/No. 10 x16 Tek screws into the top plate of the end wall beside each vertical in the frame. Gable End Roofs require bracing with trim angle (Refer Diagrams 7, 8).

Table 18. Member Selection Table Gable End Frames

GABLE END	TOP CHORD OF FRAME	BOTTOM CHORD OF FRAME	TOP PLATE OF END WALL	VERTICAL MEMBERS OF FRAME
FLUSH	Plate	Plate	Plate	Stud (60mm weld)
OVERHANG (600mm Max)	Stiffened Plate	Plate	Stiffened Plate	Stud (60mm weld)

A 600mm roof overhang of gable end frame requires an outrigger from the last truss, which cantilevers over the gable frame.

Table 19. Gable Overhang Outrigger (Metal Sheet Roof Only) (Refer Diagram10).

ROOF BATTEN USED	OUTRIGGER
50mm high	Nested 50mm battens OR 50x50x1.6 G350 SHS
40mm high	Nested 40mm battens with stud binder OR 40x40x1.6 G350 SHS

NU-STEEL HOMES

STEEL FRAMED RESIDENCE- STRUCTURAL DESIGN.
DESIGN- 2400 AND 2700 HIGH WALLS 20 deg. ROOF
TRUSS SPANS-MAX. 12m METAL SHEET ; MAX. 9.0m TILED
REGION A & B ; D.G.W.S.- 41m/sec.
SINGLE OR UPPER LEVEL OF 2 STOREY.

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PHONE (07) 344 3199

DIAGRAM 1. TYPICAL BRICK VENEER DETAIL

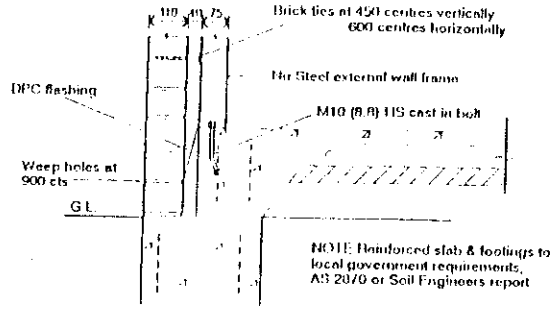


DIAGRAM 2. TYPICAL HARDIPLANK CLADDING DETAIL

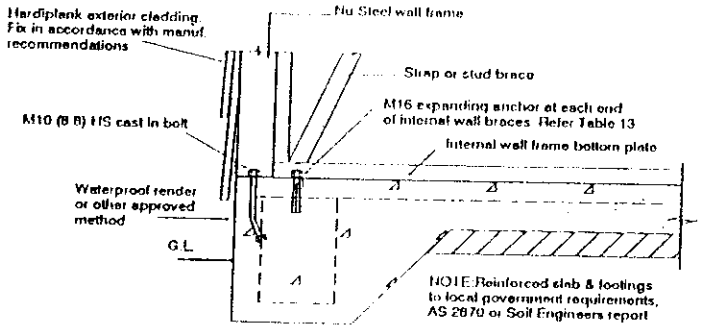


DIAGRAM 3. TYPICAL INTERNAL LOADBEARING (ROOF) WALL TO SLAB DETAIL

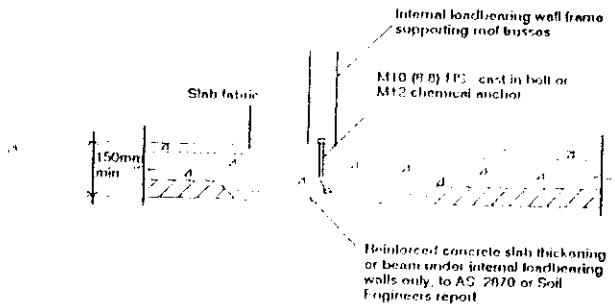


DIAGRAM 4. TYPICAL TRUSS WALL DETAIL

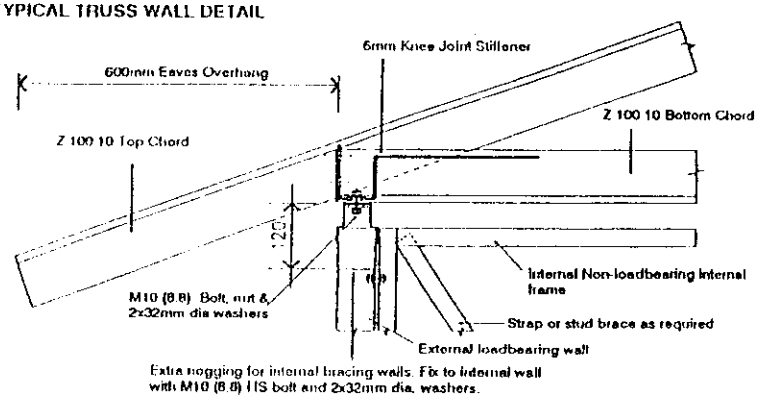


DIAGRAM 5 . TYING HEAD TO TRUSS TAIL DETAIL

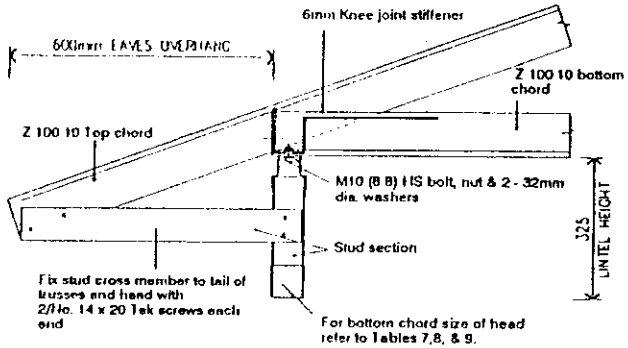
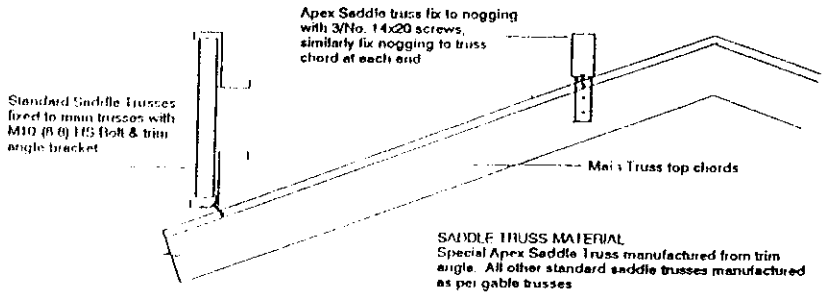


DIAGRAM 6. TYPICAL SADDLE TRUSS TO MAIN TRUSS CONNECTION TO FORM L SHAPED ROOF



NU-STEEL HOMES

STEEL FRAMED RESIDENCE- STRUCTURAL DESIGN.
DESIGN- 2400 AND 2700 HIGH WALLS 20 deg. ROOF
TRUSS SPANS-MAX. 12m METAL SHEET ; MAX. 9.0m TILED
REGION A & B ; D.G.W.S.- 41m/sec.
SINGLE OR UPPER LEVEL OF 2 STOREY.

CONSULTING ENGINEERS.
W.J.DALTON & ASSOCIATES pty. ltd.,
5/91 LANDSBOROUGH AVENUE,
SCARBOROUGH Q. 4020.

DRAWN BY: C.McKELVEY
DATE: 02/11/1994

DESIGN CHECKED BY
W.J.DALTON B.E. MIE. (AUST).
RPEQ. 1490.

DESIGN No. N3-S20
SHEET 9 OF 11

DIAGRAM 7. TYPICAL GABLE END FRAME

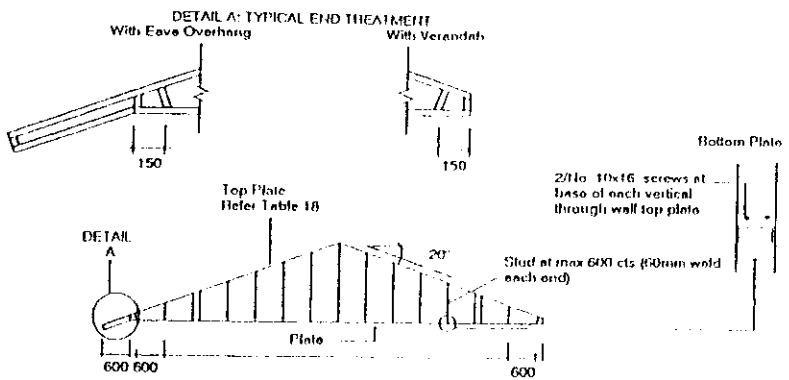


DIAGRAM 8. TYPICAL GABLE ROOF BRACING (AT EACH GABLE END)

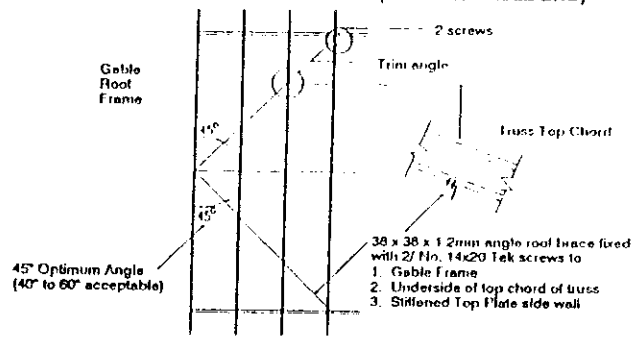
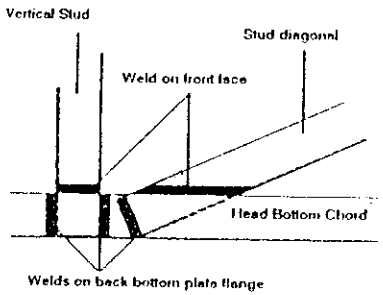


DIAGRAM 9. WELDING OF FIRST DIAGONAL IN HEADS (EACH END)

a) For welding length to 115mm



b) Welding of Gusset Plate

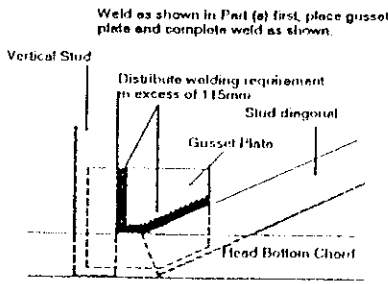
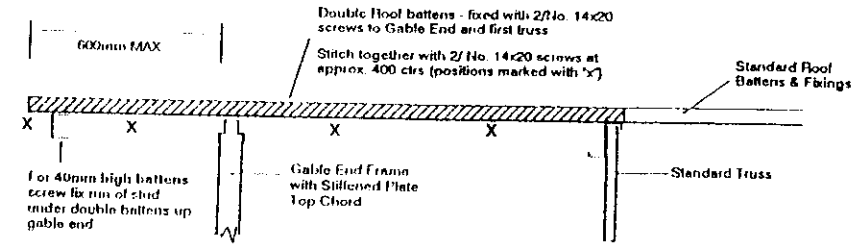


DIAGRAM 10. GABLE OVERHANG

A 600mm max roof overhang of a gable end requires either double battens or Square Hollow Section (SHS) Outriggers as shown below. (Refer Table 19).

a) USING ROOF BATTENS



b) USING SHS OUTRIGGERS

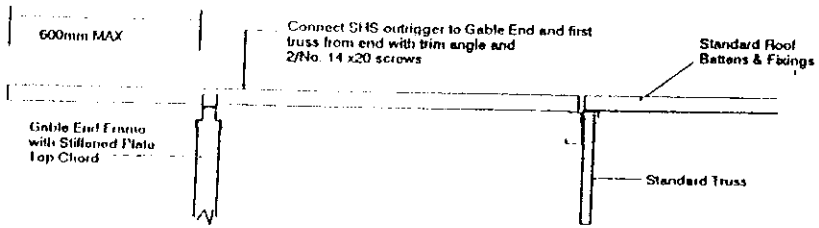
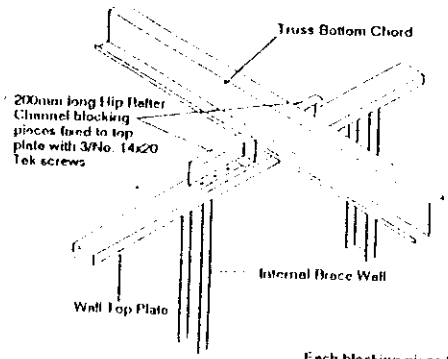


DIAGRAM 11. TYING INTERNAL BRACE WALL AT RIGHT ANGLES TO TRUSSES TO ROOF STRUCTURE

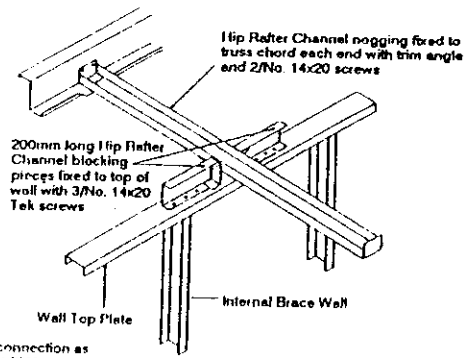
(Only necessary if internal wall does not abut an external wall



Each blocking piece type connection as shown above can transfer 4.7kN

DIAGRAM 12. TYING INTERNAL BRACE WALL PARALLEL TO TRUSSES TO ROOF STRUCTURE

(Only necessary if internal wall does not abut an external wall



NU-STEEL HOMES

STEEL FRAMED RESIDENCE- STRUCTURAL DESIGN.
DESIGN- 2400 AND 2700 HIGH WALLS 20 deg. ROOF
TRUSS SPANS-MAX. 12m METAL SHEET ; MAX. 9.0m TILED
REGION A & B ; D.G.W.S.- 41m/sec.
SINGLE OR UPPER LEVEL OF 2 STOREY.

CONSULTING ENGINEERS.
W.J.DALTON & ASSOCIATES pty. ltd.,
5/91 LANDSBOROUGH AVENUE,
SCARBOROUGH Q. 4020.

DRAWN BY: C.McKELVEY
DATE: 02/11/1994

DESIGN CHECKED BY
W.J.DALTON B.E. MIE. (AUST)
RPEQ. 1490.

DESIGN No. N3-S20
SHEET 10 OF 11

DIAGRAM 13. TYPICAL TRUSS - VERANDAH RAFTER CONNECTION

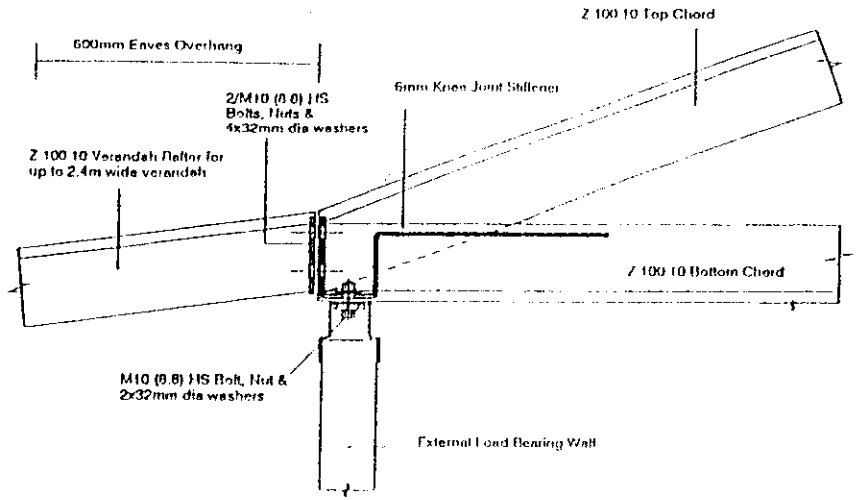


DIAGRAM 14. TYPICAL COLUMN DETAIL

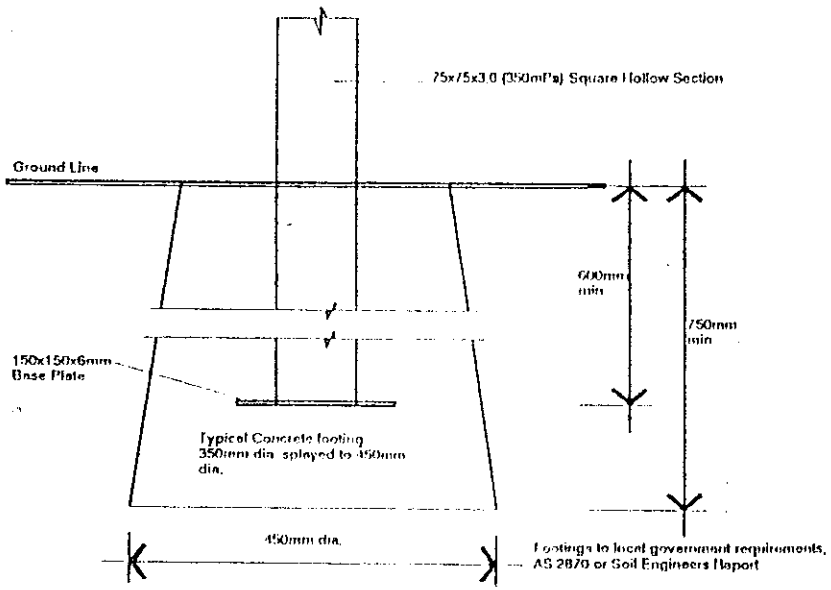
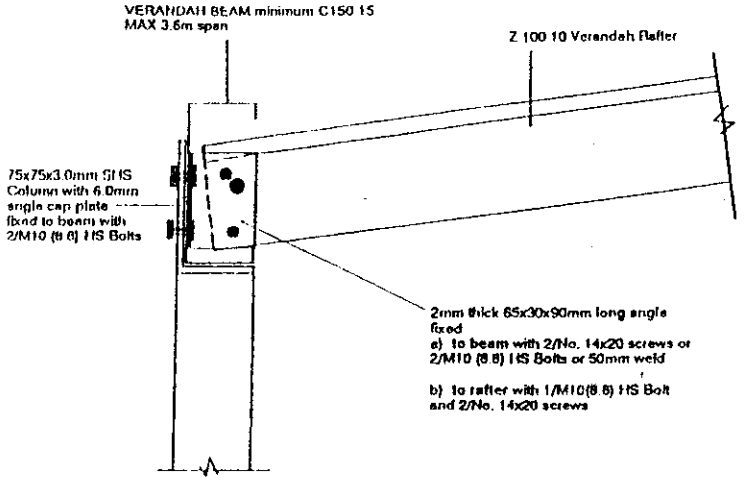
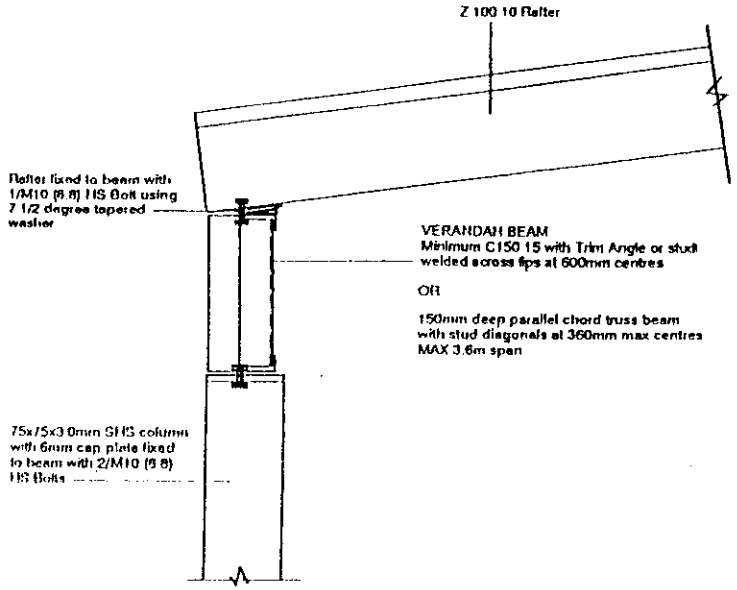


DIAGRAM 15. VERANDAH RAFTER TO BEAM DETAILS

a) Rafter Sleeved Into Beam



b) Rafter on Beam



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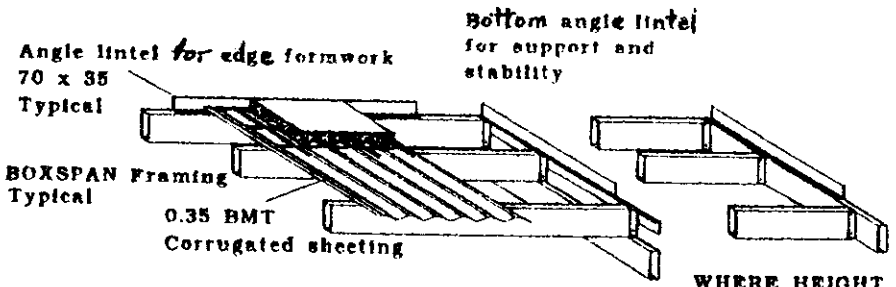
W.J.DALTON B.E. MIE. (AUST)
RPEQ. 1490.

DESIGN No. N3-S20
SHEET 11 OF 11

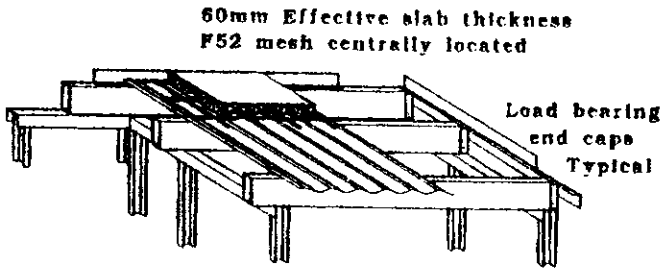
SUSPENDED CONCRETE FLOOR SYSTEM → SUPPORTED ON STEEL FLOOR JOISTS



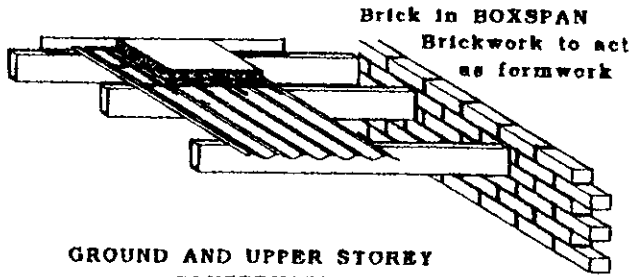
CONVENTIONAL FRAMING
EXTERNAL BEARERS UNDER JOISTS

WHERE HEIGHT IS CRITICAL
EXTERNAL BEARERS IN-LINE
WITH JOISTS

SMART FLOOR IN A SUBFLOOR APPLICATION



STEEL WALL FRAMING SUPPORT



GROUND AND UPPER STOREY
CONSTRUCTION
ALSO SUITABLE FOR MULTI-STOREY
CONSTRUCTION

SMART FLOOR FOR SECOND STOREY IN BRICK VENEER APPLICATION

SMART FLOOR IN FULL MASONARY APPLICATION

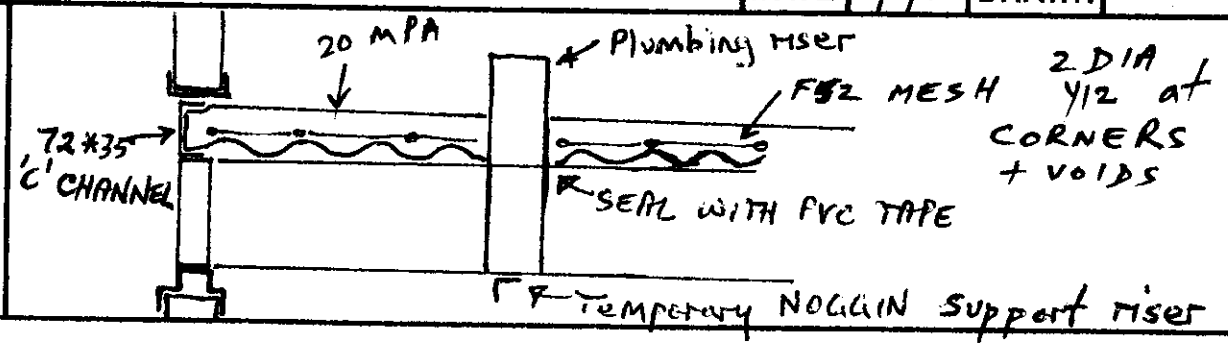
AMENDMENTS | DATE 15/3/96 | DRAWN

NU-STEEL HOMES
CASTLE HILL

19-23 Loftus Street
Riverstone, NSW, 2765

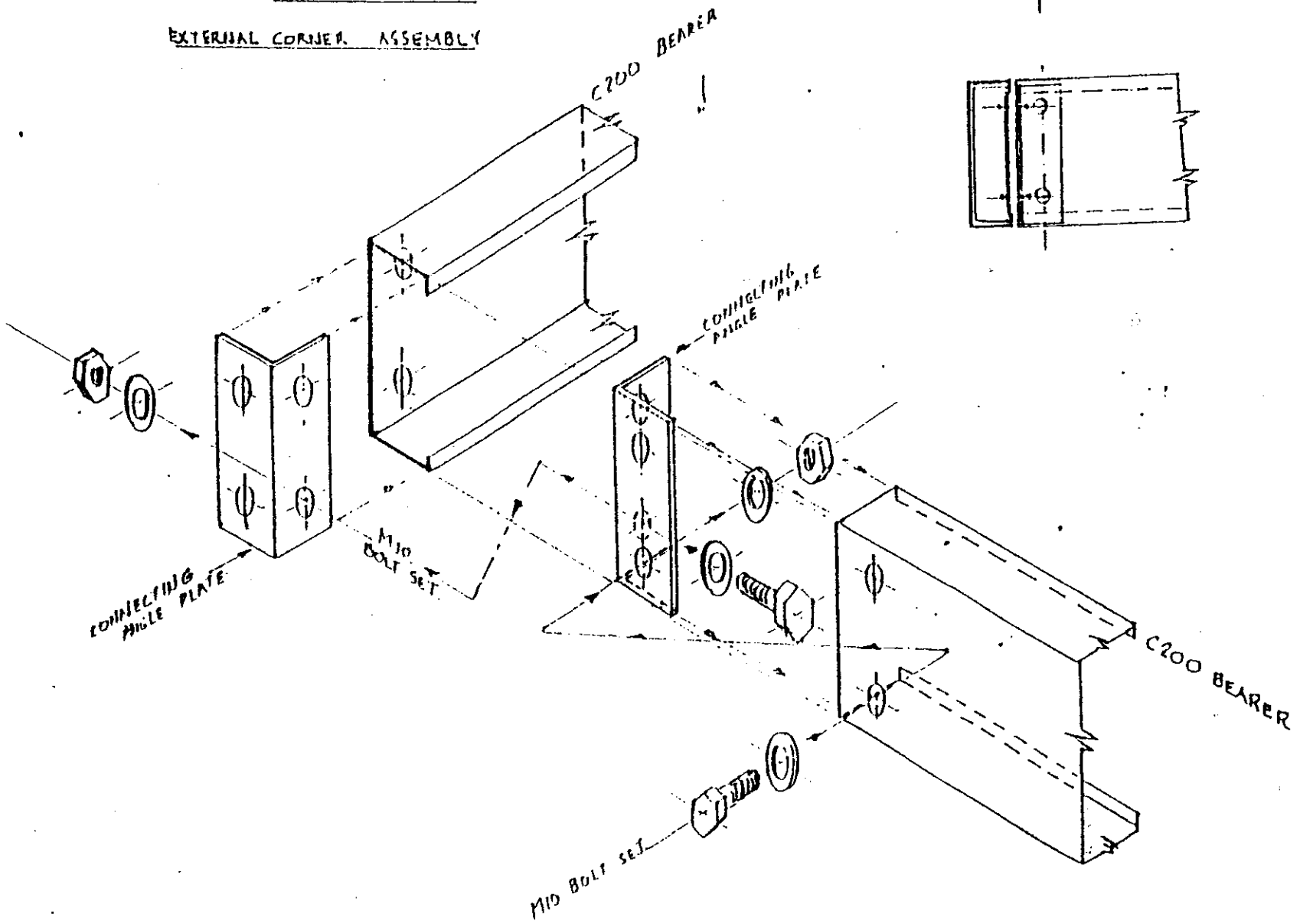
P.O. Box 339
Riverstone, NSW 2765

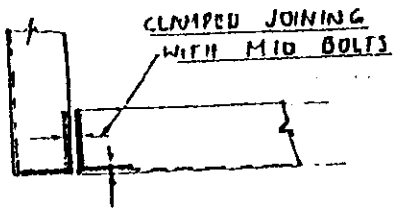
Telephone (02) 627 2322
Facsimile: (02) 627 5727



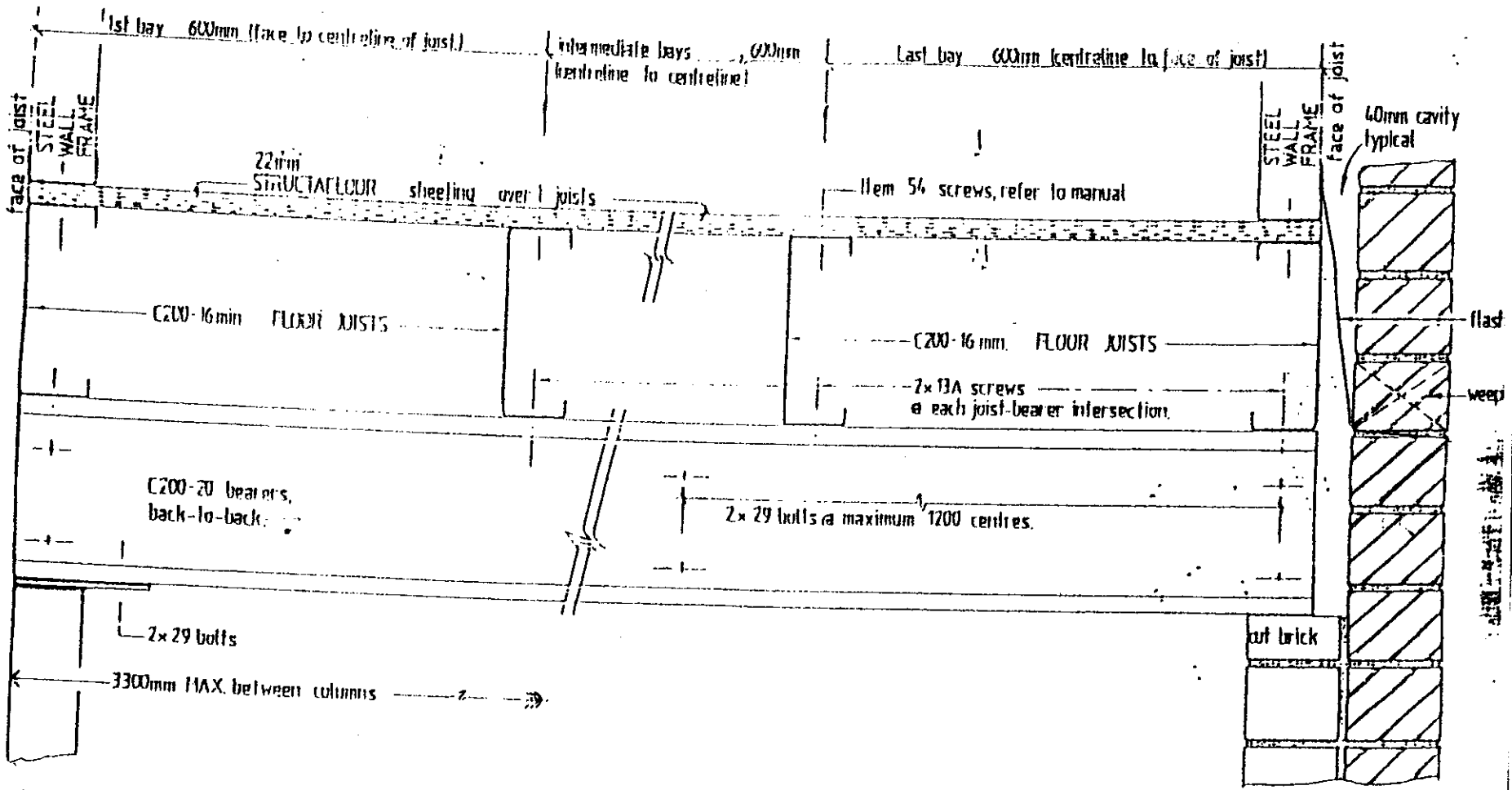
DETAIL . 2.

EXTERNAL CORNER ASSEMBLY





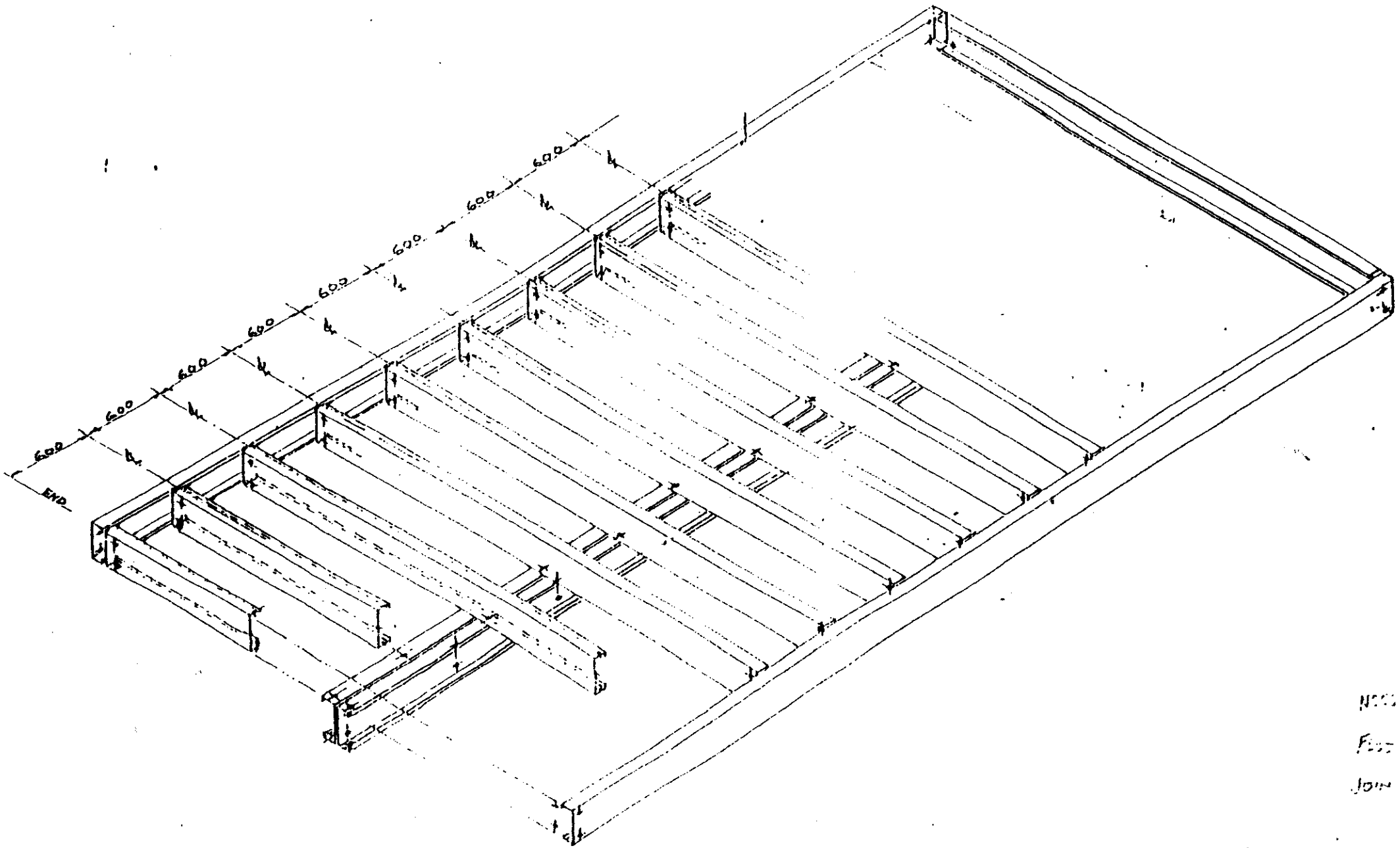
— NOT TO SCALE —



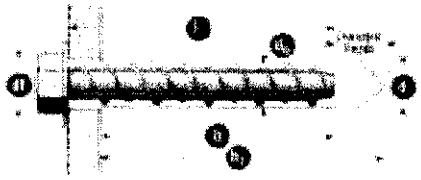
C200 FLOOR SYSTEM

NU-STEEL HOMES

LOTUS STREET RICHESTONE 2765


600
600
600
600
600
600
600
END

ANKASCREW™ ANCHORS

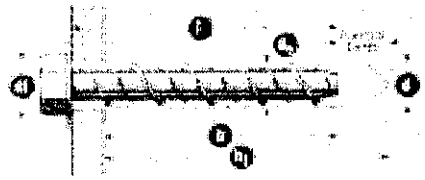


INSTALLATION AND PERFORMANCE DETAILS

d Anchor	Installation		Overdrill	d_f Fixture	Maximum	Minimum	Rec. Working Loads
Size (mm)	d_0 Hole Diameter	**h** Effective Embedment	Depth (mm)	Hole Diameter	Torque (kN)	Edge Distance (mm)	(30 MPa Concrete) Tensile / Shear
6	6	30	10	8	25	50	2.45 / 3.73
8	8	40	15	10	40	60	4.09 / 5.62
10	10	50	20	12	60	70	5.73 / 9.53
12	12	60	25	14	80	80	6.96 / 12.9

Note: Hole depth = Bolt length - fixture thickness + overdrill depth.

ANKASCREW™ ANCHORS



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12	12	60	25	14	80	80	6.96	12.9

Note: Hole depth = Bolt length - fixture thickness + overdrill depth.

ANKASCREW™ ANCHORS

The Ramset ANKASCREW™ is an innovative, Screw-in Masonry anchoring system.

ANKASCREW™ can be used to fasten fixtures and materials to brick, concrete, stone, marble and concrete block.

The Ramset ANKASCREW™ is a self tapping anchor with multi-use capabilities where the thread cuts into the substrate for a positive and safe anchorage.

ANKASCREW™ has many advantages over traditional anchors.

- Quick and easy to install.
- Ideal for close-to-edge fixings because it doesn't rely on expansion in the hole for grip.
- They can be easily removed (perfect for temporary fixing).
- Minimum insertion torque when installing.

Features

- Large outer diameter thread.
- Smaller balancing thread.
- No groove between threads.
- Precision sharp threads.
- Precise thread dimensions.

Benefits

- Deeper penetration into substrate.
- Correct alignment to the hole on insertion.
- Reduced tightening torque.
- Reduced dust clogging between threads.
- Superior performance in soft and hard materials.

Applications

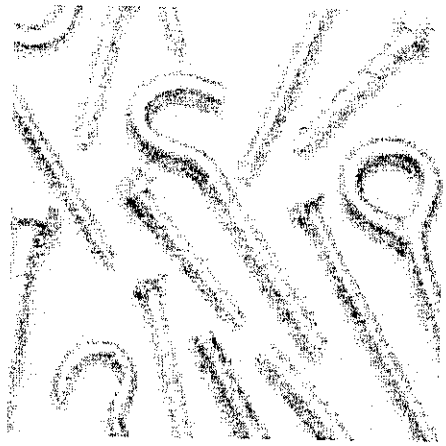
- Anchoring of load bearing angles, beams, columns, etc.
- Anchoring of structural connections.
- Formwork support anchor, 'clean finish' on removal.
- Handrail installations, permanent and temporary.

Materials

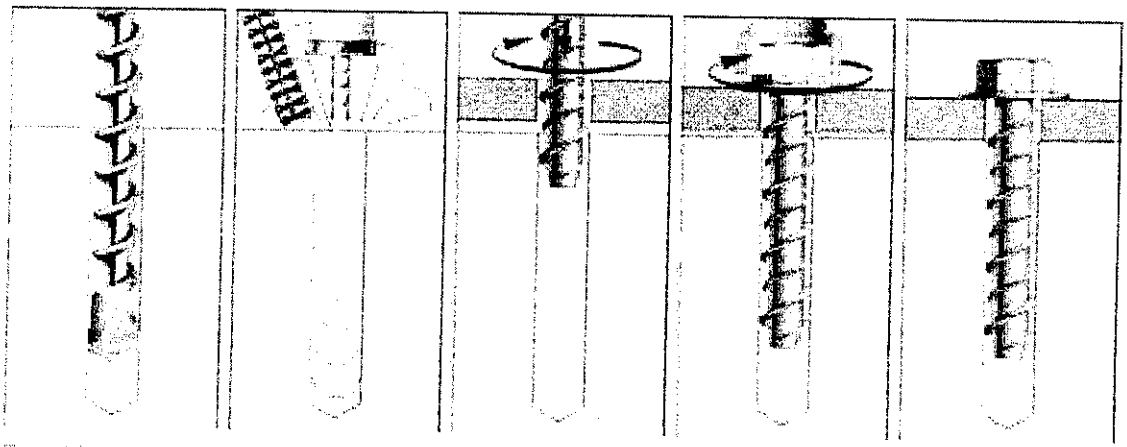
Carbon Steel

Surface Finish

Zinc electroplated with yellow chromate conversion coating.



INSTALLATION



To achieve maximum loads the installation process needs to be carried out as follows.

1. Drill a hole to the correct diameter and depth.
Note:
Hole depth = Bolt length fixture thickness + overdrill depth.

2. Clean hole with a brush and remove debris with vacuum or hand pump.

3. Using a socket wrench, screw the ANKASCREW into the hole exerting a slight downward pressure until the "self-tapping" action starts.

4. Tighten the ANKASCREW. If resistance is experienced whilst tightening, unscrew fastener one turn and re-tighten, ensuring not to overtighten with excessive torque.

5. For optimum performance, a torque wrench should be utilized.

General Housing Specifications

ADDRESS OF PROPERTY: 172 MONA VALE ROAD

INGLESIDE NSW 2101

06/09/01

GENERAL HOUSING SPECIFICATIONS BETWEEN :

OWNER: MRS JOSIE EVERSON

AND

CONTRACTOR:

CONTRACTOR LICENCE NO:

INDEX
GENERAL HOUSING SPECIFICATIONS
(Revised September 2000)

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3.0	Owner's Obligations	2
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14.0	Joinery and Cupboards	10
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1.0 INTRODUCTIONS

1.1 General

This Specification details the works to be executed and the materials to be used in carrying out those works at the Site.

This Specification shall be read as a general specification only. The extent of the works shall be governed by the Approved Plans and Special Details where applicable.

Any works not fully detailed shall, where appropriate, be sufficiently performed if carried out in accordance with applicable Manufacturer's Recommendations or Engineer's Recommendations.

1.2 Preliminary Use

This Specification forms part of the Building Contract Documents, and should be read in conjunction with the Building Agreement, Engineer's Reports, Plans and any other special details.

1.3 Prevailing Documents

Where there is a difference between Plan and Specification the Plan will take precedence. The Contractor must at all times maintain a legible copy of the plans and specification bearing the approval of the appropriate authorities.

1.4 Size and Dimensions

All sizes and dimensions given in this Specification are in millimetres unless otherwise stated and are nominal only.

1.5 Prime Cost Items

Prime cost items listed in this Specification are Contractors cost prices, they do not include Builders margins, cost of cartage and freight. Should any of these items not be required, credit will be made at the listed price in the contract's final progress claim.

1.6 Definitions

"Special Details" in respect of any item or part of the works means any drawings, plans, specifications, calculations or other documents (including Engineer's Recommendations) prepared in order to define or detail the work to be done and the materials to be used.

"Engineer's Recommendations" includes any Soil Classification Report, Preliminary Footing Report, Construction Footing Report and any other Report, Recommendation, site or other instruction, calculations or plans prepared by an Engineer in respect of the Works.

Where the words "Local Authority" are mentioned they shall mean the Local Council, or other Governing Authority, or Private Certifier with Statutory responsibility for the compliance of the work performed.

INITIALS ...../.....

2.0 STATUTORY REQUIREMENTS

2.1 The Works

The Works shall be constructed in accordance with the Building Code of Australia (BCA) Housing Provisions together with any amendment or replacement of the code.

2.2 Regulations, Notices and Fees

The Contractor is to comply with the requirements of all legally constituted authorities having jurisdiction over the Works including the provisions of the Home Building Act.

The Contractor is to give all notices, obtain all Permits and pay all fees required by such authorities.

Where referred to in these specifications, regulations shall mean the Building Regulations and Codes (including the Building Code of Australia, as amended) statutorily enforceable at the time application is made for a permit, consent or approval.

2.3 Insurance

Insurance cover of the Works against risk for Fire, Theft, Malicious Damage and Materials on Site are to be effected by the Contractor at the Contractor's expense. The Contractor shall also at his expense adequately insure Public Liability and arrange Worker's Compensation cover in respect of any liability under the Worker's Compensation Act of New South Wales.

2.4 Labour and Materials

The Contractor is to provide all labour and materials to construct and complete the Building to the stage as specified in the contract documents. Materials to be of the standard specified. Workmanship in each trade to be performed by licensed tradespeople in conformity with adequate building practice. Building materials surplus to requirements of the Works shall be and remain the property of the Contractor.

2.5 Electricity

The Contractor is to make arrangements for any electrical power to be used in the erection of the Works and is to pay fees and costs incurred therein. Should additional poles, wiring, service risers or underground wiring etc., be required by the Electricity Authority, this additional cost plus Builder's margin shall be borne by the Owner.

2.6 Sanitary Accommodation

Prior to the commencement of any Works, unless toilet facilities exist on Site, the Contractor shall provide temporary toilet accommodation for the tradespeople. Where the Authority requires the temporary toilet to be connected to sewer mains, the additional cost plus Builder's margin of such shall be borne by the owner. On completion the Contractor shall remove the convenience.

3.0 OWNER'S OBLIGATIONS

3.1 Surveyor's Certificate

If the Building Agreement so indicates, the Owner shall, at the Owner's expense, obtain a certified survey of the Site. If no survey is required, the Owner hereby certifies that the placement of the existing survey pegs or fences on the Site is correct.

INITIALS ...../.....

3.2 Engineer's Recommendations

If the Building Agreement so indicates, the Owner shall, at the Owner's expense, provide the Contractor with reports and recommendation (including soil classification) as to the foundations and/or footings requirements for the Works prepared by an Engineer.

If the Contractor instructs any party to provide such recommendations, the Contractor does so only as an agent for the Owner.

3.3 Trades Persons Engaged by Owner

The Owner shall not engage or employ any tradesperson, trade-contractor or any other person to work on the Site without the consent of the Contractor which consent may be subject to such terms and conditions as the Contractor may stipulate.

3.4 Items Supplied by Owner

For all items referred to in the Specification to be supplied by the Owner, it is the responsibility of the Owner to arrange payment for delivery of and protection against damage and theft of all these items.

Delivery is to be made when requested by the Builder to the Site. If not available when required the Owner shall be obliged to make an alternative selection.

3.5 Water Supply

The Owner shall, at the Owner's expense, supply adequate water to the Site for construction purposes. Unless otherwise specified, the Contractor shall pay the standard water metre connection fee to the Water Supply Authority providing this service is prelaid to the Site ready for use. The Owner shall be responsible for any fee to be paid in excess of the standard water metre connection fee.

3.6 Sanitation

Unless otherwise specified, the Owner shall, at the Owner's expense, supply sewerage connection riser or common effluent drainage connection riser on the Site. Unless otherwise specified, the Contractor shall pay the standard *sewer* connection fee to the Supply Authority providing this service is to prelaid to the Site and ready for use.

The Owner shall be responsible for any fee to be paid in excess of the Standard sewer connection fee.

3.7 Site Clearance

At the Owner's expense clear only the Site area of building work including vegetation stumps, boulders, rubble and the like to a minimum distance of 1,000mm outside the building or to the boundaries of the allotment, whichever is the less and fill any depressions within the area covered by the building.

4.0 PLANS, PERMITS AND APPLICATION FEES

4.1 Permits and Fees

Unless otherwise agreed, the Contractor shall lodge all necessary application notices, plans and details with the Local Authority for approval prior to commencement of construction.

4.2 Mines Subsidence

In areas affected by mines subsidence the appropriate authority to be consulted and work carried out in accordance with their requirements as a variation, any additional cost plus Builders Margin is to be borne by the Owner.

4.3 Setting Out

The Contractor shall accurately set out the Works in accordance with the Site Plan and within the boundaries of the Site.

5.0 EXCAVATIONS

5.1 Subject to Clause 3.7 the Site covered by the Building and an area at least 1,000mm wide around the Building or to boundaries of the Site – whichever is the lesser, shall be cleared and/or graded as indicated on the Site Works Plan.

Top soil shall be cut to a depth sufficient to remove all vegetation

Excavations for all footings shall be in accordance with the Engineer's Recommendation or Part 3.2.2 BCA Housing Provisions.

6.0 FOUNDATIONS AND FOOTINGS

6.1 Underfloor Fill

Underfloor fill shall be in accordance with AS 2870 or Part 3.2 BCA Housing Provisions.

6.2 Termite Risk Management

Termite treatment shall be carried out in accordance with Part 3.1.3 BCA Housing Provisions or AS 3660.1.

6.3 Vapour Barrier

The underfloor vapour barrier shall be in accordance with AS 2870 or Clause 3.2.2.6 BCA Housing Provisions.

6.4 Reinforcement

Reinforcement shall conform and be placed in accordance with AS 3600, AS 2870 and the Engineer's recommendations.

Support to all reinforcement shall be used to correctly position and avoid any undue displacement of reinforcement during the concrete pour.

6.5 Concrete

Concrete shall not be less than Grade N20 except where otherwise approved by the Engineer.

Structural concrete shall be in accordance with AS 3600. Pre-mixed concrete shall be manufactured in accordance with AS 1379 with delivery dockets kept on Site and available for inspection by the Engineer.

Concrete shall be placed and compacted in accordance with good building practice. In hot (above 30 degrees Celsius) and windy conditions concrete must be cured by covering with plastic sheeting, spraying with a curing compound or pouding of water on the surface, or as directed by the Engineer.

6.6 Footings and Slabs on Ground

Concrete slabs and footings shall not be poured until approval to pour concrete is given by the Engineer or the Local Authority.

NOTE: Bench levels and floor levels on the Site Works Plan shall be regarded as nominal, unless specified otherwise.

INITIALS ...../.....

6.7 Suspended Slabs

All concrete slabs, other than those supported on solid ground or properly compacted filling, shall be constructed as suspended slabs. These slabs shall be constructed in accordance with the Engineer's recommendations.

6.8 Foundation Walls

On footings as previously specified build brick walls to the thickness shown on plan to level underside of floor bearers and/or plates.

6.9 Sub-Floor Ventilation

Provide adequate cross ventilation to the space under suspended ground floor. No section of the under floor area wall to be constructed in such a manner that will hold pockets of still air.

6.10 Sub-Floor Access

Provide access under suspended floors in position where indicated on plan.

6.11 Curing

All slabs shall be cured in accordance with AS 3600.

7.0 RETAINING WALLS

7.1 Retaining Walls

Retaining walls shall be constructed as shown on the plans and/or special details designed by an Engineer and if applicable approved by the Local Authority whether the construction of such shall be the obligation of the Owner or the Contractor.

8.0 EFFLUENT DISPOSAL/DRAINAGE

8.1 In both sewered and unsewered areas, fit bath, wash basin, kitchen, wash tubs, pedestal pan and floor grate to shower recess in positions shown on plan. (Refer to schedule of fittings). Provide waste pipes with traps to the above fittings and connect to the drainage system. The whole of the work to be performed in accordance with the rules and requirements of the Sewerage Authority concerned.

8.2 Septic System

Provide and install a septic system where applicable to the requirements of Local Authority and in accordance with the manufacturer's instructions.

8.3 Storm Water Drainage

Allow for the supplying and laying of storm water drains where shown on Site Plan. Drains to be a minimum of 90mm UPVC pipes laid to an even and regular fall so as to have a minimum cover of 150mm. Drains to discharge into street gutter where possible. Where outlets are shown within the Site they are to discharge at least 3,000mm clear of the building. If the Authority's requirements give rise to a variation, any additional cost plus Builder's margin is to be borne by the Owner.

INITIALS ...../.....

9.0 TIMBER FRAMING GENERALLY

9.1 Timber Framing

All timber framework sizes, spans, spacing, notching, checking and fixing shall comply with the provisions of AS 1684 or Part 3.4.3 BCA Housing Provisions. Alternative structural framing to Structural Engineer's details and certification.

The work shall be carried out in a proper and tradesperson like manner and shall be in accordance with recognised and acceptable trade practices.

9.2 Floor Framing

All floors not specified to be concrete are to be framed at the level shown. Span and spacing of bearers is to conform to the requirements of the span tables for the appropriate member size. Deep joists to upper floors, where shown are to be fitted with solid blocking or herringbone strutting as required. All sizes and stress grades of timber members and tie down methods are to be in accordance with AS 1684.

9.3 Wall Framing

Plates are to be trenched to a depth not exceeding 10mm to provide uniform thickness where studs occur. Where plates are machine gauged to a uniform thickness, trenching may be omitted. Wall framing is to be erected plumb and straight and securely fastened to floor framing. Provide a clear space of 40mm between outer face of wall frame and inner face of brick veneer walls. Tie brickwork to studs with approved veneer ties. Ties are to slope downwards towards the veneer wall.

Studs in each panel of walling shall be stiffened by means of solid noggings or bridging pieces at not more than 1,350mm centres over the height of the wall. Bottom plates shall be fixed to the concrete slab in accordance with AS 1684.

9.4 Heads Over Opening (Lintels)

All sizes, stress grade and bearing area shall conform to AS 1684 or NSW Timber Framing Manual. Heads exceeding 175mm in depth shall be seasoned or a low shrinkage timber species use. Plywood web lintels conforming to the requirements of Plywood Association of Australia may be used. Glue Laminated beams conforming with AS 1328. If approved by the Lending Authority, Laminated Veneer Lumber beams to manufacturer's specification and data sheets may be used.

9.5 Roof Trusses

Where roof truss construction is used, trusses shall be fabricated in a properly equipped factory and erected, fixed and braced in accordance with the fabricator's written instructions.

9.6 Bracing

Timber frames must be braced in accordance with Clause 3.4.3.8 BCA Housing Provisions. Bracing units shall be determined as appropriate for the design wind velocity for the building or AS 1684. Bracing shall be evenly distributed throughout the building.

9.7 Flooring

Cover floor joists with strip or sheet flooring as shown on plan. Thickness of flooring to be appropriate for the floor joist spacing. With particular regard to ground clearance and installation in wet areas, structural sheet flooring shall be used strictly in accordance with the manufacturer's recommendations or Part 3.4.3 BCA Housing Provisions.

Strip flooring shall be in accordance with AS 1684.

When listed in Schedule of Works, floors shall be sanded to provide an even surface and shall be left clean throughout.

INITIALS ...../.....

9.8 Roof Framing

Roofs are to be pitched to the slope shown on plan and constructed in accordance with Clause 3.4.3.6 BCA Housing Provisions or AS 1684. Provide tie-down as required for the appropriate design wind velocity and roof covering. Provide all rafters, ridges, hips, valleys, pulins, struts, collar ties and wind bracing as appropriate with all sizes and stress grades in accordance with AS 1684.

Metal fascias shall be installed in accordance with the manufacturer's recommendations.

9.9 Timber Posts

Posts supporting carports, verandas and porches shall be timber suitable for external use, or as otherwise specified, supported on galvanised or treated metal post shoes. Post shall be bolted to all adjoining beams as required by AS 1684 for the wind speed classification assessed for the Site.

9.10 Corrosion Protection

All metal brackets, facing plates and other associated fixings used in structural timber joints and bracing must have appropriate corrosion protection.

9.11 Hot Water Storage Tank Platforms

Where a hot water storage tank is to be installed in the roof space, the tank platform shall be supported directly off the wall plates and must not be supported on ceiling joists.

All hot water services installed in the roof space shall be fitted with an appropriate spill tray and overflow drain pipe.

10.0 STEEL FRAMING GENERALLY

10.1 Steel Framing

Steel floor, wall or roof framing approved by the Local Authority shall be installed in accordance with the manufacturer's recommendations and AS 3623 or Part 3.4.2 BCA Housing Provisions.

11.0 ROOFING

All roof cladding to comply with the relevant structural performance and weathering requirements of BCA Housing Provisions and be installed as per the manufacturer's requirements.

11.1 Tiled Roofing

Concrete and terracotta tiles shall comply with AS 2049 and be installed in accordance with AS 2050. Cover the roof of the dwelling with first quality approved tiles as selected. The tiles are to be fixed to approved battens of sizes appropriate to the spacing of rafters/trusses in accordance with manufacturer's recommendations. Cover hips and ridges with capping and all capping and all necessary starters and apex caps. Capping and verge tiles are to be well bedded and neatly pointed. Roofing adjacent to valleys should be fixed so to minimise as far as practicable water penetration. As roof tiles are made of natural products slight variation in colour is acceptable.

11.2 Roofing

Provide and install a metal roof together with accessories all in accordance with the manufacturer's instructions.

Except where design prohibits, sheet shall be in single lengths from fascia to ridge. Fixings of sheet shall be strictly in accordance with the manufacturer's recommendations. Incompatible materials shall not be used for flashings, fasteners or downpipes.

11.3 Rainwater Goods

Metal Rainwater goods shall be manufactured in accordance with AS 2179. Rainwater goods shall be installed in accordance with AS 2180 or Part 3.5.2 BCA Housing Provisions.

UPVC components to be manufactured in accordance with AS 1273. Rainwater goods to be compatible with other materials used.

11.4 Sarking

Sarking if used under roof coverings must comply and be fixed in accordance with AS/NZS 4200.1 for materials and AS/NZS 4200.2 for installation.

11.5 Sealants

Appropriate sealants shall be used where necessary and in accordance with manufacturer's specifications.

11.6 Weatherproofing

Flashings shall comply with AS 2904, AS 1804, AS 3700 and Part 3.3.4 BCA Housing Provisions.

12.0 MASONRY

12.1 Bricks

All clay bricks and brickwork shall comply with AS/NZS 4455, AS/NZS 4456 and AS 3700. Clay bricks are a natural kiln fired product and as such their size may vary over a small range. Tolerances shall only be applied to the total measurements over 20 units, not to the individual units.

12.2 Concrete Blocks

Concrete blocks are to be machine pressed, of even shape and well cured in accordance with AS 2733.

Autoclaved Aerated Concrete blocks shall be in accordance with the manufacturer's Product Specification at the time the work is being carried out.

12.3 Damp Proof Courses

All damp proof courses shall comply with Part 3.3.4 BCA Housing Provisions, AS 3700 and AS 2904. The damp proof membrane shall protrude to the external face of the masonry member in which it is placed.

INITIALS ...../ .....

12.4 Cavity Ventilation (Weep Holes)

Cavities shall be cleared of all mortar droppings and weep holes shall not exceed 1,200mm centres, be in accordance with AS 3700, or Clause 3.3.4.3 of the BCA Housing Provisions.

12.5 Mortar and Joining

Mortar shall comply with AS 3700 or Part 3.3.1 BCA Housing Provisions. Joint tolerances shall be in accordance with AS 3700.

12.6 Masonry Accessories

Compliance with Part 3.3.3 of BCA Housing Provisions in acceptable construction practices. All wall ties shall be manufactured in accordance with AS 2699 and be installed in accordance with AS 3700. Wall ties to meet corrosion resistant rating of the site. Provide appropriate ties to articulated joints in masonry.

12.7 Lintels

Lintels used to support brickwork opening in walls must be suitable for the purpose under Part 3.3.3 BCA Housing provisions. Provide one lintel to each wall leaf. Where necessary clearance must be allowed at heads of frames to allow for shrinkage of timber frames.

12.8 Cleaning

Clean all exposed brickwork with an approved cleaning system. Care should be taken not to damage brickwork or joints and other fittings.

13.0 CLADDING AND LININGS

13.1 External Claddings and Linings

Sheet materials or other external cladding shall be fixed in accordance with the manufacturer's recommendations and any applicable special details.

13.2 Internal Wall and Ceilings Linings

Provide gypsum plasterboards or other selected materials to walls and ceilings. Plasterboard sheets to have recessed edges and be a minimum of 10mm thick. Internal angles from floor to ceiling to be set. Set corners or provide cornices for ceilings as required. The lining of wet area walls shall be constructed as per AS 3740 or Part 3.8.1 BCA Housing Provisions. Wet area lining to be fixed in accordance with the manufacturer's recommendations.

Where required in open veranda's, porches and eaves soffits, material indicated on the drawing shall be installed. The ceiling access hole shall be of similar material to the adjacent ceiling. Suitable cornice moulds where required shall be fixed at the junction of all walls and ceilings.

13.3 Waterproofing

All internal wet areas and balconies over internal habitable rooms to be water proofed to AS 3740 or Part 3.8.1 BCA Housing Provisions.

14.0 JOINERY

14.1 General

All joinery work (metal and timber) shall be manufactured and installed according to good trade practices.

14.2 Door Frames

External door frames shall be a minimum of 32mm thick fitted with 10mm thick door stops. Internal jamb linings shall be a minimum of 18mm thick fit with 10mm thick door stops. Metal door frames shall be installed where indicated on drawings in accordance with the manufacturer's recommendations.

14.3 Door and Doorsets

All internal and external timber door and door sets shall be installed in accordance with AS 1909. Timber Doors and Door Sets and shall be manufactured in accordance with AS 2688 and AS 2689.

14.4 Window and Sliding Doors

Sliding and other timber windows and sliding doors shall be manufactured in accordance with AS 2146 and be installed in accordance with AS 2147.

Aluminium windows and sliding doors shall be installed in accordance with manufacturer's instructions.

All glazing shall comply with AS 1288 or Part 3.6 BCA Housing Provisions.

14.5 Architraves and Skirting

Provide architraves and skirting as nominated on the drawings or listed on the Schedule of Works.

14.6 Cupboards/Kitchens/Bathroom

Units shall be installed to manufacturer's recommendations. Bench tops shall be in a water resistant material.

14.7 Stairs, Balustrades and other Barriers

Provide stairs or ramps to any change in levels, and balustrades or barriers to at least one side of ramps, landings and balconies as per BCA Housing Provisions, Part 3.9.1 for stair construction and 3.9.2 for balustrades.

15.0 SERVICES

15.1 Plumbing

All plumbing shall comply with the requirements of the Supply Authority and the work is to be carried out by a licensed plumber.

Fittings shall be supplied and installed as specified.

INITIALS ...../.....

15.2 Electrical

Provide all labour and materials necessary for the proper installation of electricity service by a licensed electrician in accordance with AS 3000, AS 3006 and the requirements of the local Supply Authority. unless otherwise specified, the electrical service shall be 240 volt, single phase supply.

15.3 Gas

All installation (including LPG) shall be carried out in accordance with the rules and requirements of the Supply Authority.

15.4 Smoke Detectors

Provide and install smoke alarms manufactured in accordance with AS 3786 as specified or as indicated on plan and in accordance with Part 3.7.2 BCA Housing Provisions.

16.0 TILING

16.1 Materials

Cement mortar and other adhesives shall comply with AS 3958.1 according to trade practices.

16.2 Installation

Installation of tiles shall be in accordance with AS 3958.

All vertical and horizontal joints between walls and fixtures e.g. benchtop, bath etc., to be filled with flexible mould resistant grout. Where practicable spacing between tiles should be even and regular. Provide expansion joints where necessary. As tiles are made of natural products a slight variation in colour is acceptable.

16.3 Walls

Cover wall faces where indicated on the drawings with selected neatly grouted tiles. Tiles are to be fixed to wall sheeting with approved adhesives. Provide all necessary strips, vent tiles and recess fittings.

16.4 Floors

Lay selected floor tiles in sand and cement mortar or approved adhesive to areas indicated on the drawings. If required, fit approved edge strips or metal angle to exposed edges in doorways or hobless showers as per AS 3740. Provide adequate and even fall to wastes where necessary.

17.0 PAINTING

17.1 General

All paint used shall be of a quality suitable for the purpose intended and the application shall be as per the manufacturer's recommendations. The colours used shall be as per Colour Schedule. All surfaces to be painted shall be properly prepared to manufacturer's recommendations.

18.0 PRIME COST ITEMS

List hereunder all P.C. Allowances

Kitchen and Vanity Cupboards (kitchen sink included)		$.....
Stove/Wall Oven/Hot Plates		$.....
Bath per item	per item	$.....
W.C. Suites	per item	$.....
Laundry Tub		$.....
Entry Door		$.....
Door Furniture		$.....
Garage Door		$.....
Hot Water System		$.....
Shower Screen		$.....
Wall and Floor Tiles supply only		$...../m
Bricks		$...../,000

TO BE SELECTED

19.0 SIGNATURES

This is the specification referred to in the Building Agreement No. ..... Date: .....

Signed by the said Owner in the Presence of

.....	.....	...../...../.....
Witness	*Owner's Signature*	*Date*
.....	.....	...../...../.....
Witness	*Owner's Signature*	*Date*

Signed by the said Contractor in the Presence of

.....	.....	...../...../.....
Witness	*Contractor's Signature*	*Date*

25/01

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EVERSON

SCHEDULE

VIEW A - COVERSHEET
VIEW B - GROUND FLOOR PLAN
VIEW C - FIRST FLOOR PLAN
VIEW D - EAST & WEST ELEVATIONS
VIEW E - NORTH & SOUTH ELEVATIONS
VIEW F - SECTION THROUGH
VIEW G - SITE PLAN 1:200

REVISION

NO.	DATE	DETAILS
1	09/08/05	ALTERED DA SET - GAMES ROOM ADDED
2	01/12/05	1.8m HIGH BRICK FENCE MOVED TO A MIN 1.8m FROM FRONT BOUNDARY
3	09/01/06	SW CONCEPT ADDED

DO NOT SCALE.
IF IN DOUBT, ASK.

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INGLESIDE NSW 2101

JOB REFERENCE 050203

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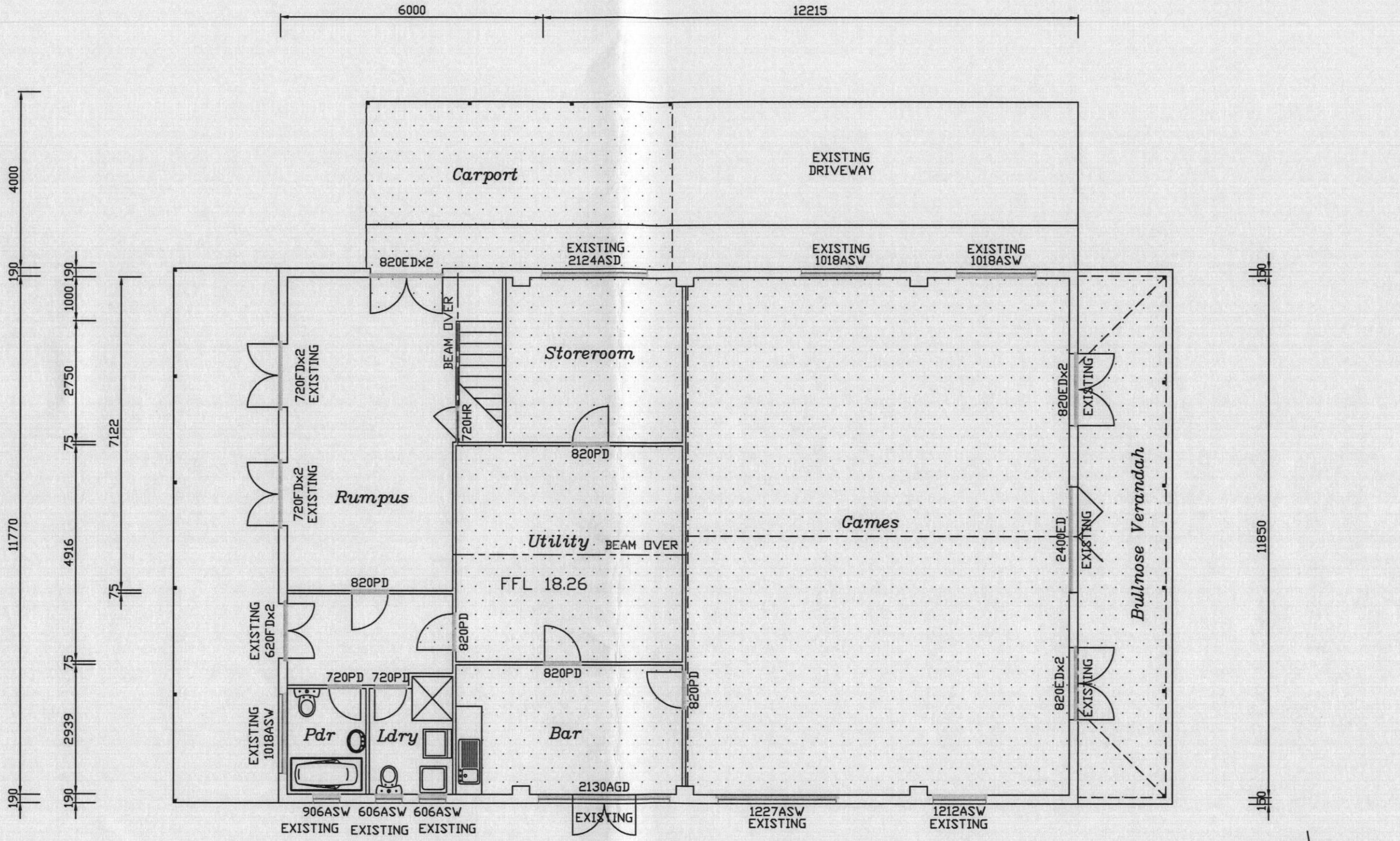

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Ground Floor Plan

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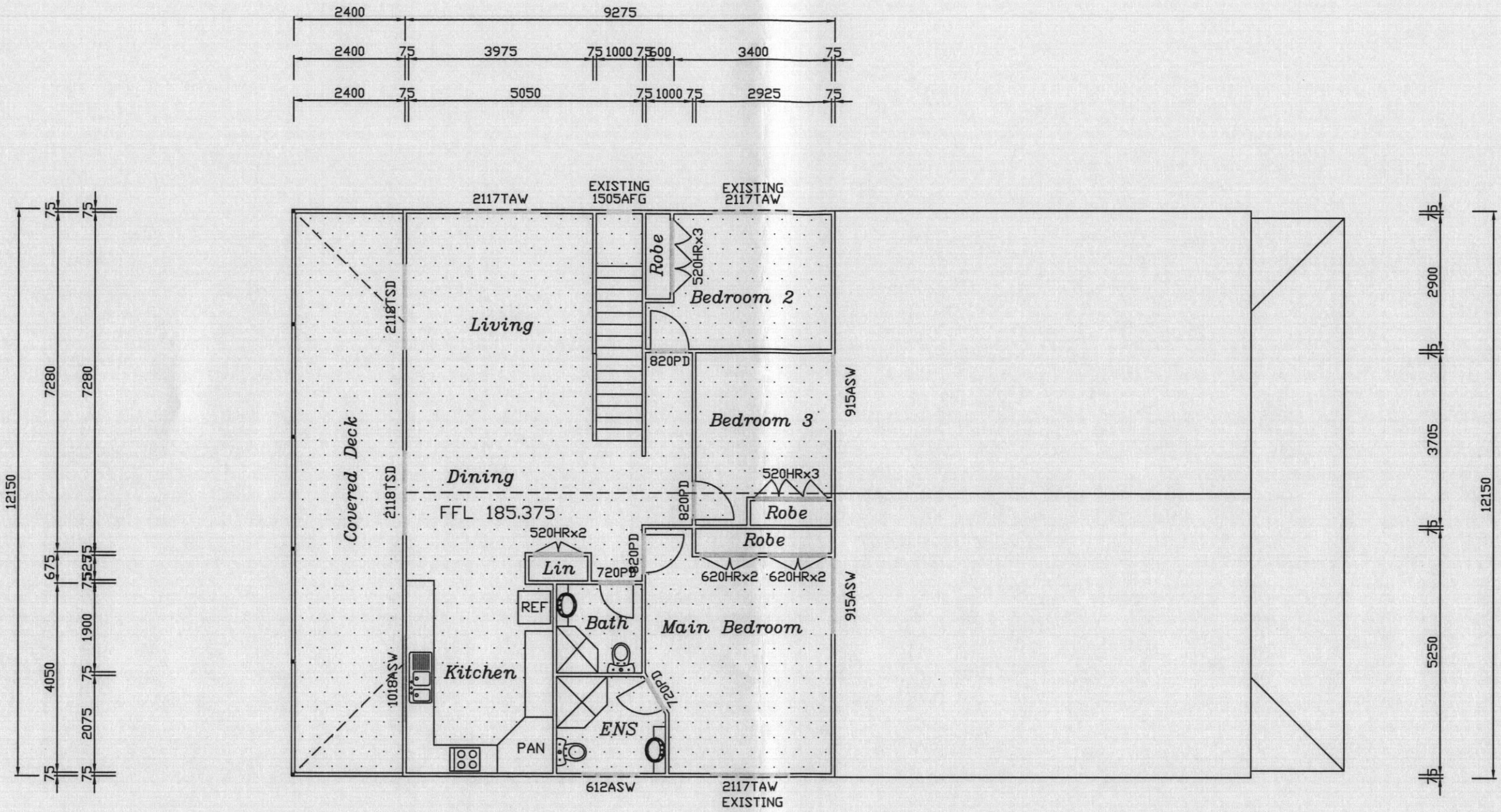

First Floor Plan

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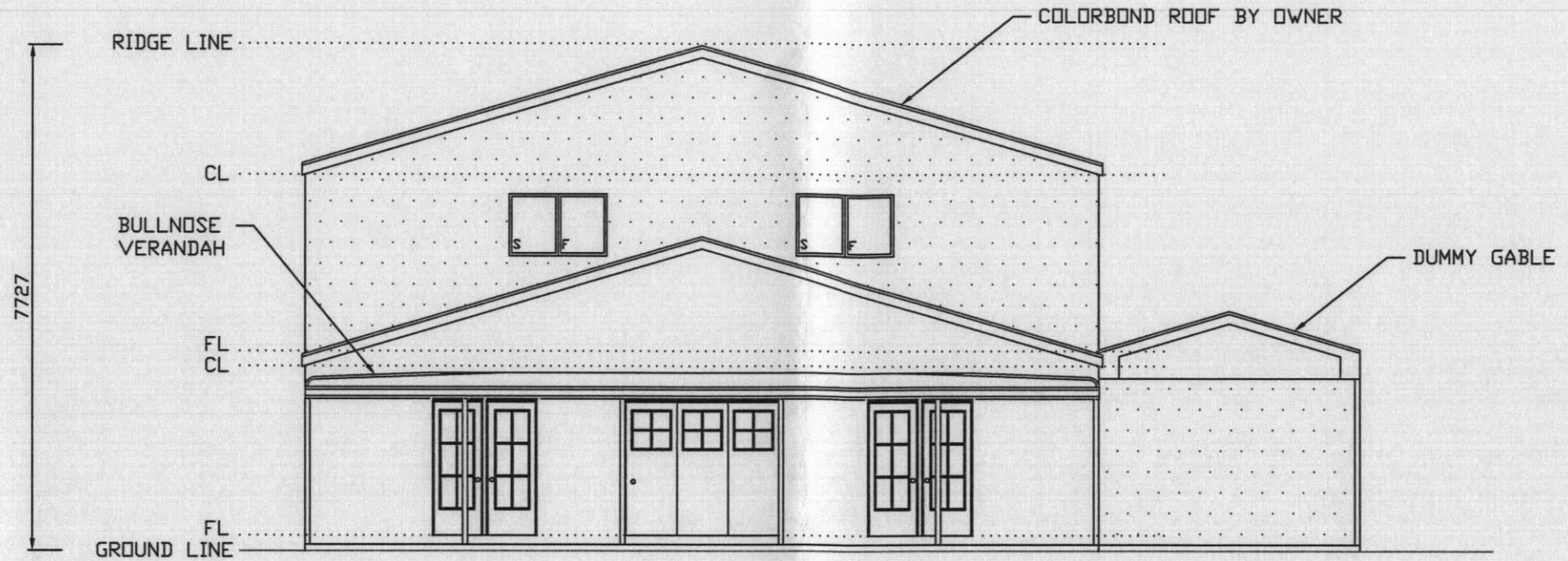
RIDGE 190.075

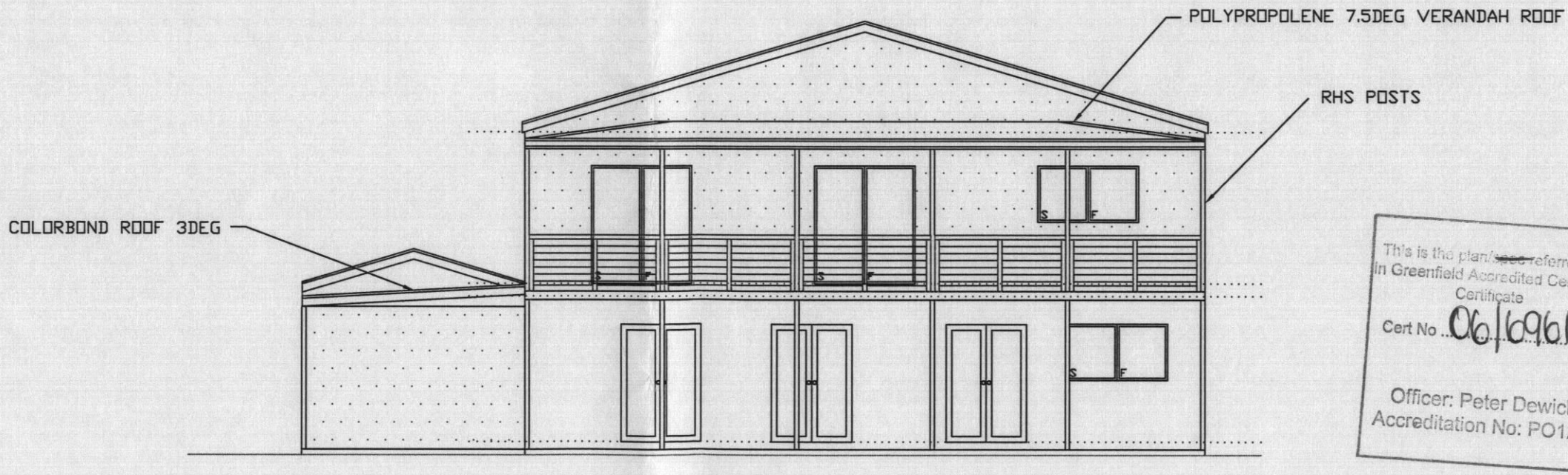
RL 188.075

RL 185.375

RL 182.56



WEST ELEVATION



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EAST ELEVATION

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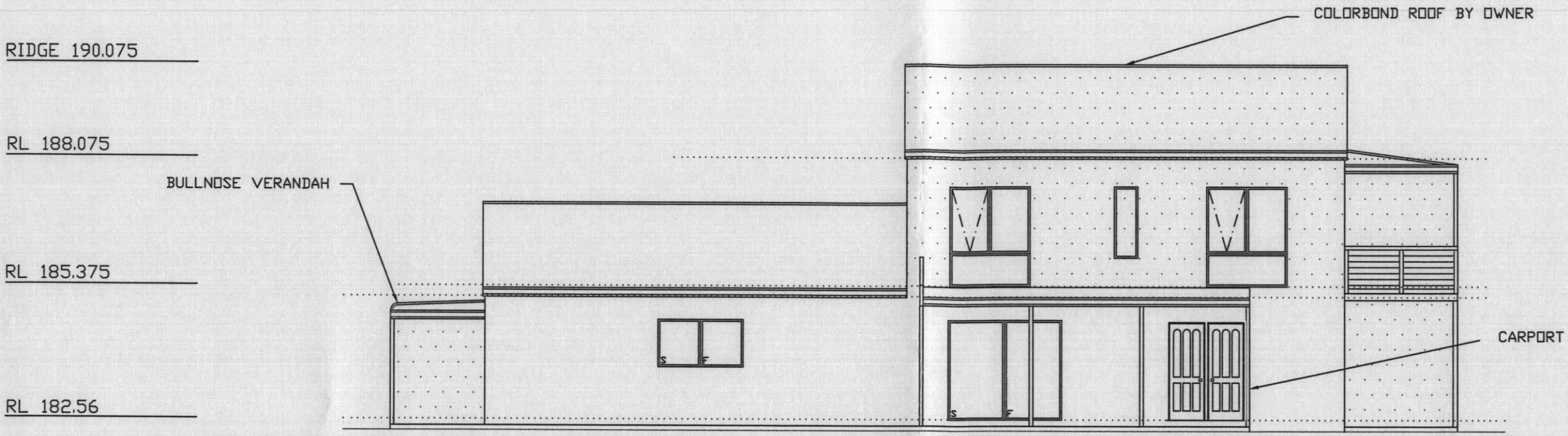
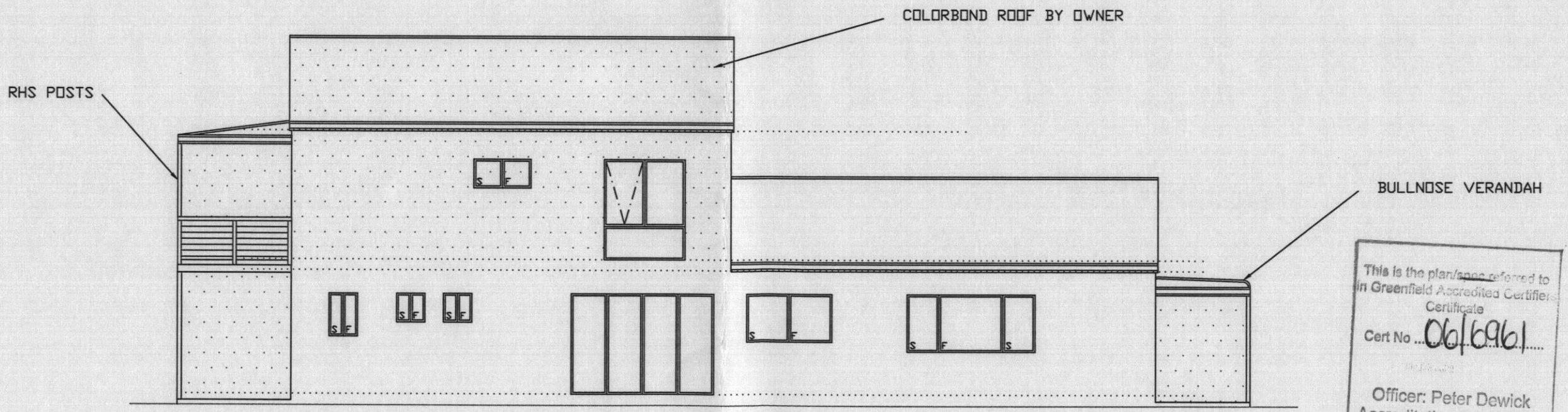


SOUTH ELEVATION



NORTH ELEVATION

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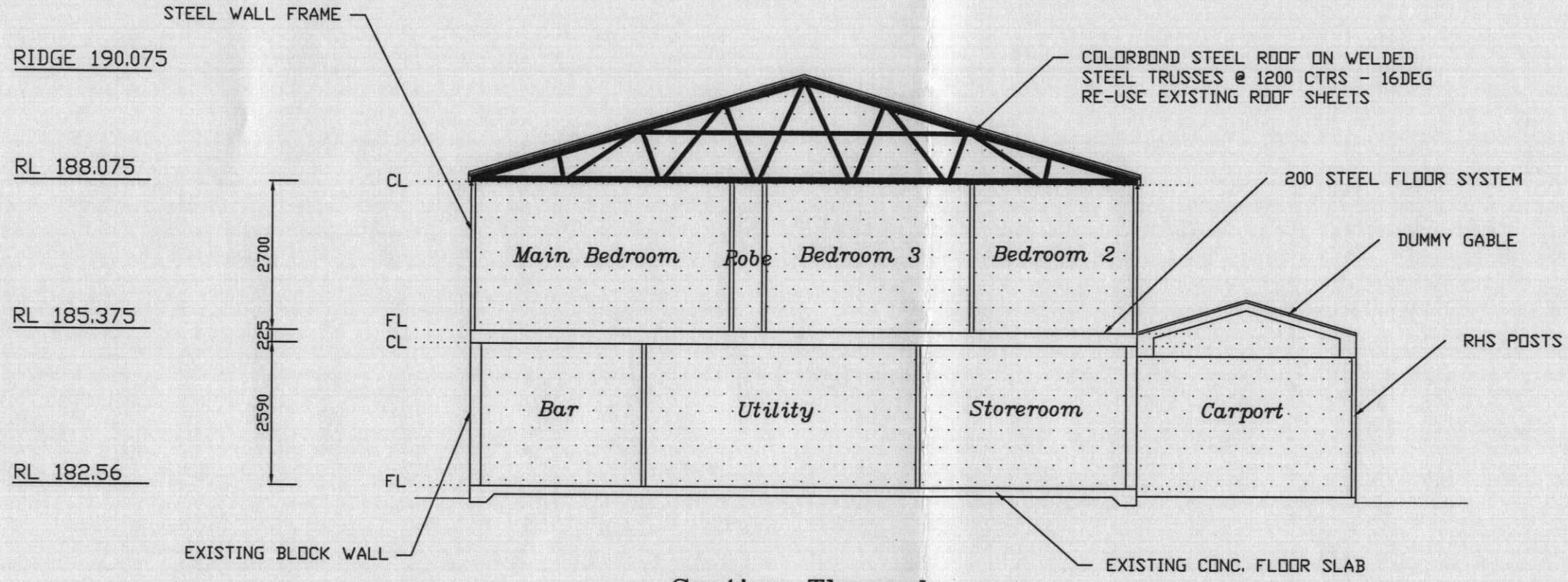

Section Through

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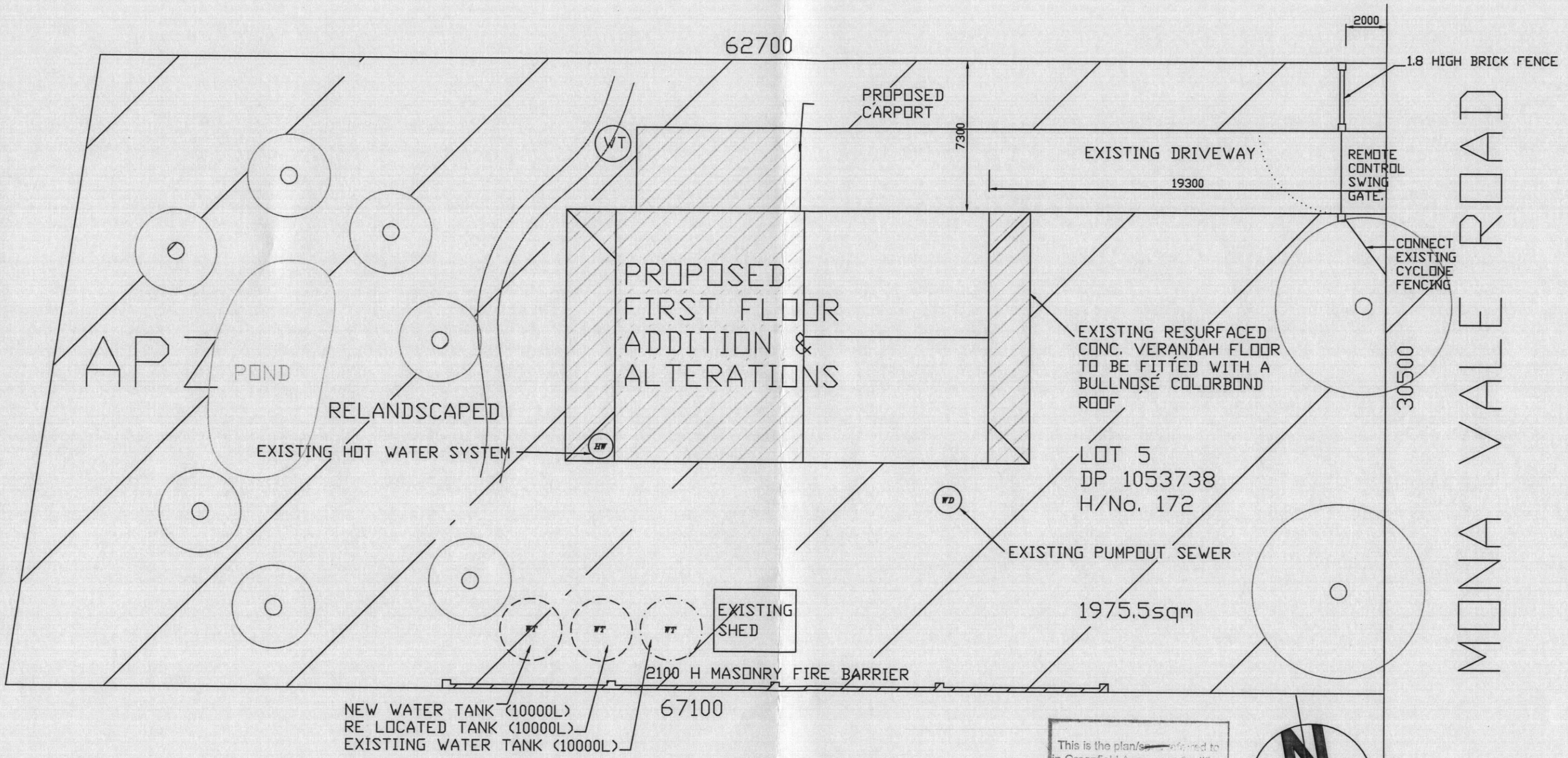

SITE PLAN – ASSET PROTECTION ZONE

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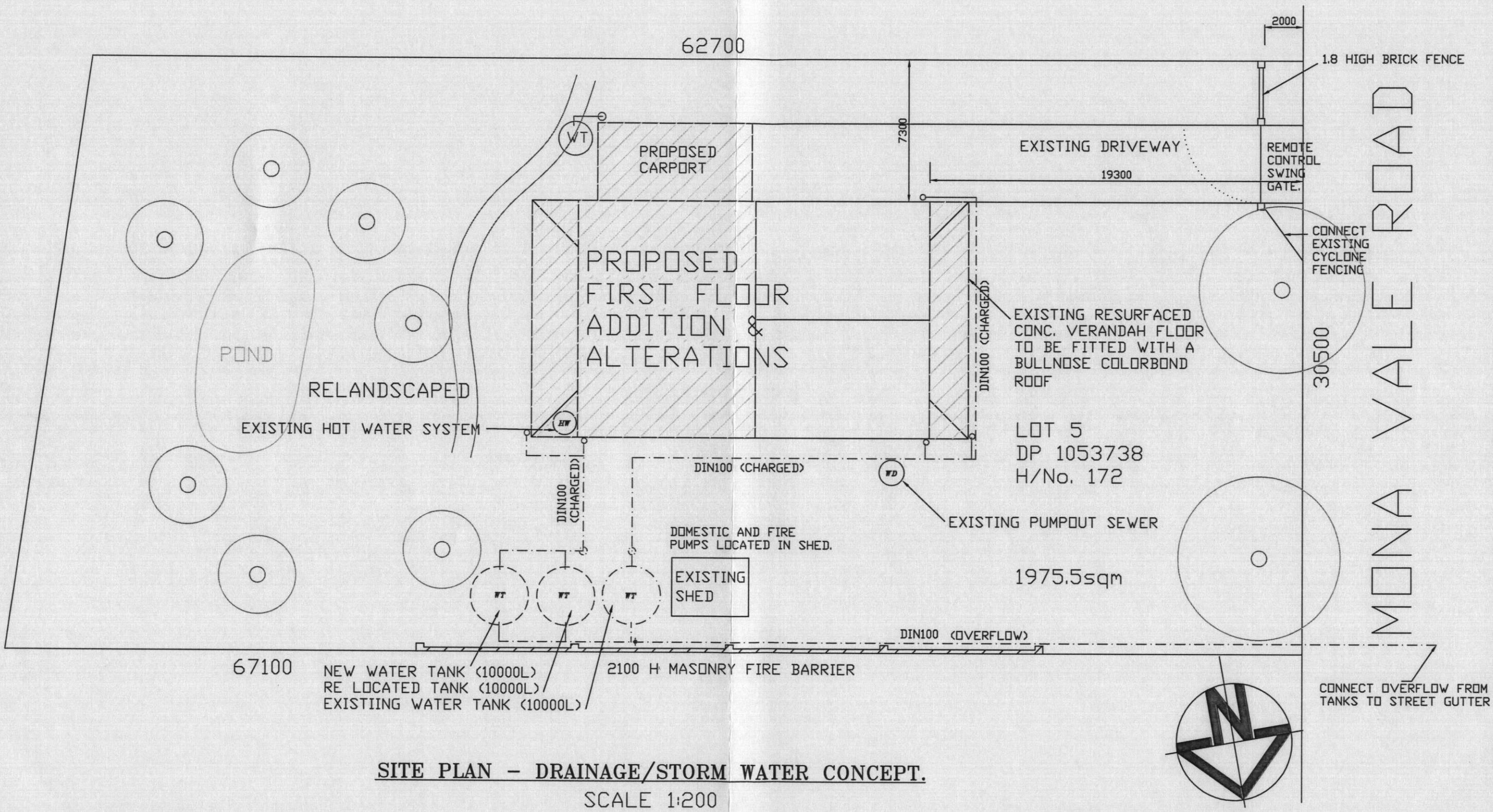

SITE PLAN – DRAINAGE/STORM WATER CONCEPT.

SCALE 1:200

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