



**TWO STOREY MASONRY VENEER
DESIGN SOLUTION - FIRTH 10 SERIES
HOLLOW MASONRY, MANORSTONE®
& 90MM MASONRY VENEERS**

CBI 3311 4261 4273

October 2012



STRUCTURAL CERTIFICATION PRODUCER STATEMENT PS-I : DESIGN

FIRTH TWO STOREY VENEER CLADDINGS 10 Series Hollow Masonry, Firth Manorstone® & 90mm Manorstone

I, Matthew Q. Cusiel, being a Chartered Professional Engineer under the provisions of the Chartered Professional Engineers Act of NZ (2002), on behalf of The Engineering Company Ltd, hereby certify that the details of the "Firth Two Storey Veneer Cladding Systems" have been designed and detailed in accordance with widely accepted engineering principals.

The structural design has been prepared in accordance with the following approved documents;

AS/NZS1170:	Structural Design Actions
NZS3604:	Timber Framed Buildings
NZS3603:	Timber Structure Standards
NZS4210:	Masonry Construction - Materials & Workmanship
NZS3404:	Steel Structures Standard

I BELIEVE ON REASONABLE GROUNDS that subject to:

1. Timber framed buildings clad in Firth Two Storey Veneer Systems shall comply with all aspects of the specifications and drawings (including compliance with NZBC E2/AS1) contained in this brochure
- and 2. All proprietary products meeting the performance specification requirements,

then, the details, specifications, and other documents according to which these veneer claddings are proposed to be installed & supported, comply with the relevant provisions of the building code.

M.Q. Cusiel B.E.(hons), M.IPENZ(struct), CPEng, IntPE(NZ)
for- **The Engineering Company Ltd**

Date: 24 September 2012

CPEng. No. 161509

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

GENERAL INFORMATION

Firth 10 Series Hollow Masonry, Manorstone® and 90mm Masonry Veneers may be used in accordance with E2 AS/1 as a cladding up to 7.0m in height by incorporating a galvanised steel shelf angle at a maximum height of 4.0m above the top of the foundation height.

The following information and attached Producer Statement - PS1 - Design, will allow Designers/ Owners to apply for a building consent without the need to consult a structural engineer for a specific

design for veneer support above 4.0m.

The designer must ensure that all other aspects of the supporting structure, including, but not limited to; site bearing capacity & wind speed, stud heights, wall bracing, beam or lintel spans & sizes, veneer lintel bar sizes, structure durability, etc, are all compliant with E2 AS/1.

Any parts of the structure that do not comply with the requirements of NZS3604 will require specific design.

MASONRY VENEER WEIGHTS

The approximate maximum weight for all of the Firth Masonry Veneers covered by these specifications is 14.7 kg for each unit or 195kg/m² including mortar. There are 12 ½ blocks per square metre of cladding.

This weight is less than the maximum prescribed weight of 220kg/m² for "Heavy" claddings in NZS3604, meaning that Firth 90mm Masonry Veneers can be used and detailed in accordance with E2 AS/1 for any building complying with the requirements of this document.

FIRTH MASONRY VENEER CONSTRUCTION ABOVE 4.0M

Install a galvanised 125x75x6mm steel shelf angle as indicated in figure 1.

It is recommended that the shelf angles be positioned at 4.0m above the top of the foundations so that they are likely to be positioned between the upper level windows, thus, minimising the required length of the shelf angles.

Refer to figure 2. for recommended shelf angle positions.

The maximum height of the veneer cladding supported on top of the shelf angle shall not exceed 3.0m. This can be increased with specific design by a structural engineer.

Site measure the shelf angle lengths required and predrill as per figure 1. before galvanising. Where shelf angles need to be site cut or drilled, ensure an appropriate brushed on corrosion protection is applied.

Block between the studs as indicated in figure 1. Predrill 9mm pilot holes to the timber to avoid splitting of the timber blocking.

Where the Firth Masonry Veneer continues above a lower roof line, provide a galvanised 125x75x6mm steel shelf angle and 90x75 timber blocking between studs as required. This angle may rake along a slope as required. In this case the base block shall be cut to the required angle also.

MASONRY VENEER CAVITY DIMENSIONS

The masonry veneer cavity shall be in the range of 40mm (minimum) to 55mm (maximum) for Firth 10 Series Hollow Masonry, Manorstone® and 90mm Masonry Veneers. This is a departure from the

maximum limit imposed by NZS3604. The maximum dimension is governed by minimum veneer seating on the shelf angle detail of 70mm.

ANGLE

All wall framing supporting a shelf angle, shall continue to the foundations or an internal slab thickening.

Where a lower storey opening occurs below a shelf angle supporting masonry veneer cladding, a 290x90 VSG8 timber lintel can support the following load combinations, up to a 2.10m clear opening:

1. 4m of heavy clad roof (1/2 of 8m wide roof span including overhangs) with up to 0.5kPa snow load.

2. 3m of masonry veneer over a shelf angle (note: all veneer below the shelf angle is independently supported on masonry veneer lintel over the opening).
3. 3m of timber framed flooring & ceiling (1/2 of 6m wide floor span) with 2.0kPa Live Load.

The lintel shall be directly supported on 2-90x45 studs with two rows of dwangs to adjacent framing.

MASONRY VENEER TIES AND FIXINGS

Masonry veneer ties and fixings shall comply with the requirements of NZS 4210:2001. Ties shall be either hot-dip galvanised or Grade 316 stainless steel to comply with the durability requirements of E2 AS/1. Screws shall be either hot-dip galvanised or Grade 316 stainless steel, 35 mm x 12g Type 17 hex head screws for timber.

Brick ties shall be laid as required by E2 AS/1 and have a 5° down slope away from the wall frame to the masonry veneer.

MASONRY VENEER TIE SPACING

Ties shall be placed at the following positions & centres:

- | | | |
|----|---|---|
| 1. | At window or door openings: | Ties to every veneer unit |
| 2. | Veneers up to 4.0m above the foundations: | Tie every second block in a course.
(Stagger ties horizontally to form a "diamond" pattern.) |
| 3. | Veneers over lintel angles: | Tie every unit |
| 4. | Veneers over 4.0m above the foundations: | Tie every unit |

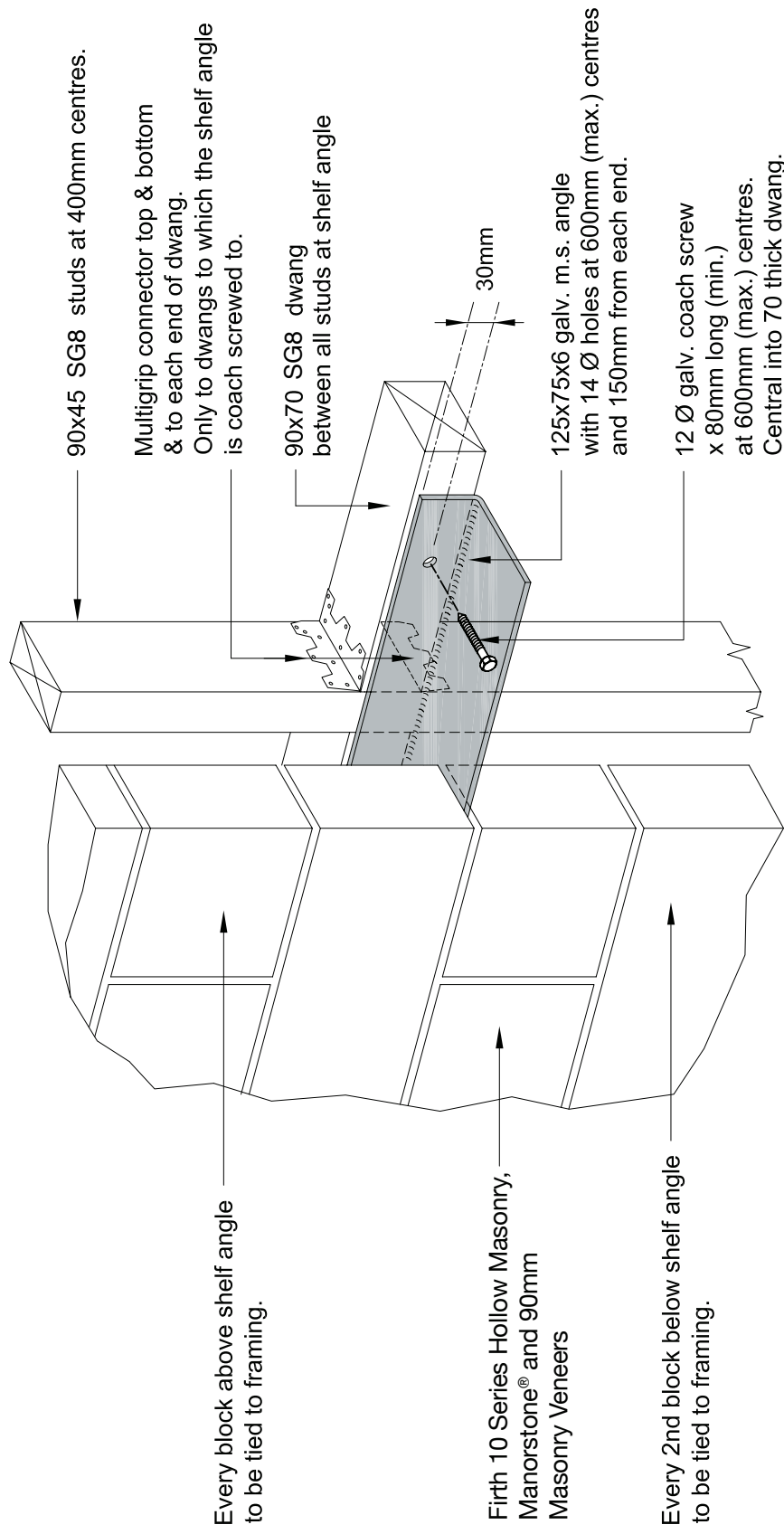
WEEPHOLES AND VENTILATION OVER A SHELF ANGLE

Provide weep holes at 800mm centres above a shelf angle

WALL BRACING CALCULATIONS

Bracing may be calculated using the methods specified in NZS 3604.

Where the veneer height exceeds 3.0m, the minimum bracing units along an external line must be increased by 20% (i.e. from 10 BU's/m to 12 BU's/m), in accordance with NZS3604 clause 11.7.1 (f).

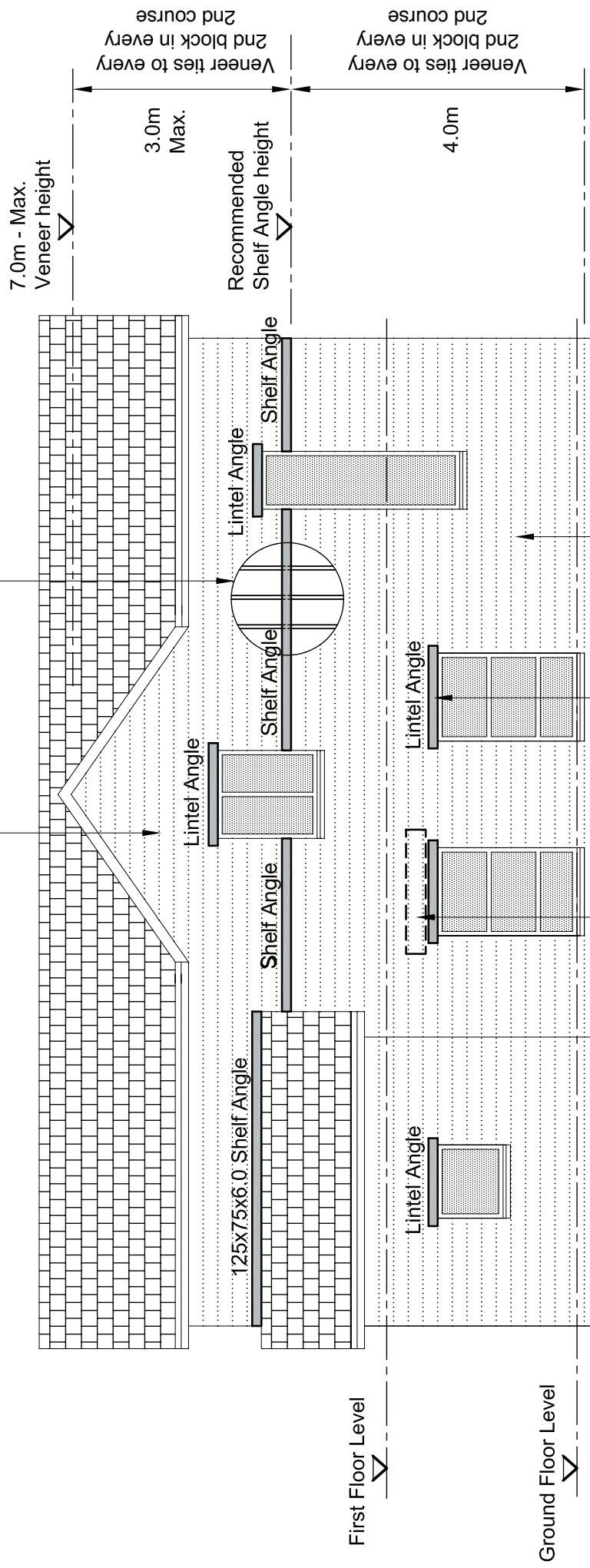


TWO STOREY FIRTH MASONRY VENEER
 FIRTH 10 SERIES HOLLOW MASONRY, MANORSTONE®
 90MM MASONRY VENEERS AND 400MM WIDE UNITS

Scale:
N.T.S.

FIGURE 1.
SHELF ANGLE DETAIL

Firth 10 Series Hollow Masonry, 90x45 SG8 studs at 400mm centres
 Manorstone® and 90mm Masonry Veneers to top and bottom storeys



290x90 VSG8 lintel can be used over a lower storey opening to a maximum clear span of 2.10m. Longer spans require specific design by a chartered engineer. (Refer to notes also for load limitations)

Firth 10 Series Hollow Masonry, Manorstone® and 90mm Masonry Veneers
 Veneer lintels to Table 18E/NZBC E2/AS1



TWO STOREY FIRTH MASONRY VENEER
 FIRTH 10 SERIES HOLLOW MASONRY, MANORSTONE®
 90MM MASONRY VENEERS AND 1400MM WIDE UNITS

Scale:
N.T.S.

FIGURE 2.
SHELF ANGLE DETAIL

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 Date : **March 2016**



CONCRETE AND MASONRY PRODUCTS: A SUSTAINABLE BUILDING OPTION AND SOLUTION

- Manufacturing plants operating in compliance with relevant legislation
- All products manufactured according to ISO9001
- Strong focus on reducing transport impacts
- Masonry products manufactured according to Lean principles
- Greenstar and environmental product options available
- Environmental Management Plans operative at all sites
- Effective acoustic barrier and fire resistant
- Longer and effective building life
- Demolished concrete can be recycled, reused or as clean fill
- Passive solar heated thermal mass provides energy efficiencies
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- Rainwater and process water reused in most products

For more on Firth's contribution to building a sustainable tomorrow today, visit www.firth.co.nz or call us on 0800 800 576 for our free brochure.

