

L S C BRUNETTE

CONSULTING ENGINEERS

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31 March 2022

RESTORATION OF OUTBUILDING 1 AT 258 WAKESLEIGH ROAD BELLAIR

REPORT ON STRUCTURAL DEFECTS AND RECOMMENDATIONS FOR REMEDIAL WORK

1.0 Floors

All rooms , except Passage 1 , have tiled floor finishes . Passage 1 has a granolithic finish . There are no large cracks in , nor evidence of , differential settlement of the tiled and granolithic floors .

The veranda floor outside Store 1 is cracked adjacent and parallel to it's eastern and northern edge where it butts against a dwarf foundation wall . The veranda edge is raised +- 350 mm above the adjacent garden . There is a 6 mm wide crack and vertical and lateral dislocation across the crack in the north dwarf wall +- 1.0 m west of the northeast corner of the veranda . The floor has a floated concrete finish . The outer face and top of the dwarf foundation wall has a plaster finish . The east and north dwarf foundation walls have tilted outwards .

1.1 Veranda Floor Repair

The crack/separation between the veranda surface bed and dwarf wall and the dislocation and cracking of the north dwarf wall are as a consequence of settlement /differential settlement of the wall and its foundation (assuming it has a foundation) .

The foundation wall and its footing (?) is to be demolished with the bricks being saved and re-used in the reconstruction of the wall . The two timber posts supporting the eaves beam of the veranda roof must be effectively propped during the reconstruction works to the wall . A new 600 wide x 200 thick 20mpa/19 mass concrete wall footing is to be constructed at a depth where uniformly stiff very soft to soft rock is found . The top of the footing must be at least 400 mm below the ground level adjacent the veranda's edge . The 230 brick foundation wall is to be re-constructed in English bond brickwork in class 2 mortar . The outside face and top of the wall is to be plastered .

The existing concrete surface bed is to be demolished after the foundation wall is reconstructed . The fill below the demolished slab is to be removed down to stiff original ground and filled back in layers compacted to a minimum dry density of 95% of Mod Aashto . Any clay encountered in the fill materials is to be removed and replaced with an imported fine G7 material . A new 100 mm thick 25mpa/19 concrete , mesh reinforced (ref 311 at 40 cover) slab is to be cast to a 25 mm fall (west down to east) with a fine woodfloat finish . The surface bed is to bear on top of the 230 foundation wall and its top edge is to have a 6 mm radius tooled finish) .

2.0 Walls

2.1 Wall Cracks and other defects

2.1.1 O/B Living Room

A 2 mm vertical crack below W22 cill .

A vertical separation crack between the west block wall junction with the O/B Bedroom west wall .



2.1.2 O/B Bedroom

Vertical crack above D29 and external inclined crack above north corner of this doorhead .

2.1.3 Abl 1

External crack from W27 lintel south corner

Internal horizontal crack 150 mm above W27 lintel , north corner .

Horizontal crack , north wall , 400 below ceiling (central west location)

2.1.4 Abl 2

External crack at W26 cill level from W26 to northwest corner

2.1.5 Store 1

Horizontal crack 300 mm above floor , northeast corner and east wall .

2.2 Wall Crack Repair

2.2.1 The vertical crack below W22 is to be stitched (east and west faces of wall) as per detail CR/1 with the stitches being positioned in each block bed joint . An inspection pit is to be excavated against the southeast corner of the room , to level with the underside of the wall footing , to allow the Engineer to determine the soil condition and whether excessive settlement is the cause of the cracks . If poor soil is encountered the footing will have to be underpinned down to competent soil .

The separation crack between the west block (cement) wall and adjacent bedrooms clay brick wall is to be reamed to a nominal 10 mm width and 35 mm depth and sealed with a nominal 10 x 6 mm thick coloured (to match the mortar) silicone sealant (with a 50 % elongation capability) applied onto a 15 mm diameter polyethylene cord backing .

2.2.2 The vertical or semi vertical cracks to O/B Bedroom and Abl 1 walls are to be stitched as per detail CR/1 .

2.2.3 The horizontal cracks in the Abl 1 walls and the west wall of Abl 2 are to be reamed to a nominal 5 mm width for a depth of 20 mm and infilled with a paintable gun applied acrylic sealant/filler.

2.2.4 The horizontal cracks near floor level in the northeast corner walls to Store 1 are probably as a consequence of settlement of the foundations in this area . An inspection pit is to be excavated adjacent the corner (before the veranda surface bed is reconstructed) . If poor soil conditions are confirmed by the Engineer the existing wall footing must be underpinned down to competent soil .

The horizontal cracks are to be reamed , on both wall faces , to a width of at least 10 mm and depth of at least 40 mm and ram caulked with a proprietary non shrink grout .

3.0 Roofs

3.1 Roof over O/B Living Room

The roof covering is asbestos sheeting of a profile similar to that of Everite Bigsix . The ceilings are 12 x 150 mm T& G boards fixed to the underside of the roof truss bottom chords . The construction of the timber roof trusses (type 7A) is shown on schedule RR/7 . The purlin size and spacings are shown in section 7.2 of the schedule . All timber is Oregon Pine .

Safe access into the roof void to assess the condition of the timbers was not possible . An inspection through the ceiling trapdoor in the northeast corner found indicators of borer activity in the roof timbers . The extent of borer infestation and the damage caused to the timbers must be assessed when the asbestos roof sheeting is removed for replacement and safe access is possible .

3.1.1 Remedial work to O/B Living Room roof

The asbestos roof sheeting is to be unfixed and disposed of all in accordance with regulatory protocols . The replacement roof sheets are to be Everite Nutec Bigsix profile . The existing asbestos ridge

cappings and gable fascia boards are to be replaced with Everite Nutec ridge cappings and Oregon Pine gable fascia boards (as would have been on the originally constructed roof) . The existing 300 x 20 mm shaped Oregon Pine eaves fascias are to be replaced with like if they cannot be repaired .

The Engineer is to assess the condition of the roof timbers once the asbestos roof sheeting is removed .Timbers whose structural integrity is found to be compromised are to be replaced with equal sized Oregon Pine CCA treated members .

In view of the 12 mm T&G boards being incapable of safely supporting a workman , due to their having to span +- 1400 mm between truss bottom chords , four 228 x 50 mm grade 5 S A Pine CCA treated duck boards are to be installed , orientated north/south at nominally 1000 mm centres , across the top of the truss bottom chords . The first board must be positioned immediately west of the ceiling trapdoor .

3.2 Roof over O/B Bedroom , Abl 1 , Passage 3 , Store 1 , Abl 2

The roof covering is S profile steel sheeting of nominal 0.6 mm thickness . The sheets have a galvanized finish . The top surface of the sheets have been painted since originally installed . The galvanized finish to the underside of the sheets , where visible, appears sound .

The cross section through the roof together with the measured and inferred Oregon Pine timber sizes are shown on schedule RR/7 .

The 230 x 22 ridge beam is not present above most of Store 1 despite the top chord truss rafters being notched for such a ridge beam . The ridge beam is slightly laterally distorted at off-set rafter positions

Several rafters have deep (up to 50 mm) notchings out of either the top or bottom surfaces ..

There are two locations above Ablu 1/Store 1 where the west roof slope rafters are offset relative to the east roof slope rafters ; the ridge beam having to transfer both vertical and horizontal forces to the adjacent fully configured trusses .

Many of the roof timbers are and have been infested with and damaged by borer activity . There is inadequate crawl space in the roof to enable an assessment to be made of the extent of individual member damage and loss of structural integrity .The roof sheets will have to be removed to enable the roof timbers to be inspected and assessed for damage and replaced with equal sized CCA treated Oregon pine timbers .

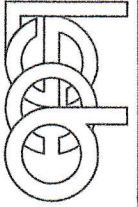
3.2.1 Remedial works to O/B Bedroom, Ablu 1, Passage 3 , Store1 , Ablu 2 roof

As noted in 3.2 above (last paragraph) the roof must be opened in order for the extent of member damage and the need for their replacement to be determined .Structurally compromised members are to be replaced with equal sized Oregon Pine CCA treated timber .

The roof void , once damaged timbers have been replaced and the roof sheeting refixed , is to be fumigated to kill off all live borer and/or termites that may have infested but not yet compromised the structural integrity of members .

Notches in existing rafters and tie beams are to be infilled with tightly fitted and glued Oregon pine timber pieces of equal width . The direction of the grain of the infill pieces is to match that of the member being infilled .

The condition of the galvanised roof sheets at their end and side laps is to be assessed when the sheets are removed to enable inspection of the roof timbers . Where corrosion cannot be removed from sheets and leave adequate metal thickness such affected sheets are to be replaced . Retained sheets cleaned of corrosion are to be painted with 3 coats of a zinc rich epoxy paint to give a total minimum coating DFT of 225 microns .



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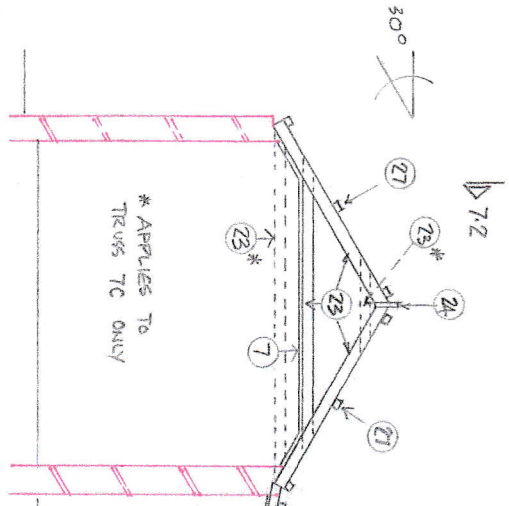
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JOB TITLE
RESTORATION OF EXISTING RESIDENCE AND
OUTBUILDINGS - 25B WAKESLEIGH ROAD BELLAIR
OUT BUILDING 1 - ROOF TIMBER LAYOUT

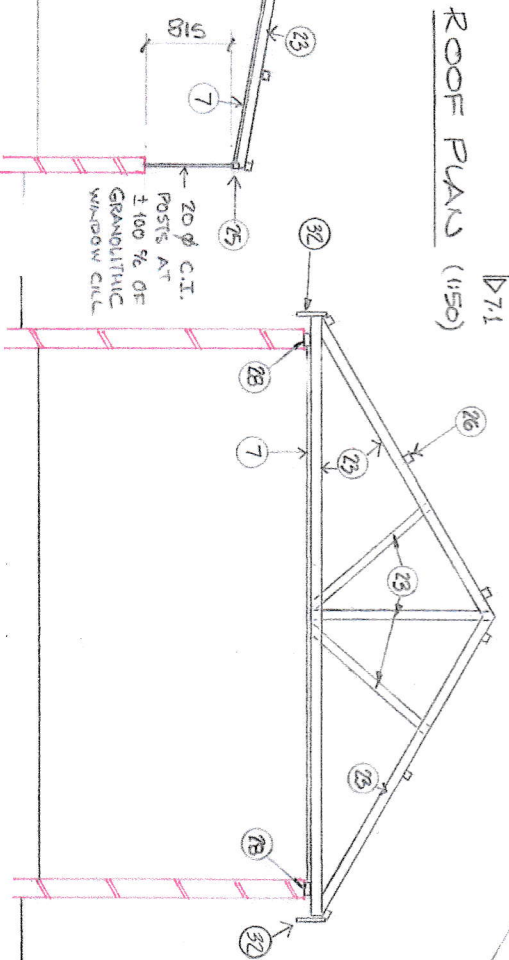
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REFERENCE DRG. NO.

JOB NO. D3892/21
SCHEDULE NUMBER
RR/7

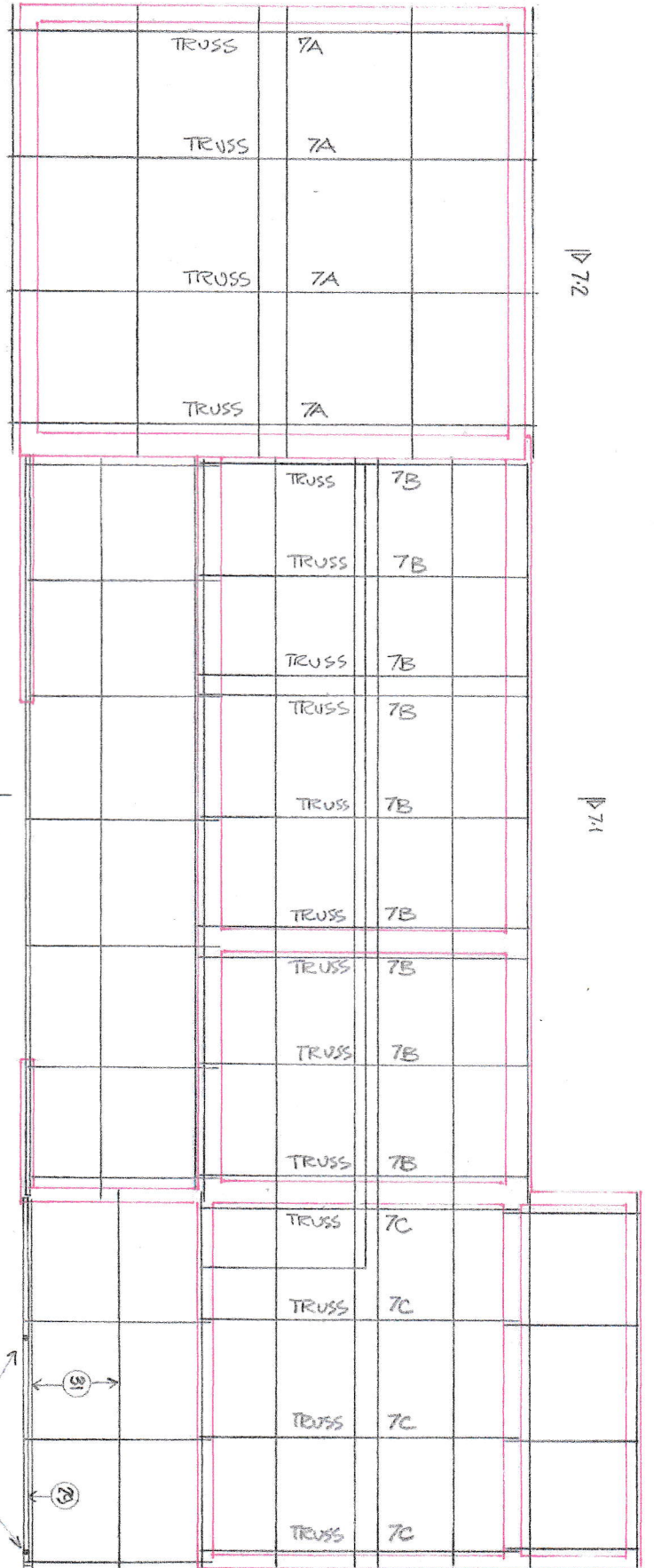
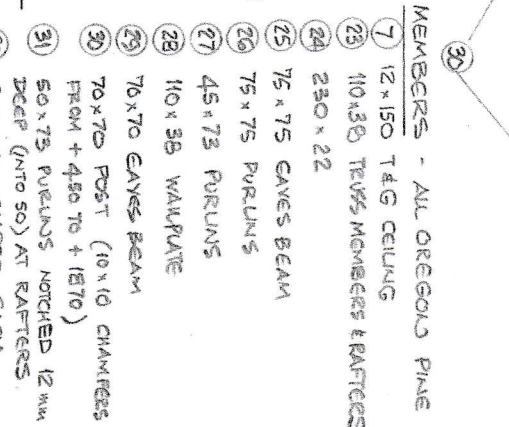
SECTION 7.1 (1:50)
(TRUSSES 7B & 7C)



ROOF PLAN (1:50)



SECTION 7.2 (1:50)



MEMBERS - ALL OREGON PINE
7 12x150 T&G CEILING
23 110x38 TRUSS MEMBERS & RAFTERS
24 230x22
25 75x75 GAVES BEAM
26 75x75 PURLINS
27 45x73 PURLINS
28 110x38 WALKPLATE
29 70x70 GAVES BEAM
30 70x70 POST (10x10 CHANGERS FROM +450 TO +1870)
31 50x73 PURLINS NOTCHED 12mm DEEP (INTO 50) AT RAFTERS.
32 300x20 SHAPED FACIA