



L S C BRUNETTE

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RESTORATION OF BILLIARD ROOM AT 258 WAKESLEIGH ROAD BELLAIR

REPORT ON STRUCTURAL DEFECTS AND RECOMMENDATIONS FOR REMEDIAL WORK

1.0 Floors

The original suspended timber floors were removed in 2014/2015 when a restoration /conversion of the Billiard Room into a “unique inspirational multi-purpose space for exhibitions ,displays ,musical recitals and performance art “ was commenced by a joint venture between the then owner and then prospective purchaser/developer . The timber floors were replaced by concrete surface beds of unknown construction before the restoration /conversion project was abandoned . The surface bed is lower by +- 550 mm over an area of approximately 5.5 m x 3.1 m centred on the Billiard Room .

1.1 Floor Repair

The rubble covering areas of the floor and the water and rubble on the lowered floor is to be removed and an inspection hole is to be chiseled through the upper floor slab adjacent the step down in the floor to ascertain the construction details of the surface bed , the presence of a DPM and the waterproofing/tanking detail for the lower surface bed and the dwarf retaining wall to the perimeter of the lowered area . Should no DPM or tanking be found the surface beds and dwarf retaining wall will have to be broken out in order for a replacement lower surface bed (if indeed a recessed floor is considered necessary) and dwarf retaining wall to be tanked and the upper surface bed replaced on top of a DPM.

2.0 Walls

From a 2014 exposure of the founding of the external brick and a half thick walls it is probable that all such walls are founded on corbelled brickwork on the underlying very soft to soft rock tillite into which the Billiard Room platform was cut . There is some cracking in the external wall in the south east corner of the building suggesting possible foundation settlement .

There is evidence widespread rising damp in the walls . The damp has resulted in the deterioration of the bricks and the crumbling/raveling of the face of the bricks . This deterioration of the face is probably the reason for the east wall having been plastered up to the bay window cill level at some time since the building was originally constructed . Many areas of the roof above the walls have been open to the weather for 8 years and rainwater wetting of the brickwork has contributed to its deterioration .

2.1 Wall Repairs

Two inspection pits are to be excavated to a depth of 1.0 m at the southeast and northeast corners of the building so that the Engineer can inspect the soil conditions and founding depths of the external walls . If the soil conditions have deteriorated from the original very soft to soft rock at founding level underpinning of the external walls may be necessary to stabilize the cracked southeast corner brickwork and to prevent future settlement of the east elevation of the building .

The damp induced deterioration of the face of at least 70% of the external brickwork requires the affected outer 110 skin of brickwork to be removed and replaced with matching bricks . The replacement bricks skin is to be pinned to the balance of the wall according to the detail given on schedule RR/9 . Consideration should be given to removing the external plaster previously applied to the east elevation (north and south of the bay window) and replacing the outer skin of brickwork as referred to above .

In order to minimize future rising damp the walls should be pressure injected from both sides at the level of the new underside of the new surface bed with Silane Siloxane chemical (ABE Durasil SH) that crystalizes when in contact with water in the capillary orifices sealing off such passageways from the movement of water/damp .

The re-installation of the original north façade window that was removed in 2014/2015 in preparation for the installation of a wider sliding door assembly will require the removal of the corroding steel I beam lintels installed in 2014/2015 , the construction of infill reveal brickwork and the construction /installation of a new precast lintel slab and infill lintel brickwork as detailed on schedule RR/9 .

The existing timber and brick lintel between the main billiard room space and the fireplace alcove to the west will require the removal of the dislocated lintel brickwork , the removal of the structurally compromised (termite/borer/ water damaged) timber lintel beam and its replacement by a reinforced brick lintel built off three standard prestressed concrete lintels (the whole assembly is masked by a plastered bulkhead to match the original) .

The cracks in the walls are to be stitched (on each face of the wall) as per the detail contained in schedule CR/1 (see main residence report) .

3.0 Roof

The roof profile is as shown on the Architects drawing 18-26-RR06 . Two cross sections indicating the arrangement of the primary roof timbers (all Oregon Pine) appear on the Engineers drawings SS/BR2 and SS/BR3 . The pitch of the main four way pitched roof is nominally 39 degrees . Dormer roofs occur east and west over the bay window and fireplace alcove respectively . A mono pitched roof occurs over the entrance and two rooms to the south of the main room . Canopy roofs occur over the east entrance and the west window to Ablution 3

There is a central roof-light (with top hung cottage pane windows to the four sides of the roof-light) above a vaulted ceiling.

The roof covering is nominally 6 mm thick timber shingles nailed to 32 x 75 mm battens at 150 mm centres .

The ceilings are elaborately moulded mesh reinforced plaster on 45 x 75 mm battens and framings (to bulkheads) at varying spacings depending on the profile and shape of the ceilings .

An assessment of the structure of the roof and the support provided by the wall plates and external walls indicate a flawed original structural concept due to the wall plates , several of the timbers and their connections and the external walls not being theoretically capable of safely fulfilling the structural role the concept assumed . It is obvious that numerous secondary mechanisms , in which the ceilings have played a significant role , have allowed the roof to remain intact .

A high percentage of the roof timbers have been damaged by a combination of termite/borer infestation and wet and dry rot . The roof was opened up in 2014/2015 in preparation for restoration of the then damaged timbers but was never effectively protected once the restoration project was abandoned . As a result the roof and ceilings have been open to the weather the condition of many of the timbers and ceilings has deteriorated significantly since 2014/2015. The uncoated steel mesh reinforcing to the plastered ceilings and bulkheads has also corroded and failed in many areas resulting in the collapse of the majority of the ceilings and bulkheads .

3.1 Remedial work to Roof

The temporary scaffold support system for the roof that was designed and installed prior to the commencement of the 2014/2015 restoration work was replaced with a gumpole prop arrangement by the restoration /conversion builder/developer . This arrangement has recently been stabilized/upgraded and supplemented by the current owner under instruction from the writer .

A new system of supporting steel beams and stabilizing bracing is to be introduced into the roof , the former before the damaged timbers , as identified in schedule RR/8 , are progressively replaced . The new steel beams and bracings are detailed on drawings SS/BR1 , SS/BR2 and SS/BR3 . Before the steelwork is introduced , and to facilitate the erection of same , the entire floor area of the main roof , bay window and fireplace alcove is to be scaffold with a working platform at a level of +- 1200 mm below the level of the underside of the ceiling rafters . The scaffold platform is to step up to nominally 1000mm below the bulkheads encasing the roof timbers passing east /west through the roof light area . THE EXISTING GUMPOLE SUPPORT SYSTEM IS TO REMAIN IN PLACE . The gumpole props are to be progressively wedged up during the jacking of the steel beams so that the north /south timber support beams to the rooflight east/west bulkheads through the rooflight zone remain fully supportive of the rooflight and bulkheads .

The damaged roof timbers and wallplates are to be progressively replaced (see wallplate detail on RR/9) after the steel beam support jacks have been concreted in .The contractor is to agree a method and sequence for the replacement of damaged timbers with the Engineer before replacement commences (complete 5 member rafter assemblies from opposite sides of the roof light are to be extracted from the roof and each is to be used as a pattern for the replacement timbers to the opposing pair of 5 member assemblies) . The replacement timbers are to be treated Oregon Pine of a size and shape to match the existing . The joint types are to match the existing and where possible the existing bolts are to be extracted , de-rusted and reused provided there is no significant loss of cross section due to corrosion .

The roof light timbers will have to be exposed for inspection by the Engineer .This is only to be done after the main roof timber frameworks (5 members assemblies) have had their damaged members replaced and have been re-installed . The bulkheads across the rooflight zone must be opened up from the top so that inspection of the timbers can take place . Secondary propping may be required to replace unsound timbers currently propped by the gumpole system .

The timbers to the dormer roofs over the east bay window and west fireplace alcove are general in very poor condition and it is envisaged that most of the primary roof timbers will have to be replaced . This is to be done by carefully dismantling the roof timber assemblies after recording their locations and configurations . The unsound timbers are to be replaced and the roofs reconstructed . The work to these dormer roofs is to be done AFTER the main roof timbers have been restored .

The east bay window frame supports the timber framed /mesh reinforced exposed aggregate gable which in turn supports the dormer roof . The gable is to be temporary supported (vertically and horizontally) whilst the damaged window frame timbers are replaced and whilst the damaged timber framing to the plastered gable is replaced .

The timber shingle battens are to be carefully removed so that sound batten timber can be re-used . Temporary 38 x 50 SAPine battens must be installed at maximum 900 mm centres to maintain the stability of the rafter assemblies once restored and before the shingle battens are re-installed

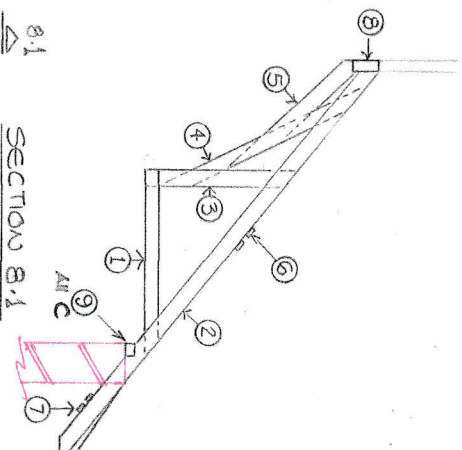
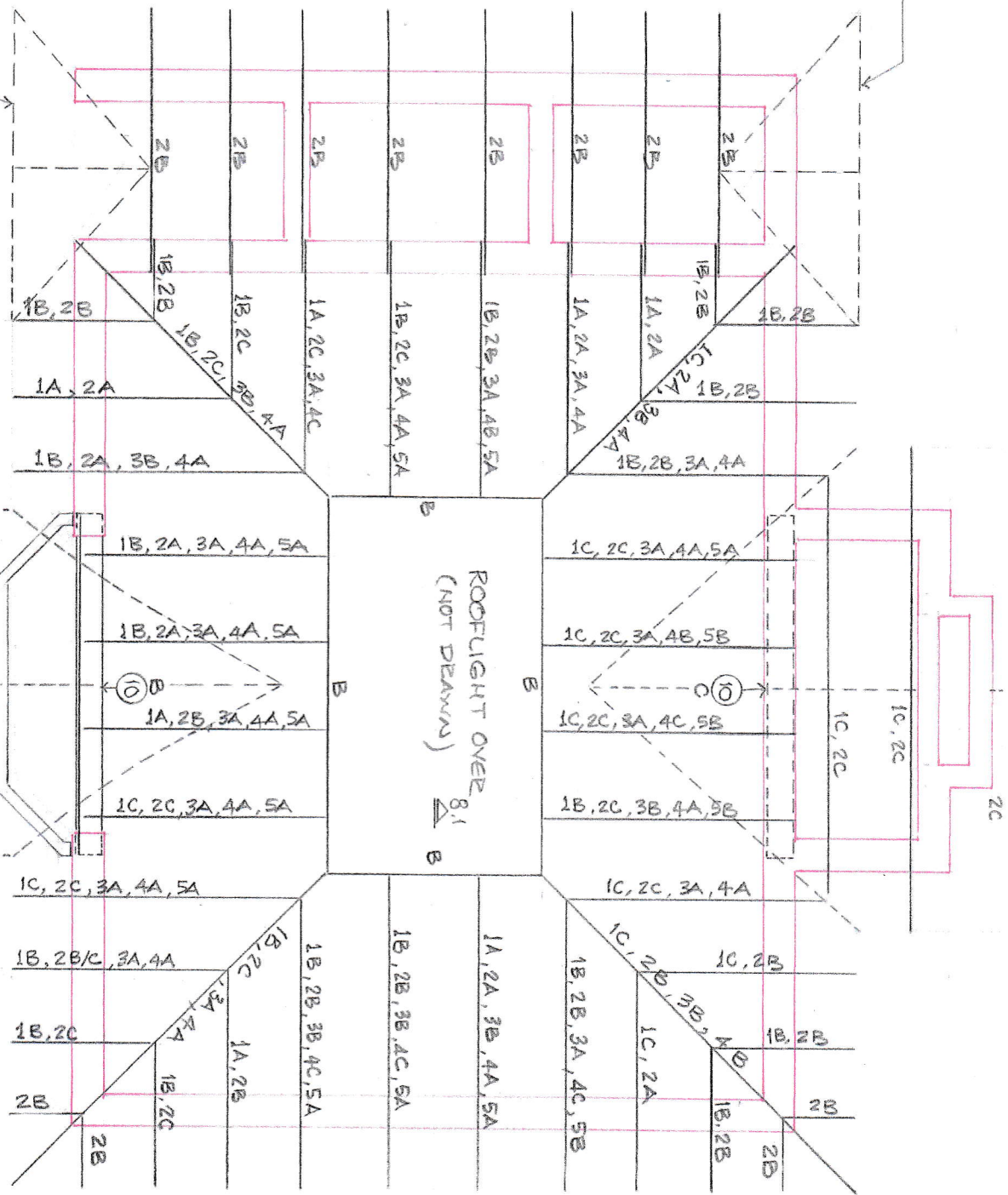
The southern monopitch roof rafters are to be replaced with equal sized Oregon Pine members . Sound sections of timber from the existing rafters are to be reused elsewhere in the restoration works .

The east and west canopy roofs over the entrance and ablution 3 window are to be dismantled , their timber support brackets checked for soundness of the timbers, replacement brackets made where necessary and the roofs reassembled to their original shape and configuration .

All facias , barge boards and trims are to be unfixed , checked for soundness , replaced if unsound with Oregon Pine of same size and shape and refixed .

CANOPY ROOF.
ALL TIMBERS
CONDITION B.

CANOPY ROOF, ALL
TIMBERS CONDITION B.



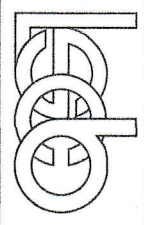
8.1
SECTION 8.1
MEMBER SIZES:-

- ① 150 x 75
- ② 150 x 75
- ③ 150 x 75
- ④ 108 x 75
- ⑤ 150 x 50 (SHAPED)
- ⑥ 75 x 32 SHINGLE BATTENS AT 150 W/C + MOSTLY A.
- ⑦ 50 x 20 EAVES CLOSURE BATTENS AT 75 W/C. 50% B, 50% C
- ⑧ 225 x 75 ROOFLIGHT RING BEAM, CONDITION B.
- ⑨ 108 x 75 WALL PLATES, ALL C
- ⑩ 220 D x 310 W TIMBER BEAMS

CONDITION OF TIMBERS
A = PERIPHERAL DAMAGE - REUSABLE
B = LOSS OF STRUCTURAL CAPACITY TO BE INVESTIGATED
C = SEVERE BORE/TERMINAL DAMAGE. REPLACE.

TIMBER FRAMED BAY WINDOW
SUPPORTS DORMER ROOF & TIMBER/EXPANDED METAL/PLASTER GABLE.

DORMER ROOF.
50% TIMBERS CONDITION B,
50% TIMBERS CONDITION C



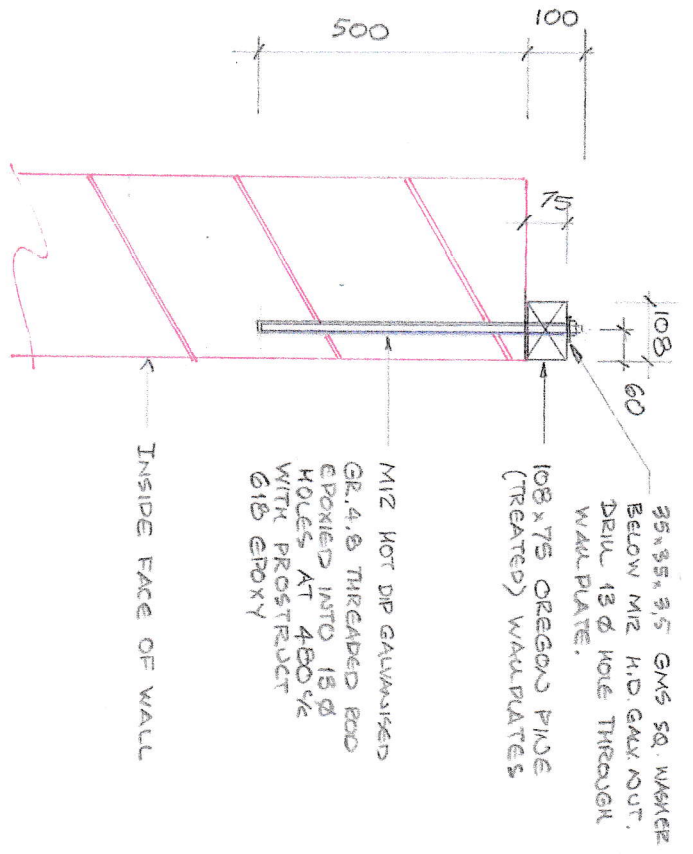
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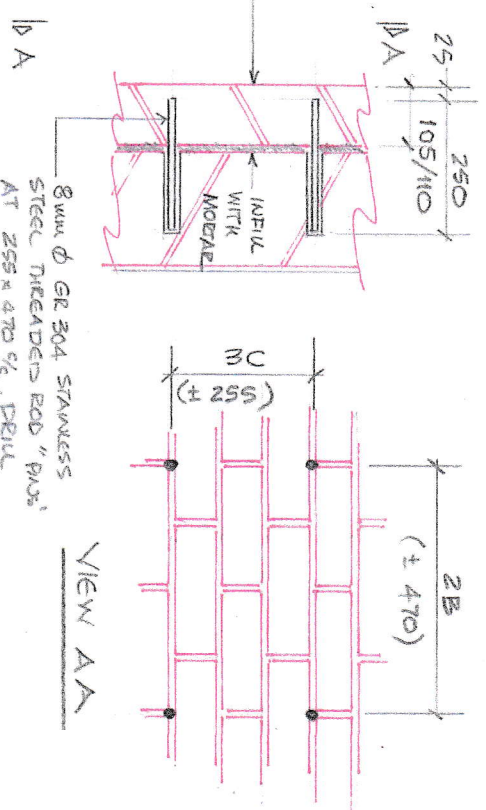
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JOB TITLE
RESTORATION OF EXISTING RESIDENCE AND
OUTBUILDINGS - 258 WAKESLEIGH ROAD BELLAR
BILIARD ROOM - MAIN ROOF TIMBERS LAYOUT
& CONDITION OF TIMBERS

DATE	20/4/2022	JOB NO.	D3892/21
DRAWN BY	H/B	SCHEDULE NUMBER	RR/B
REFERENCE			
DRG. NO.			

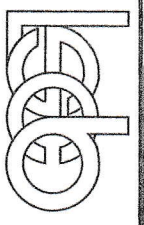
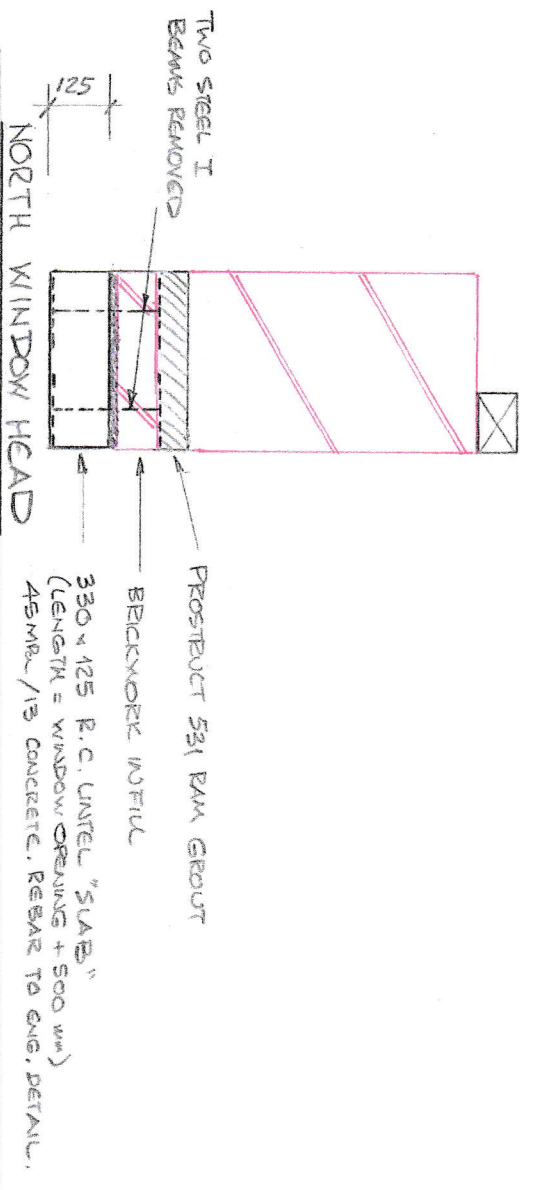


NEW "FACE" BRICKS
 TO REPLACE EXISTING
 THAT HAVE CRUMBLED/
 WEATHERED, PATTERNS
 & JOINTING TO MATCH
 EXISTING.
 CLASS II CEMENT/LIME
 MORTAR



REPLACEMENT OF "FACE" BRICKS

WALL-PLATE FIXING



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JOB TITLE
 RESTORATION OF EXISTING RESIDENCE AND
 OUTBUILDINGS - 258 WAKESLEIGH ROAD BELAIR
 BILLIARD ROOM - SUNDRY DETAILS
 REFERENCED ON DRGG. 55/BR2 & 55/BR3

DATE	26/4/2022	JOB No.	D3892/21
DRAWN BY	H.B.	SCHEDULE NUMBER	RR/9
REFERENCE DRG. NO.			