Appendix B –

Oatlands Gaol Remedial Works Report 2004

Barry and Eleanor Bjorksten 2004.

OATLANDS GAOL

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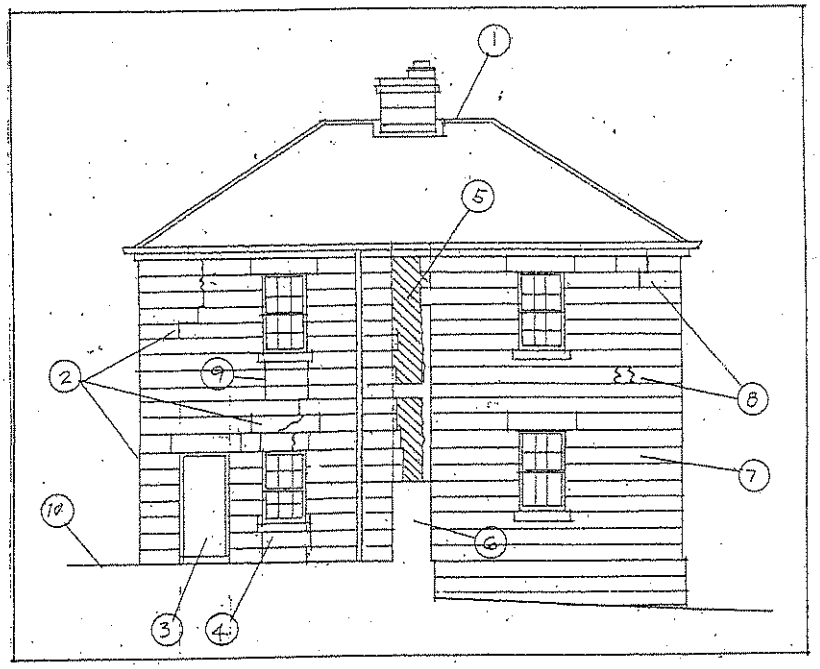

OATLANDS GAOL

Remedial Works Report 2004

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REPORT FORMAT

This report has the following sections serving the indicated functions:

Contents - a reference in one place to all things.

Brief - the report parameters.

Introduction - introduction of the report.

Synopsis - overview of the text as an introduction to it.

Text - development of an understanding of the building and the remedial work necessary.

Drawings - the working heart of the document providing:

- A detailed record of the building.
- A checklist of remedial work.
- Illustration of the work and its locations.

Priority list - a sequential order of remedial work.

Specification - provides detailed work information not included in the drawings.

NORTH POINT

The Mason Street wall of the residence is orientated 26° west of north. In order to avoid the cumbersome usage of NW, SE, etc for identification of direction the simple solution of calling the nearest wall to north **north**. Refer GROUND FLOOR PLAN and remedial work. (P 26)

APPROVALS

Approval must be obtained from the Tasmanian Heritage Council for all work to the original fabric of the gaol including excavation within the gaol perimeter and the cesspits on the outside and for any subsurface drainage of the site. It is expected overall approval will come with the adoption of this document, including any addendum by the Tasmanian Heritage Council. Individual items may require further investigation/recording/negotiation before they can be proceeded with. These will be identified by the Tasmanian Heritage Council.

CONTENTS

Details

Specification

THE BRIEF

The purpose of this report is the investigation of the structural and general condition of the gaoler's residence and the gaol walls in so far as that condition impinges on the further deterioration of the fabric of these structures – and the recommendation of remedial works, on a priority basis, necessary as a result including detailed instructions for the work.

This report is not a survey of the total condition of the gaoler's residence and gaol walls and the concomitant works necessary for their total restoration.

ENGINEER

Because of the very nature of the subject the structural evaluation of the gaoler's residence and gaol walls, and the solutions to problems identified should not be the responsibility of the author of this report alone. It is important that a second opinion be sought from a structural engineer, preferably with experience in conservation work, and that that person be employed to design any new members resulting from this report and the collaboration that cannot be determined by other means.

INTRODUCTION

The Oatlands gaol is leased from the state by the Southern Midlands Council and before that by the Oatlands Council for the purpose of providing the municipality with a swimming pool in the gaol yard. The pool was constructed in the 1950's and, still in use today, is near the end of its useful life.

The gaol is listed on the Register of the National Estate and now also the Tasmanian Heritage Register. In 1986 the Office of the National Estate commissioned Crawford, Cripps and Wegman to prepare a conservation study. This is brief by today's requirements and none of its recommendations were carried out.

In 2003 the Southern Midlands Council commissioned Brad Williams, archaeologist, to carry out a historical study of the gaol as a preamble to future archaeological work on the site (pending re-location of the swimming pool) and, subsequently, to prepare a report on urgent maintenance. Both were completed by April 2004. With respect to the maintenance report Brad felt somewhat uncomfortable operating outside his field of expertise. Consequently Council approached myself in July 2004 to prepare a second report.

What follows is not a bald priority list of works assessed on the basis of architectural experience but a partial conservation study resulting from the need to understand the building as a first step in recognising its problems, finding appropriate solutions and setting priorities. Most of the building fabric involved in the works recommended by this report has been recorded or will remain recordable. Some is yet to be recorded before work can proceed ie the window, sink and door to the men's cook house, internal finishes where cracks are to be investigated/made good and walls stabilized and where items such as dados, floors and ceilings are to be removed.

It is acknowledged that the cart is somewhat before the horse and that a comprehensive conservation study must be done before long if all those involved are to act in the best interests of the gaol's remains and their future.

With regard to remedial works proper guidance and supervision are essential. Much of the work carried out so far, even though with the best of intentions, is less than satisfactory in the long term or indeed the short term, ie when installing valley flashings a strut was dislodged and not re-instated straightaway putting the roof frame at risk of further damage.

SYNOPSIS

After 167 years of existence and 70 odd years of neglect the gaoler's residence at a glance appears still to be in reasonable order. This is something of a misconception.

The roof has spread, become deformed and disjointed with the valley and hip rafters falling out of the hip apexes. A pair of beams across the centre of the building, through change affecting their span and loading, and years of water damage show excessive deflection. The ceilings sag. Chimneys need much attention, the roof has extensive deep rust, chimney flashings have gone and the rainwater goods, though relatively new, are unsatisfactory.

Three out of four walls bow outward at the top, two having broken their connection with the cross-walls and the third having had its cross-walls removed. The north wall and NW corner have extensive cracks probably resulting from the heaving of the clay foundation. Cracks above the front and back doors may also be due to this as there seems to be a reservoir of water under the northern half of the building. The back door lintel is broken and the stonework above has lost much of its mortar from water cascading down from the box gutter.

The cracking in the SW corner in poor reconstruction work where a wall has been removed, and adjacent areas, and the appearance of failing stonework internally at the door head begins to ring alarm bells. Immediately adjacent this corner the western half of the south wall suffers from poorly made alterations resulting in cracked lintels and a promise of future trouble.

The east wall has its cracks and stones swinging out and a stair in a state of dilapidation. Generally there is loose and lost pointing and fretting stonework to be made good.

Remedial work will include the roof being tied together, roof and ceiling timbers and beams strengthened, replacement of roofing, rebuilding of chimney tops, rebuilding of cross walls, tying of external walls to existing cross-walls, strengthening of the NW and SW corners including partial rebuilding, lintels strengthened or replaced, cracks, bulges, pointing loss, etc, etc dealt with, conservation of front steps and improvement to drainage.

The gaol walls all lean outward and suffer excessive dampness, erosion of the surface and efflorescence. The front wall abutting the residence and the gaol entrance wing wall are in a state of dilapidation. The primary remedial action required is the removal

swimming pool as soon as possible, which means **now** if these walls are to be saved from further gross disfigurement and damage. The tops of the walls require rationalizing and made to shed water and the gaol entrance walls rebuilt and conserved.

BRIEF SURVEY OF PLANS in relation to the actual building.

The aspects that will be examined are those touching on the building elements recorded in this report for the purpose of determining remedial work and will be limited to the gaoler's residence.

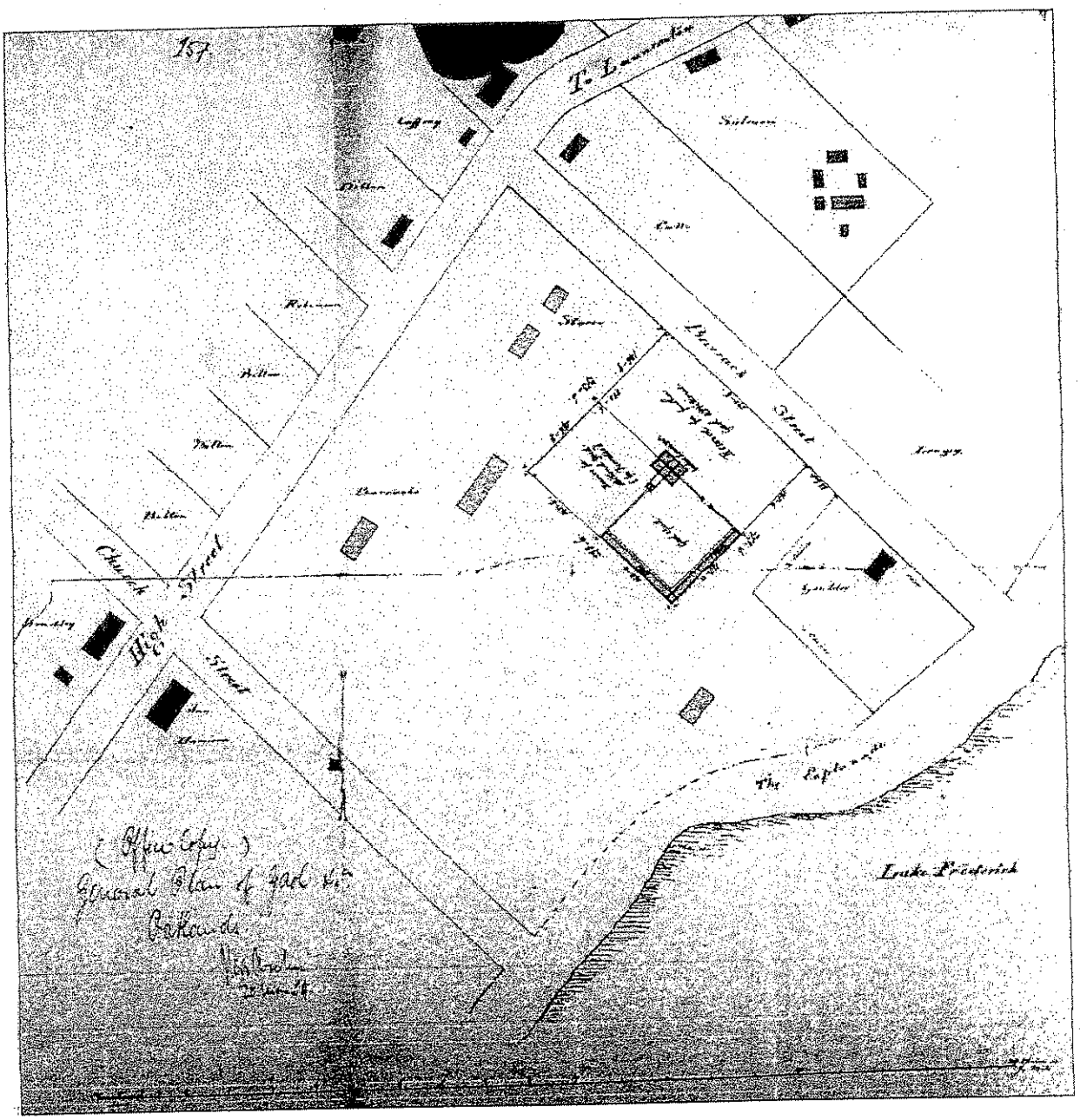
None of the plans, even those which purport to represent the gaol after completion, correspond closely with the actual building though the differences between the plans are minor. All show the residence as a regular rectangle.

Archer's 1835 plans show the Women's Yard wider than the residence with each wall of the yard canted inwards to accommodate the narrower width of the residence. William Kay's 1844 plans show the residence the same width as the Women's Yard, the latter being the same width in both plans. What was built was a residence with a front similar in width to Archer's plan and a back the width shown in Kay's plan. This solution created an irregular plan onto which had to be placed a regular roof. This meant that the stone cornice projected varying amounts (but when viewed from the front the left projection matched the right) and the roof frame was pitched off timber plates in different locations on the cornice (even beyond the wall face in one case) and, although the roof is regular in shape it is wider from centre to south than from centre to north. Consequently the SE hip does not line with the corresponding valley. Even so the roof could not be made to cover the outer part of the south wall projection without a narrow strip at a shallow angle. Having to pitch the roof from beyond the face of the front half of the south wall may also have prompted the carpenter to lay the ceiling joists N – S across the long dimension of the rooms rather than the shorter dimension to prevent this section of cornice tipping outward.

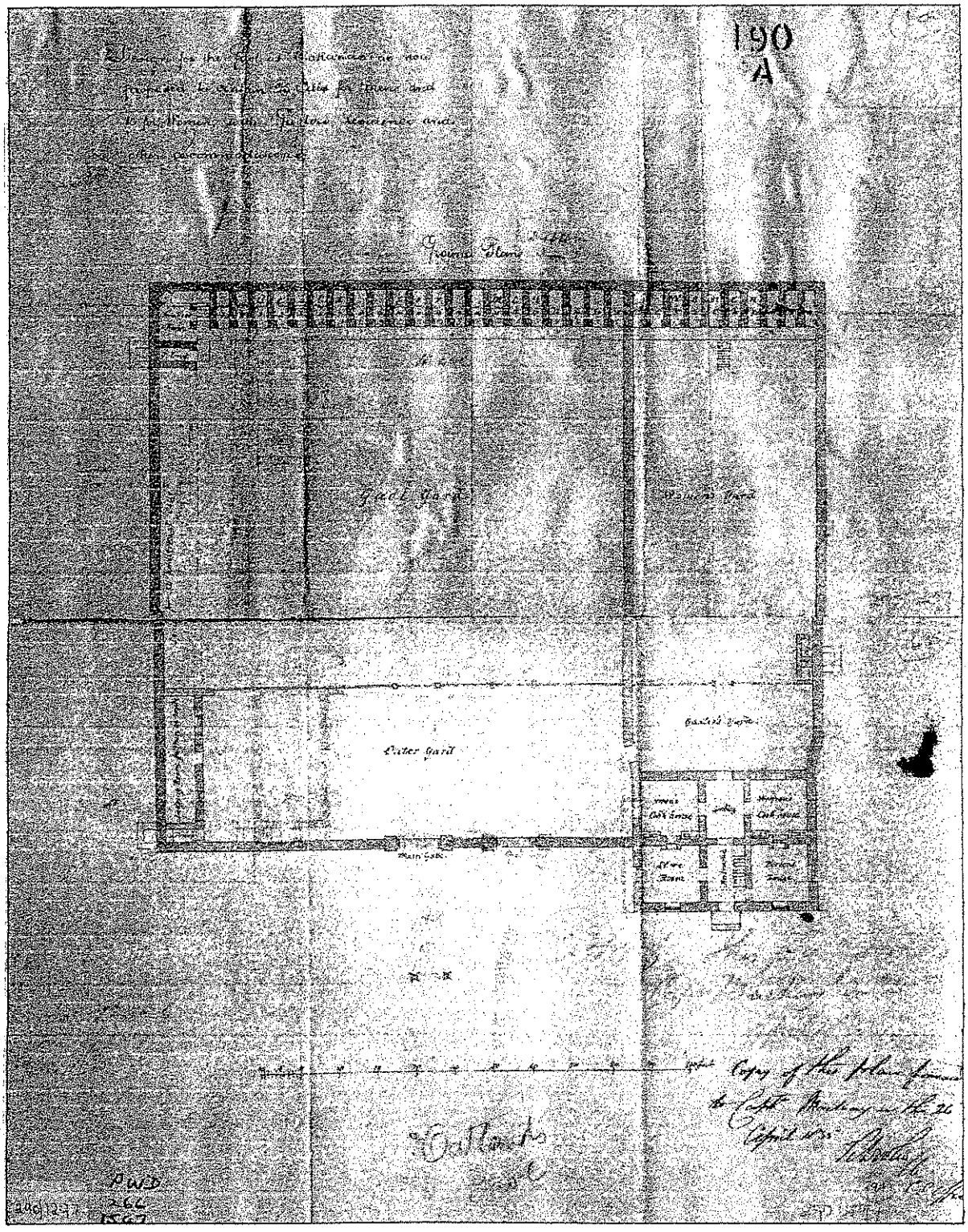
The north wall also has a step of some 75mm. This appears to have no purpose but does correspond to the position of a gaol wall in a plan for a much larger prison design proposed in 1834.

The south window of the parlour (on the first floor) is shown as a window on William Kay's plan and this is how it was built, but Lee Archer's plan shows a door. The evidence from the building is that initially a door was intended as there are perpends one above the other in line with the window reveals from floor level up. What could have been the purpose of this door? In 1841 in order to improve security at the gaol it was recommended (among other things) that "Mr Smie's [presumably the gaoler] window be made into a door or french doors and a gangway to look out in the angle." (AOT CSO 5/274:7123:147-53) Was this the original purpose?

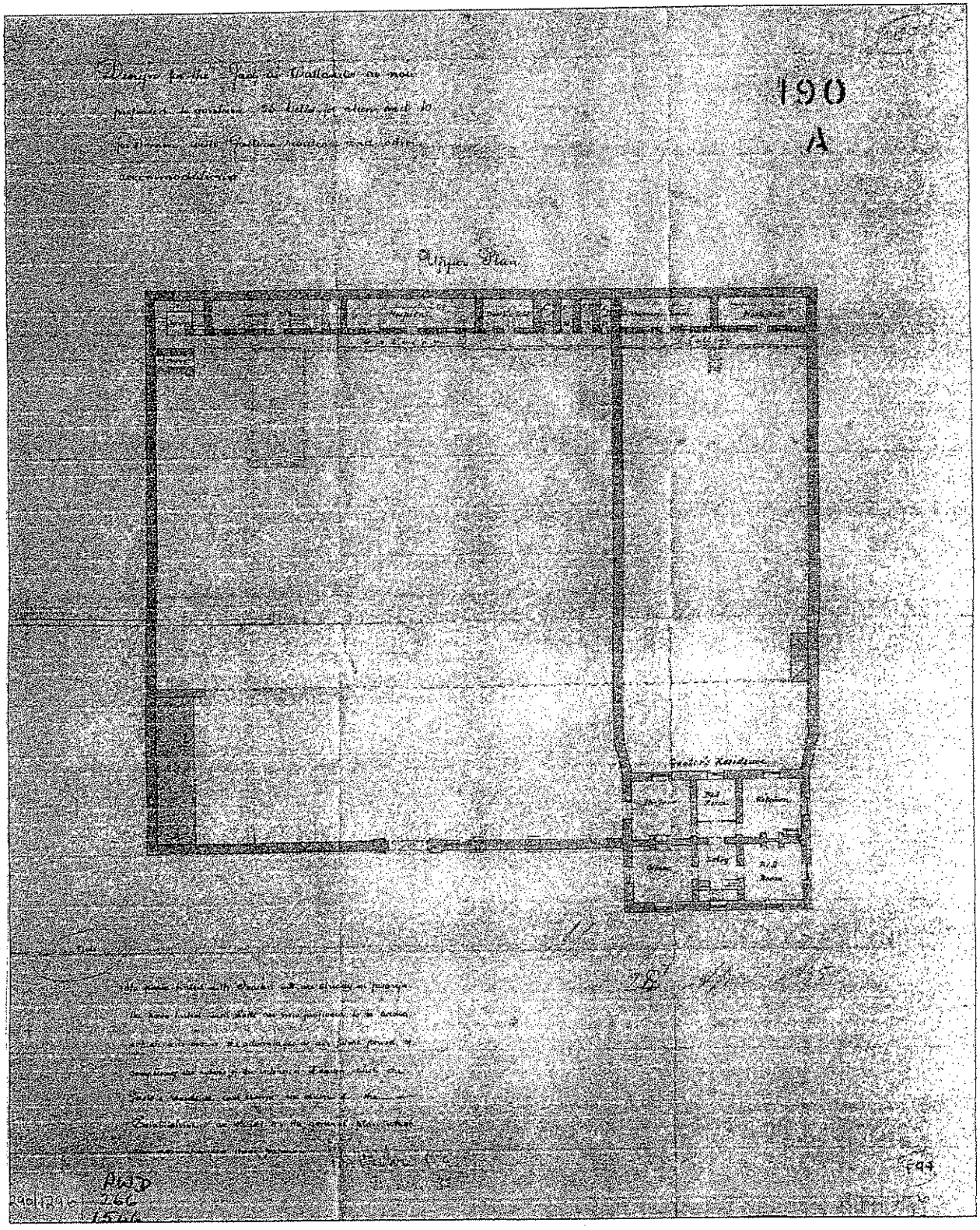
In 1838 a board of inquiry inspected the gaol. One of its recommendations was "The present women's kitchen [sic – actually refers to the men's kitchen – Brad Williams Oatlands Gaol Historical Report and Archaeological Survey P 20] to be altered into a Javelin Men's room, the window opposite the fire place to be removed ....." (AOT CSO 5/97/2165:90-8) Kay's 1844 plan drawn after the completion of the gaol in 1836



LEE ARCHERS FIRST DESIGN FOR THE OATLANDS GAOL, FOUR TIMES THE SIZE OF WHAT WAS BUILT.



LEE ARCHER'S 1835 GROUND FLOOR PLAN OF OATLANDS GAOL.



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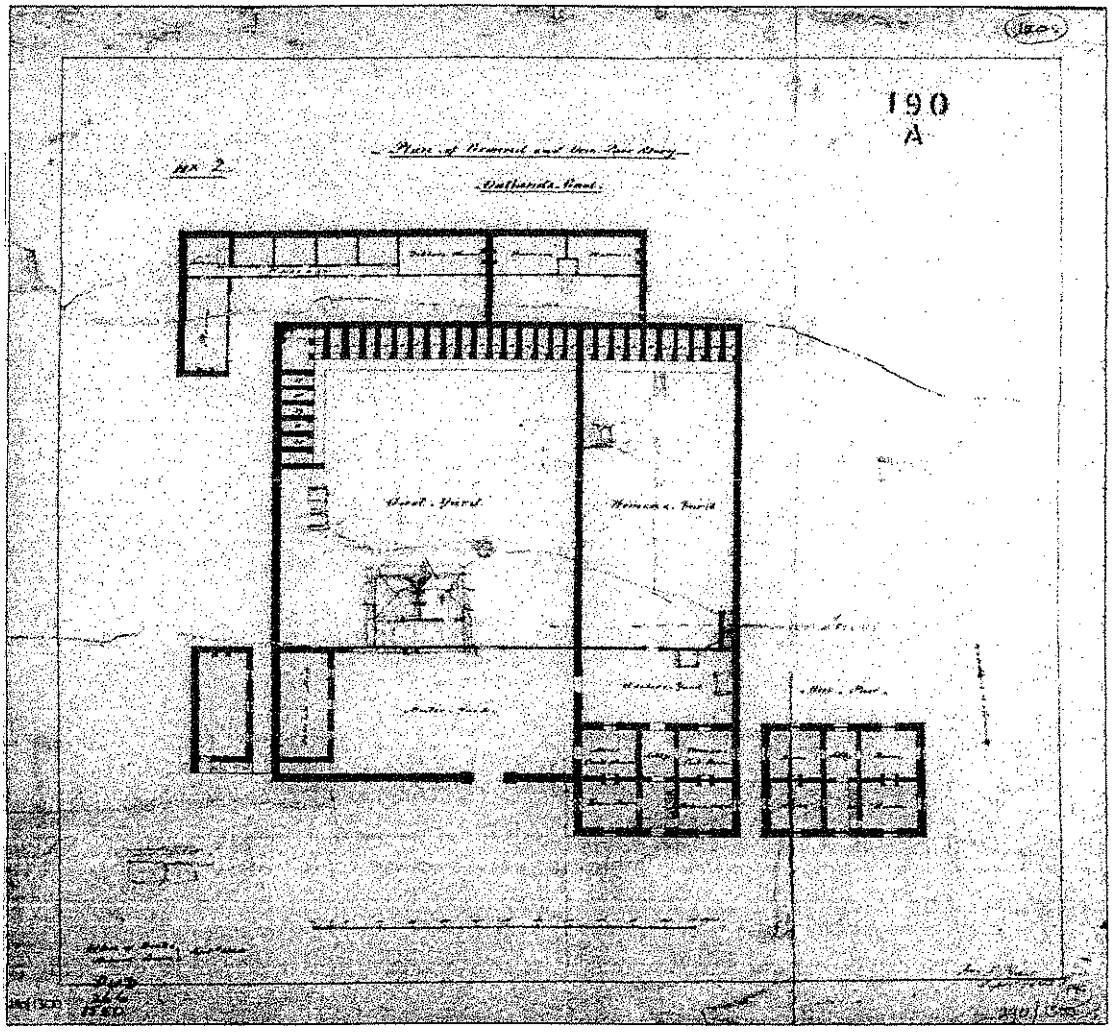


WILLIAM KAY'S 1844 PLANS OF THE OATLANDS GAOL.

shows a window opposite the fireplace and a door in the present window location. Archer's 1835 plan has the window drawn but blanked in! The evidence from the building is that there was a door in the present window location and the window opposite the fireplace has been removed. A window has been installed in the former doorway and a new doorway cut in beside it. If this is the correct explanation the Board's recommendation could be read as indicating that there was a highlight over the door. In support of this the lintel on course 9 and the stonework around it look as if it was there from the beginning. The existing window is framed in this manner (in relation to the course 9 lintel) as if the door frame was left in situ and altered to make a full window. It is a curious thing that the repairs where the window was removed are of a much higher standard than the changes around the corner. (See P 81)

Lee Archer's plan shows the N-S central masonry wall on both floors running right through the building and a stud wall on the first floor to the west of it forming a short passage. William Kay's plan shows the same masonry wall but not the stud wall. What was built on the first floor was just the stud wall, as the ground floor masonry wall was built to the west of the centre of the building to accommodate the stair, with the stairwell balustrade on the line of the central wall.

ROOF AND CEILING TIMBERS

All roof and ceiling structural timbers are pit sawn hardwood with a fair percentage having sapwood. All sapwood has been completely eaten out by Lyctus borer. All have been used green and many show evidence of shrinkage collapse. Particularly in the long ceiling timbers some have bent and twisted due both to the use of poor quality timber and overstressing.

A number of joists over the NE bedroom have the Roman numerals II, V and X which may be sawyer's or carpenter's identification numbers. One of the hip apex braces has the initials 'FJ' carved into it. The joints of the mortised and tenoned trimmers around the northern chimney breast are also marked with Roman numerals cut in with a chisel – I/I, II/II, III/III, etc.

R. Hall, the Superintendent of Public Works at Oatlands comments on the lack of sawyers in the settlement with only one pair of men available (AOT CSO 1/691/15206:74). He also makes the following statement to Lee Archer that, "The only trees in the neighbourhood of the settlement fit for the saw, is a sort of bastard wood between stringy bark and gum (and it is only to be found on a tier of hills 7 miles off) which thrusts and twists and turns in all directions and should not be used in any building until it has been sawn for at least a month, or perhaps some months." From his description he could be referring to a Peppermint, possibly the Black Peppermint, using bark as his means of identification.

Member sizes are

- Central pair of beams 200 x 90mm.
- Wall plates, corner braces and various strutting plates 130 – 140 x 65 – 70mm
- Ceiling joists 125 – 140 x 60 – 70 mm at 600mm and 450mm centres.

- Common rafters 55 – 65mm thick tapering from 140 – 150mm at the eave to 80 – 90mm at the ridge and spaced at 450mm centres. Creeper rafters are cut from common rafter stock to match the corresponding part of common rafters.
- Hip and valley rafters 125 – 140mm x 30 – 32mm.
- Ridge boards 145 x 20mm.
- Hip and valley rafter struts 85 – 90 x 70mm.
- Apex struts – common rafter stock.
- Rafter propping boards 150 x 25mm.
- Ledgers 40 x 30mm.
- Modern ceiling hangers 75 x 25mm.

The sizes given above are *as measured* rather than indicating the sizes cut and used originally.

ROOF AND CEILING FRAME evaluation

The residence has a typical hipped roof of 34° pitch presenting ridges to the front and sides and two hip ends to the rear in an 'm' configuration with a box gutter between.

A timber plate was laid loose on the stone cornice, half housed in splices and at corners and tied together by dovetailed cross-wall plates and corner braces and a pair of (gutter) beams extending across the full width of the building. Rafters were pitched off the perimeter plate and (except on the eastern half of the south wall where the plate is at the outer edge of the cornice – due to fitting a regular roof to an irregular plan) reverse birdsmouthed to finish at the top outside corner of the stone cornice. (See Detail 11, P 72.) Hip rafters are propped off plates laid over the ceiling joists while valley rafters are propped directly off the joists. There are other props which have no rational explanation except perhaps an inclined pair of long props from the central pair of beams to the apex of the front hips. These struts are carrying roof load and it may be surmised their inclusion was a deliberate attempt in the part of the roof with only widely spaced ties against roof spread to relieve the long ridge board of thrust (imposed by the hips) to prevent its lateral displacement and consequent roof spread.Rafters were pitched off the central beams allowing a gutter to be formed in between. Trimmers at the chimneys were housed into the top of the rafters each side to support cripple rafters. Ceiling joists were run N-S bearing upon stone cornices and internal brickwork and housed over plates and corner braces.

Roof spread

There are no collar ties, reliance for the countering of roof spread being put in the restraint offered by linked and braced plates, the two central beams housed over plates and, in the N-S direction, ceiling joists as well. Curiously, while the joists over the four main rooms are nailed at each end the short centre ones (each side of the centre pair of beams) are not restrained either laterally or longitudinally. Not being linked over the length of the building any restraint provided by these joists must have come from the lath and plaster ceiling (and more recently caneite and masonite ceilings) acting against walls and chimney breasts. In the E-W direction where one would have expected binder joists (mortised, tenoned and pegged to outer joists and housed over plates) to make use of the ceiling material bearing against walls there are none. The

diagonal hip strutting plates, nailed at each end to joists and bearing roof load, and the corner ties and friction all contribute to the restraint of roof spread.

The roof has spread in all directions. On the north and south roof spread is difficult to establish by looking at the timbers. On the north the outside wall and cornice have moved away from the central cross-wall by 25 – 30mm. The roof has dropped at both chimneys, quite noticeably at the south chimney. The greatest movement, a total of approximately 95mm, has occurred in the central part of the long walls, ie E-W. This should have caused the long east facing ridge to dip in the centre more than it does. What has happened is that the central pair of beams and ceiling joists bearing roof load have deflected allowing the hip apexes to drop.

Central beams and valley rafters

It is likely that the size of the central pair of beams was determined on the basis of a 4700mm span east of the central N-S masonry wall. Lee Archer's plans show a passage on the first floor formed on the west side of the masonry wall by a timber stud partition. The masonry wall at this passage was not built thereby increasing the span by 29%, most likely causing the beams to deflect under their own weight and some alarm to the carpenters as the beam which shows the greater deflection has an iron collar around its scarf joint, presumably to close the crack along the centre line. These beams were most likely installed green and the collar positioned at the same time as there is a gap of some 12mm, probably representing timber shrinkage, between the timber and the top of the collar. Refer Detail 5. (P 69) At a later date, possibly in the 1940's when the gaol was used as an army base, the masonry cross-walls to the west of the central N-S masonry wall and the timber partition were removed to make one big room. The ceilings were re-supported by providing hangers from the roof and a new stud wall was built in line with the central N-S wall to support the pair of central beams. With increased span and additional load the western half of the beams deflected (as did the top member of the stud wall) allowing the valley rafters to drop. As the hip apexes were held up by the long diagonal struts, one valley rafter fell right out of the apex and the other broke its back. In addition long term leakage from the box gutter has caused extensive rotting of the beams, spacers, joists, etc, seriously impairing a scarf joint and reducing beam size to an effective 170 x 70mm, or even less. Refer Details 1 and 3. (P 66, 68)

In addition:

- The northern beam of the pair is weakened at the scarf joint by the housing and mortising of other timbers, rot and a long crack.
- A long crack in the southern beam scarf joint.
- Many rafters have deflected.
- The long ridge has developed a slight lateral sine curve.
- The lower half of the northern valley rafter has deflected.
- The southern valley rafter has a considerable bow to the SW.
- Creeper rafters are parting company with the valley rafters.
- A hip rafter in the SW hip end is dropping out of the apex.
- A short ridge board at the NE hip apex has split.
- Ceiling joists show considerable deflection.

In conclusion

It is evident that as some roof members (including the beams) are stressed close to their limit and that the roof, because of its deformation and disjointing, is more than usually flexible and subject to vibration and movement. While no doubt it has survived the last 167 years it now has no realistic margin of safety and its survival let alone safety without considerable remedial work cannot be assured.

ROOF AND CEILING FRAME remedial work

To a significant extent the conservation and long life of the Gaoler's residence walls is dependant on the stability of the roof. The walls bow outward at the top and are cracking primarily as a result of roof vibration and spread. While the rate of movement in the walls is slow cracks that have appeared in previous patching show that it is continuing.

It is essential that the roof regain structural integrity and sufficiency. This can be achieved by either rebuilding it to modern standards or by stabilizing and re-supporting the existing structure to an extent that will achieve the same aim. The latter approach is practical and should be adopted.

Rebuild cross-walls

A key requirement of the conservation of the roof structure is to relieve the central pair of beams of as much load as possible, ie reduce spans and re-direct load by re-instating previously removed walls. This raises the question should the present large back room be retained to represent a more modern aspect of the history of the building (and perhaps be more appropriate to its re-use) or should the walls be rebuilt in accordance with the building's original function? As the modern use of the Gaoler's residence was intermittent and opportunistic (art school, World War 2 soldiers' base and meeting rooms for the CWA and Rural Youth – Brad Williams, Oatlands Gaol Historical Report and Archaeological Survey, P 30.) it is reasonable to suppose that the primary historical and archaeological importance of the residence is that it formed an integral part of the Oatlands Gaol and the gaol an integral part of the colonial penal system. It may also be reasonably stated that the demands of the conservation of the original fabric far outweighs any minor historical interpretation. Remedial work will, therefore, be discussed on this basis.

The building of the cross-walls will once again allow the ceiling joists from the parlour and kitchen to bear on masonry and the ceiling of the small bedroom can be made with new joists below the central pair of beams spanning between the walls. The building of a new stud wall in the original location (though not necessarily in this stage of the work) will permit a new beam spanning between the masonry walls and concealed within the stud wall to be installed for their support. This will reduce the western span of the central beams by 29%. The original ceiling joists over this area and the present stud wall can be removed. Refer CEILING FRAMING PLAN remedial work and Details 1 – 4 (P 42, 66 – 68). The bricks for the cross-walls present something of a problem. The sandstock bricks used in the residence are larger than what one usually encounters and probably means that they will not be obtainable. If not, modern recycled pressed clay bricks should be used with a slightly thicker bed

joint than normal to bond with the original brickwork. Removal of modern patching of the external wall should reveal the bond to be adopted there. Compare brick sizes:

- Normal sandstock 210 x ?mm x 20 courses = 1505mm.
- Oatlands gaol 225 x 110mm x 20 courses = 1800mm.
- Modern 230 x 110mm x 20 courses = 1714mm.

Central beams

It is assumed the rotting of the original beams will cease once the present gutter leak is fixed. However, if ultimately the ceilings are insulated to render the building more useable the insulation material should be kept back from these beams to allow the free flow of warm roof air around them, and a vapour barrier should be installed between the ceiling and the insulation to avoid condensation. New spacers are to be installed between the beams where the existing ones are rotted and the gutter board re-set to fall to the outlet.

Removal of the existing stud wall supporting the central pair of beams will increase their span over the first floor lobby and will almost certainly cause them to deflect once again, particularly as they bend upwards over this point. As this wall must ultimately be removed it seems sensible to place another beam here, but above the ceiling, to keep the same span and retain the present shape of these beams thereby avoiding the possibility of further deflection and consequent damage as they straighten. Although this eastern span has deflected an amount (115mm, one fortieth of the span) far in excess of the permissible deflection for timber the beams are not springy and, as new vertical struts to be placed under the hip apexes will relieve the existing diagonal struts landing on these beams of much of their thrust there ought not be a need for additional support. However, the present deflection should be accurately measured before the new apex struts are installed and then monitored over the following 12 months or so to determine the veracity of this assessment.

Ceilings

The main first floor ceilings have all sagged as a result of imposed roof loading, long spans and joists under-performing due to drying collapse, Lyctus borer eating out the sapwood and the use of poor quality timber. No attempt should be made to straighten the ceilings by drawing them up to a line as it would disengage them from the wall plates, or by battening underneath as this would destroy a feature that conveys the very comfortable and important feeling of age.

Though the joists have survived to this day and could be said to need no additional support it is clear that many of them are stressed beyond a reasonable limit. The simple solution to this problem is to reduce their span by providing hanging beams. Refer CEILING FRAMING PLAN remedial work and Detail 10 (P 42, 71). Note that the hanging beams will also serve as roof ties and should be adequately nailed or bolted together in the lap, and to support one end of the hip apex strutting beams. Should joists remain wobbly after installing the hanging beams they should have battens nailed over the top.

None of the first floor ceilings are original. All, except possibly the pine lining boards in the long back room are modern, ie installed in the 20th century. The Caneite and

Masonite ceilings relate only to the incidental modern usage. Once adequately recorded all first floor ceilings, except over the lobby, should be removed (carefully in the case of the pine lining boards as these are to be cleaned and saved for re-use) to improve lighting and access, and therefore safety, for work in the roof. Ceiling joists should be battened temporarily top and bottom during this work.

Valleys and hips

Making the valleys and hip apexes sound is essential to the structural integrity of the roof as a whole. As always there are more ways than one of doing things, and some are more likely to succeed than others. There are two clear alternatives for making good the valleys. The choice of the alternative to be adopted should be made in consultation, with the contractor for the work included. The alternatives are

1. Replace the existing damaged valley rafters with new ones inserted into their correct positions.
2. Shore up the existing valley rafters in as near their correct position as is practical.

Common to both are:

- The strutting of the upper ends of both valley and hip rafters from new beams and the linking of these struts in such a manner as to hold the hip apexes together and transfer thrust.
- The re-connection of creeper rafters and general making good of valley timbers.
- The re-support of the lower end of the central common rafter.
- The strutting and making good of a hip rafter in the SW hip apex.

Refer to

- VALLEYS AND HIPS remedial work Alternative 1. (P 46)
- VALLEYS AND HIPS remedial work Alternative 2. (P 48)
- Details 26, 27 and 28. (P 86, 87)

Roof spread

The prevention of further roof spread is essential to the conservation of both the roof and the external walls as it is evident that the one is causing deterioration in the other, albeit at a slow rate. For roof spread refer CEILING FRAMING PLAN as it is now (P 40); for wall movement refer WALL MOVEMENT (P 52). It is surprising that the roof was built without collar ties and/or linked ceiling joists tied to pitching plates in both directions.

Because of the configuration of the roof N-S collar ties are not possible in the eastern half. It is proposed therefore to link ceiling joists with steel rods across the first floor lobby. Refer CEILING FRAMING PLAN remedial work and Details 7 and 8 (P 42, 70). This system is not possible in the western half of the roof due to the box gutter and the deterioration of the central pair of beams. Other methods of linking joists below these beams, and joists to rafters over the small bedroom were considered but rejected in favour of the more direct traditional method of collar ties to stabilize each hip end separately, and placed low in the roof to avoid causing any further deflection in the rafters. Refer ROOF FRAMING PLAN and remedial work (P 44). The two hip ends can be linked together to prevent contrary movement causing cracks in the

external wall at this point by way of stops attached to the new ceiling joists over the small bedroom. Refer Detail 29 (P 88).

In the E-W direction the roof shall be restrained by a system of steel ties (and ceiling hanging beams acting as ties) anchored to the rafters just above the ceiling joists. Refer ROOF FRAMING PLAN and remedial work and Details 9 and 10 (P 44, 71).

For 167 years rafters pitched from beyond the face of the south wall have not moved the stone cornice one scrap, but it is an inherently unstable situation and will move if the existing conditions are changed in some way. To add certainty to this detail roof load should be directed onto the inner part of the wall by the addition of ashlering. Refer to CEILING FRAMING & ROOF STRUTTING PLAN as originally constructed (P 38).

ROOFING and rainwater goods

The corrugated iron roofing has not many years of life left, perhaps 10, at a guess. There are works that need doing before that, preferably immediately. The galvanized steel downpipes will not last with water running into them from zincalume spoutings and the bird proofing and the long ragged overhang into spouting discourages regular maintenance. Some of the existing roofing must be temporarily removed for valley rafter remedial work. What the building needs to carry it over the next 50 – 60 years is a new, complete, unified and compatible system of roofing and rainwater goods preferably all galvanized rather than zincalume or colourbond as the latter finishes are not traditional. Refer to ROOF PLAN and remedial work (P 50).

THE STONE WALLS evaluation and remedial work

The first question is *what is the condition of the walls?* This can be answered straightforwardly enough. The next is *what should be done?* This can involve getting into a difficult area of *what will happen if certain things are not done?* The approach in this report in relation to the second question is to always describe only the fullest reasonable solution for the desired end which is *the achievement of a sound structure that, with normal maintenance, will remain so for the next 100 years.*

The general health of the walls of the Gaoler's residence is quite satisfactory, possibly due to the use of a good quality lime mortar throughout, including in the rubble core (which improves bond with blocks and friction between them and prevents deterioration and movement in the core); with some exceptions, satisfactory bond; the cornice of large full thickness (of the wall) stone slabs; and the apparent absence or limited presence of rising damp and associated fretting. However, there are some areas of concern. They are

- North wall cracks and bulge.
- The NW corner where the gaol wall was removed.
- The area of mortar loss and broken lintel at the west door.
- The SW corner where a gaol wall was removed.
- The alterations to the south wall.
- The south wall where the gaol wall has been removed.
- Cracks and rotating stones on the east wall.
- Bowing walls and cornice on the east, north and west.

- The front steps.

North wall cracks

There are two significant cracks in the north wall which were noted in 1985 by Crawford Cripps and Wegman . At least the LH one of the two had been re-pointed earlier than 1985 as the same grey pointing can be seen in photographs taken at the time (Crawford, Cripps and Wegman, The Gaoler's Residence Oatlands A Conservation Study.). This crack has opened 5mm since the re-pointing.

The nature of this crack suggests footing subsidence but the bed joints are straight and level. Examination of the footing below this crack and at a point 4 metres west of the NW corner of the residence reveals the building and gaol footings to be rubble apparently founded on bedrock, however, a bricklayer's trowel pushed in under the footing with only moderate resistance gave the impression that the footing actually sits on a bed of clay of uneven thickness (50 – 100mm?). A more thorough investigation was prevented by a flow of water into the holes, very fast from under the building and slower through the gaol wall. A third hole was dug against the east wall close to the SE corner. Here the bedrock was higher and the rubble footing shallower and bearing on a 200mm thick bed of clay. This hole remained dry. The clay in all three holes is yellow streaked with grey.

By and large the east wall is dry enough at the base that there is no fretting whereas the north wall has a course of damp fretting blocks near ground level. That water flowed very quickly into the hole below the crack suggests the ground floor fill is quarry waste with a considerable proportion of connected voids. During wet periods (as is this winter) this reservoir would keep the relatively thin bed of clay saturated and swelled while during dry periods it would shrink, thereby causing stresses within the wall which get relieved at places of weakness such as lines of poor bond. On the east where the clay bed is thicker but higher and not so wet there are no cracks like those in the north wall. It may well be that the nature of the fill in forming a reservoir is restricting the water and the damage to the low (north) side of the building thereby preventing damage to the other walls that would otherwise occur if the fill had no voids and the damp was therefore more general.

With respect to an appropriate remedy there is a natural tendency to attempt to strengthen the bond across such cracks by the insertion of steel ties in the bed joints. It is unlikely that this would equal the strength of the surrounding stonework with the consequence that the crack would reform and the ties pull loose. The cracks should be pointed and monitored. The amount of movement may be able to be reduced by constructing a pit at the fissure in the footing below the LH crack and laying a drain to the nearby storm water pit in the street to drain off the water under the northern end of the residence. Removing water from under the building aught to go some way to equalizing the moisture content of the clay foundation as then the principal influence would be moisture from outside the building, and that which periodically flows on top of the bedrock, common to all sides. Refer NORTH ELEVATION and remedial work and Detail 25 (P 56, 84).

North west corner

The cracking at the NW corner of the residence, being at a corner, could have multiple causes but the major cause is the same as for the north wall cracks. A third crack on the north side noticed by Crawford, Cripps and Wegman in the gaol wall near the junction with the residence, and now lost to view in an area of recent re-pointing, most likely links up with the crack which now inhabits the poor *making good* in the residence wall where the gaol wall has been removed. This crack may have originally extended up through the gaol wall at or near this junction and could have influenced the decision to remove this section of wall when the government was obtaining building material for the school. (Brad Williams, Oatlands Gaol Historical Report and Archaeological Survey, P 34.)

The making good after removal of the gaol wall is very poor. The scar was simply *filled in* with small blocks with no attention given to the need for good bond, either structurally or visually. Remedial work at this corner, therefore, should aim to make the stonework of the corner as strong as the bulk wall areas either side by building in re-cycled blocks and reinforcing the corner with steel ties built into the joints, all as shown on Detail 22 (P 78). The use of ties in this location to provide additional strength rather than the whole strength means that they are more likely to give value for money. Refer to NORTH ELEVATION and remedial work; Detail 22 and WEST ELEVATION and remedial work (P 56, 78, 58).

Recycling of stone

The strengthening of the existing stonework by partial rebuilding using new or recycled blocks should not be an issue for there is little merit in retaining the result of poor workmanship by tradesmen who had nothing to do with the original erection of this building. The reasons for suggesting the use of recycled blocks rather than newly quarried ones are both economic and aesthetic. The problem with using recycled blocks is that course height at the Oatlands gaol is greater than what one usually encounters and would make finding suitable Oatlands stone all but impossible. There is of course a plentiful supply of the correct material right at hand in the remains of the gaol walls, though this may well be considered taboo. However, these walls have already been reduced to a height that registers with an observer as *remains* of a gaol wall rather than *the wall of a gaol* – the 2900mm remains cannot psychologically represent the inhuman notion of confinement behind a 7800mm high wall therefore the effect of the removal of a course of blocks along part of the remaining walls would make no difference to the perception of the gaol or the quality of their experience, and could make the preservation of what then remains easier to accomplish. It is certainly the best way to ensure the preservation of the gaoler's residence. This matter bears thinking on.

At the back door

The area of substantial mortar loss above the back door (almost certainly caused by water cascading down the wall from the gutter above) requires the replacement of its mortar, to at least 75mm depth for the efficacious return of bond strength and the ability to arch over the opening below. The broken lintel should not be replaced for it would not be possible to find another of this colour, used almost throughout the

building to distinguish these elements. The lintel should be propped and a mild steel flat bar bedded into slots cut into the top of the reveal stones each side of the opening to give it support. The bar is to be set in the middle of the thickness of the lintel and the slots must not be cut through to the face of the wall. Refer to WEST ELEVATION and remedial work (P 58).

There may or may not be anything in the observation that there are cracks between both front and back doors and the windows above. Since the bedrock slopes down to the north forming a reservoir of water (?) below the northern half of the residence it is possible this part of the building is moving due to foundation movement out of synchronization with the rest.

South west corner

The SW corner of the residence suffers from dispersed cracking due to roof movement, alterations without regard for proper re-construction and the failure of the internal stonework at the head of the men's cook house door. The crack along a line of weakness starting at the first floor window could be due to several causes. This corner is in trouble. No doubt it has stood for 167 years but it is also potentially unsafe.

The strength of the corner must be re-established with the partial rebuilding and tying together shown in Detail 24, (P 82) including internal work at reference 3, and at reference 8 in Detail 23. (P 80) A certain amount of careful investigation at the doorway and window to the men's cook house will be necessary to determine the amount of repair or re-building necessary. Refer WEST ELEVATION and remedial work; SOUTH ELEVATION and remedial work (P 58, 60).

Wall removal scar

The scar left by the removal of the front wall of the gaol needs to be made good to return structural strength and integrity to this part of the building and to keep the weather out of the interior of the wall.

The wall may be made good in one of two ways – create a step in the wall or build an engaged pier the thickness of the gaol wall. The first alternative if done entirely with face blocks would answer well enough if, because of the dearth of through stones the two skins of blocks are pinned together with metal anchors. Refer Detail 19 (P 76). If the wall's core is to be exposed for interpretation purposes such a neat solution is illogical in that it cannot truthfully portray what it represents and impractical in that it will be difficult to build. If interpretation is to be considered it would be better to build an engaged pier, say 1500mm from the wall to outer end as it can be designed to portray the reality of wall construction while providing strength and continuity for the residence. If finished with a coping it could also give some notion of the gaol wall and its intimidating height. This is the preferred option. Refer SOUTH ELEVATION and remedial work; Details 23 + 24 (P 60, 80, 82).

Walls bowing outward

The stone cornice and upper parts of external walls of at least three elevations have bowed outward. The fourth, the south, requires more sophisticated means to determine if it bows – which probably is not warranted as the evidence of only narrow internal cracks and little patching suggests that it does not bow and, should an engaged pier be constructed where the gaol wall was removed any existing bow will be of little consequence.

The evidence so far is that these walls are moving outward intact rather than delaminating – the separation was measured above the tops of the walls on the north and by drawing a string line internally on the west. Though the bow is quite small, only some 25 – 30mm, the east and north walls have broken their connection with the cross-walls, their principal means of restraint. Even with roof spread curtailed the outward movement (even if very slowly) can continue under the influence of vibration from the roof, earth tremors and wind. Once formed cracks often continue to grow through loose particles falling into the interstice thereby preventing it closing. Though these walls may not be in danger, except in an earthquake or freak wind, internal cracks at cross-walls and edges of ceilings will continue to appear no matter how many times they are made good. The east and north walls should be tied back into the cross-walls with steel anchors. Refer EAST ELEVATION and remedial work (P 54); NORTH ELEVATION and remedial work (P 56); and Details 18 + 19 (P 76). The west wall, if the new brick cross-walls are bonded deeply enough, and mortared in tight should be satisfactory without anchors.

Repointing

The repointing of stonework generally receives too little consideration, especially its appearance. While the maintenance of pointing is essential to keep water out of the walls it more often than not mars the appearance of the buildings. The stark, spotty, patched appearance so often seen cannot be attractive to the users, and potential users of historic buildings who are so necessary for the continued survival of the built heritage. Even when whole facades are repointed the stark white one sees used completely overpowers the mellowness of the stone transforming handsome buildings into gaudy kitsch.

Effort should be made to match at least the colour, and if at all possible, the particle size of the original mortar by selecting an appropriate sand. The original pointing mortar used in the gaol is pinkish river sand of large particle size. While the cost of completely repointing the residence (and the gaol walls?) is questionable obtaining a matching sand, and even the complete repointing of one or two facades of the residence and gaol should be given serious consideration. It will ultimately pay a dividend.

THE FRONT STEPS

The steps are single long slabs of sandstone (or were, as most are now broken) supported by dressed stone walls each side and quarry waste fill between. With constant use they have worn very thin in the middle and since the rubble fill has subsided they cracked and pieces were lost. The worn steps have been continually

repicked to maintain non-slip surfaces. The steps have never had a balustrade. Each tread was bedded in mortar on the side walls but were either mortarless in the lap of one over the other or bedded in what looks as if it could have been a paste of lime and stone dust. Most are loose and some are displaced. Refer to Detail 17 (P 75). Remedial work is now a necessity though this cannot be considered in isolation from the requirements of the re-use of the building.

The architecture of the gaoler's residence demands that the public approach it from the front and enter up the flight of steps and in the central door. This is somewhat problematical as the steps, being excessively worn, do not comply with the essential benchmark for safety, the Building Code of Australia. Also, the landing, being only 900mm wide is not wide enough to accommodate a disabled person's ramp which, though not mandatory is inevitable under the terms of the Discrimination Act. Therefore the use of the existing front door raises the issues of public liability and discrimination which could be expected to result in the existing steps being rebuilt and a long ramp installed in accordance with modern standards.

The options are that the existing steps should be conserved in situ or relocated elsewhere. In their very worn and cracked state they are a potent expression of the passage of time, such as is rarely seen. Much of this potency is due to their visual association with the entrance doorway centred in the building façade. Removal and display or re-erection of the steps elsewhere as an interpretation exhibit would rob them of their emotive power and reduce them to the status of being the subject of an intellectual exercise. While this issue of the entrance and the steps is not something to be resolved in this report the problem must at least be introduced for if the steps are to survive they must either be adequately conserved as soon as possible or be removed to storage for protection. Despite being practically unused over the past 18 years the amount of deterioration in that time is significant and, because of the present condition of the steps, this can only proceed at a much greater rate in the future. (Refer photographs, Crawford, Cripps and Wegman, The Gaoler's Residence Oatlands, A Conservation Study.)

For the purposes of this report it will be assumed the steps are to remain. In order to arrive at this point a plan showing how these issues might be resolved in future was prepared – see THE ENTRANCE STEPS and a new entry (P 62).

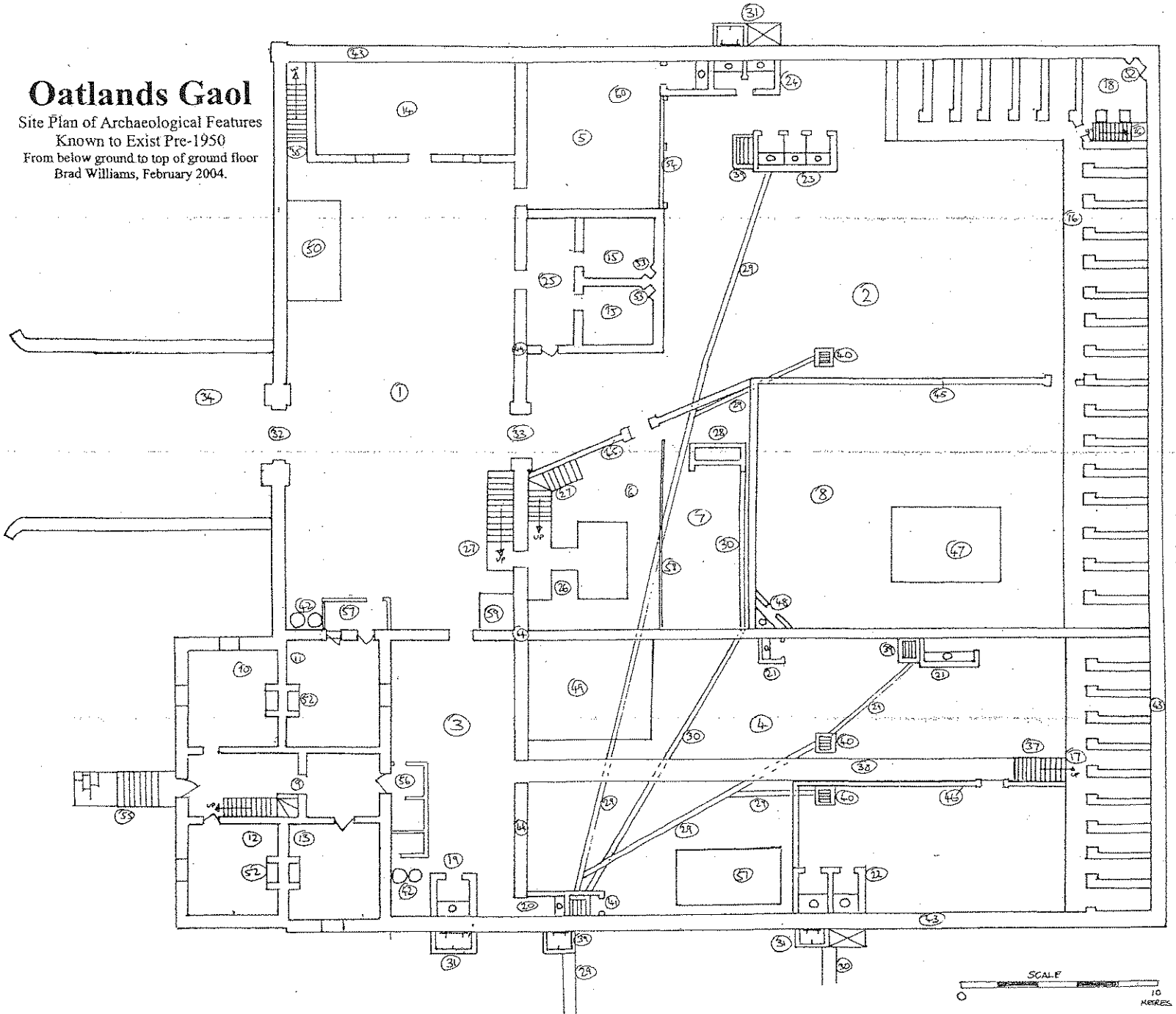
Conservation will necessitate removing the steps to build up and make solid the quarry waste core, then re-bed them and make good the lost portions with a lime concrete finished to the shape of each step. One tread is as yet unbroken and will require a purpose built lifting device to handle it. Refer Detail 30 (P 88).

GROUND WATER

Much of the older part of Oatlands sits on sandstone which outcrops here and there but mostly lies 500 – 800mm below the surface. In wet periods water is known to flow on the top of the rock and along bedding fault planes to appear as small springs. Under the gaol the rock slopes down from south to north about 1100mm, and from east to west 140mm measured along the north wall.

Oatlands Gaol

Site Plan of Archaeological Features
Known to Exist Pre-1950
From below ground to top of ground floor
Brad Williams, February 2004.



Key To Features			
No.	Feature	Date const.	Date dem.
1	Outer yard	1836	
2	Men's Division yard	1836	
3	Gaoler's yard	1836	
4	Women's yard	1836	
5	Jevelin Men's yard	1849	
6	Gallows yard	1855	
7	Well yard	Pre-1883	
8	Debtors yard	1855	
9	Gaoler's residence foyer	1836	
10	Gaoler's residence store room	1836	
11	Men's kitchen	1836	
12	Women's kitchen	1836	
13	Porter's lodge	1836	
14	Javelin Men's quarters/cook-house	1836	Pre 1938
15	Condemned cells	1849	1926-1938
16	Men's Division	1836	1937
17	Women's Division	1836	1937
18	Turnkey's room/Men's Hospital	1836	1937
19	Gaoler's privy	1849	
20	Gaoler's privy	1836	1849
21	Women's privy	1836	1849
22	Women's privy	1849	
23	Men's privy	1836	1849
24	Men's/Javelin Men's privy	1849	
25	Condemned cells yard	1849	
26	Gallows	Pre 1855	
27	Stairs to gallows/viewing platform	Pre 1855	
28	Well	1835	
29	Drain	1836	
30	Drain	1849	
31	Cesspit	1849	
32	Main gates	1836	1939
33	Inner gates	1836	Pre 1938
34	Approach wingwalls	1836	
35	Stairs to upper Javelin Men's	1836	Pre 1938
36	Stairs to upper Men's Division	1836	1937
37	Stairs to upper Women's Division	1836	1937
38	Gravel path	Pre-1849	
39	Sink trap	1836	
40	Sink	1836	
41	Privy and or sink	1836	1849
42	Water tanks	Pre-1938	
43	Outer wall	1836	Partial 1937
44	Inner wall	1836	1900-1937
45	Gallows/well/debtors yard wall	1855	Pre 1890
46	Women's yard inner wall	1855	1900-1937
47	Open timber shed	1855	Post 1900
48	Debtors privy	1855	
49	Stables	Pre 1883	Pre 1938
50	Timber shed	Pre 1883	Pre 1938
51	Timber shed	Pre 1938	Pre 1950
52	Fireplace	1836	
53	Fireplace	1849	
54	Timber fence	1849	
55	Path/steps to Gaoler's residence	1836	
56	Porch/privy	Pre 1938	Post 1983
57	Porch	Post 1938	Pre 1980
58	Well/gallows yard fence (timber)	Post 1855	Pre 1883
59	Privy	Pre 1883	Pre 1938
60	Possible site of tread-mill	1843	

Some six inspection holes were dug against the walls of the gaol and the gaoler's residence. Refer Detail 31 (P 89). In three of the lower holes, but not the lowest, water ran in from the gaol and residence and stopped at a fairly consistent height above the bedrock at roughly the same level as water sitting in the street drainage swale four metres to the north. Since the holes in the upper part of the site remained dry the water in the lower holes will most likely be from within the gaol enclosure or from the street to the south flowing within fault planes and trapped by the wall and saturation of the ground in Mason Street (it having been a wet winter).

Why the hole on the lowest portion of bedrock remained dry is difficult to explain. At a point six metres from the back of the residence are the hinges of a cesspit at the wall. A map of archaeological features of the gaol prepared by Brad Williams (Oatlands Gaol Historical Report and Archaeological Survey) shows a similar cesspit at nine metres from the rear of the residence to which run three drains from various features throughout the gaol. Perhaps water is being carried to this corner of the gaol by the old drains. The question then arises as to why the water eleven metres to the east, and at a slightly higher level, flowed into the hole much faster, as if a tap was turned on. Is it a separate source such as a spring and the material through which it runs is more open, such as quarry waste fill that is thought to support the flagstone floors?

THE GAOL WALLS evaluation and remedial work

The north, west and south walls (the east wall adjoining private property was not investigated) all lean out at the top, by varying amounts up to 40mm. Whether these walls have always leaned out or it is the result of having to hold back the earth fill around the swimming pool is anyone's guess. As the walls are thick (750mm), and provided through stones hold the small out-of-plumb amounts are of little consequence. However, on the west wall 5m from the NW corner in an area of extreme wetness, the top half of the wall is vertical while the bottom leans in 40mm. This could represent movement since the installation of the pool and the creation of the source of the moisture – possibly causing breakdown of the mortar. On the other hand this whole wall bows out horizontally so this vertical bow could be just poor workmanship in the first place.

The biggest enemy of these walls is water. The walls are too wet and kept that way. The north wall is seriously eroded, caused both by salts being brought to the surface by water to crystallize (below the surface of the stone) and fretted away and, the stonework being so wet that it is soft enough to be worn away by the wind. Though the walls are very thick the facing blocks are in many cases quite thin. Erosion of say 50mm in one block can cause another or a small patch of blocks to become unstable and fall out, particularly as the blocks often are not square edged top and bottom. Erosion also grossly disfigures the stonework, turning it into an eyesore. This has already happened to the north wall.

The walls are damp generally and very damp to wet in patches. Effort should be made to discover the sources of this water so that it can be dealt with. The two worst areas are are the NW corner and the eastern end of the north wall. On present evidence it seems likely the former is due to the swimming pool and the latter to the old cesspits and drains. It may be that the water causing the major area of dampness on the north

wall can be drained off to the adjacent street swale pit but this will need further investigation. Refer to GROUND WATER and references 15 + 16 in GAOL WALLS and remedial work (P 64).

A third significant source of moisture is rain water trapped in and behind the tops of the walls. The fill around the swimming pool is higher near the pool than at the walls and buildings backing on to the walls have no spoutings. Cavities and depressions and grass and rubbish in the tops of the walls retain water. 60% of the top course of these walls has no internal facing blocks. Where this occurs nothing can be done to protect the tops of the walls. Neither in the present circumstances can anything be done to prevent water collecting behind the walls. It is clear that the pool must go as soon as possible and the walls rehabilitated or some positive measures taken to collect and drain away the water. If the walls were reduced in height or some reduced and the remainder built up to full thickness the tops of the walls could be weathered to shed water.

The western wall, especially the northern half (and besides the eroding patch at the NW corner) is showing signs of deterioration from moisture bringing salts to the surface. This is evident in the fretting of joints and stone blocks and the white efflorescence. The latter may or may not be due to the use of chlorine at the pool as this sort of deposit has been observed in Oatlands where there is no possibility of the presence of the man made chemical. Testing will be necessary to determine this. Here the wall will benefit from the removal of the asphalt footpath which is preventing the harmless evaporation of moisture from the ground adjacent the wall thereby causing all evaporation, with destructive effect, to take place in the wall. Removal of a narrow strip of footpath (say 150mm) next to the wall and filling it with gravel, as is a common practice, would be too small (10 – 12%) to have a significant effect, even if it worked, but it doesn't for gravel is used in nurseries as a mulch for the express purpose of preventing evaporation. The footpath should be replaced with a porous topping material containing a sufficient percentage of fines to promote capillary action and therefore evaporation.

As well as a certain amount of repointing some rebuilding work is necessary – a stone block has fallen out on the south, two blocks are rolling out and one falling in on the west. However, the major rebuilding work necessary is the making good of the remnant section of wall abutting the south wall of the residence and the one remaining gaol entrance wing wall. The longer these are left in a tumble down higgledy-piggledy state the greater will be the damage to this fabric. This is of particular concern for the wing wall capping which is already much broken and for the support of the south wall engaged pier which must be built up off sound stonework.

It is interesting to note that the one hole dug against the south wall revealed a rudimentary flat stone footing, a single wide dressed stone bearing on the soft bedrock. All the holes on the north and at the front of the residence are rubble on clay and hard and soft bedrock. Lee Archer's 1835 plan of the gaol distinguishes between those parts of the gaol started and those not. Those started ran along the south and west only. Was there a conscious change made from the use of one type of footing to another, perhaps to speed things up a bit? One cannot help but speculate.

PRIORITY OF REMEDIAL WORK

This section contains two lists

Minor Work related to recent roof improvements and typical council work and nonskilled work which can be carried out by council staff, Green Corps, etc.

Major Work to be undertaken by skilled tradesmen under the supervision of a heritage architect.

These are simple sequential lists. However, should the roof begin to leak due to rust before it is reached on the list it will have to be moved forward, but preferably not higher on the list than number five. In some respects the lists are just an arbitrary ordering of work into digestible portions – **all the works represented are urgent.** Each item on the list has a page reference to its listing in relation to a drawing.

Minor list

1.

- Fix spouting at NE corner. (p50)
- Fix box gutter leak. (p50)
- Improve box gutter outfall. (p50)
- Set box gutter to fall outward. (p50)
- Provide lead caps to NW and SW hip apexes. (p50)

2.

- Replace asphalt footpath along the west gaol wall. (p64)
- Discover and terminate the source of water causing the NW corner deterioration of the gaol wall. (p64)
- Investigate/install drains to remove water affecting the eastern end and centre of the gaol wall. (p64)
- Remove the swimming pool and surrounding fill down to original gaol floor or
- Modify the area within the gaol walls to capture and drain away storm water. (p64)

3.

- Make temporary repairs to floors of two bedrooms. (p28)
- Remove first floor ceilings in areas 1,3,5,8,10,11. Timber ceilings are to be removed carefully for re-use, de-nailed, cleaned and stacked. (p36)
- Remove all bird nesting and roosting deposits. (p36)

Note that this item must precede item 1. On the Major priority list.

4.

- Remove ground floor rear lobby ceiling. (p34)
- Remove ground floor timber floors and dado. (p26)

5.

- Improve surface drainage of the area to the west and south of the gaoler's residence. (p58)

Major list

1.

The roof frame and chimneys.

- Re-build cross-walls and re-support ceiling wall plates. (p28)
- Install temporary battening of ceiling joists. (p42)
- Install hanging beams. (p42)
- Re-support central pair of beams. (p42)
- Install Type 1,2 and 3 roof ties. (p42,44)
- Restore structural integrity and capacity of valley rafters (Alternatives (1 and 2). (p44)
- Re-establish structural continuity in SW hip apex. (p44)
- Install collar ties. (p44)
- Install ashlering to the south wall. (p44)
- Install new ceiling joists over small bedroom. (p42)
- Re-build chimney tops and repoint generally. (p54)
- Install new flashings around chimneys. (p50)

2.

The south west corner.

- Install recycled blocks and wire ties at the corner, including at the adjacent door and window. (p60)
- Install two new lintels. (p60)
- Do whatever other improvements are found upon investigation to be necessary to adequately stabilize and make safe the lower part of the SW corner. (p60)
- Rebuild window sill. (p60)
- Make good cracks following joints. (p60)
- Make good internal cracks. (p60)

3.

At the back door.

- Repair door lintel. (p58)
- Make good loss of bedding in stonework above the door. (p58)
- Make good corresponding internal cracks. (p58)

4.

The north west corner.

- Install recycled blocks and wire ties. (p56)
- Make good corresponding internal cracks. (p56)
- Install drain to carry away water from below the building. (p56)

5.

The front steps and gaol walls.

- Conserve the steps. (p26)
- Rebuild the remnant gaol wall abutting the south wall of the residence and the gaol entrance wing wall. (p64)
- Make good where stones are falling out of the gaol walls. (p64)

6. The four elevation.

East elevation.

- Anchor external wall to cross-walls. (p54)
- Make good corresponding internal cracks. (p54)
- Make good cracks following joints. (p54)
- Re-bed and install anchors in stonework rotating out of wall. (p54)
- Weather the top of the plinth. (p26)
- Repoint the whole façade or make good pointing loss including removing loose pointing. (p54)

North elevation.

- Anchor external wall to cross-walls. (p56)
- Make good corresponding internal cracks. (p56)
- Make good cracks following joints. (p56)
- Install anchors in bulge above the ground floor window. (p56)
- Repoint whole façade or make good pointing loss including removing loose pointing. (p56)
- Weather top of plinth. (p26)
- Apply sacrificial render to fretting stonework. (p56)

West elevation.

- Make good pointing loss including removing loose pointing. (p58)
- Make good cracks following joints. (p58)
- Make good internal cracks corresponding to external work. (p58)

South elevation.

- Rebuild full height portion of gaol wall. (p60)
- Make good cracks following joints. (p60)
- Weather the top of the plinth. (p26)
- Make good pointing loss including removing loose pointing. (p60)

7. Gaol walls.

- Remake and weather the tops of the walls. (p64)
- Rebed and repoint where necessary. (p64)
- Make good remnant east wall and entrance wing wall. (p60)

8. The roof.

- Replace the existing roofing and rainwater goods. (p50)

9.

Air drain.

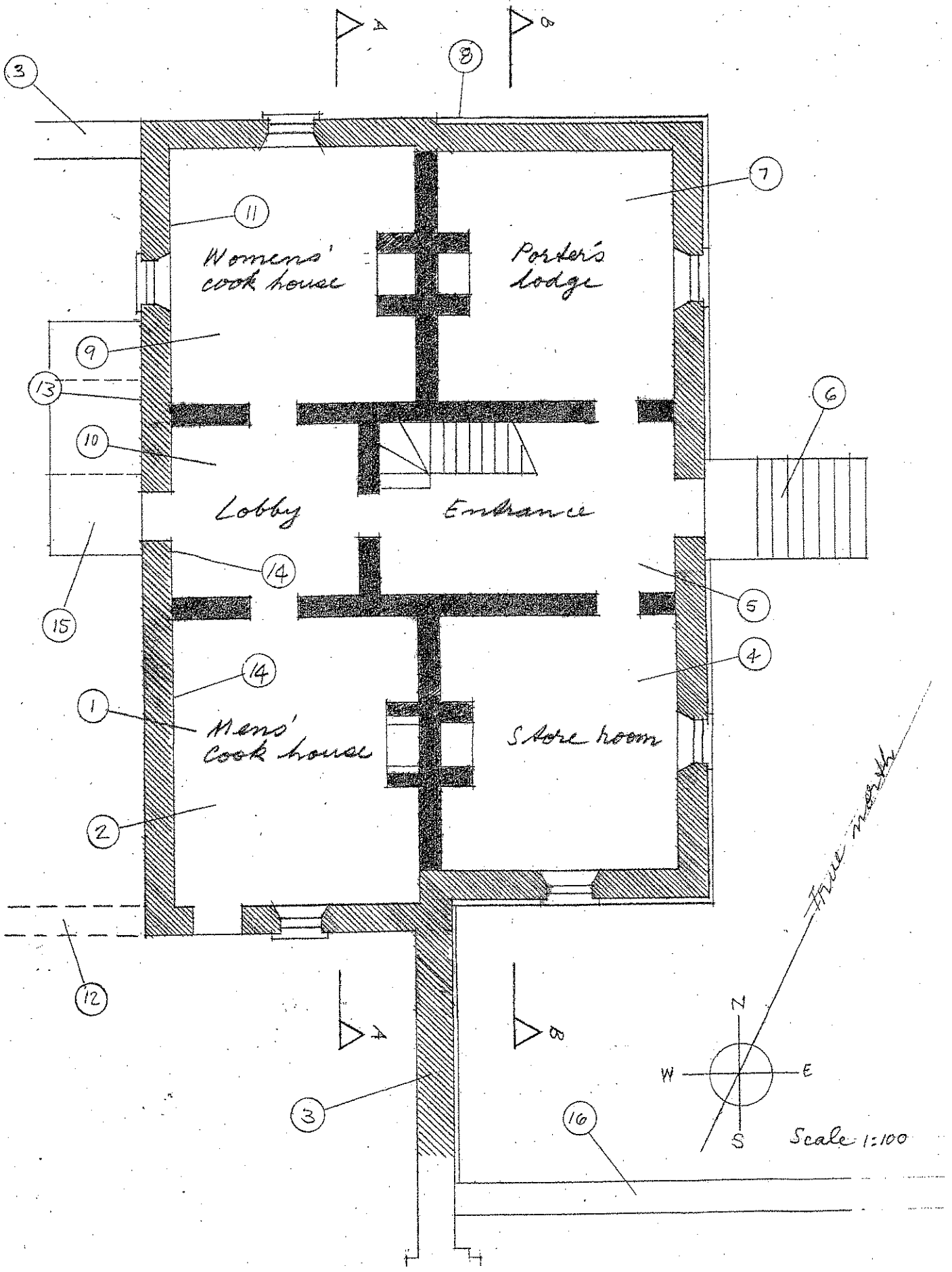
- Provide an air drain along the west wall and western half of the south wall. (p58)

GROUND FLOOR PLAN and remedial work

1. Room designations given on Lee Archer's plans for the gaol.
2. Sandstone flagstone floor.
3. Remains of gaol wall. Refer Detail 32 (P 90).
4. Modern timber floor installed over the original flagstones.
5. Ditto 4
6. Worn and broken sandstone steps in a state of very poor repair. Refer Detail 17 (P 75).
7. Ditto 2.
8. Top of plinth once weathered (note the remnant of mortar weathering at the step in the north wall) now retains water and directs it into the wall.
9. Modern timber and Masonite floor installed over the original flagstones. This floor, having partially rotted away, is in a dangerous state.
10. Ditto 4.
11. Modern T & G 'V' jointed hardwood dado to the four walls of the Women's Cook House.
12. Gaol wall removed.
13. Area of fretting stonework.
14. Evidence of rising damp up to shoulder level.
15. Stones seemingly laid down in three stages and at a level some 60mm above the lowest part of the excessively worn residence threshold. Photographs taken by Crawford, Cripps and Wegman (The Gaoler's Residence, Oatlands. A Conservation Study) show a weatherboard addition at the back door of the residence serving as a porch and water closet. The interior view shows large flagstones level with the modern wooden floor of the ground floor lobby and the timber frame of this addition sitting at a lower level. That the remains show no wear and are higher than the worn down threshold indicates that they are relatively modern. Their function would seem to be just that of a footing for the addition.
16. Gaol entrance wing wall. Refer Detail 32 (P 90).

Remedial work

- Remove modern flooring and dado to allow floors and walls to breathe and to improve safety.
- Repair/conserve front steps. Refer Detail 17 (P 75).
- Provide mortar weathering to the plinth including along the gaol wall.

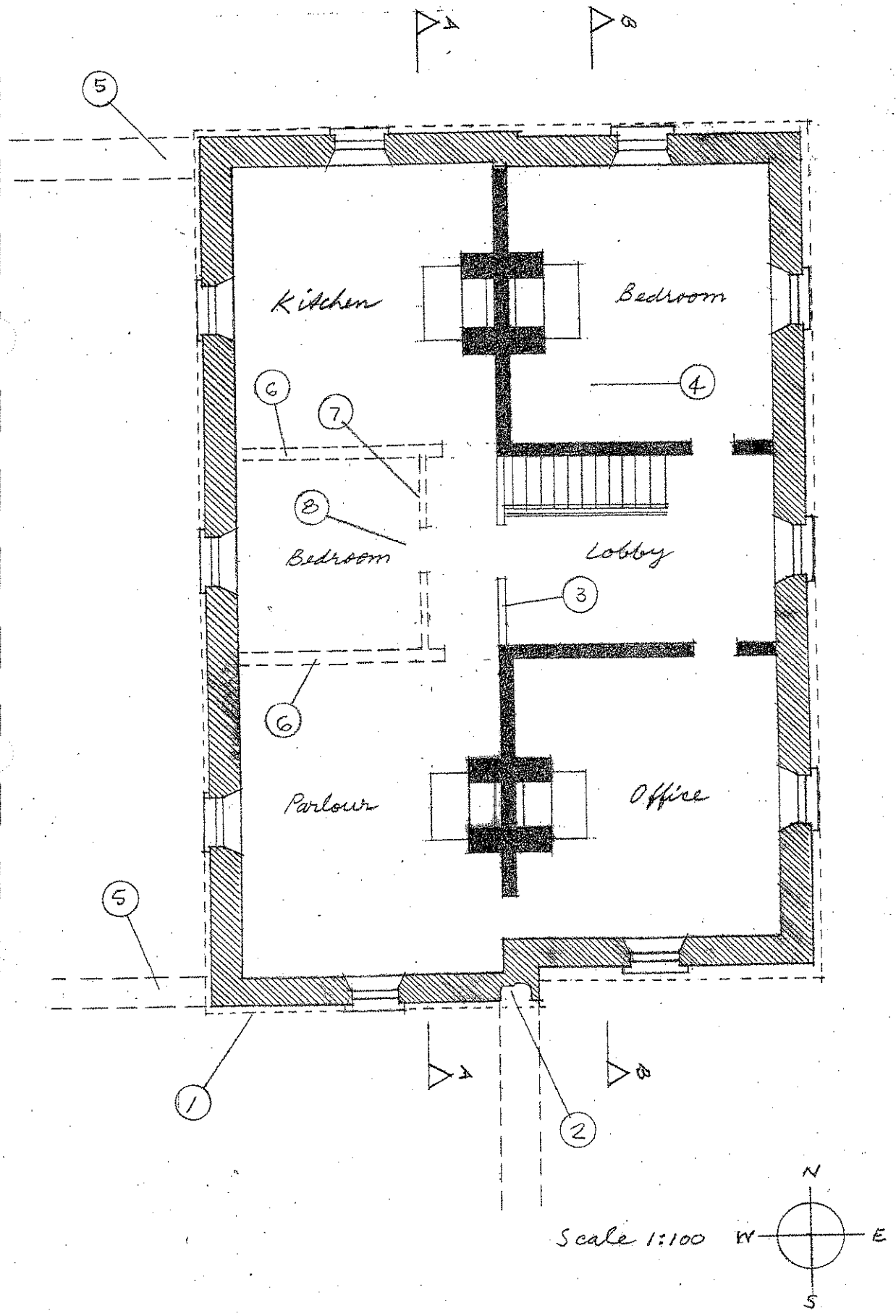

A
B
3
8
7
11
Women's cook house
Porter's lodge
9
13
6
10
Lobby
Entrance
14
15
5
14
4
1
Men's cook house
Store room
2
12
A
B
3
16
True north
N
W
E
S
Scale 1:100

FIRST FLOOR PLAN and remedial work

1. Stone cornice overhanging walls by 235 and 155 on the north; 140 on the east; 235 and 80 on the south; 75 on the west.
2. Gaol wall removed leaving quarry waste rubble core exposed to the weather and as a weakness in the wall.
3. Modern timber framed wall supporting the central pair of beams. This wall should remain until a later stage of the building's conservation.
4. Floor boards missing.
5. Gaol walls removed and the building's walls made good, but poorly.
6. Original brick walls removed and the floor and external walls made good with cement mortar.
7. Original stud wall removed.
8. Floor boards rotten/missing.

Remedial work

- Make temporary repairs to the floors in the two bedrooms for safety.
- Reinstate brick walls each side of the small bedroom. Door openings to be 950mm wide by a height to match the original doors. Note that these doorways have always been hard against the central N-S walls rather than having nibs as shown on Lee Archer's drawings.

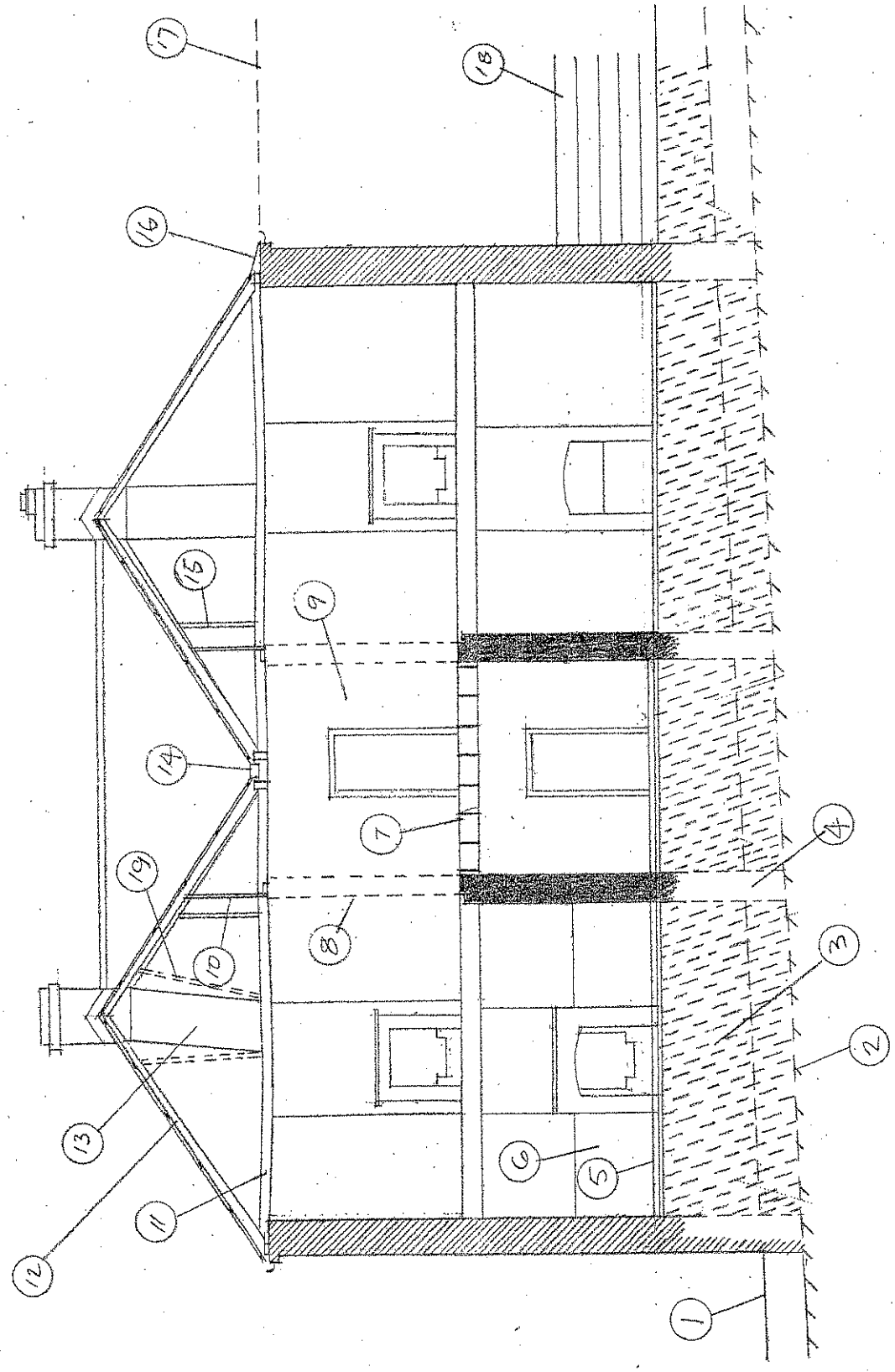

A
B
5
Kitchen
Bedroom
4
6
7
8
Bedroom
Lobby
3
6
Parlour
Office
5
1
2
A
B
N
W
E
S

Scale 1:100

SECTION AA

1. Present ground level – probably the same as in the 19th century as the north wall is rubble just below the surface.
2. Conjectural sandstone bedrock based on measurements taken in holes dug at the NE and SE corners of the residence, 4m west of the residence and local council knowledge of the NW corner of the gaol.
3. Conjectural fill of quarry waste based on observation of the fill under the front steps and the rate at which water poured into the hole dug against the north wall near the NE corner through a fissure in the rubble footing. It came in as fast as it could be bailed out with a 2 litre container. This could only happen if there were substantial interconnected voids to form such a reservoir. That the level of water was constant 500mm below the surface and 200mm above the bedrock suggests that below the building the quarry waste fill extends to the rock. Material dug from the hole contained a very high percentage of yellow and grey clay.
4. Internal brick wall footings are likely to be stone. An 1835 Lee Archer report of progress on site would seem to confirm this, "....putting in foundation of Gaoler's house ..... In rubble stonework." (AOT CSO 1/714/16037:196)
5. Modern timber floor over sandstone flags.
6. Modern T & G 'V' jointed hardwood dado.
7. 250 x 70mm floor joists at 460mm centres.
8. Nominal 230mm thick sandstock brick walls removed during the 20th century.
9. Modern stud wall (fixed with bullet head nails) erected at the time the brick walls were removed.
10. Ceilings partially re-supported by hangers from rafters to wall plates at mid span of the latter.
11. 125 – 140mm x 60 – 70mm ceiling joists at 600mm + 450mm centres.
12. Rafters at 450mm centres, 55 – 65mm thick tapering from 140 – 150mm to 80 – 90mm, pitched at 34°.
13. Chimneys are sandstock brick below the roof and sandstone above. The northern chimney is sloped (without corbelling) to the south to exit at the ridge.
14. Box gutter between pair of nominal 200 x 90mm beams.
15. Struts under valley rafters.
16. Shallow section of roof over the projecting wall of the Parlour.
17. Gaol wall removed.
18. Remains of gaol wall.
19. 150 x 25 board under 3 rafters each side of chimney, evidence of now missing struts.

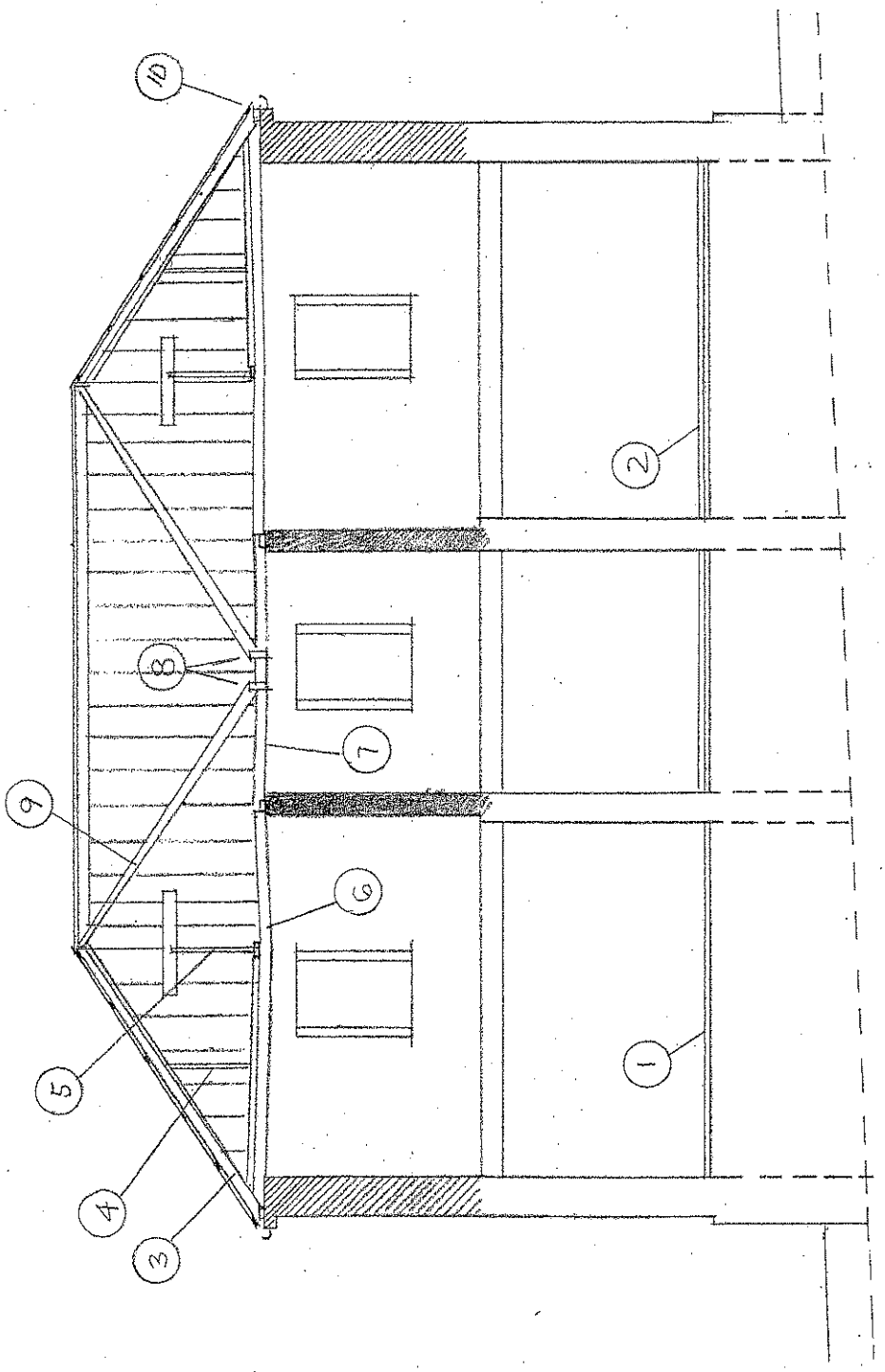
Scale 1:100



SECTION BB (section not fully shown)

1. Flagstone floor on fill.
2. Modern timber floor over flagstones.
3. Common rafter pitched off timber wall plate bearing on the stone cornice.
4. Hip rafters strutted off 125 x 70 plate laid over the ceiling joists. These struts carry load as the roof has spread and sagged causing the upper half of the hip rafters to bow downwards.
5. Struts off short plates laid over the ceiling joists. These occur over 3 of the 4 main room ceilings – purpose unknown.
6. Ceiling joists deflected due to imposed loads, long spans, shrinkage collapse, Lyctus borer and the use of poor quality timber. Only the joists over the main rooms are nailed at the ends.
7. Short middle joists are not nailed in place.
8. Pair of central beams. Refer Details 1 and 2.
9. Pair of common rafter struts between the central beams and hip apexes. These struts take much of the thrust that would normally be resisted by the valley rafters and ridge boards and have contributed to the valley rafters dropping away from the hip apexes.
10. Rafters pitched off a wall plate bearing on the stone cornice outboard of the wall. This cornice has remained level (rather than dipping outward, as one would expect) presumably due to the weight of the ceiling joists (and roof load imposed on the joists) bearing on the inner edge of the cornice stones.

Scale 1:100

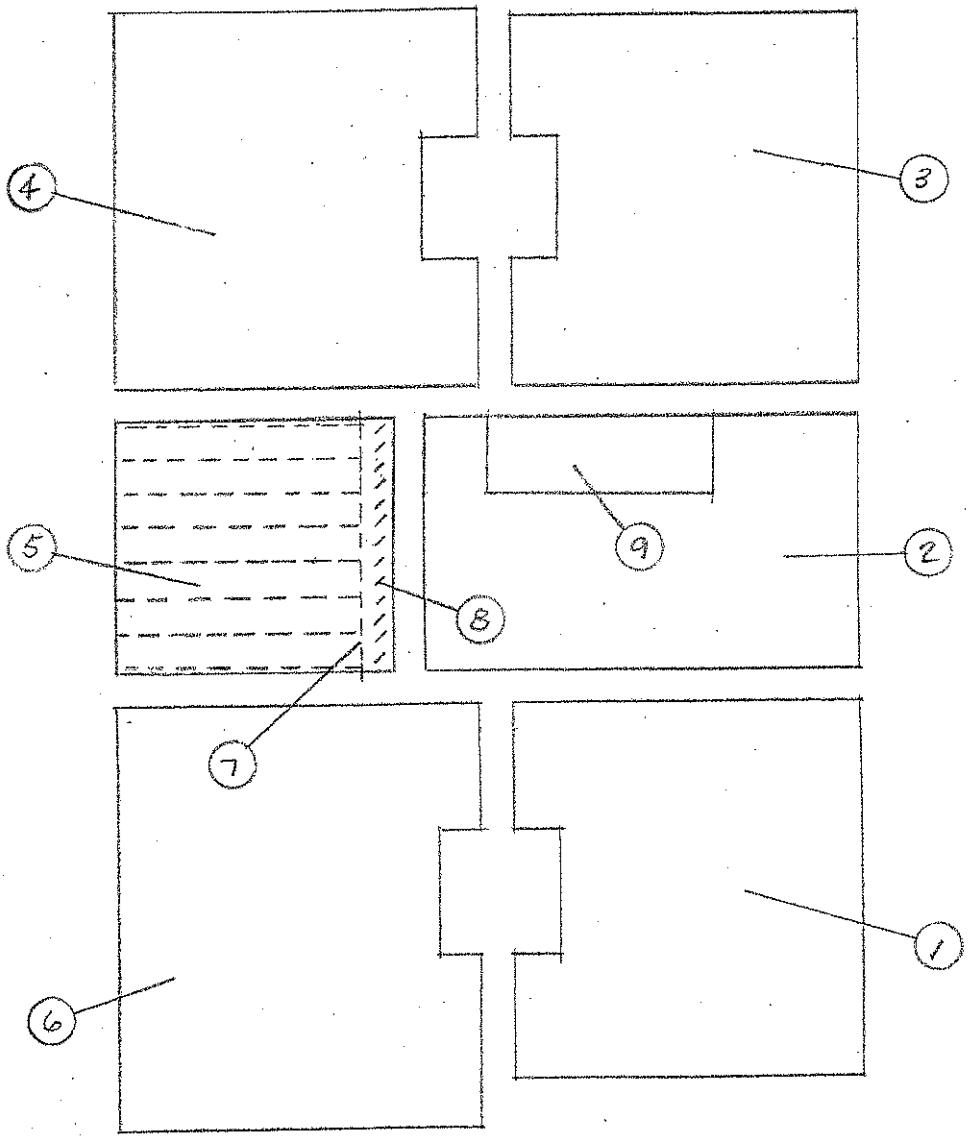


GROUND FLOOR CEILING PLAN and remedial work

1. Beaded T & G pine lining board ceiling.
2. Ditto, but two beads per nominal 150mm wide board.
3. Lath and plaster ceiling.
4. Modern Masonite ceiling.
5. Lath and plaster ceiling in a dangerous state due to the presence of wet and dry rot and an accumulation of organic matter which is wet, all as the result of long term roof leakage. The joists may well be rotten at their connection with the external wall due to long term water penetration of the wall from the box gutter above.
6. Ditto 3.
7. Trimmer joist 400mm from the wall between the Lobby and entrance supporting the north end of the bedroom floor joists. Refer Detail 14 (P 73).
8. Position of the wall above (which originally supported the pair of centrally located roof beams) but now removed. This wall was supported on the cantilevered ends of the first floor lobby joists some of which are short and secured to a trimmer at the south end of the stair well.

Remedial work

- Remove the lobby ceiling for safety and allow the first floor structure to dry out.



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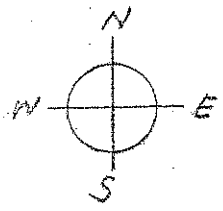
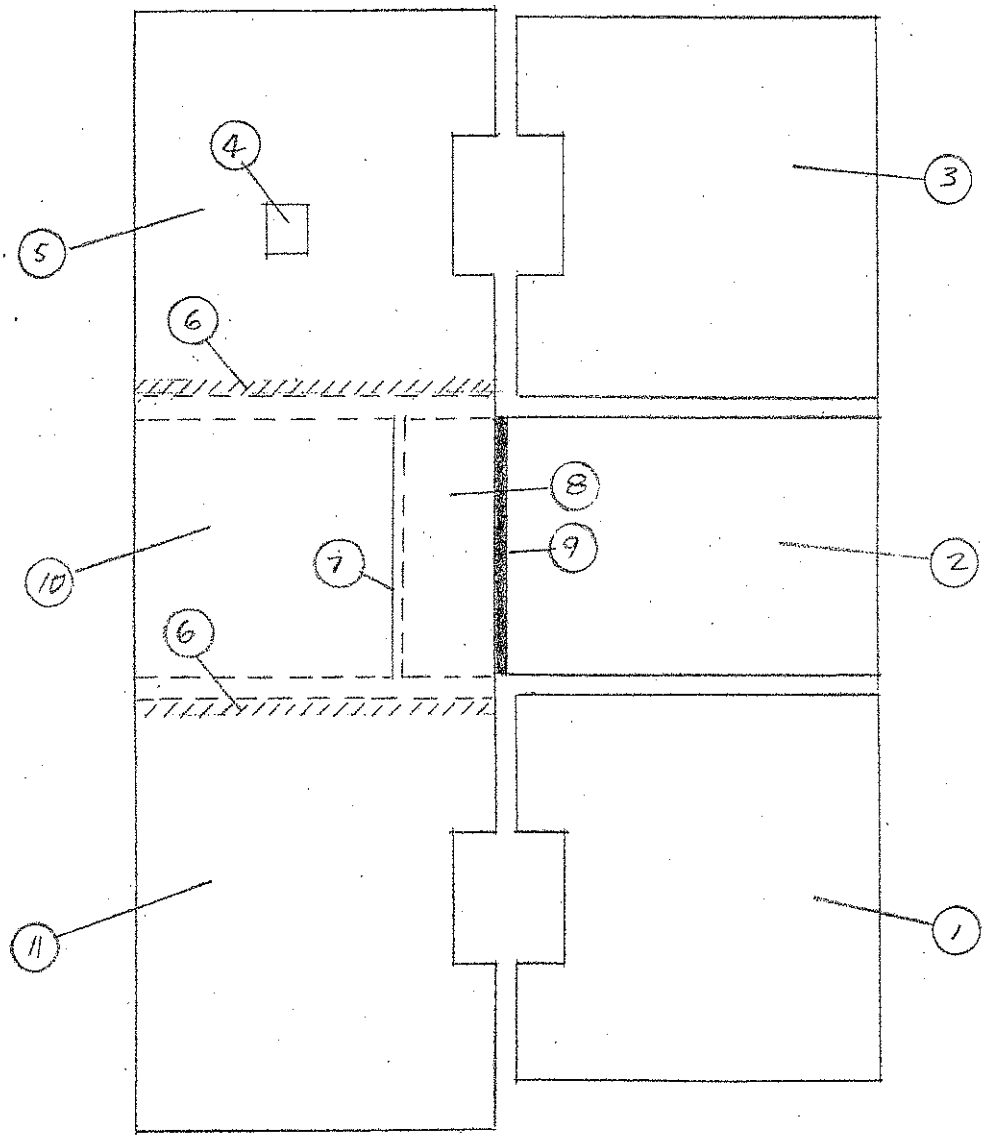


FIRST FLOOR CEILING PLAN and remedial work

1. Modern Masonite ceiling.
2. Painted beaded T & G pine lining boards fixed with small flat head wire nails and installed prior to the wall at Ref. 9. These boards appear to have extended across area 8 but were hacked off when the wall at Ref. 9 was built and replaced with varnished lining boards.
3. Modern Caneite ceiling.
4. Manhole to be retained. This is the original position but the lining could be modern.
5. Varnished beaded T & G lining boards poorly installed without first removing the remaining lath and plaster ceiling nails. These boards are secured with wire nails having small truncated pyramidal heads (early 20th century?).
6. Lining boards cut down in width as if to finish up against a wall. The ceilings in areas 5 and 11, or 5, 10 and 11 were probably installed prior to the removal of the walls shown dotted.
7. Join in the lining boards at the position of the original timber framed wall between the bedroom and lobby.
8. Ditto 5.
9. Modern Masonite clad stud wall.
10. Ditto 5, now substantially rotted due to long term leaking of the box gutter.
11. Ditto 5.

Remedial work

- Remove ceilings to areas 1, 3, 5, 8, 10 and 11 to facilitate work in the roof – to improve access, increase light and reduce glare to make the work safer.
- Remove all bird nesting and roosting deposits over area 2, around the perimeter of the roof, above chimney breasts, etc.
- In area 2 remove only as much ceiling as is necessary to install the new beam hangers. Ref Detail 6 (P 69).



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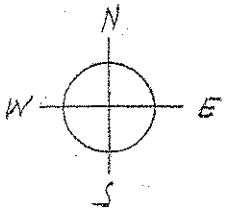
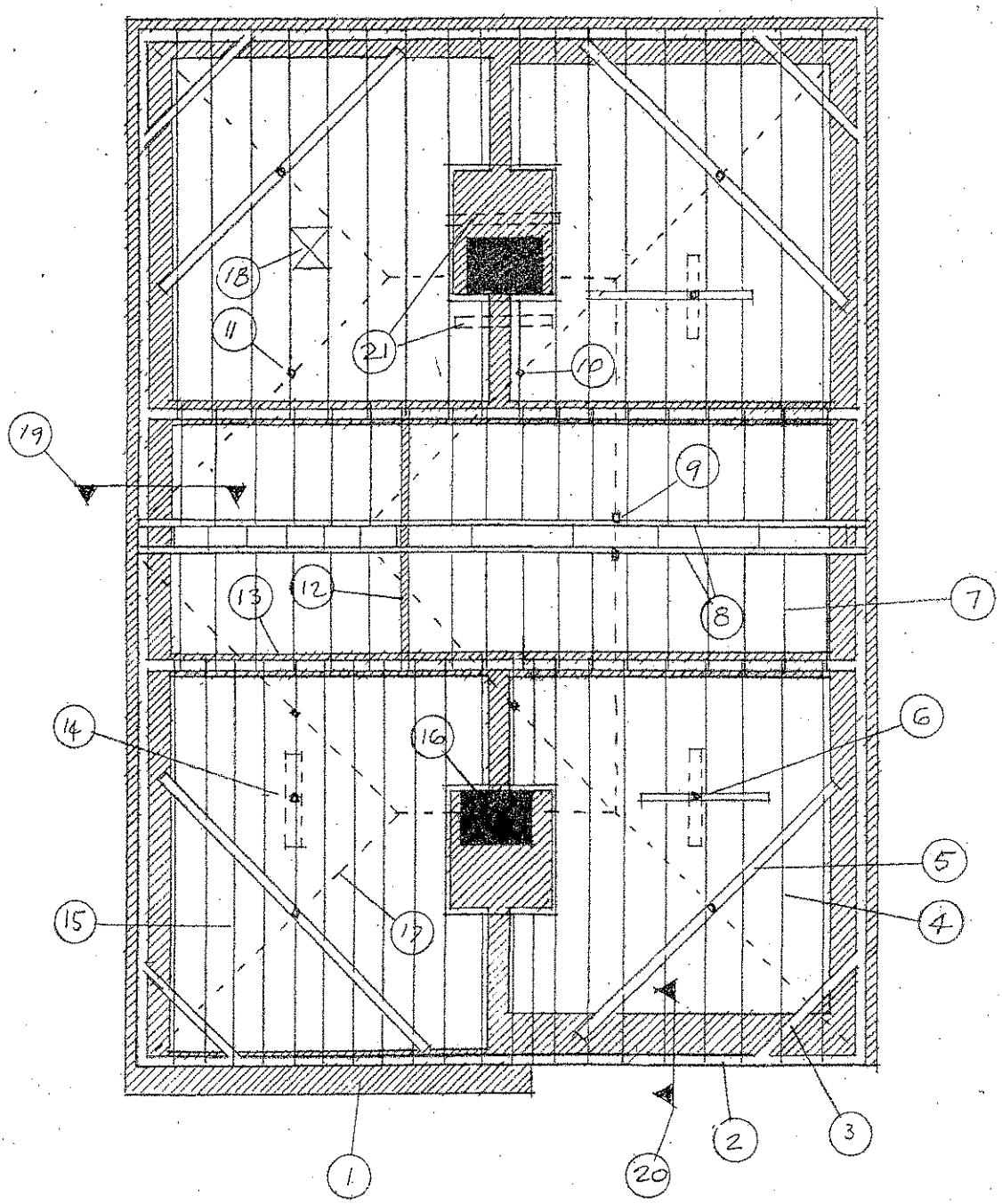


CEILING FRAMING & ROOF STRUTTING PLAN as originally constructed.

1. Hatching represents internal walls and the stone cornice to the external walls. Cornice stone widths vary due to the superimposition of a regular roof plan on an irregular floor plan.
2. 130 – 140 x 65 – 70mm timber wall plates dovetailed to corner braces and cross-wall plates, halved in splices and at corners, all secured with nails.
3. Corner brace.
4. 125 – 140 x 60 – 70mm ceiling joists at 600mm centres generally. Main room joists are housed over wall plates and corner braces and fixed at each end with one large nail.
5. 125 x 70mm plates over joists, nailed only at the ends, and supporting 70 x 85mm struts to the hip rafters.
6. Struts between plates over the joists and 150 x 25mm boards under the rafters. Their purpose is unknown.
7. Short ceiling joists (125 – 140 x 60 – 70mm) housed over wall plates and ledgers (see Detail 3, P 68) but not secured against longitudinal movement.
8. Pair of beams (see Details 1 and 2 (P 66, 67) and others referred to from these) with through mortised spacers between.
9. Pair of diagonal braces from the central beams to the hip apexes. Construction at the apex of the hips clearly shows that these struts were intended to remain permanently in position. Refer Detail 27 (P 87).
10. 90 x 70mm struts between ceiling joists and the valley rafters.
11. Struts between ceiling joists and hip rafters
12. Timber framed wall supporting the central pair of beams.
13. Brick walls supporting ceiling joists.
14. Strut between ceiling joist and a board under the rafters. Note that such a strut does not appear to have existed in the NW hip end.
15. Ceiling joists at 450mm centres.
16. Position of chimneys at ceiling level.
17. Roof outline.
18. Man hole.
19. Refer Detail 11 (P 72).
20. Refer Detail 12 (P 72).
21. Board under three rafters each side of the chimney similar to reference 6 with clear evidence of struts, now missing. Purpose unknown.



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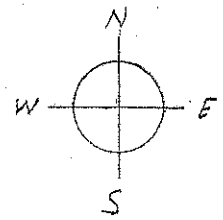
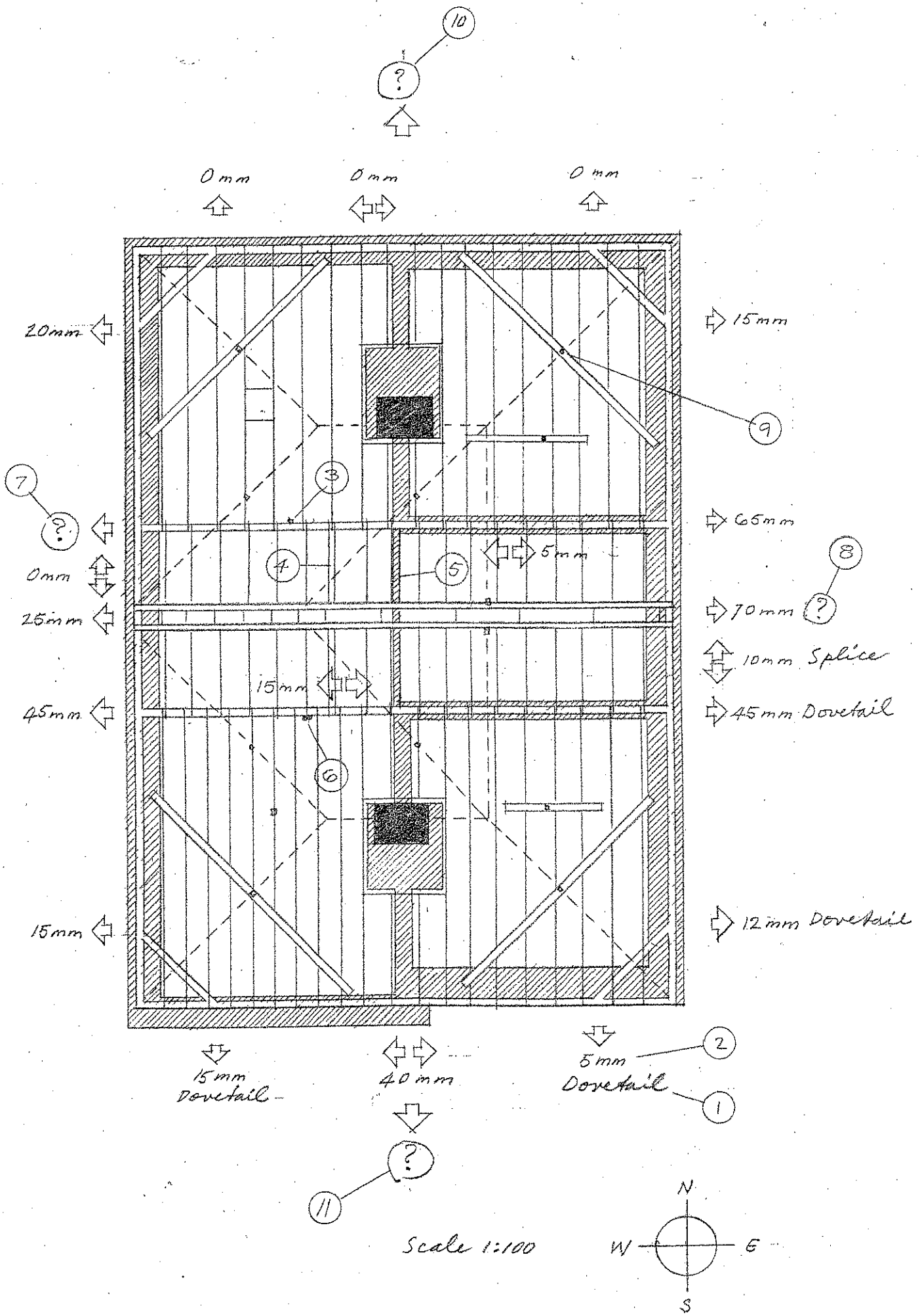


CEILING FRAMING PLAN as it is now

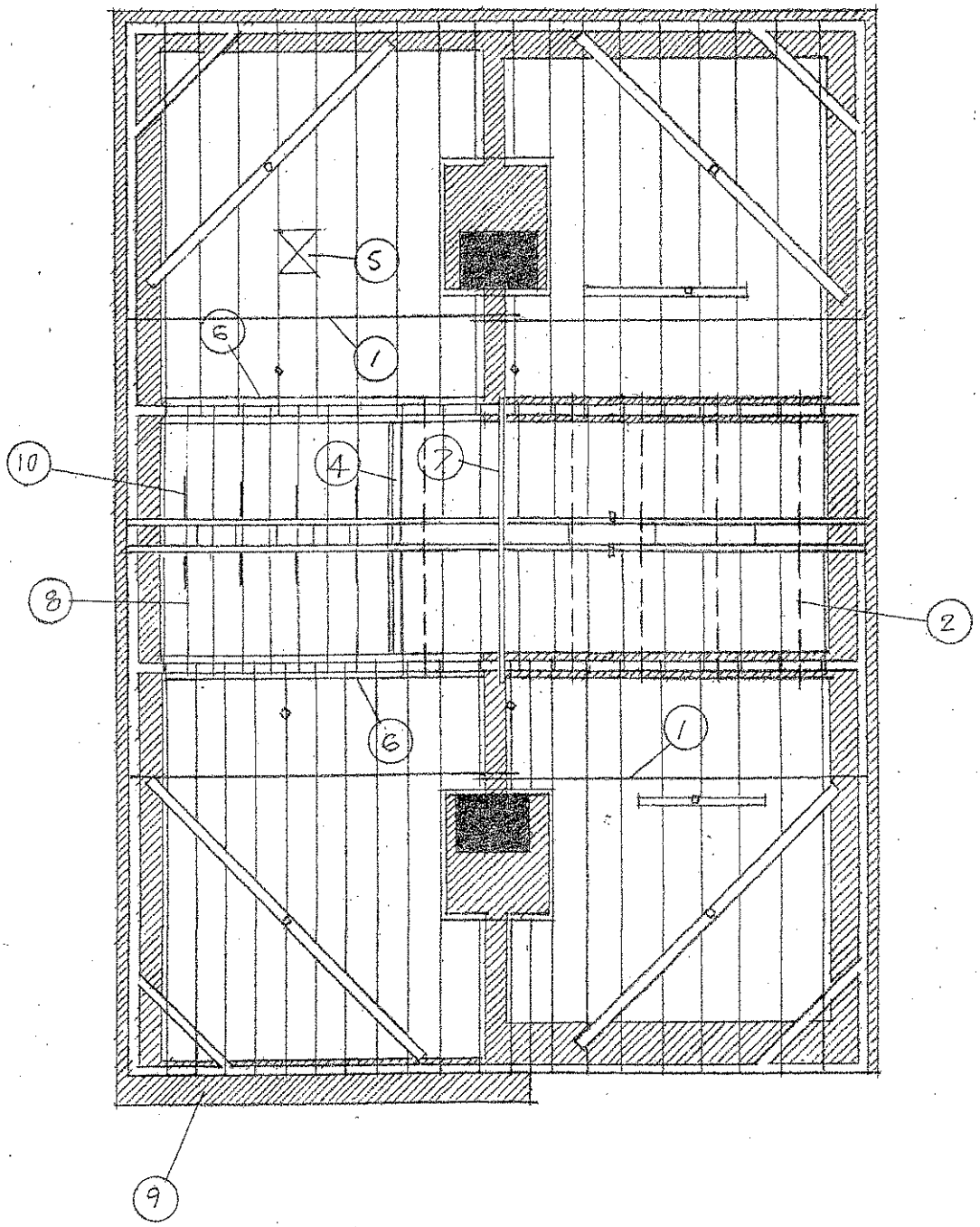
1. Type of joints in wall plates.
2. Movement in wall plate joints – an indication of roof movement. See also WALL MOVEMENT..
3. Hanger from rafter to wall plate installed when the wall below was removed thereby transferring support of a substantial part of the ceiling to the central beam.
4. Double joist (with an additional timber nailed between) where a wall originally supported the central pair of beams.
5. Modern timber framed wall (secured with bullet head nails) supporting the central pair of beams. Increases in span and ceiling load have caused the western half of these beams to deflect. Refer Detail 1 (P 66).
6. Pair of hangers ditto 3.
7. This joint not investigated.
8. There has been sufficient movement here to draw the nails out of the wall plate but in housing the beams over the plate there may have been small gaps right from the beginning as there are where ceiling joists are housed over the north wall plate.
9. Roof struts all as shown on CEILING FRAMING AND ROOF STRUTTING PLAN as originally constructed (P 38).
10. Where joists are housed over the wall plate gaps vary from zero to 20mm, suggesting there has been no movement. However, the roof has dropped at the chimney and the cornice and wall have moved out 25 – 30mm in the centre.
11. A similar problem to the north wall. The roof has dropped at the chimney.


10
?
0mm
0mm
0mm
20mm
15mm
9
7
?
3
65mm
0mm
4
5
5mm
8
?
25mm
70mm
10mm Splice
15mm
45mm
45mm Dovetail
6
15mm
12mm Dovetail
5mm
Dovetail
2
1
15mm
Dovetail
40mm
?
11
Scale 1:100
N
W
E
S

CEILING FRAMING PLAN remedial work

1. New hanging beams for additional support of the sagging ceilings and the strutting of valley rafters – refer ROOF FRAMING PLAN and remedial work (P 44). Without disturbing existing structure locate the beams as close to the chimneys as possible but centre them between rafters. Refer Detail 10 (P 71).
2. Five Type 3 ties linking joists to prevent roof spread. Refer Details 2, 7 and 8 (P 67, 70).
3. Deleted.
4. New beam between new masonry walls for the support of the two central beams. Refer Details 2 and 13 (P 67, 73). Nominal location 1160mm from the modern wall at the stair well.
5. Existing manhole to be retained as is.
6. New masonry walls in place of the original ones now removed.
7. New hanging beam to maintain the existing vertical position of the central pair of beams. Refer Details 2 and 6 (P 67, 69)
8. New ceiling joists over the bedroom. Refer Detail 2 (P 67) and 29 (P 88).
9. Hatching represents existing internal walls and external wall cornices.
10. Stops on ceiling joists each side of beams to tie the two hip ends together. Refer Detail 29 (P 88).

- Install temporary battening of ceiling joists for safety.
- Install hanging beams. Install battens over the joists if they remain wobbly after installation of the hanging beams.
- Install Type 3 roof ties.
- Install new beam under central pair of beams.
- Install new beam over central pair of beams.
- Install new ceiling joists over small bedroom.



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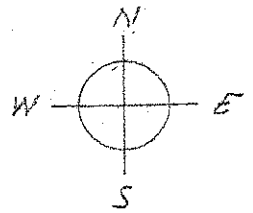


ROOF FRAMING PLAN and remedial work

1. Hip apex disjointing – short ridge board split, valley rafter dropped almost free.
2. Hip apex disjointing – valley rafter dropped free.
3. Hip apex disjointing – hip rafter dropped almost free.
4. Roof frame regular in concept but not in dimension – width from box gutter to south eave greater than to north eave so that the SE hip does not line with the corresponding valley.
5. Framing not known.
6. Four collar ties at a low level (with hangers shown as crosses) in each rear hip end to stabilize these parts of the roof in the N – S direction.
7. Four Type 1 ties across the building to prevent spreading of the roof in the E – W direction. See Detail 9 (P 71).
8. Two Type 2 ditto utilizing new ceiling hanging beams. See Detail 10 (P 71).
9. Face of stone cornice and wall plate.
10. Refer Detail 12 (P 72). Roof support is provided by the stone cornice beyond the outer face of the wall. Presumably only the weight of the ceiling, assisted by some weight from the roof (struts from the hip and common rafters) balances out the forces as the cornice remains level. This construction is inherently unstable and will give way if any change is made to the present balance of the members and the forces. It may well be advisable to transfer load to the inner part of the wall by the addition of short struts called ashlering.
11. Valley rafter – lower half excessively deflected, back broken above the strut and falling away from the hip apex at the top end.
12. Valley rafter –excessively bowed, strut fallen out, structural capacity reduced by Lyctus borer, and fallen away from the hip apex at the top.
13. Common rafter support rotted away.

Remedial work

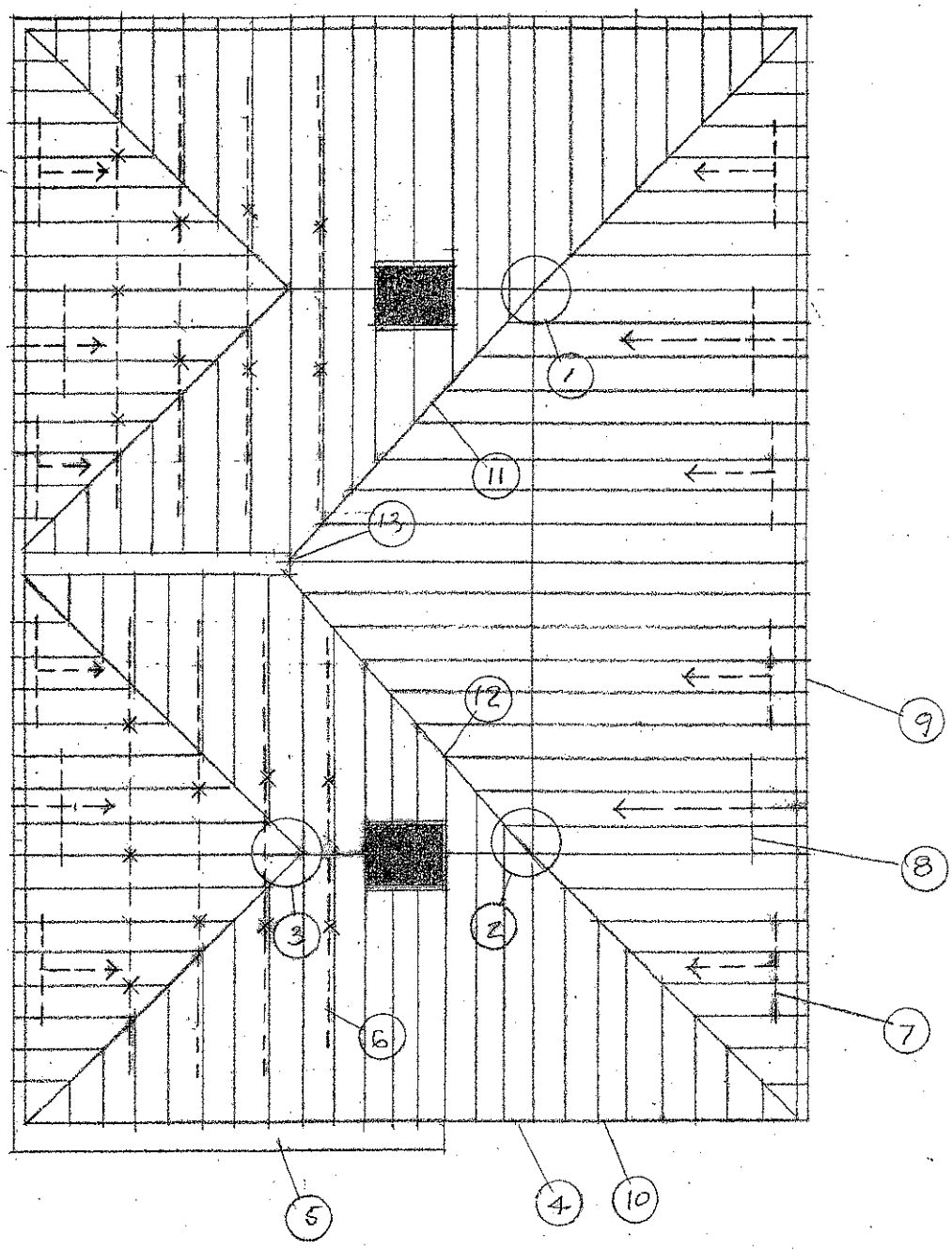
It is desirable the existing framing members (logical or otherwise) be retained either as original fabric or new replacements.

- Provide collar ties.
- Provide Types 1, 2 and 3 ties (see CEILING FRAMING PLAN and remedial work, Details 2, 7 and 8, P 42, 70).
- Restore the structural integrity and capacity of the valley rafters.

Alternative 1. Remove roof covering and prop the roof while carrying out the work; replace valley rafters, refix creeper rafters and re-support central common rafter. Refer VALLEYS AND HIPS remedial work Alternative 1 (P 46).

Alternative 2. Provide new props to valley rafters, remove roof covering and refix creeper rafters. Re-support the central common rafter. Refer VALLEYS AND HIPS remedial work Alternative 2 (P 48).

- Re-establish full structural continuity at the SW hip apex by propping the top of the hip rafter to the correct height (off the chimney breast) and wedging tight in the apex.
- Provide ashlering along the north half of the south wall (Detail 12, P 72).



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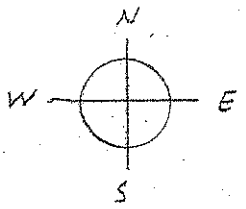
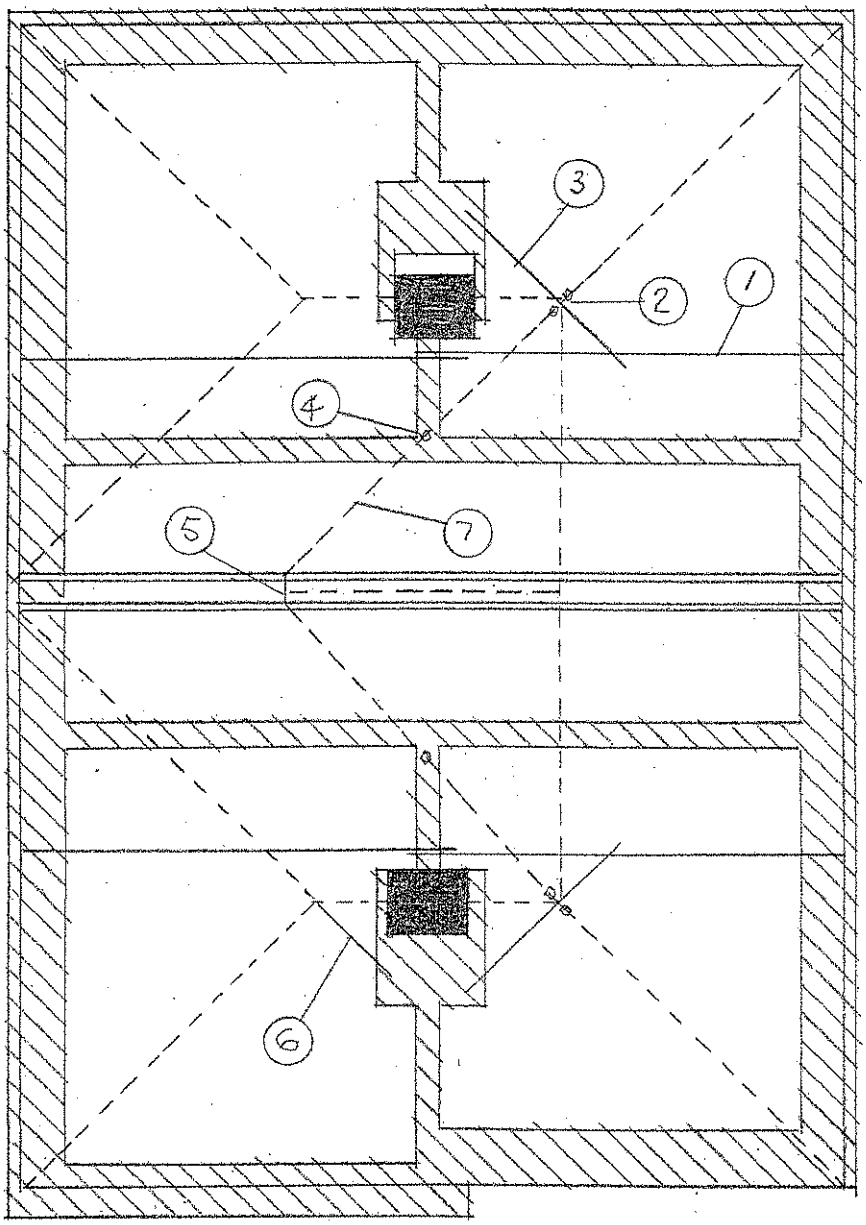


VALLEYS AND HIPS remedial work Alternative 1

1. Hanging beam to support ceiling joists and hip apex strutting beam.
2. Pair of struts to support the ends of hip and valley rafters, tie them together and transfer thrust. Refer Detail 26 (P 86).
3. Hip apex strutting beam.
4. 90 x 45 F17 strut off brickwork to midpoint of the valley rafter.
5. New support for central common rafter.
6. 70 x 70 F17 strut to dropped hip rafter. Raise the rafter to the correct height and wedge tight into the apex.
7. New 140 x 35 F17 valley rafter.

Existing N-S hip apex struts are to remain. Refix valley board timbers, etc. This alternative requires the roof frame to be propped and a section of roof removed before remedial work can proceed.



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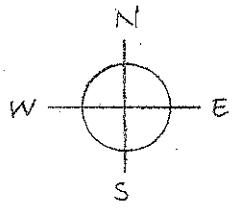
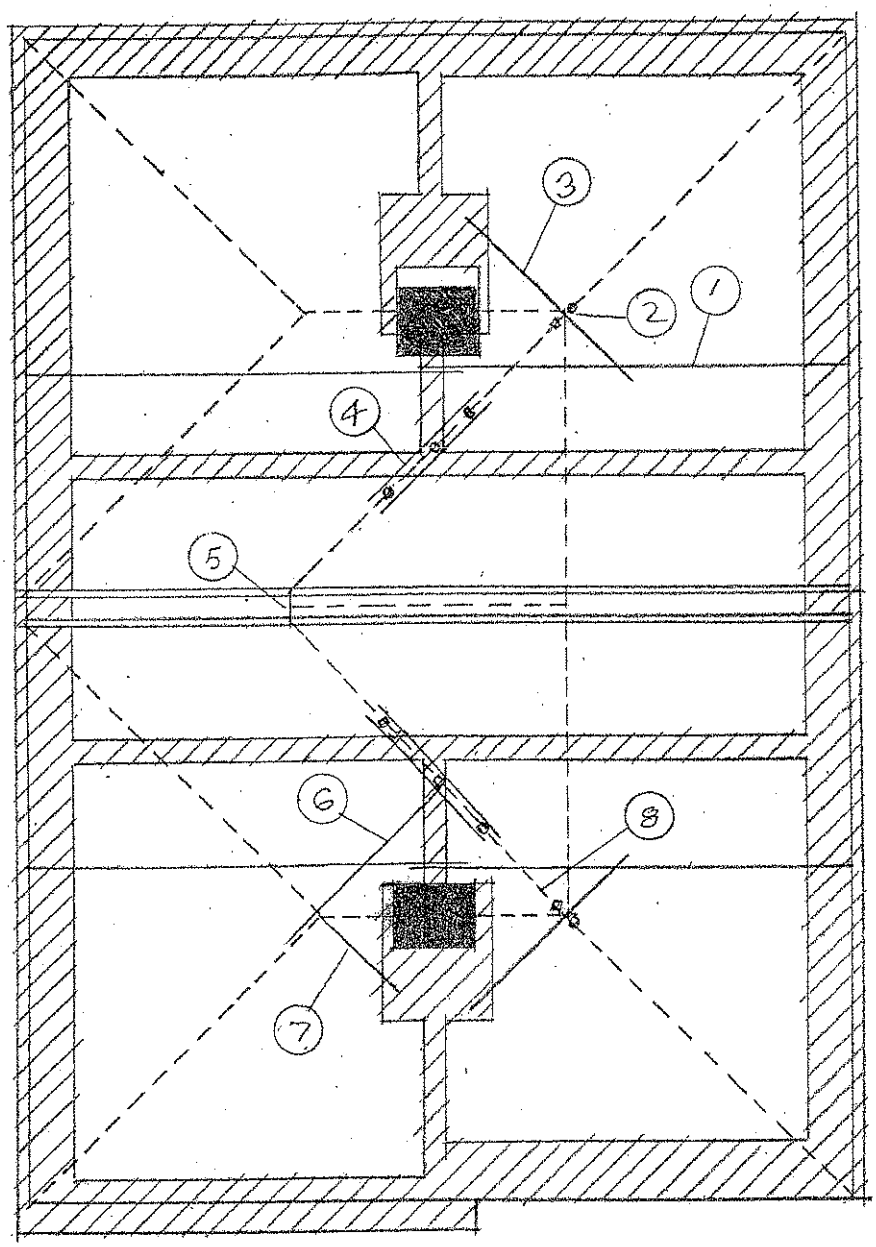


VALLEYS AND HIPS remedial work Alternative 2

1. Hanging beam to support ceiling joists and hip apex strutting beam.
2. Pair of struts to support the ends of hip and valley rafters, tie them together and transfer thrust. Refer Detail 26 (P 86).
3. Hip apex strutting beam.
4. Fan strut off brickwork to limit valley rafter spans to 1800mm. Locate break in northern valley rafter between struts. Refer Detail 28 (P 87).
5. New support for central common rafter.
6. 90 x 35 F17 strut to SW hip rafter from fan strut to limit bow in valley rafter.
7. 70 x 70 F17 strut to dropped hip rafter. Raise the rafter to the correct height and wedge tight into the apex.
8. Raise the head of this valley rafter as near as practicable to its original position before strutting.

This alternative requires a section of roof removed after securing the valley rafters in order to re-fix creeper rafters and valley board timbers, etc.



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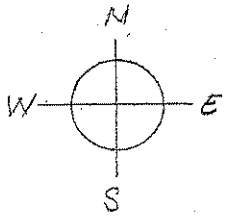
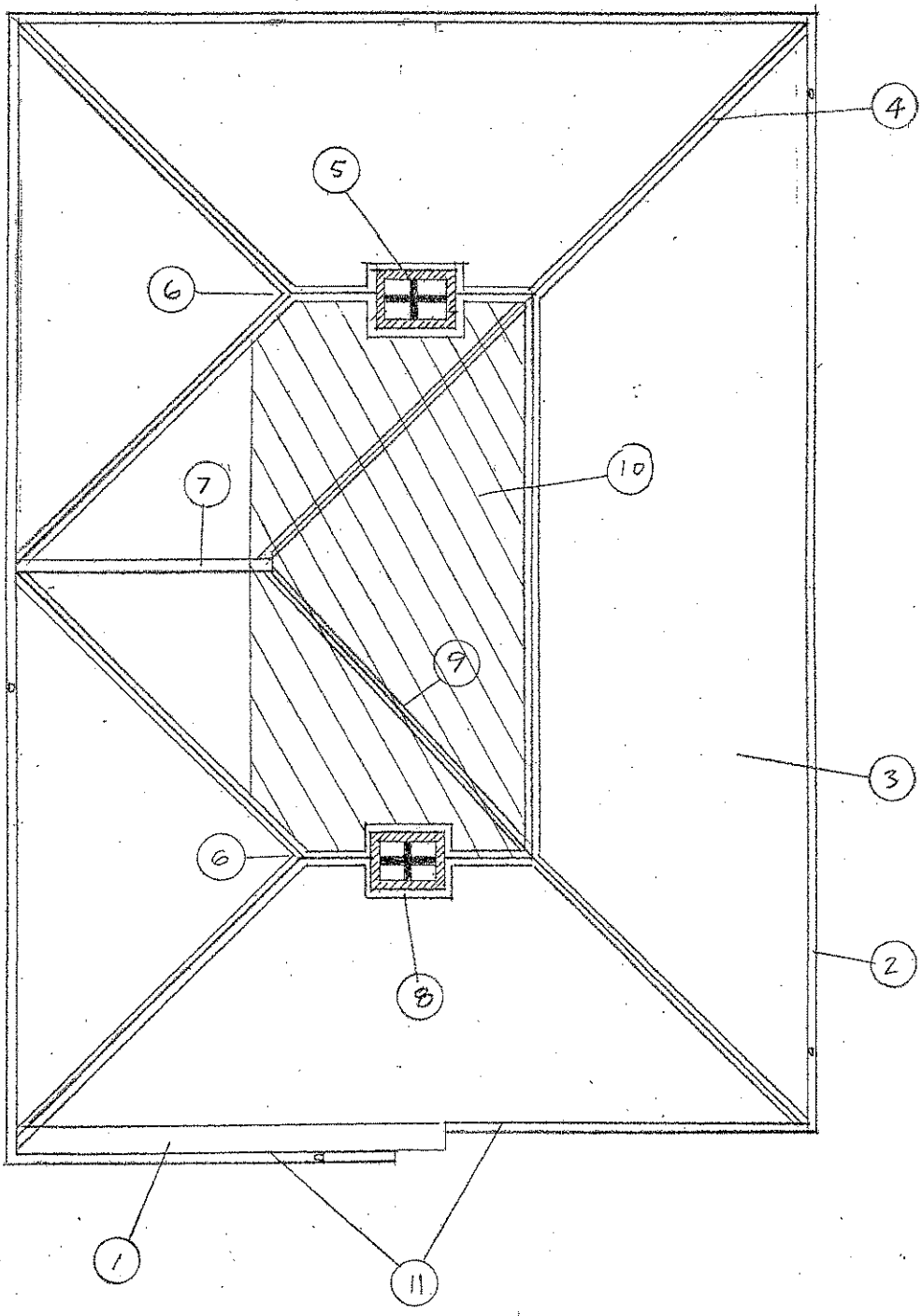


ROOF PLAN and remedial work

1. Roof slope flattens to cover projecting wall.
2. Recent zincalume spouting with bird mesh. Leak in mitre of NE corner. Four downpipes connected to storm water drains terminating in the Mason Street drainage swale.
3. Corrugated roofing, rusty but not yet leaking. Rust very advanced in the centre part of the roof. It will only be a few years before the roofing must be replaced.
4. Roll top ridge capping.
5. Sandstone chimneys with sandstock brick flue partitions. No pargeting.
6. NW hip apex source of long term leak (drops have drilled through both ceiling and floor). SW hip apex looks as bad.
7. Recent zincalume box gutter set to fall, but backwards away from outlet. Significant leak at the inner end of this gutter. Gutter outfall allows water to run/blow back behind the spouting to saturate the stone cornice and cause green slime to form.
   Directly below the box gutter is a doorway. Originally, without spoutings water from the gutter would have poured onto users unless there was a rainhead and downpipe or a spout to throw the water clear.
8. Heavy gauge lead chimney flashings with nail holes along the outer edge probably installed with the original shingle roof. Both chimney's flashings are dislodged, torn, missing, ineffectual due to stone delamination, pointing loss, wind and the sagging of the roof. Entry of water has caused some rotting of roof timbers.
9. Original (?) heavy gauge lead valley flashings remain underneath the recent zincalume flashings.
10. Area of roofing required to be removed for valley rafter remedial work. Remove half at a time.
11. A beaded pine fascia board with parallel sided groove along the top edge (as if it had been a floor board) remains secured to the outer edge of the stone cornice of this wall only though wooden plugs are evident in the cornices of other walls. As the original shingle roof did not have a spouting and therefore no reason to have a fascia it most likely dates from the installation of the corrugated iron roofing. A photograph in the Weekly Courier, 27/4/1907, shows the building with a shingle roof and no spouting.

Remedial work

- Fix spouting leak at NE corner.
- Fix box gutter leak.
- Improve box gutter outfall – see detail 15 (P 74).
- Set box gutter to fall to outlet.
- Provide lead cap to rear hip apexes.
- Provide new lead apron and cover flashings to the chimneys.
- In view of the limited life of the existing roofing some work must be re-done after only a short time when the roofing is replaced. Install new galvanized roofing and cappings, spoutings, down pipes, gutter and concealed bird proofing as a complete, unified and compatible system.



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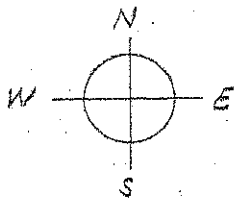
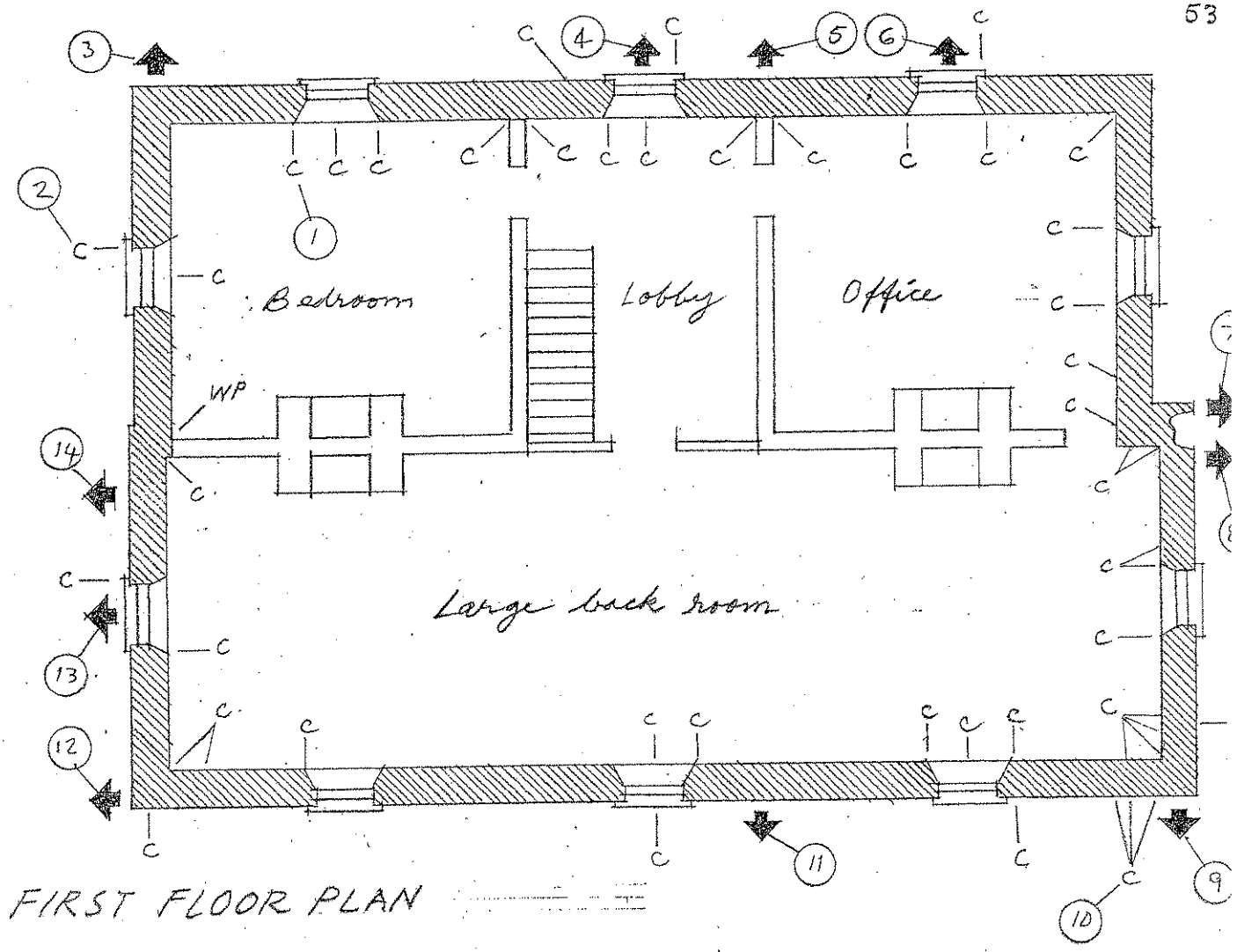
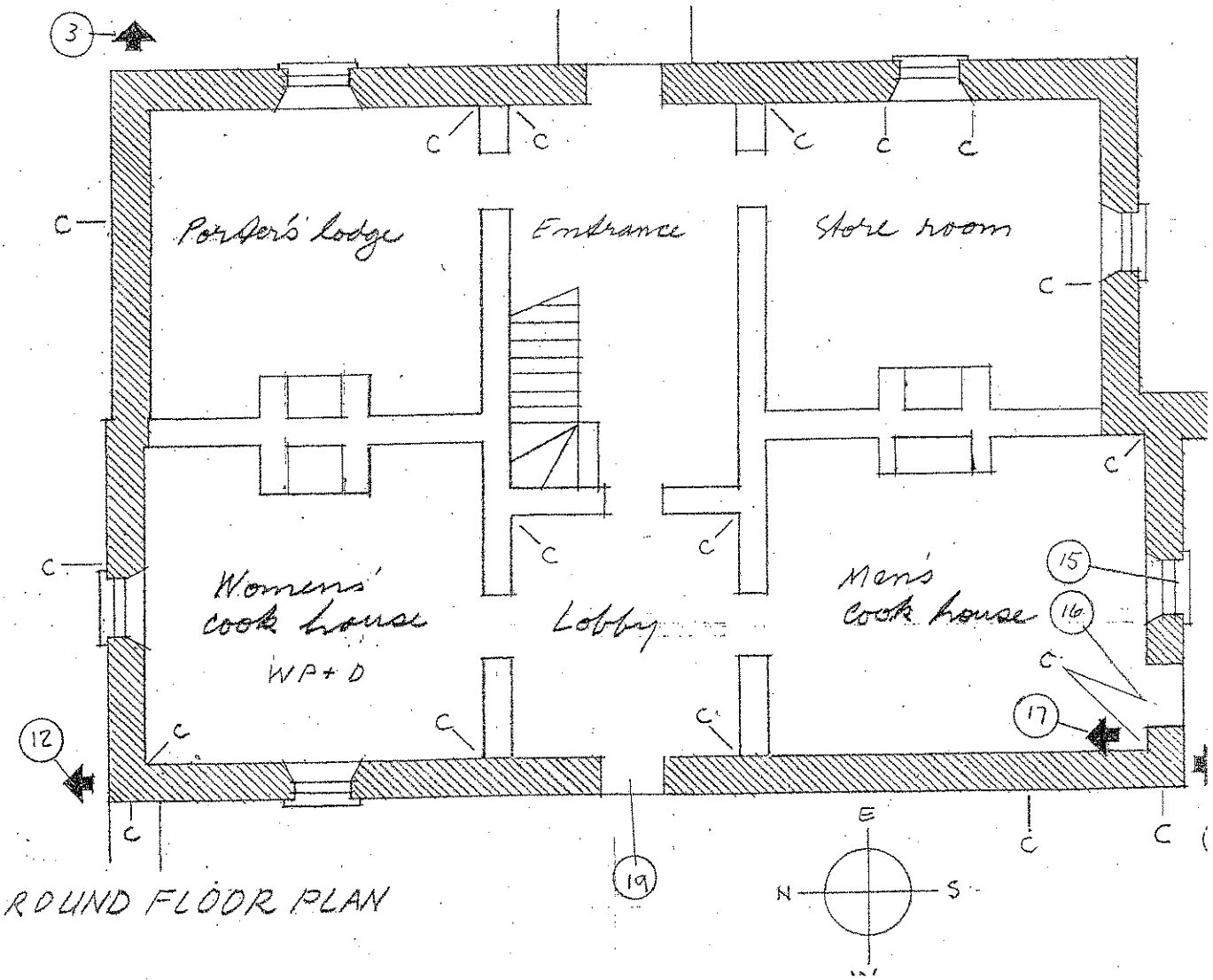


WALL MOVEMENT

1. Notation: c – cracks
   WP – wall paper
   D – dado
   Arrow – direction of movement and location of movement or maximum bow.
2. Refer to elevations and Details 22, 23 and 25 for location and extent of external cracks, and some associated internal cracks (P 54, 56, 58, 60, 78, 80, 84).
3. Resultant wall movement possibly primarily due to movement at the footing
4. Blocks swinging out of the wall.
5. Wall and cornice bow out across the width of the wall 25 – 30mm maximum. Bow was estimated by sighting along the cornice. Both sides of the junction with the cross-wall have been patched (at least once) in the past. The crack in the patching is only 2mm, but total internal movement could be more and the wall may not be delaminating as the evidence, literally interpreted, suggests. Further investigation required.
6. Blocks swinging out of the wall.
7. It is not possible to determine the extent of external movement because of the step in the wall and cornice – each half of the wall remains relatively straight. Internal movement is only 1 – 2mm.
8. Two top courses rolling outward.
9. Small localized movement due to roof spread.
10. Area of cracking across blocks.
11. Wall and cornice bow out across the width of the wall 25 – 30mm maximum. Bow across the top of this wall measured internally is 25 – 30mm indicating that the wall is not delaminating and that the movement is likely to have taken place since the cross-walls were removed.
12. Movement restricted to the area of poorly repaired wall after removal of the gaol wall.
13. Local bulge of 15mm below window.
14. Wall and cornice bow out across the width of the wall 30 – 40mm. One side of the junction with the cross-wall has been extensively patched and shows a crack 6mm wide at the top. The other has many layers of wallpaper supporting unpatched plaster which is separated from the external wall by a gap of 25 – 30mm suggesting that the wall is moving as a whole.
15. Lintel broken, probably due to the inability of the stonework to arch over below the first floor window, and the evident flaw (crack?) in the original lintel.
16. Internal stone lintel broken.
17. Stonework at and below the lintel failing.
18. Movement restricted to the area of poorly repaired wall after removal of the gaol wall.
19. Lintel broken either due to relative movement of the two sections of roof corresponding to a line of weakness in the wall or the substantial loss of mortar in the stonework above reducing its ability to arch over.



FIRST FLOOR PLAN



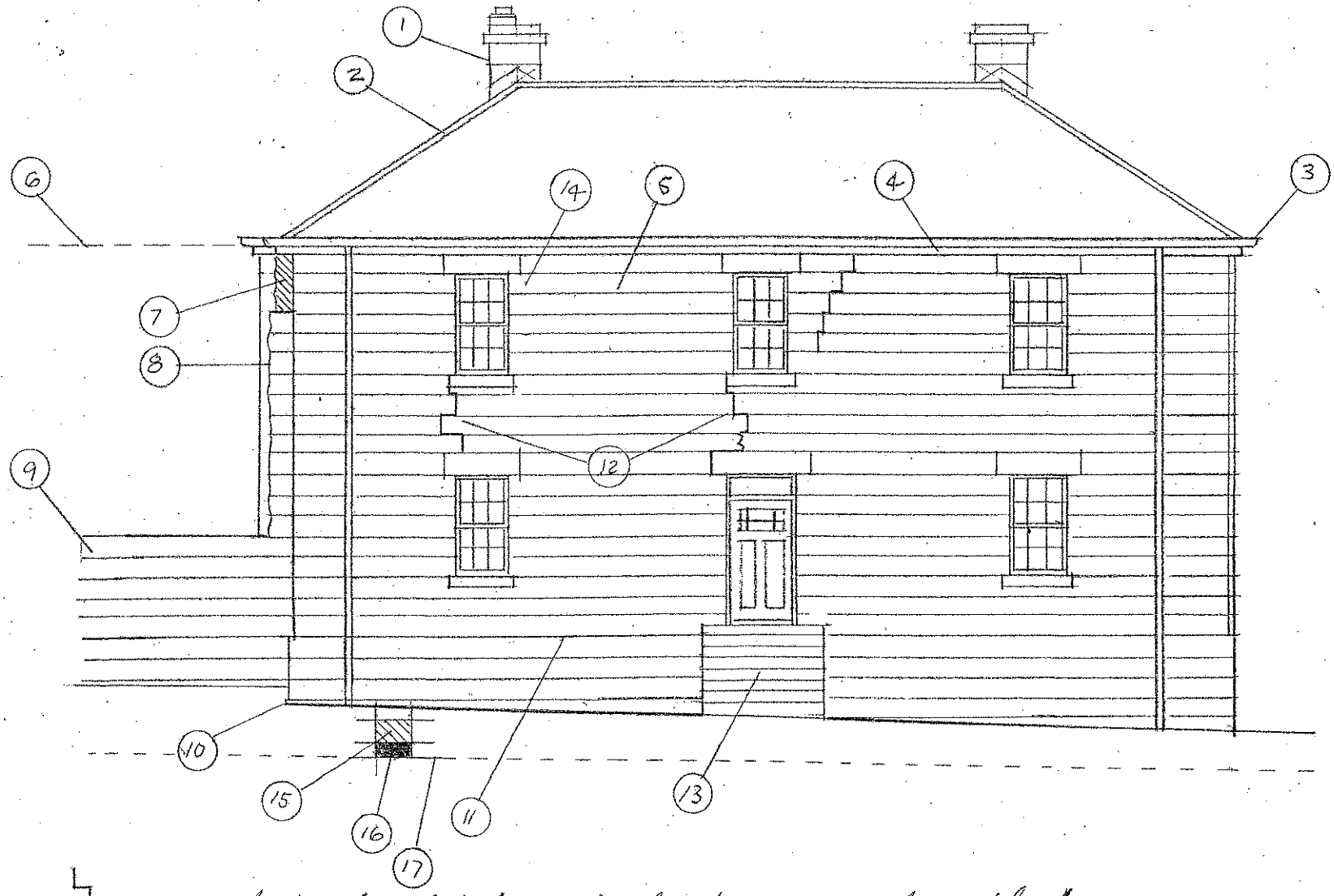
GROUND FLOOR PLAN

EAST ELEVATION (FRONT) and remedial work

1. Stone chimneys suffer pointing loss generally and total loss of mortar to the string and top courses; delamination of stones; lead flashings dislodged, lost, going brittle and torn. Remains of a stone chimney pot made by turning on a lathe. A c1910 photograph (Allport Library, State Library of Tasmania) shows the remains of at least two pots on the southern chimney.
2. Galvanized corrugated iron roof on battens at nominal 900mm centres replacing shingles. A half shingle remains above the chimney breast of the Parlour.
3. Modern Zincalume 'D' spouting and galvanized rectangular downpipes. Leak in NE mitre. Spoutings generally require cleaning and at least the RH down pipe in this elevation is blocked.
4. Rectangular stone cornice. Cornice and upper part of the wall bow outward 25 – 30mm.
5. Generally there is pointing loss and loose pointing to 80% of the upper part of the wall and 20% of the lower part, little delamination of stones and virtually no fretting.
6. Gaol wall removed.
7. Quarry waste rubble core of wall exposed by removal of the gaol wall.
8. Face blocks of the gaol wall remaining attached to the building, the outer ends of which are 50 – 100mm short of the outer face of the wall beyond.
9. Remains of the gaol wall.
10. Course of blocks 40mm beyond the face of the plinth.
11. Building plinth projecting 75mm.
12. Cracks with blocks swinging outward 15mm.
13. Sandstone steps worn thin, broken and displaced. Refer Detail 17 (P 75).
14. Block rotating out of wall.
15. 340mm deep rubble footing exposed in hole dug against wall.
16. 220mm yellow and grey clay. No water seepage.
17. Sandstone bedrock.

Remedial work

- Anchor the external wall to the two first floor lobby cross-walls with a Detail 18 tie at a point 3 courses down from the stone cornice and with Detail 19 ties at 5 and 7 courses down. Make good internal cracks at junction of cross and outside walls (P 76).
- Make good cracks following joints.
- Re-bed and repoint blocks moving out of the wall. Insert two Detail 19 anchors at reference 12 locations at points one and two courses above the ground floor window lintels (P 76).
- Make good pointing loss including removing loose pointing.
- Alternatively, repoint the whole of this façade.
- Remove the top and string courses from chimneys, provide copper or stainless steel wire cramps in the top of the next course, re-bed string and top courses and repoint the whole of both chimneys. Re-bed remnant chimney pot.



55

Crack following joints } Crack across stone block.

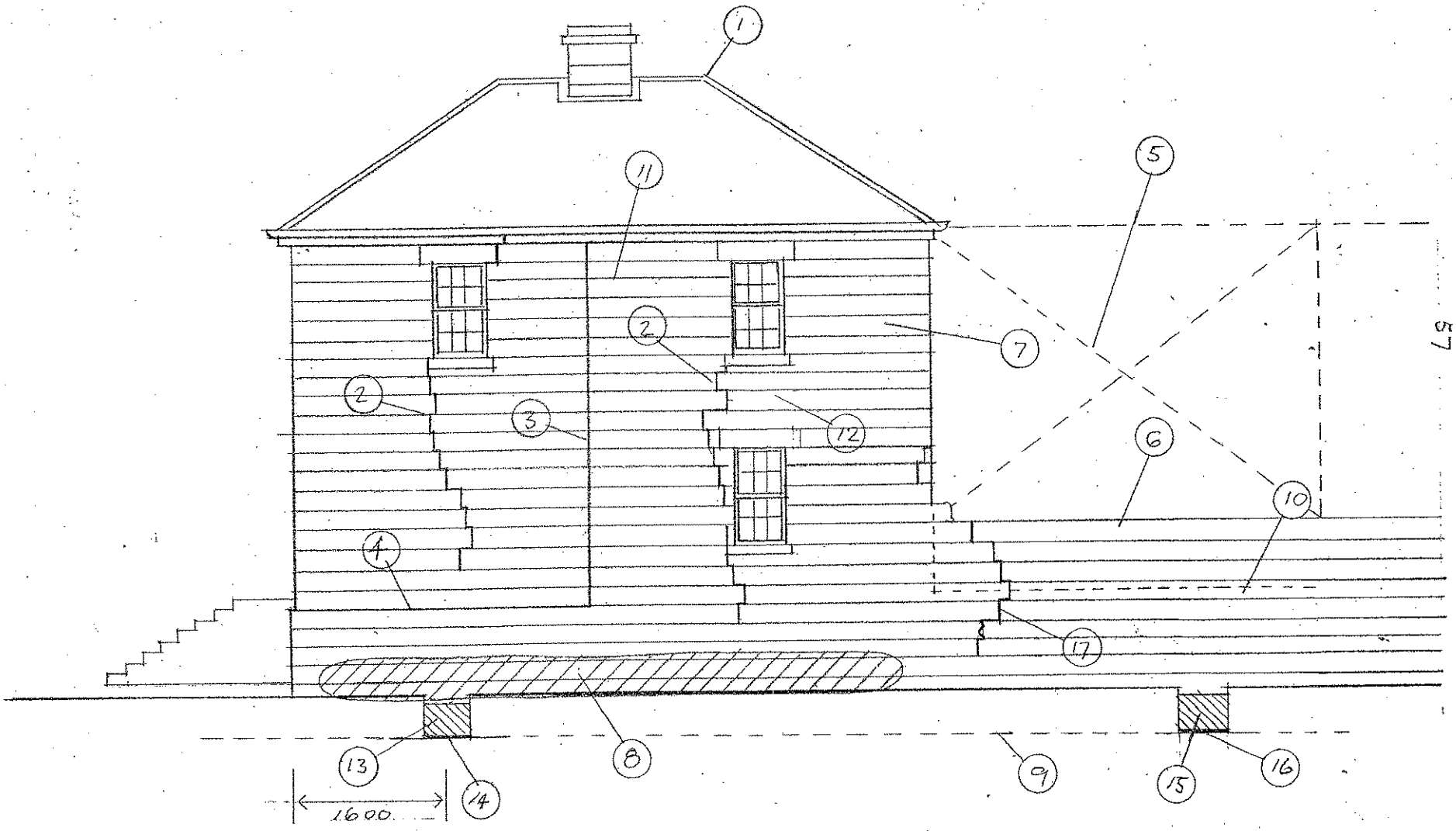
Scale 1:100

NORTH ELEVATION and remedial work

1. Long term leak at hip apex.
2. Cracks along lines of weakness in the wall. Refer Detail 25 (P 84).
3. Step in wall corresponding to the plinth projection and possibly intended to mark the location of a future dividing wall shown in a plan for a much larger gaol, proposed in 1834. (AOT CSO 1/691:15206:157)
4. 75mm wide plinth projection.
5. Initial section removed of this gaol wall.
6. Remains of gaol wall.
7. Generally there is pointing loss and loose pointing to 20% of the wall, and delamination of stone and fretting to 4%.
8. Area of fretting stonework practically confined to one course.
9. Nominal level of sandstone bedrock. Refer Detail 25 and 31 (P 84, 89).
10. Ground level behind the residence. The level throughout the rest of the gaol is approximately 400mm higher.
11. Stone cornice and upper part of the wall bow outward approximately 30 – 40mm.
12. Local bulge of approximately 15mm below the window.
13. Rubble footing approximately 500mm deep.
14. Probable in situ clay foundation 50 – 100mm thick. Investigation hampered by water.
15. Rubble footing approximately 660mm deep.
16. Ditto 14.
17. Probable location of a crack noted by Crawford, Cripps and Wegman in 1985, now in an area of recent re-pointing.

Remedial work

- Anchor the external wall to the cross-wall between the kitchen and bedroom with a Detail 18 tie at a point 3 courses down from the stone cornice and with Detail 19 ties at 5 and 7 courses down. Make good corresponding internal cracks. (P 76)
- Make good cracks following joints.
- Insert two Detail 19 anchors at reference 12 at points one and two courses above the ground floor window lintel. (P 76)
- Make good pointing loss including removing loose pointing.
- Alternatively repoint the whole of this façade.
- Apply sacrificial render to area of fretting stonework.
- Install recycled blocks and wire bed joint ties at the NW corner in accordance with Detail 22 (P 78) Make good corresponding internal cracks..
- Install a pit at a point 1600mm back from the NE corner and drain to the street storm water pit to remove water from under the building. Confirm location by flow of water through the footing.



Crack following joints & Crack across stone block

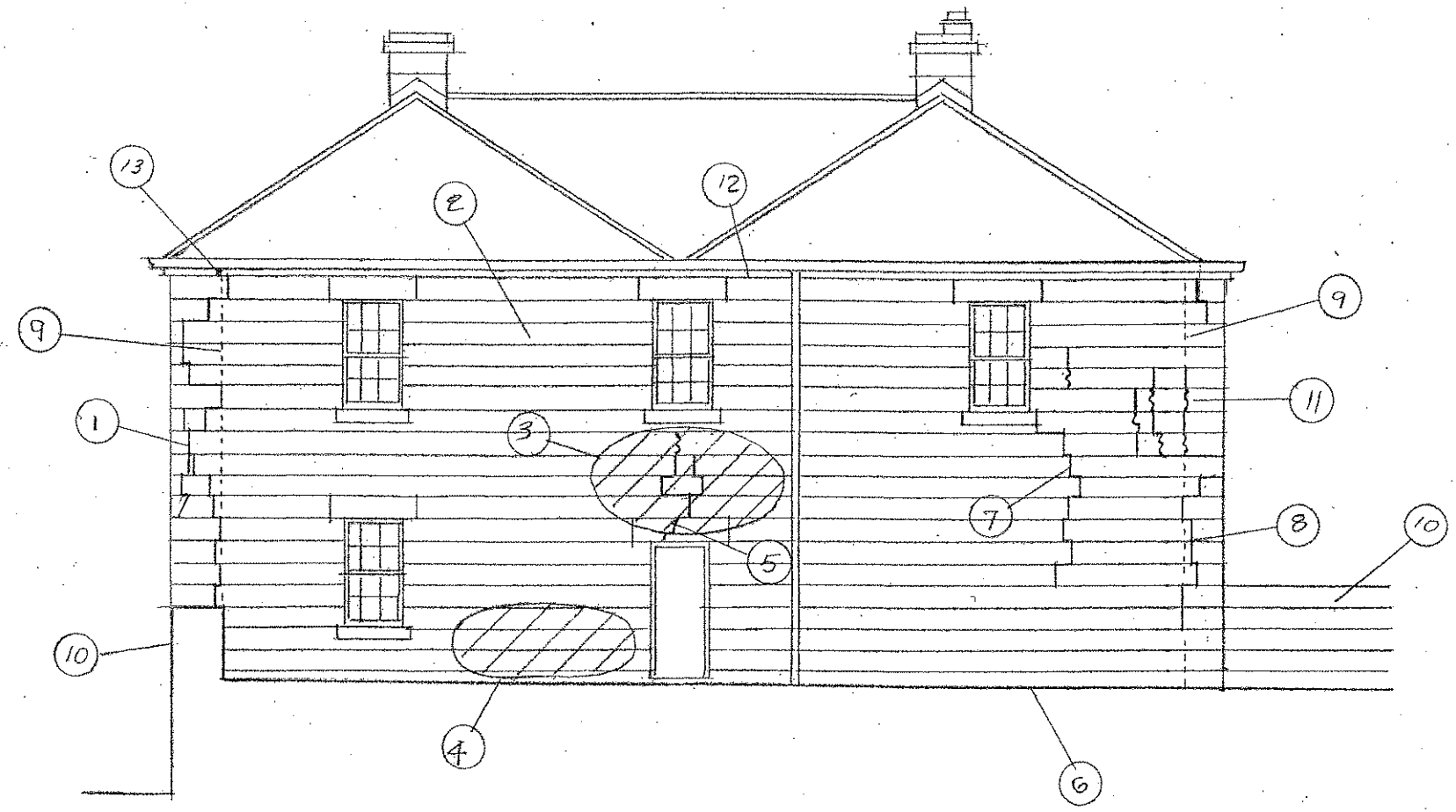
Scale 1:100

WEST ELEVATION (BACK) and remedial work

1. Crack due to poor reconstruction after removal of the gaol wall (prior to 1904 – The Weekly Courier photograph 20/2/1904:18)
2. Generally there is pointing loss and loose pointing to 20% of the wall, some delamination of stones and some fretting. The dampness in this wall is more evident internally where the walls are painted. The paint is flaking off up to shoulder height.
3. Area of substantial loss of pointing and bedding mortar (and probable internal deterioration - internally the whole area below the first floor window has been roughly patched) due to years of roof water cascading down the wall.
4. Area of fretting/delaminating stones. Internally the damage cannot be seen due to the dado and wall paper in this room.
5. Broken lintel. It is not unusual for lines of weakness in walls (here a door and window one above the other with an area of weakened wall between – refer to 3 above) below the junction of two roofs to experience cracking.
6. The area behind the residence drains surface water to the back of the building where it is trapped.
7. Crack along a line of weak bond.
8. Crack due to poor reconstruction after removal of an inner gaol wall. Refer Detail 23 (P 80). Due to the similarity in making good this wall was probably removed at the same time as the north wall – refer 1 above.
9. Line of removed wall.
10. Remains of gaol wall.
11. Cracks across stones. Refer Detail 23 (P 80).
12. Stone cornice and upper part of the wall bow out 25 – 30mm
13. Birds enter roof through a wide joint in the stone cornice.

Remedial work

- Install recycled blocks and wire bed joint ties at the NW and SW corners in accordance with Details 22 and 24 (P 78, 82).
- Make good cracks following joints.
- Make good loss of bedding above the door and make good internal cracks.
- Make good pointing loss including removing loose pointing.
- Grade the rear area to the south and east or to a central pit connected to the storm water drains and provide a compacted surface of crushed sandstone material of particle size from 20mm to dust.
- Provide an air drain along the west wall and the western half of the south wall. Refer Detail 20 (P 77).
- Prop the rear door lintel and insert a MS bar immediately beneath it.
- Make good internal cracks corresponding to external work.



Crack following joints

3 Crack across stone block

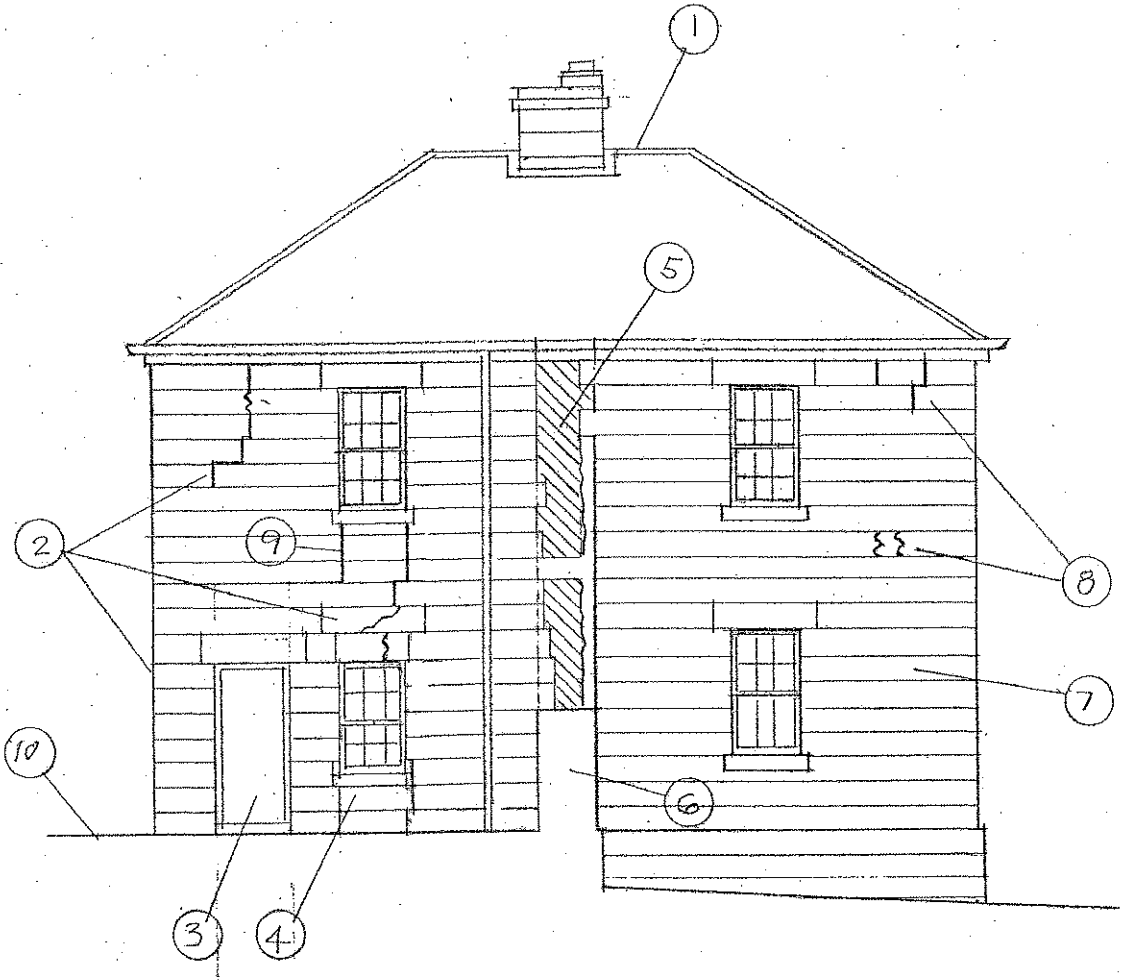
Scale 1:100

SOUTH ELEVATION and remedial work

1. Ridge dips from hip apexes to chimney.
2. For cracks in walls and lintels, and unstable stonework, refer to Detail 23 (P 80).
3. Doorway cut into the wall after it having been built.
4. Doorway changed to a window at the time of cutting in the adjacent doorway. (?)
5. Gaol wall removed leaving quarry rubble core exposed. Refer Detail 23 (P 80).
6. Remains of gaol wall.
7. Generally little pointing loss and loose pointing, delamination of stones and fretting.
8. Cracks in joints and across stones.
9. Stacked perpends in line with window reveals. Refer Detail 23 (P 80).
10. Present ground level same as main gate hinge therefore original yard level may have been here or a little lower.

Remedial work

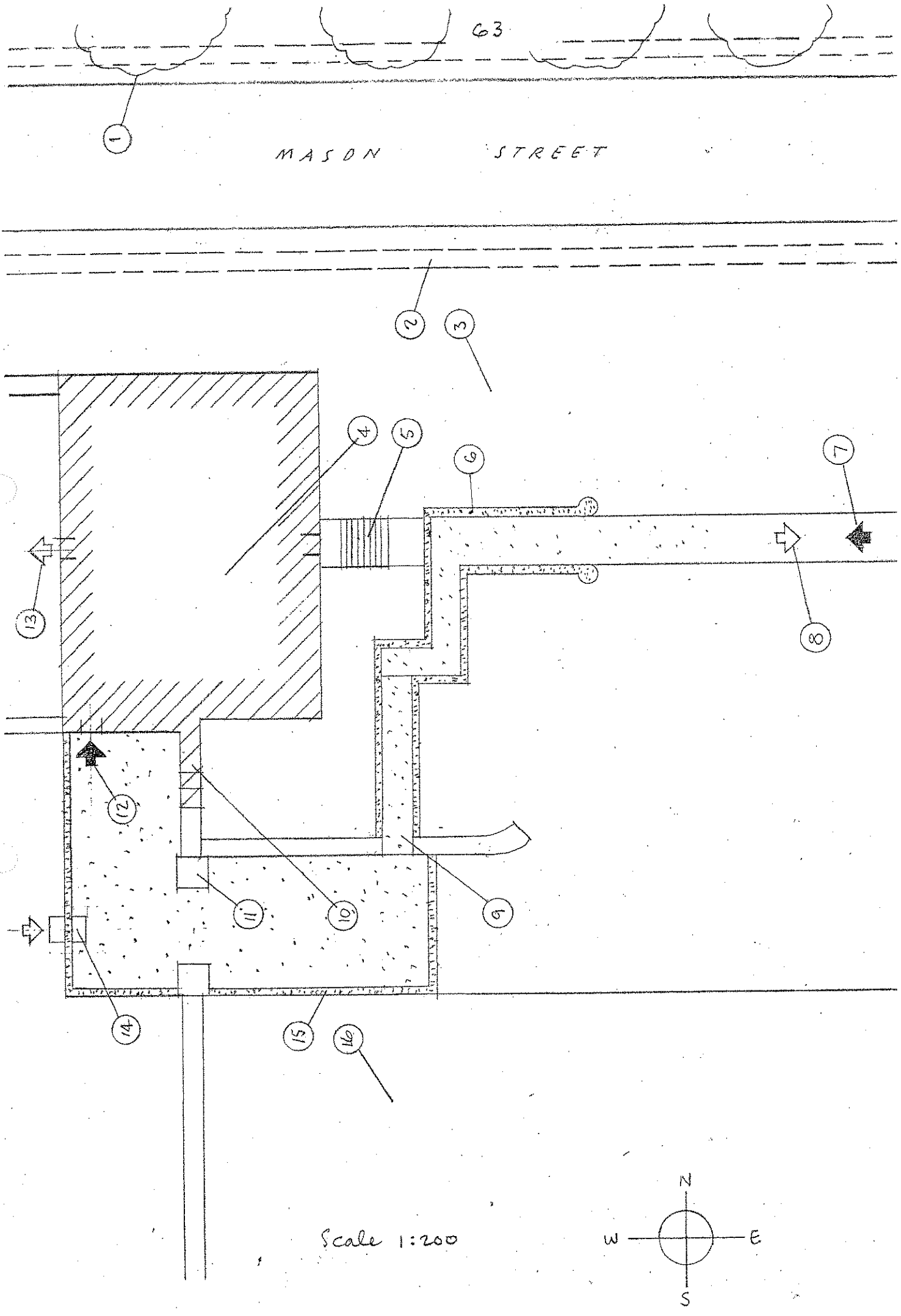
- Install recycled blocks and wire bed joint ties as shown in Detail 24 (P 82).
- Make good cracks following joints.
- Make good pointing loss including removing loose pointing.
- Prop and insert new lintels to doorway and window. Refer Detail 21.Build in a steel angle below the lower window lintel. (P 77)
- Rebuild sandstock brick window sill.
- Do whatever other improvements are found upon investigation to be necessary to adequately stabilize and make safe the lower part of the SW corner.
- Re-build portion of gaol wall as per Detail 24 (P 82).
- Make good internal cracks corresponding to external work.
- Make good remnant east wall and entrance wing wall. Refer Detail 32 (P 90).



Crack following joints ε Crack across stone block Scale 1:100

THE ENTRANCE STEPS and a new entry

1. Trees on north side of street – barrier between domestic and institutional use.
South side of the street to have the openness of the original setting.
2 + 3. Street drainage swale and grass. Nothing to encourage entry from Mason Street.
4. Gaoler's residence – interpretation and other uses?
5. Conserved original front steps.
6. Low hedge barrier and change in direction to direct visitors to the new entry and provide a positive signal that the original steps and entry are not to be used.
7. Approach to the complex from Barrack Street. The long path centred on the building.
   - Classic Georgian architectural experience.
   - Stark simplicity.
   - Sense of grim past.
8. Path leads over open pasture to Callington Mill, symbol of positive enterprise.
9. Ramp up over gaol entry wing wall to bring it to the attention of visitors and to accommodate the disabled.
10. View of full height bit of gaol wall.
11. Path 150mm below remains of gaol gate so that they are noticeable.
12. New entry.
13. Interpretation loop.
14. Steps over low hedge barrier.
15. Low hedge.
16. Adjoining property.


63
MASON STREET
1
2
3
4
5
6
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8
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12
13
14
15
16
Scale 1:200
N
W
E
S

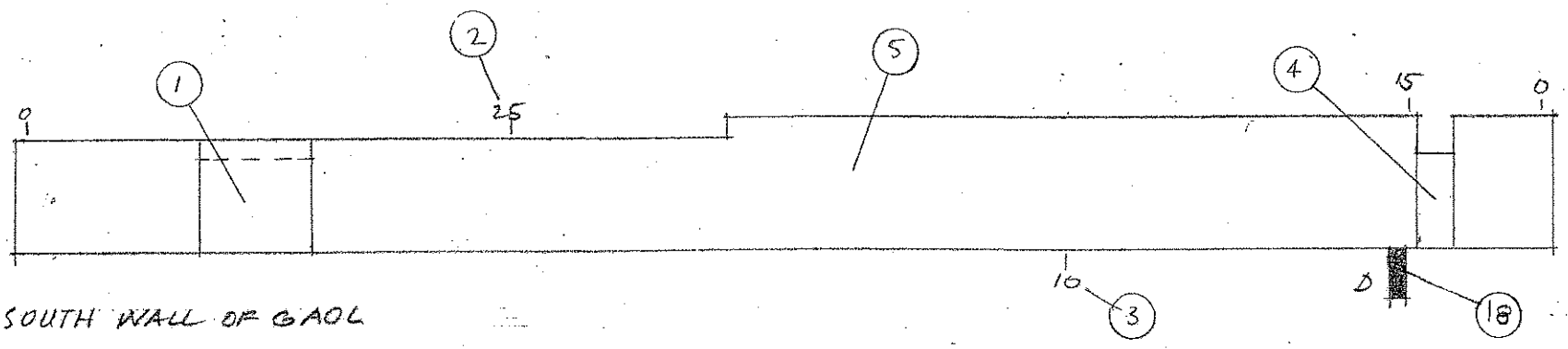
GAOL WALLS and remedial work

East wall not investigated.

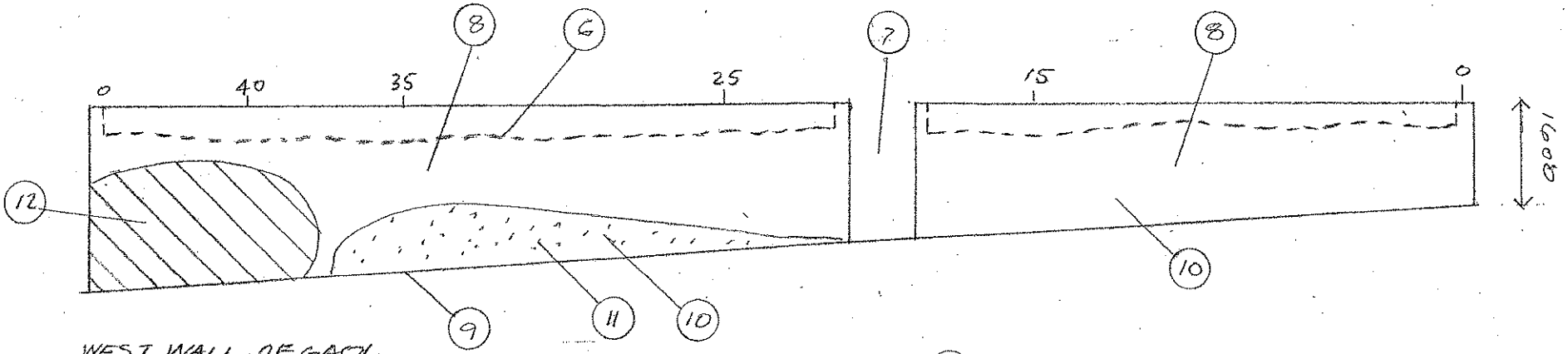
1. Modern opening filled in.
2. Amount in millimetres the wall leans out at the top.
3. Amount in millimetres the wall leans in at the top.
4. Modern opening filled in.
5. Little pointing loss.
6. Top of inner face of wall.
7. Entrance to swimming pool.
8. 70% pointing loss.
9. Asphalt footpath to this wall only.
10. White efflorescence on the face of blocks and along joints.
11. Area beginning to erode.
12. Area of wet stonework fretting and eroding.
13. Area of wet stonework.
14. Level of ground behind the wall.
15. Cesspit lid hinges.
16. Position of a privy and cesspit, shown on plan of archaeological features, Oatlands Gaol Historical Report and Archaeological Survey by Brad Williams.
17. Significantly eroded stonework. Some repointing to be done.
18. Holes dug to bedrock against the wall. Refer Detail 31 (P 89).

Remedial work

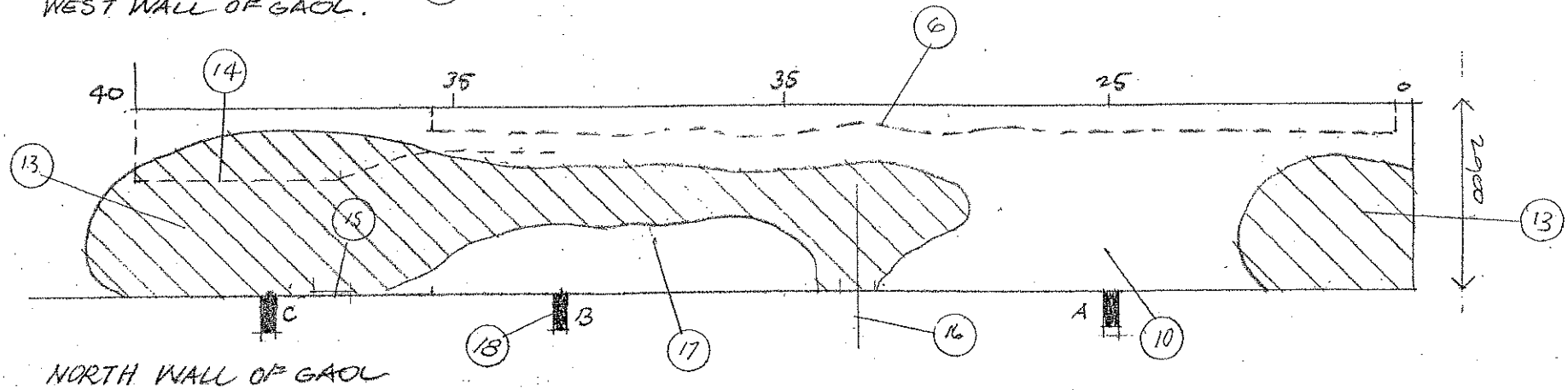
- Discover and terminate the source of water causing the NW corner deterioration.
- Investigate/install drains to remove water affecting the east end and centre of the north wall.
- Replace the footpath.
- Remake and weather the tops of the walls.
- Remove the swimming pool and surrounding fill down to the original gaol floor level or
- Modify the area within the walls to capture and drain away storm water.
- Make good where stones are falling out of walls.
- Rebuild the remnant wall abutting the south wall of the residence and the gaol entrance wing wall.
- Rebed and repoint where necessary.



SOUTH WALL OF GAOL

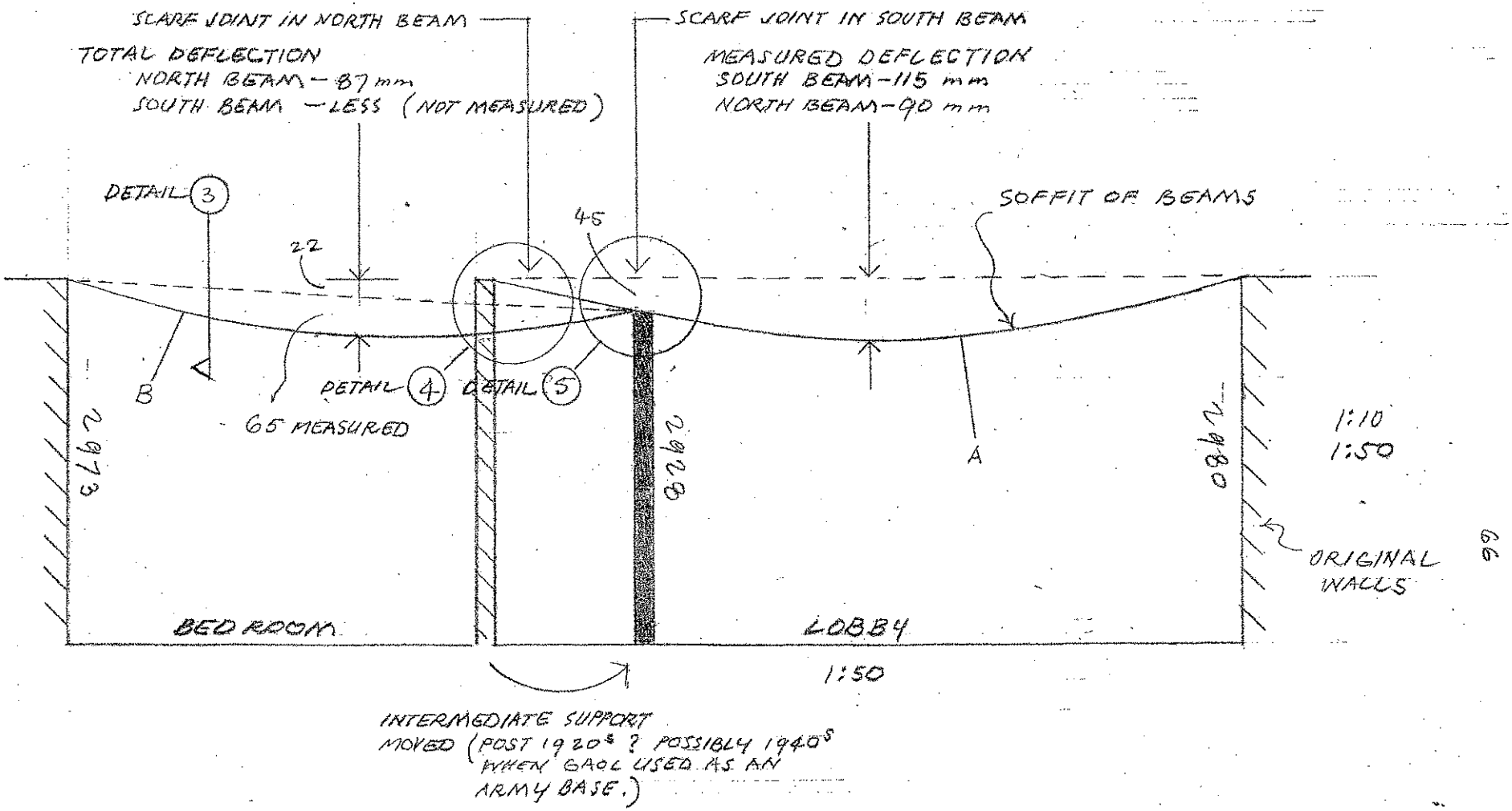


WEST WALL OF GAOL.



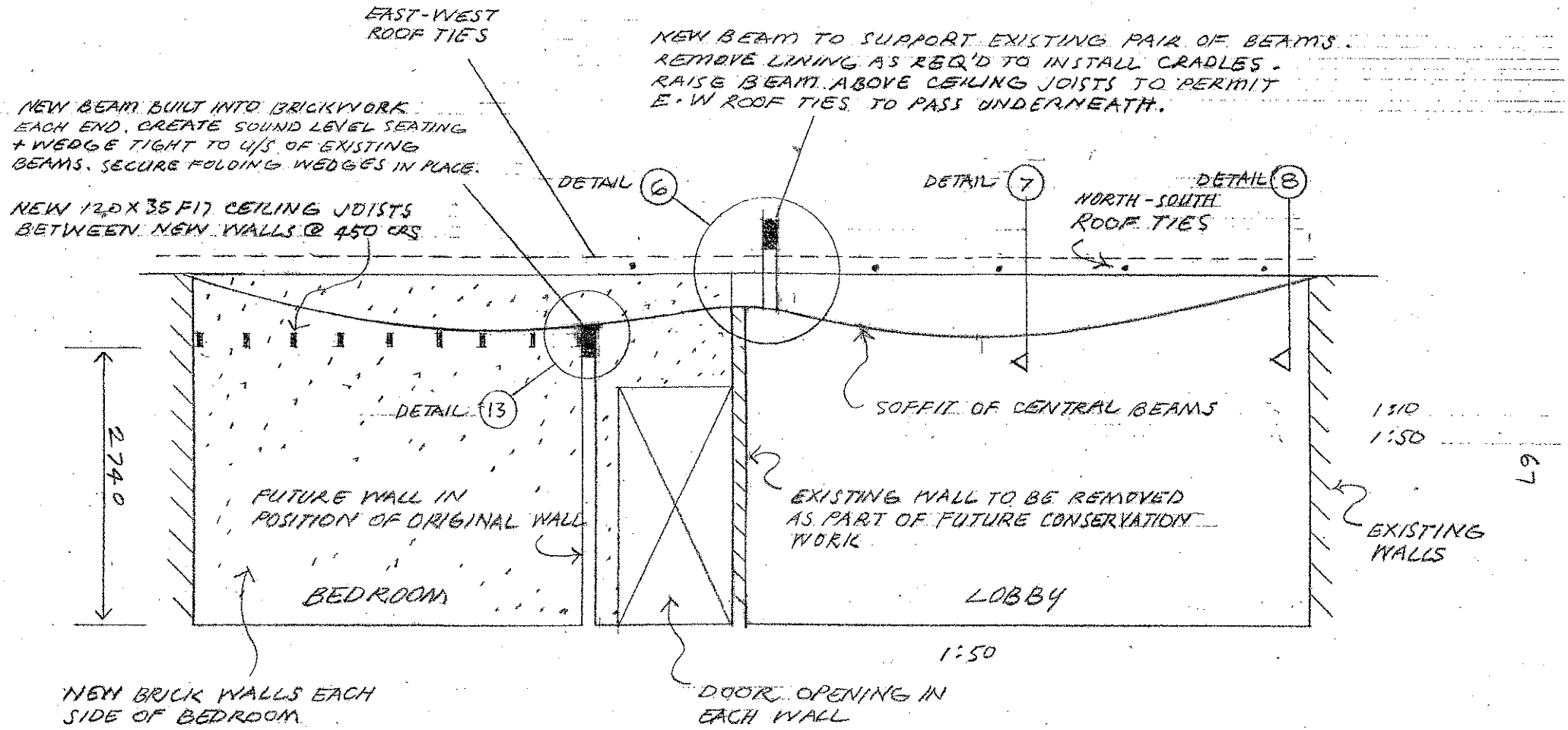
NORTH WALL OF GAOL

Vertical scale 1:100 Horizontal scale 1:200

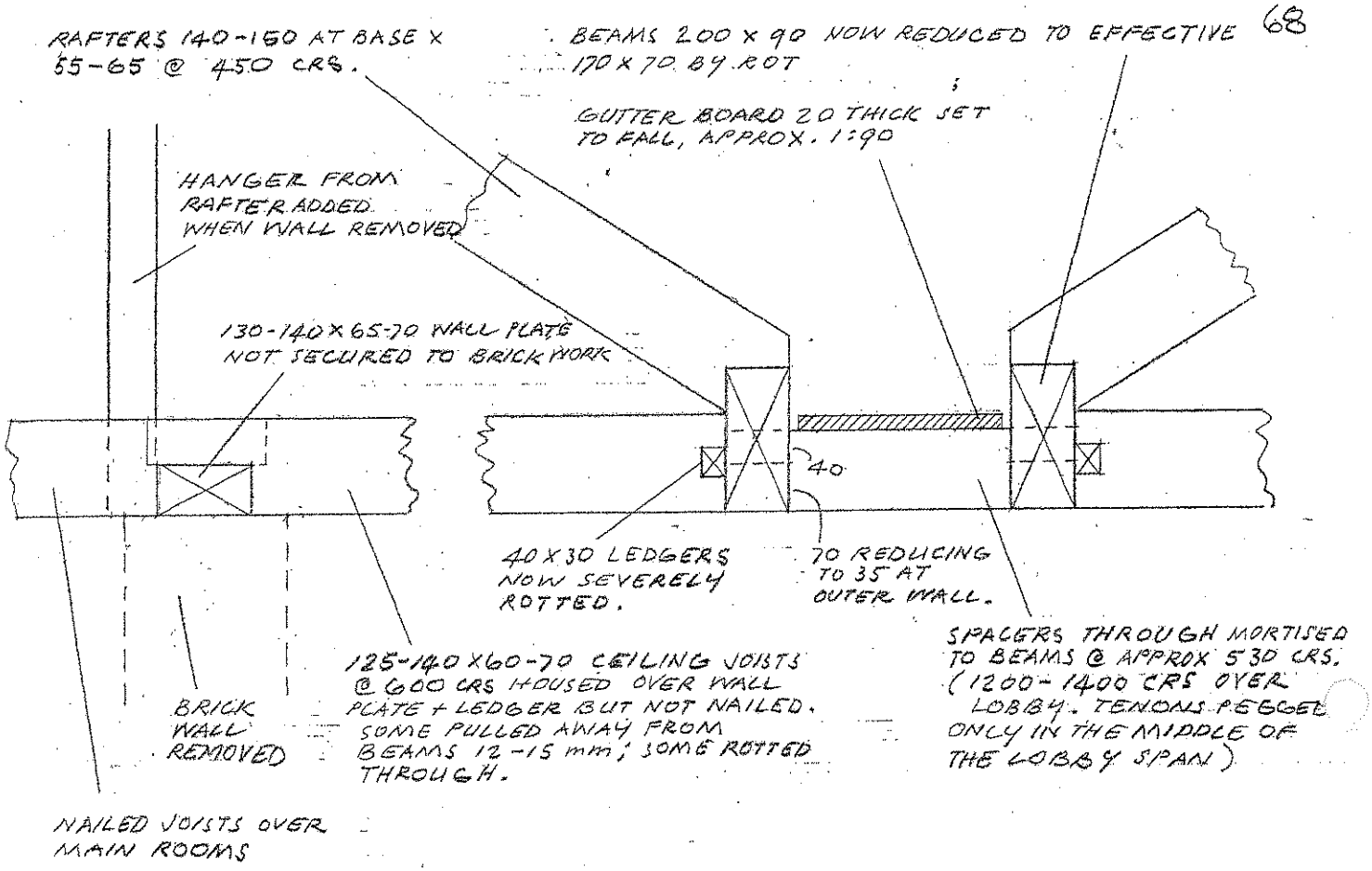


DETAIL (1) DIAGRAM OF CENTRAL PAIR OF BEAMS

The diagram shows the early deflection 'A' due to self weight and roof load and later deflection 'B' due to the shift in support and extra ceiling load

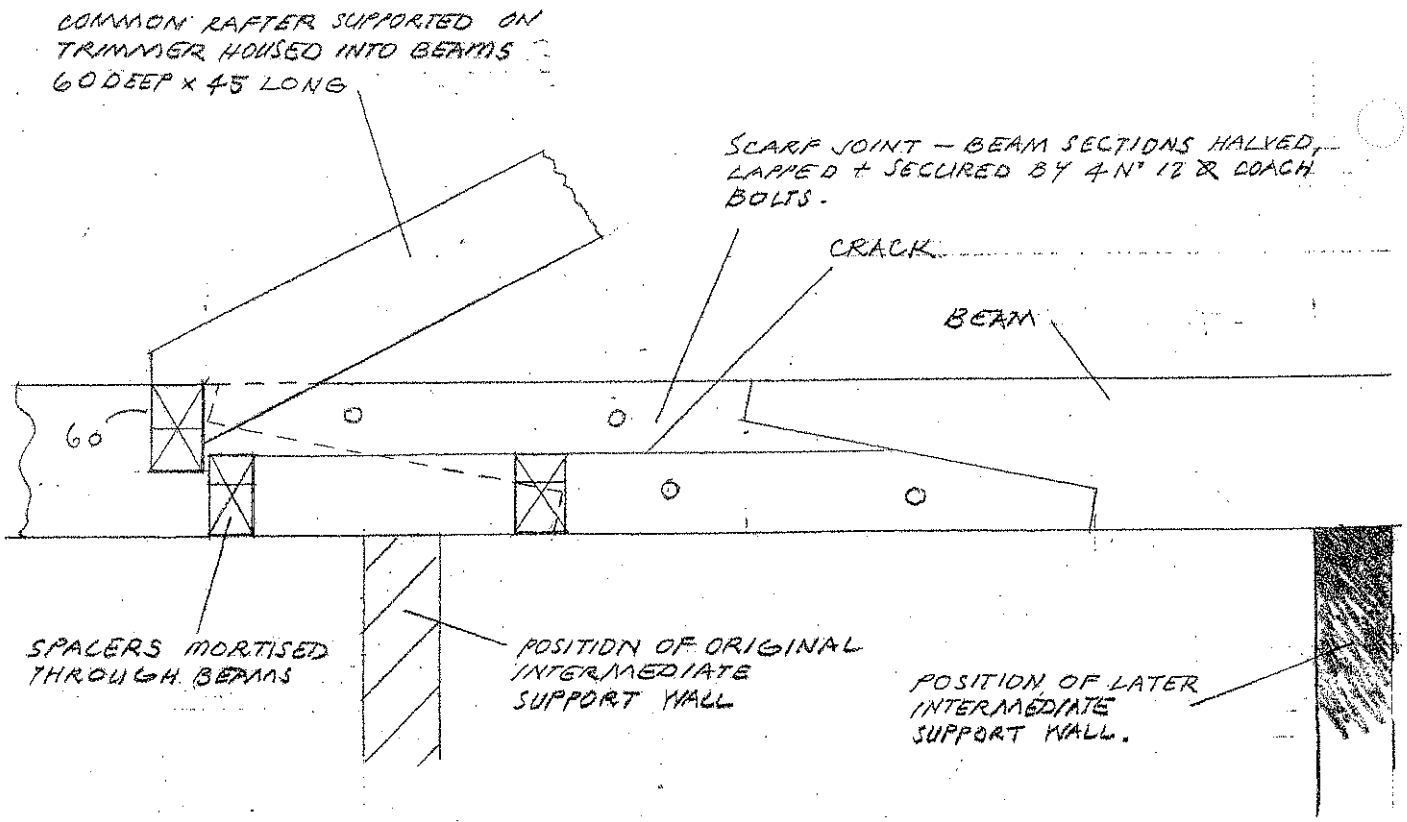


DETAIL (2) DIAGRAM OF REMEDIAL WORK AT CEILING OF BEDROOM + LOBBY

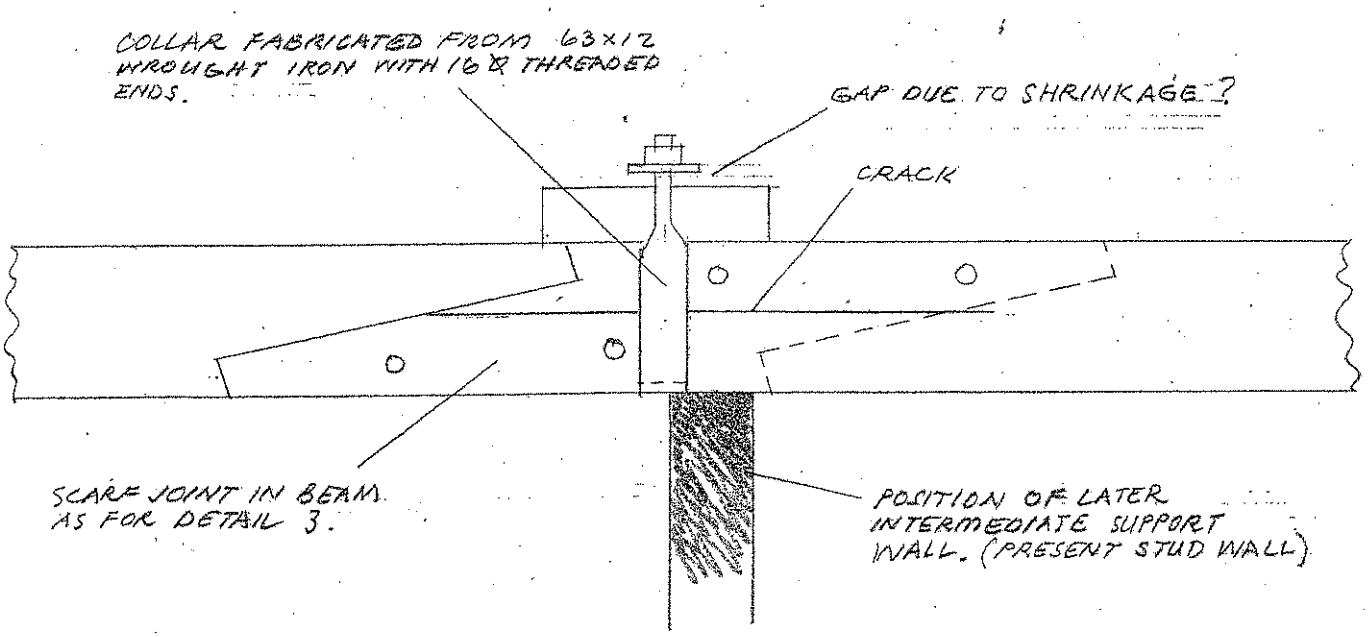


DETAIL (3) BASIC STRUCTURE OVER BEDROOM Scale 1:10

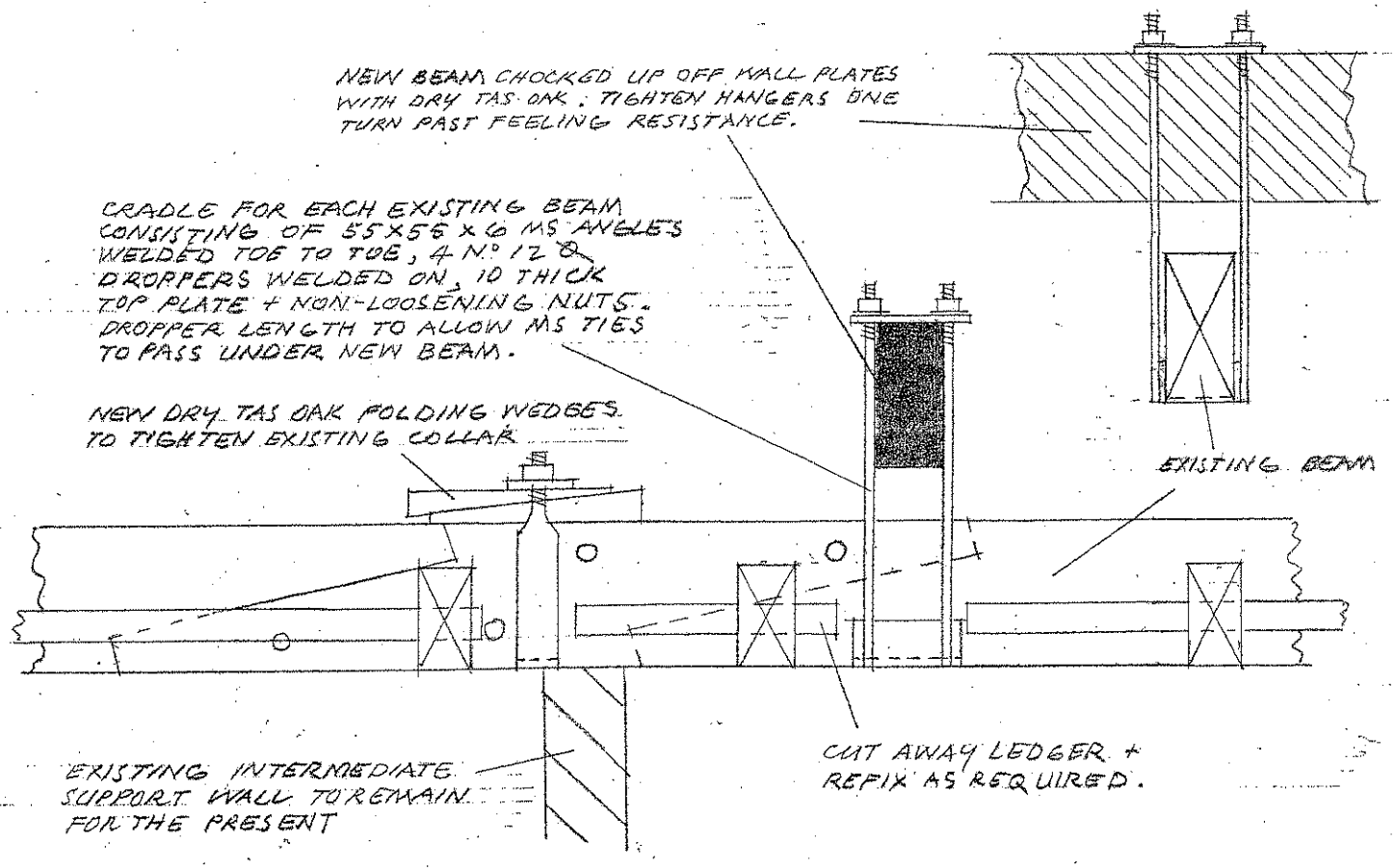
Deflection not shown. Structure over LOBBY similar — a pair of roof struts in lieu of rafters and the brick walls remain.



DETAIL (4) NORTH BEAM SCARF JOINT Scale 1:10



DETAIL (5) SOUTH BEAM SCARF JOINT Scale 1:10
Ledgers and ceiling joists not shown.

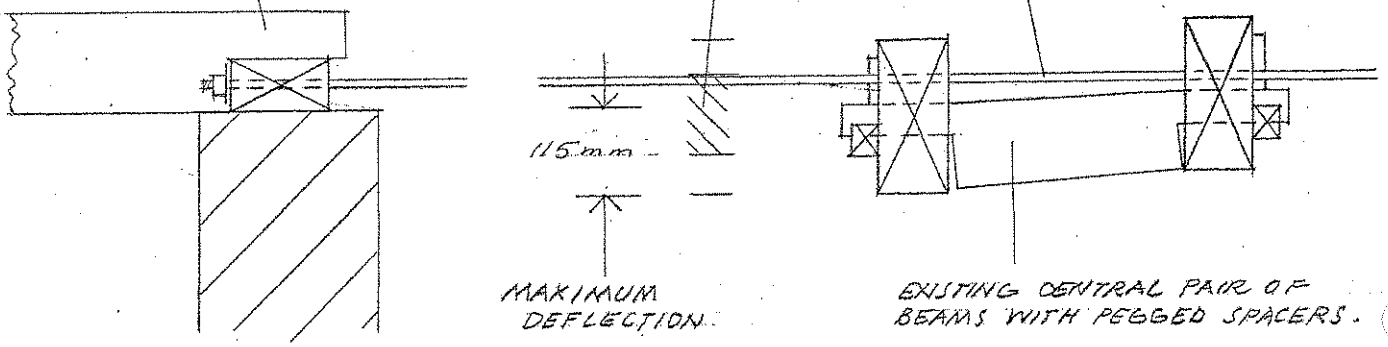


DETAIL (6) NEW SUPPORT FOR CENTRAL BEAMS Scale 1:10

12 Ø MS TIE ROD WITH THREADED ENDS, LARGE Ø WASHERS, AND NON-LOOSENING NUTS. PROVIDE FLAT SEATING FOR WASHERS. TIGHTEN ½ TURN PAST FEELING RESISTANCE.

TIE ROD TO BE LEVEL + PASS THROUGH BEAMS WITHIN THE CENTRAL ½ OF THEIR HEIGHT. MAXIMUM HOLE SIZE 16 Ø.

CEILING JOISTS NAILED TO WALL PLATE.

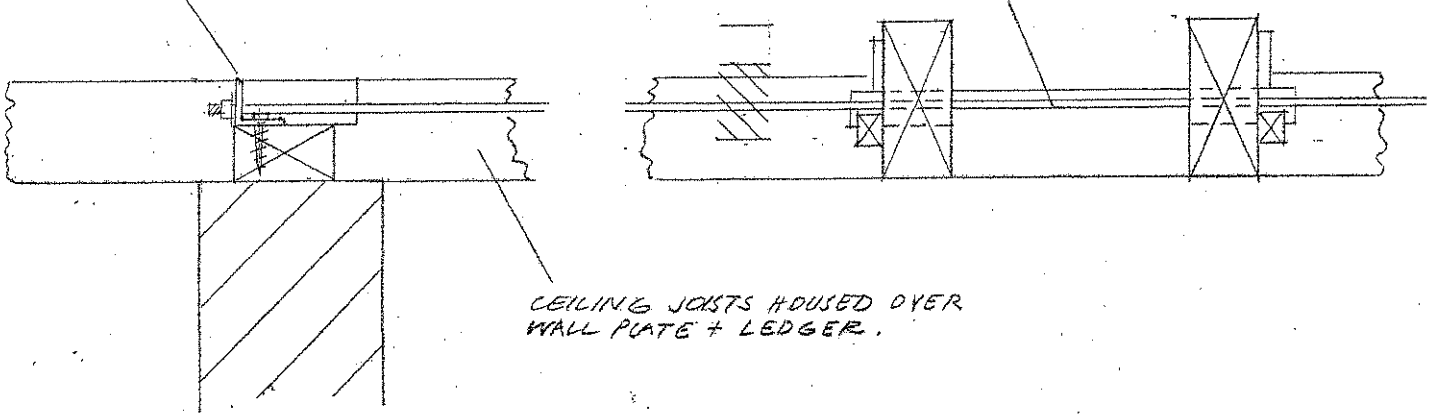


DETAIL (7) N-S (TYPE 3) ROOF TIE ABOVE LOBBY Scale 1:10

Canted ceiling joists and new beam over the LOBBY not shown for clarity. LOBBY ceiling joists are not secured against longitudinal movement.

55X55 X 6 X 300 LONG MS ANGLE ANCHOR SECURED TO WALL PLATE WITH 2 X 10 Ø COACH SCREWS.

TIE ROD AS IN DETAIL 7.



DETAIL (8) N-S (TYPE 3) ROOF TIE ABOVE LOBBY Scale 1:10

2 No° 12 ø BOLTS. MEASURE FOR TIES, MISMATCH HOLES IN LAP, DRAW HOLES TOGETHER WITH SPIKE TO TIGHTEN TIE + BOLT UP.

40 x 3 MS FLAT TIE. SECURE TIE TO ANCHOR WITH ONE 12 ø BOLT.

PACK TIE UP TO LEVEL WHERE CEILING HAS SAGGED.

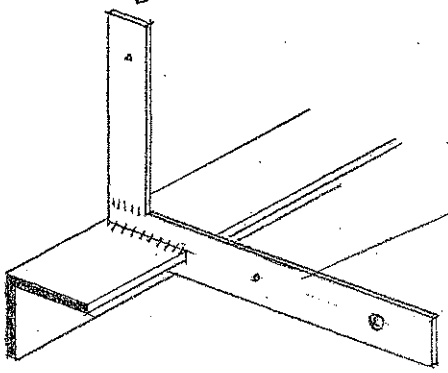
CEILING JOISTS

RAFTER

WALL PLATE

STONE WALL + CORNICE

75 x 75 x 8 MS ANCHOR BAR WITH 40 x 3 LUGS HORIZONTALLY + VERTICALLY TO EACH OF 4 RAFTERS. DRIVE ONE NAIL THROUGH EACH LUG TO POSITION ANCHOR. SET ONE 12 ø BOLT THROUGH EACH HORIZONTAL LUG ON RAFTER CENTRE LINES.



SLOT HORIZONTAL LUGS OF ANCHOR + WELD TO ANGLE SO THAT CENTRE OF BOLT HOLE IS IN LINE WITH TOP OF ANGLE.

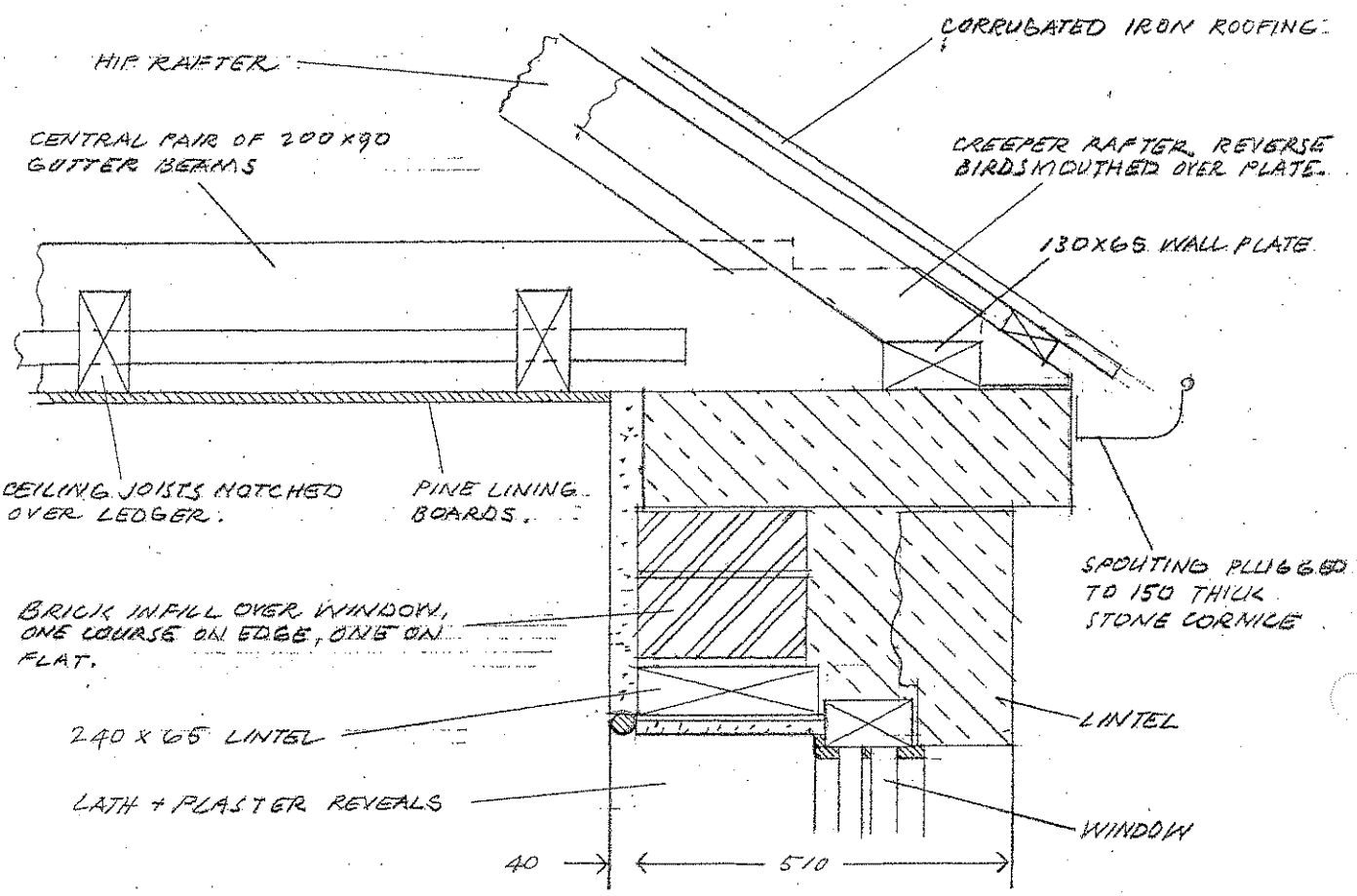
DETAIL (9) E-W (TYPE 1) ROOF TIES. Scale 1:10

ANCHOR SIMILAR TO DETAIL 9 SECURED TO TOP OF HANGING BEAM WITH 2 No° 10 ø x 75 COACH SCREWS.

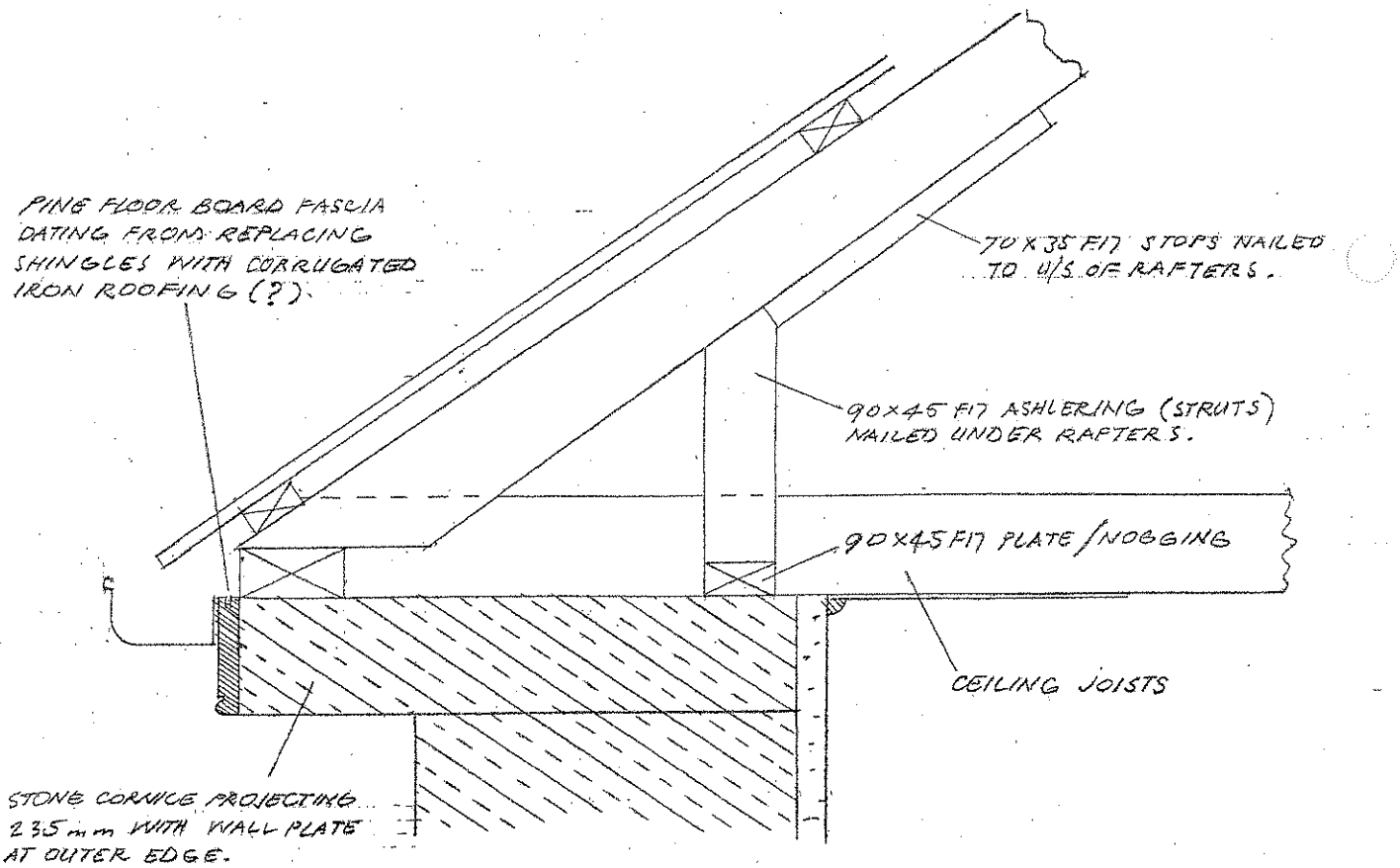
CEILING JOISTS

HANGING BEAMS LAPPED OVER CENTRAL WALL + NAILED TOGETHER. BLOCK UP OFF WALLS WITH DRY TAS OAK AS REQUIRED. ENSURE UNIFORM LEVEL SEATING.

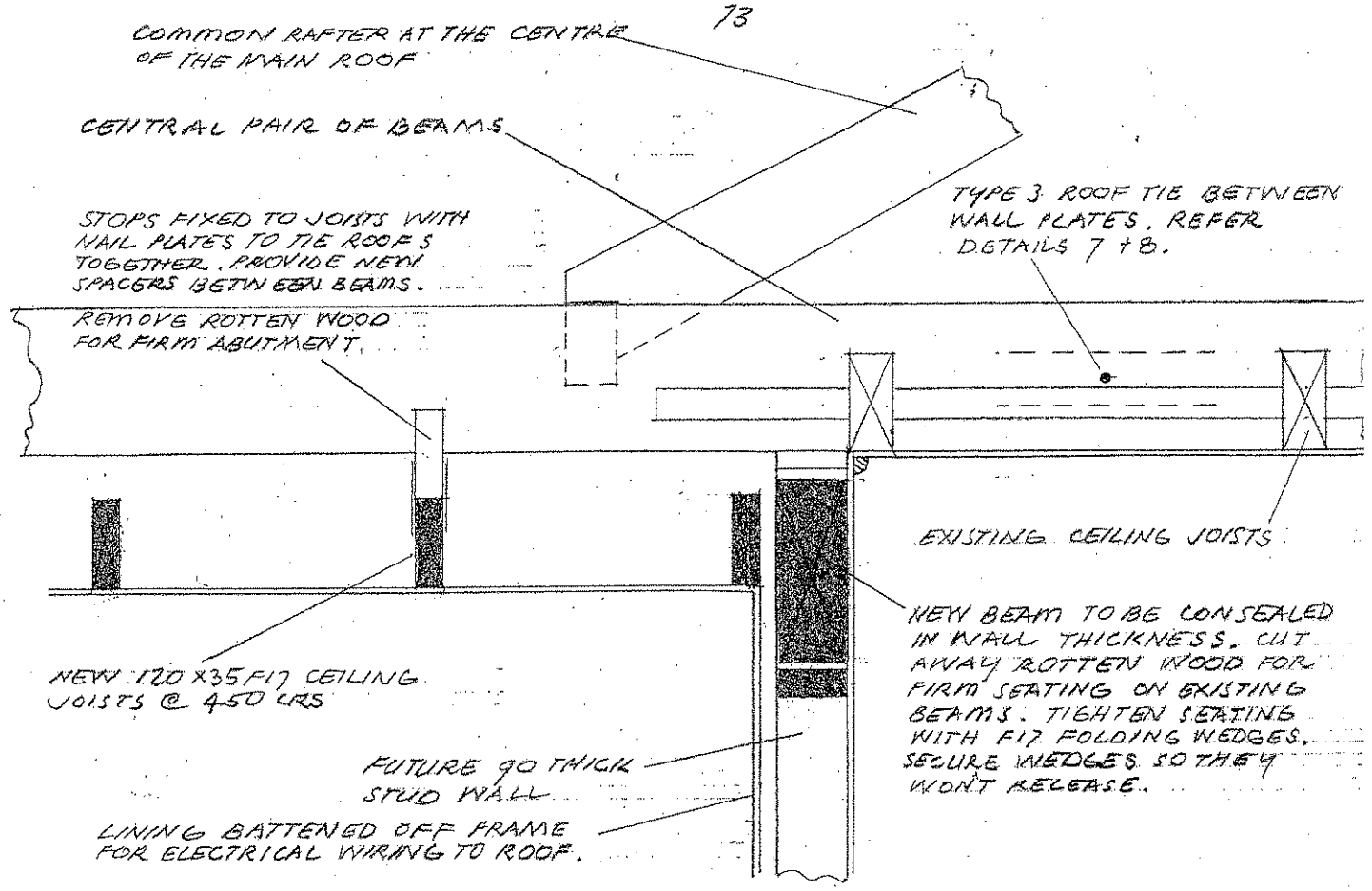
DETAIL (10) E-W (TYPE 2) ROOF TIES Scale 1:10



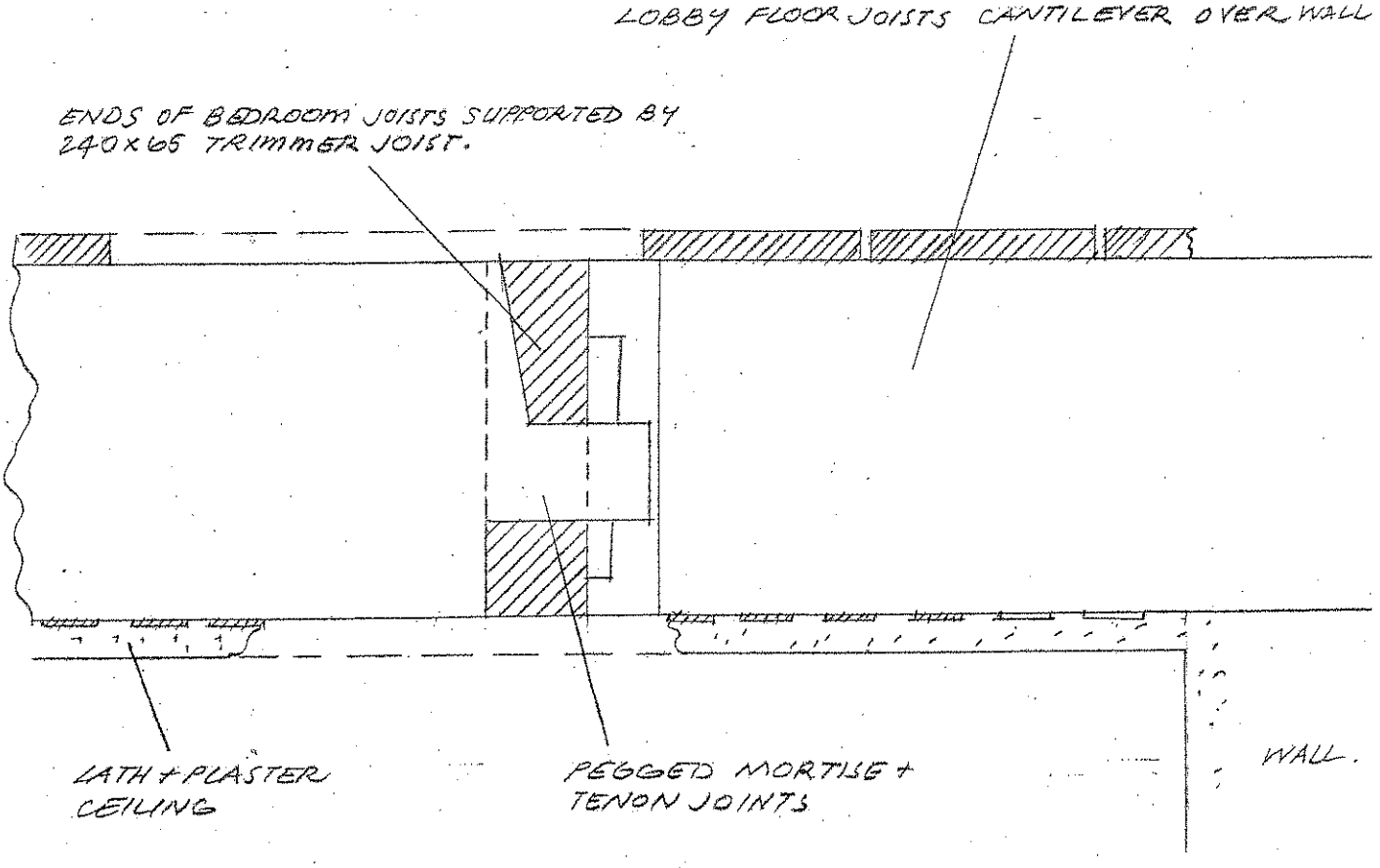
DETAIL (11) WEST WALL SEATING OF CENTRAL BEAMS Scale 1:10
Other eaves similar



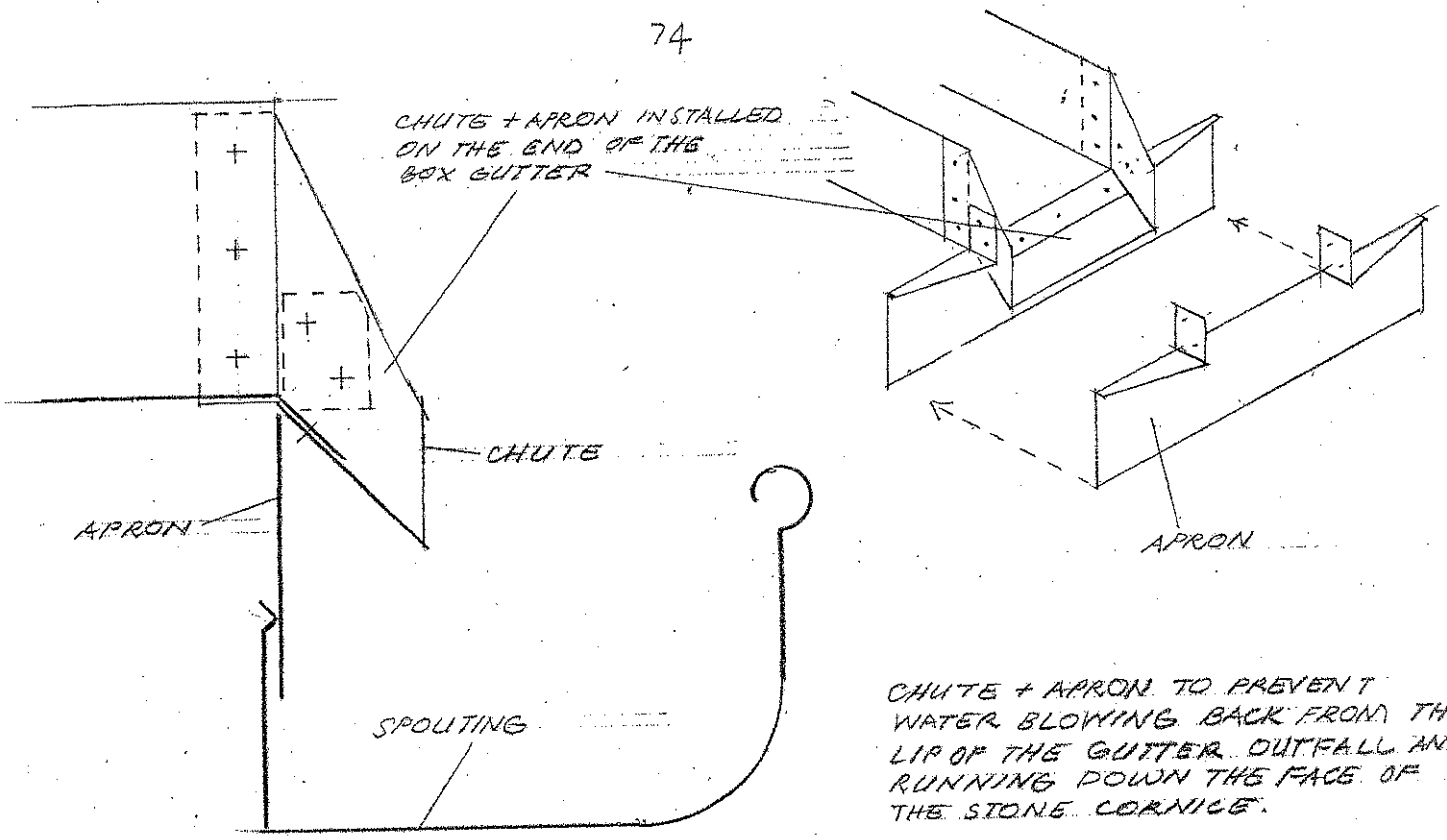
DETAIL (12) SOUTH EAVE WITH ASHLERING. Scale 1:10



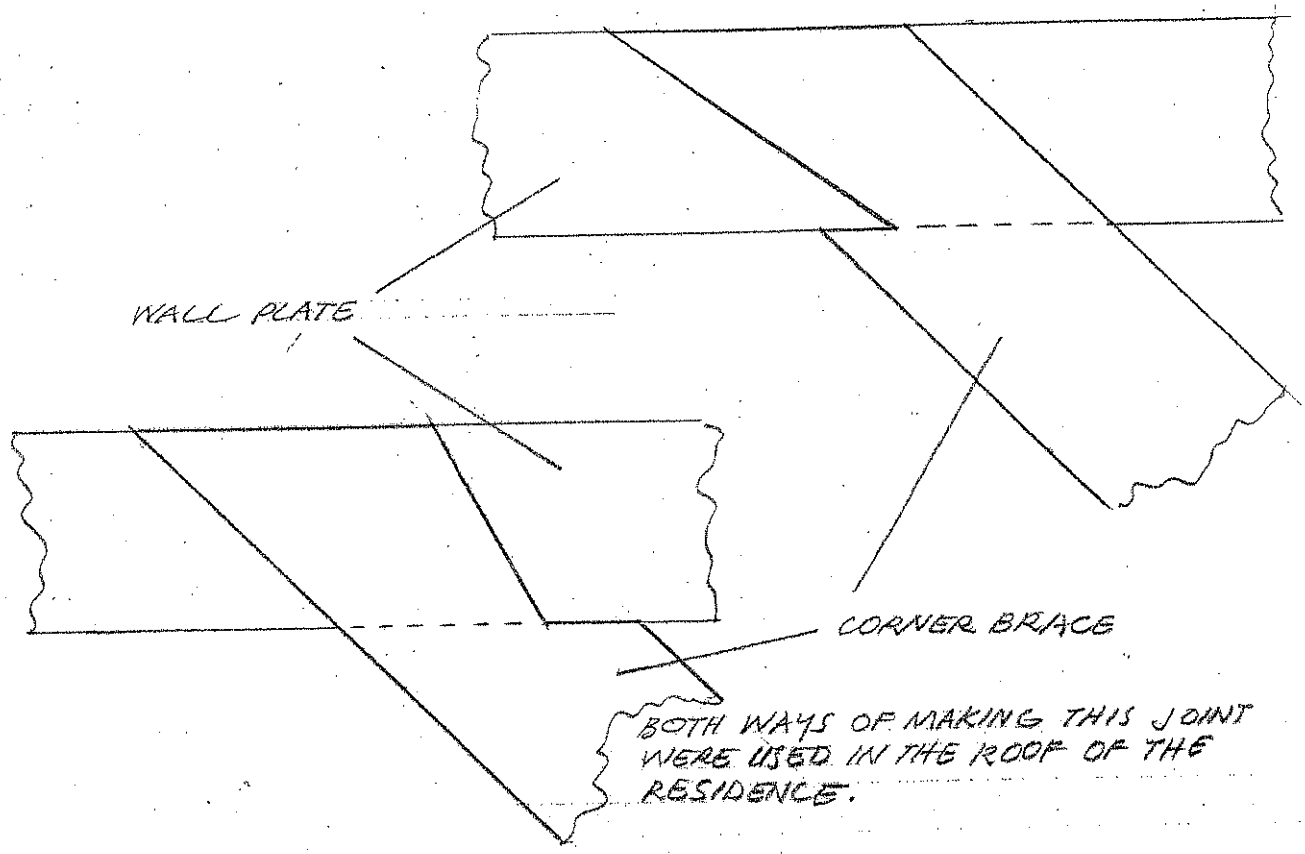
DETAIL (13) NEW SUPPORT, CENTRAL PAIR OF BEAMS Scale 1:10



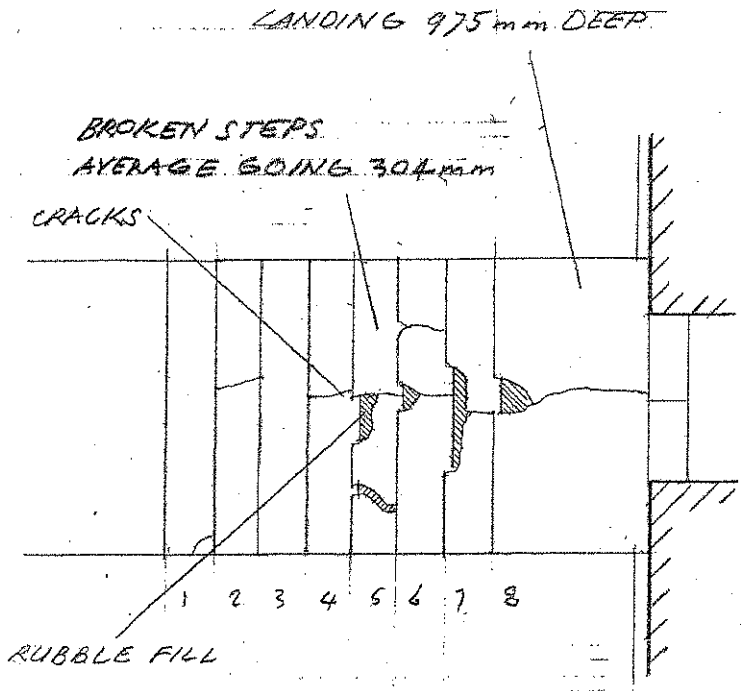
DETAIL (14) BEDROOM FLOOR JOIST TRIMMER Scale 1:5



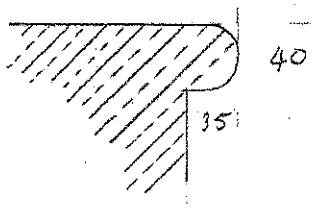
DETAIL (15) BOX GUTTER OUTFALL IMPROVEMENT Not to scale.



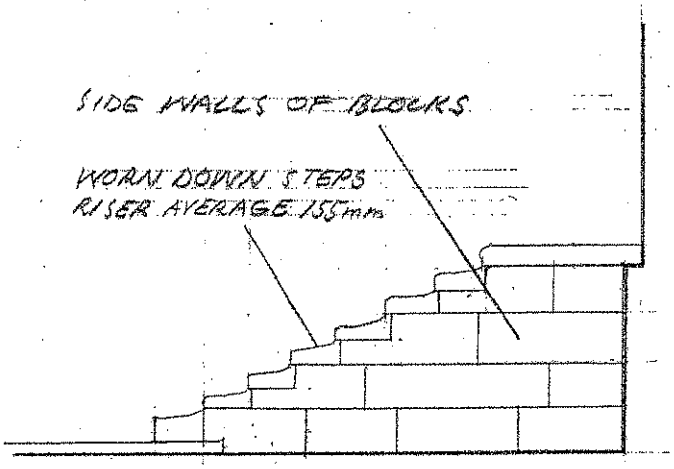
DETAIL (16) DOVETAIL JOINTS Scale 1:5



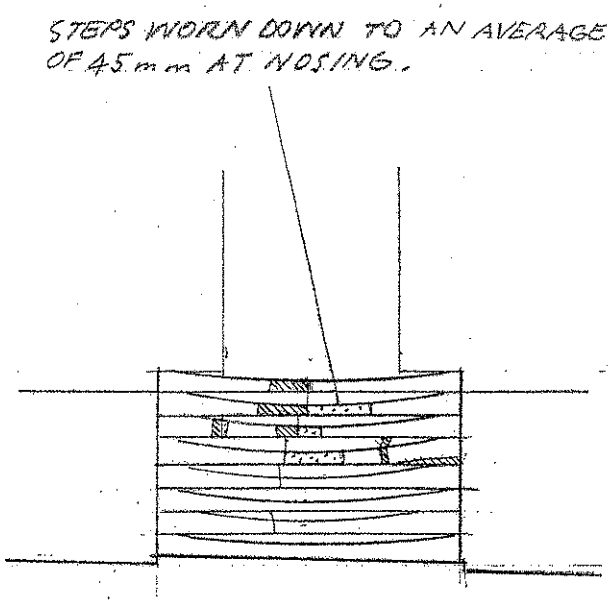
PLAN



MOULDING AT ENDS OF TREADS

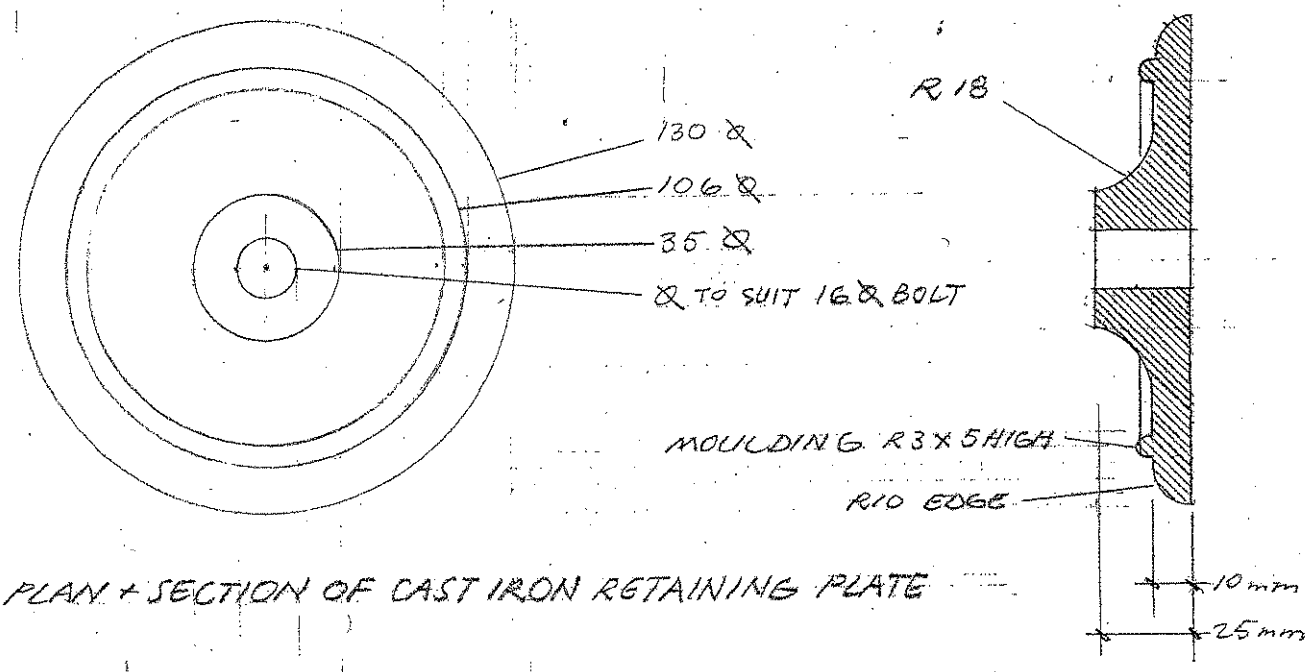


NORTH ELEVATION

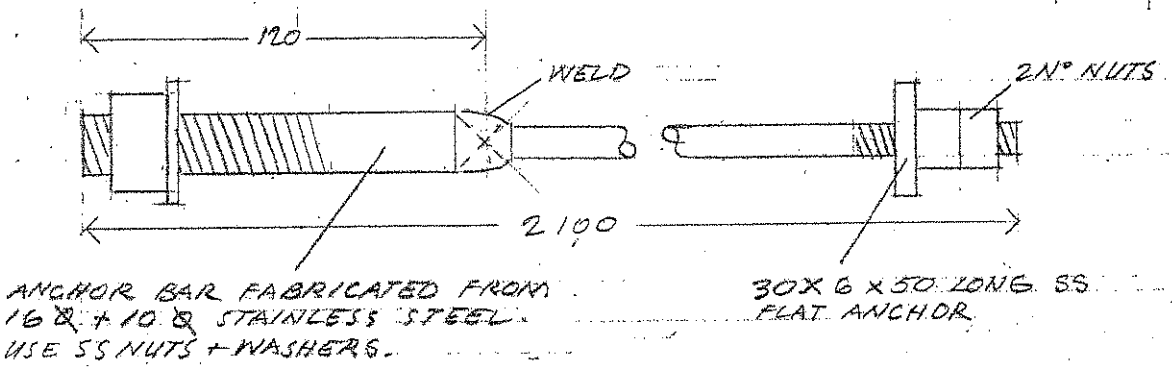


EAST ELEVATION

DETAIL (17) ENTRANCE STEPS Scale 1:50

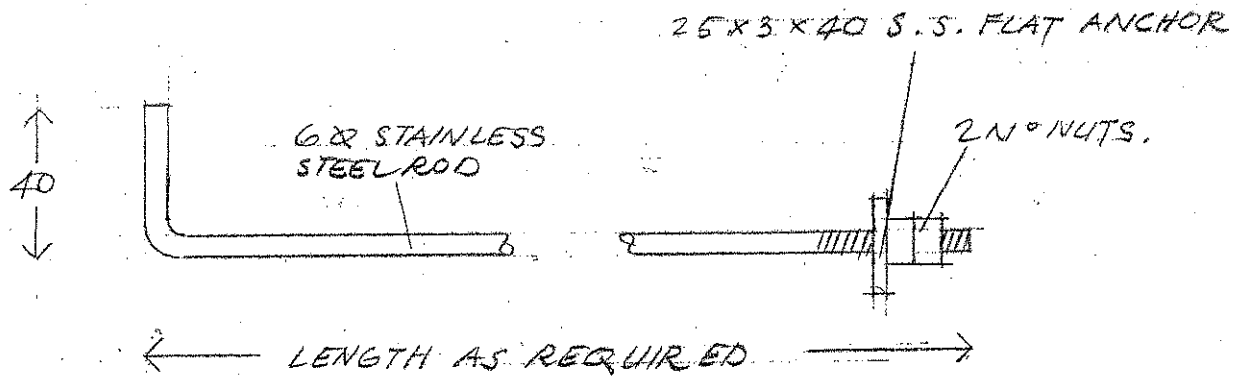


PLAN + SECTION OF CAST IRON RETAINING PLATE

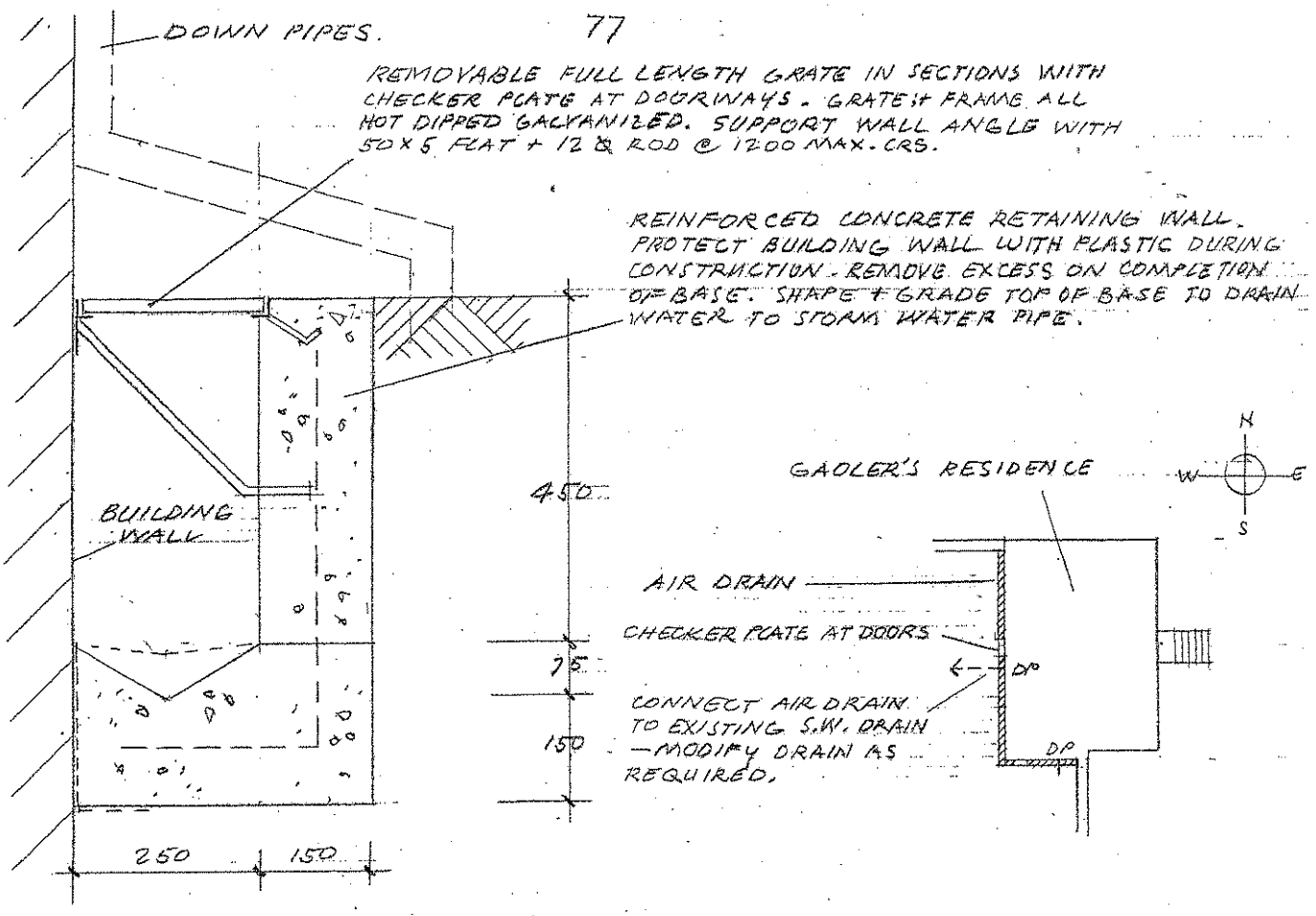


DETAIL (18) CROSS-WALL ANCHOR Scale 1:2

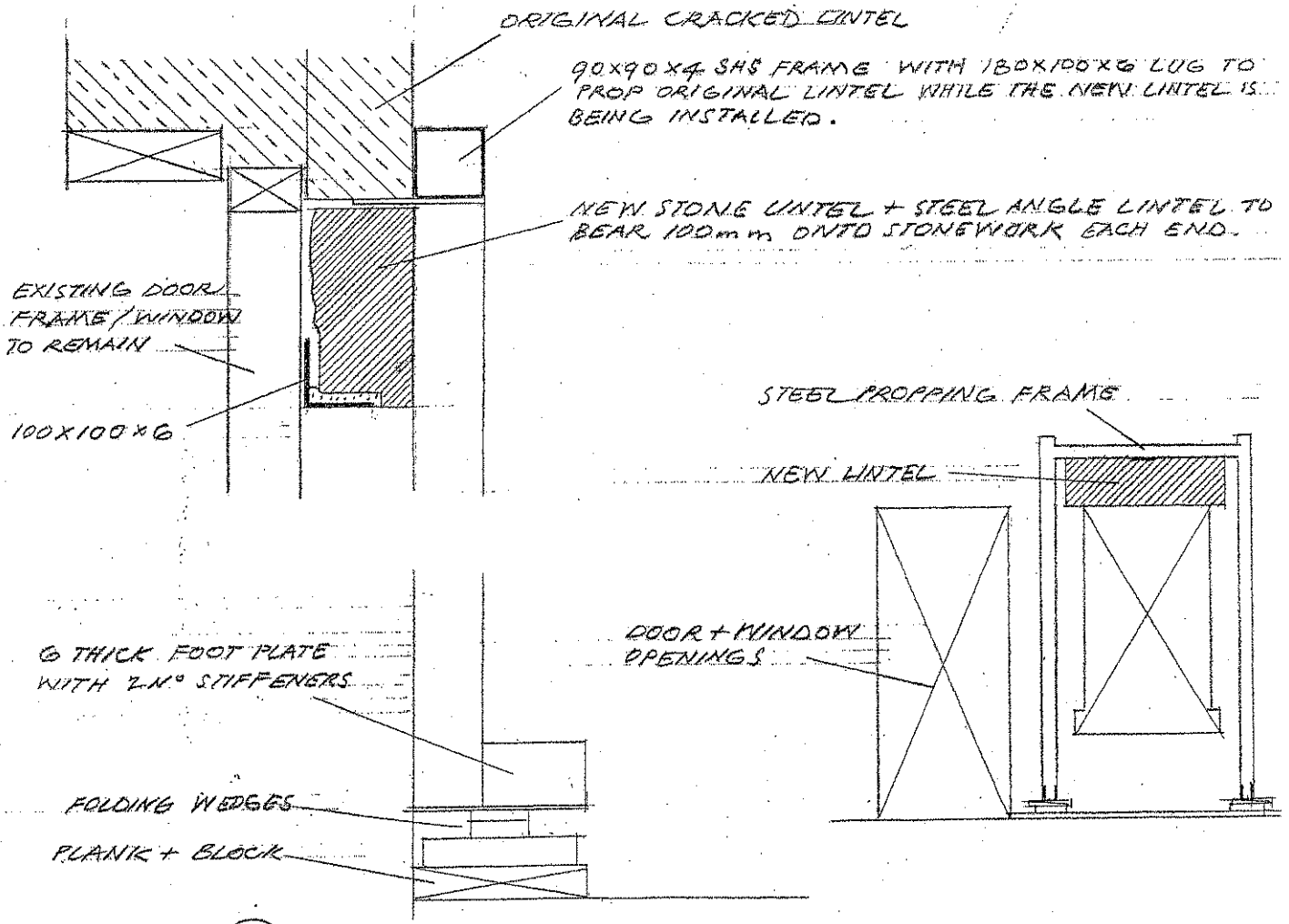
For tying external walls to cross-walls.



DETAIL (19) DELAMINATION / CROSS-WALL ANCHOR Scale 1:2



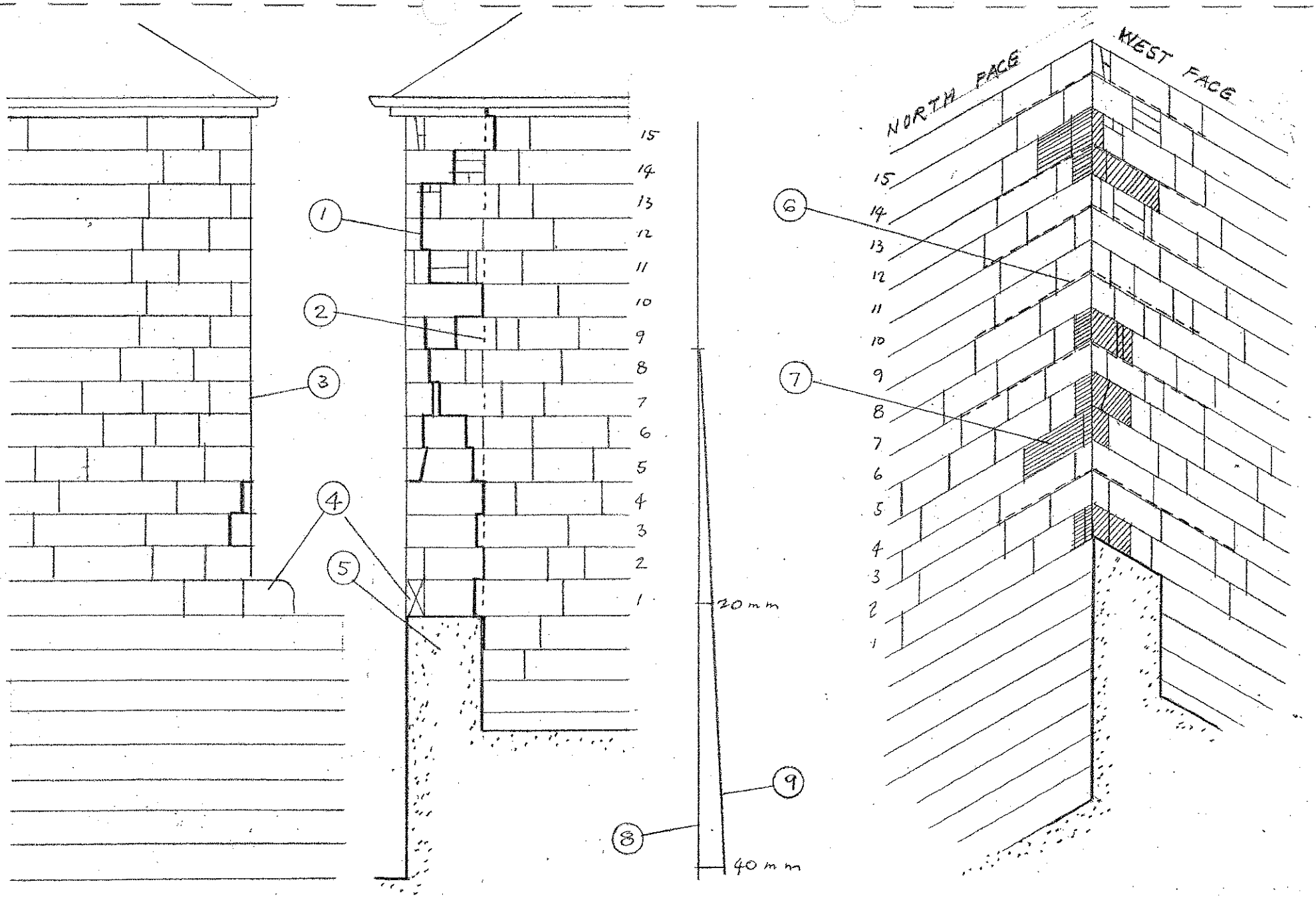
DETAIL (20) AIR DRAIN Scale 1:10



DETAIL (21) NEW MENS' COOK HOUSE LINTEL Scale 1:10

DETAIL 22. (NW CORNER) and remedial work

1. Stresses do not disperse at corners as they do in bulk wall areas therefore with such poor bond in the re-building of this corner following removal of the gaol wall cracking here is inevitable.
2. Line of inner face of the gaol wall.
3. Stone courses in the gaol and residence are higher than generally encountered and vary between 315 – 340mm. All dimensions required for remedial work, both vertical and horizontal, must be obtained by measurement on site.
4. Block projecting beyond the corner.
5. Remains of Gaol wall.
6. Stainless steel wire ties built into bed joints to help stitch the corner together.
7. Recycled blocks built in to improve bond.
8. Plumb line at the north face of the corner.
9. Line representing the north face of the corner. Curiously, it appears to lean inward at the bottom suggesting it has always done so. However, the first joint back from the corner on the west face of the stone cornice is unusually large, about 50mm and, despite the apparent lack of roof movement here, the north wall being relatively straight just east of the corner and the crack in the *making good* being narrower it could represent movement which took place before the gaol wall was demolished. It is possible this section of the wall was removed to provide material for the state school (Weekly Courier 20/7/1901). What more likely bit to remove than a section already falling outwards. Internally the corner has been patched from floor to ceiling on the first floor.



NORTH FACE

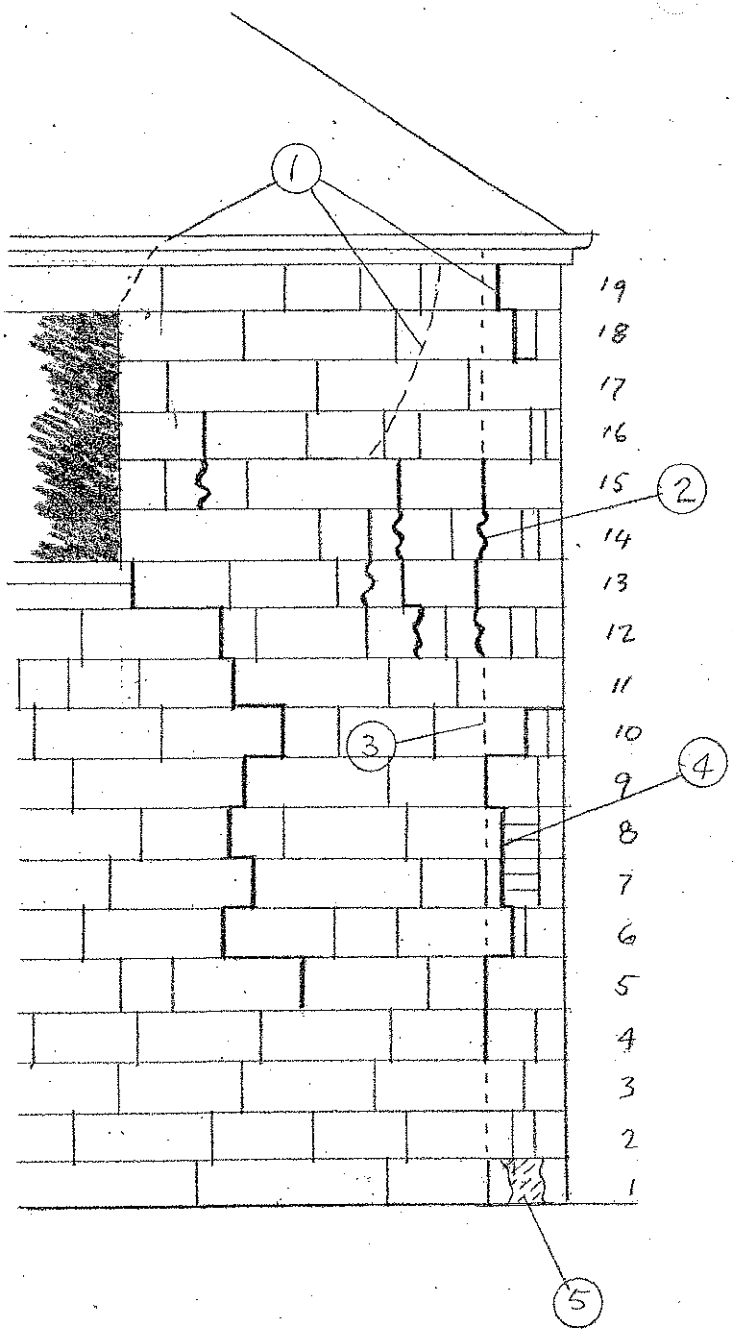
WEST FACE

REMEDIAL WORK

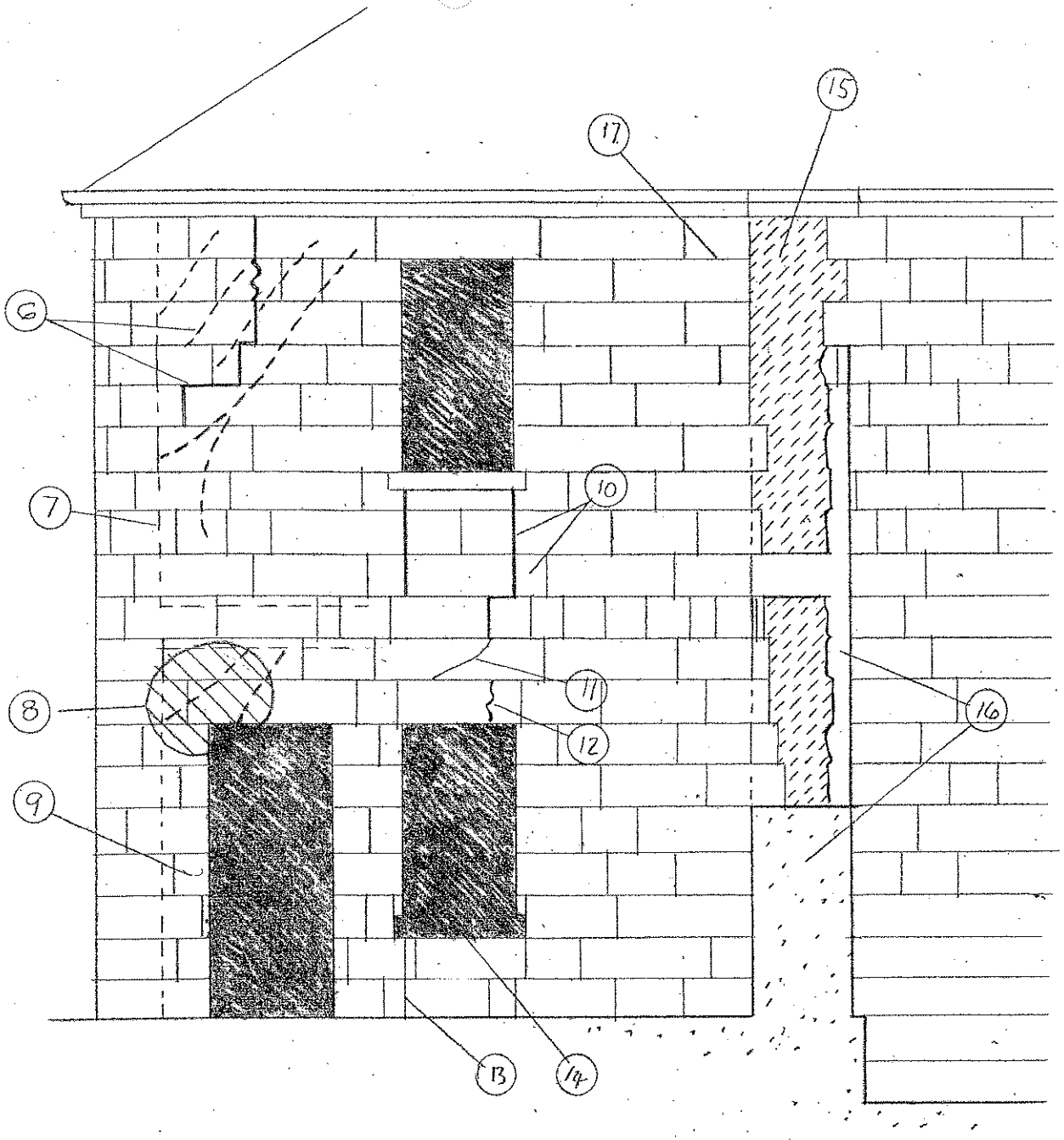
Scale 1:50

DETAIL 23 (SW corner)

1. Internal and external cracks possibly due to southward movement of the roof.
2. Area of wall where blocks have been cracked possibly due to the failure of stonework at door head height.
3. Line of removed gaol wall.
4. Crack along a line of poor bond allowing a 7 course section of wall to bow southward.
5. Ends of stretcher blocks and quarry waste core illustrating the wall construction. Gaol wall thickness 510mm the same as the residence walls.
6. Internal and external cracks indicating a westward movement probably due to spreading of the roof.
7. Line of inner face of the west wall and the first floor floor.
8. Internal cracks including through a stone lintel and an area of stonework bulging inwards and showing signs of crushing.
9. There are no through stones either side of this doorway which was cut in after the wall was built.
10. Stacked perpends in line with window reveals and reveal headers below the window. The original intention could have been a doorway, as was shown on Lee Archer's 1835 plans. The lack of proper bond prevents the stonework arching over the lower opening thereby increasing load on the lintel below. Internal cracks match the stacked perpends.
11. Flaw or crack in the original window lintel.
12. An additional rough lintel with only 50mm bearing presumably added to reinforce the defective lintel and cracked right through, the result of improper bond above. Although the original lintel has flexed enough to crack the lintel below it appears to be carrying the weight of the stonework above.
13. Original door reveal. (?)
14. Remains of sandstock brick-on-edge sill.
15. Gaol wall removed leaving quarry waste rubble core exposed to the elements. Note the extent of this core related to the thinness of the facing stones.
16. Remnant of 750mm thick gaol wall.
17. Top two courses rolling out of the wall.



WEST FACE

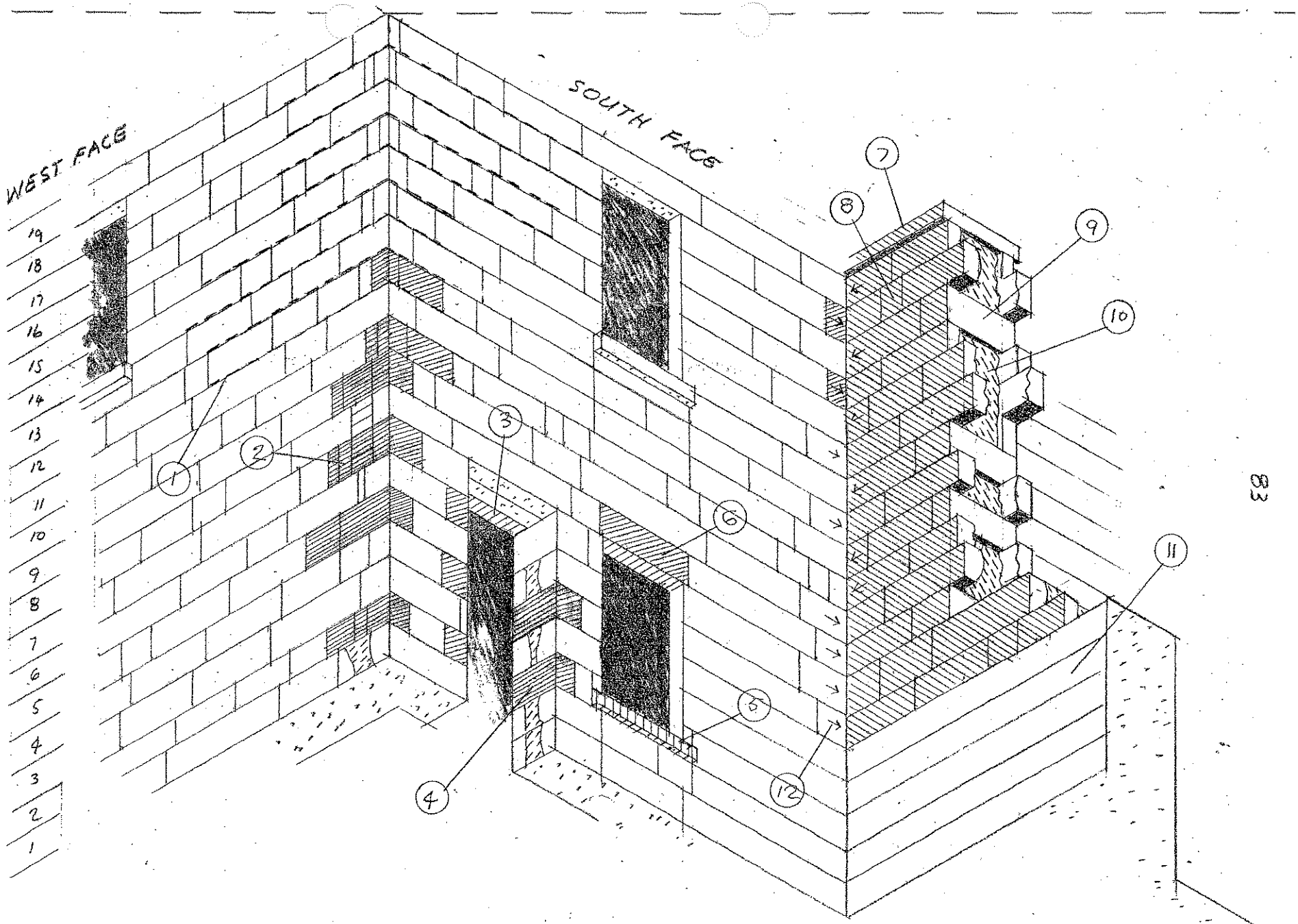


SOUTH FACE

Scale 1:50

DETAIL 24 SW corner remedial work

1. Stainless steel wire ties set into bed joints.
2. Recycled blocks built in to improve bond and strengthen the corner.
3. New internal stone lintel and adjacent stonework.
4. New through stones in doorway reveals using recycled stone. It is assumed there are through stones each side of the window opening. Window reveal linings and/or plaster should be removed to check that this is so.
5. Reinstate sandstock brick-on-edge sill.
6. New lintel using recycled stone. Refer Detail 21. Build in a steel angle below the lower window lintel. (P 77)
7. Stone coping similar to the one (assumed to have come from the gaol) above the gaol entrance arch now in front of the old area school.
8. New section of gaol wall approximately 1500mm long with through stones at its inner and outer edge to tie the otherwise unrestrained skins of facing stone together and to retain the quarry waste rubble core.
9. Through stones.
10. Quarry waste and mortar core.
11. Remnant gaol wall.
12. The arrow indicates a stone block passing behind the corresponding block in the adjacent wall to create a tying in bond.


WEST FACE
SOUTH FACE
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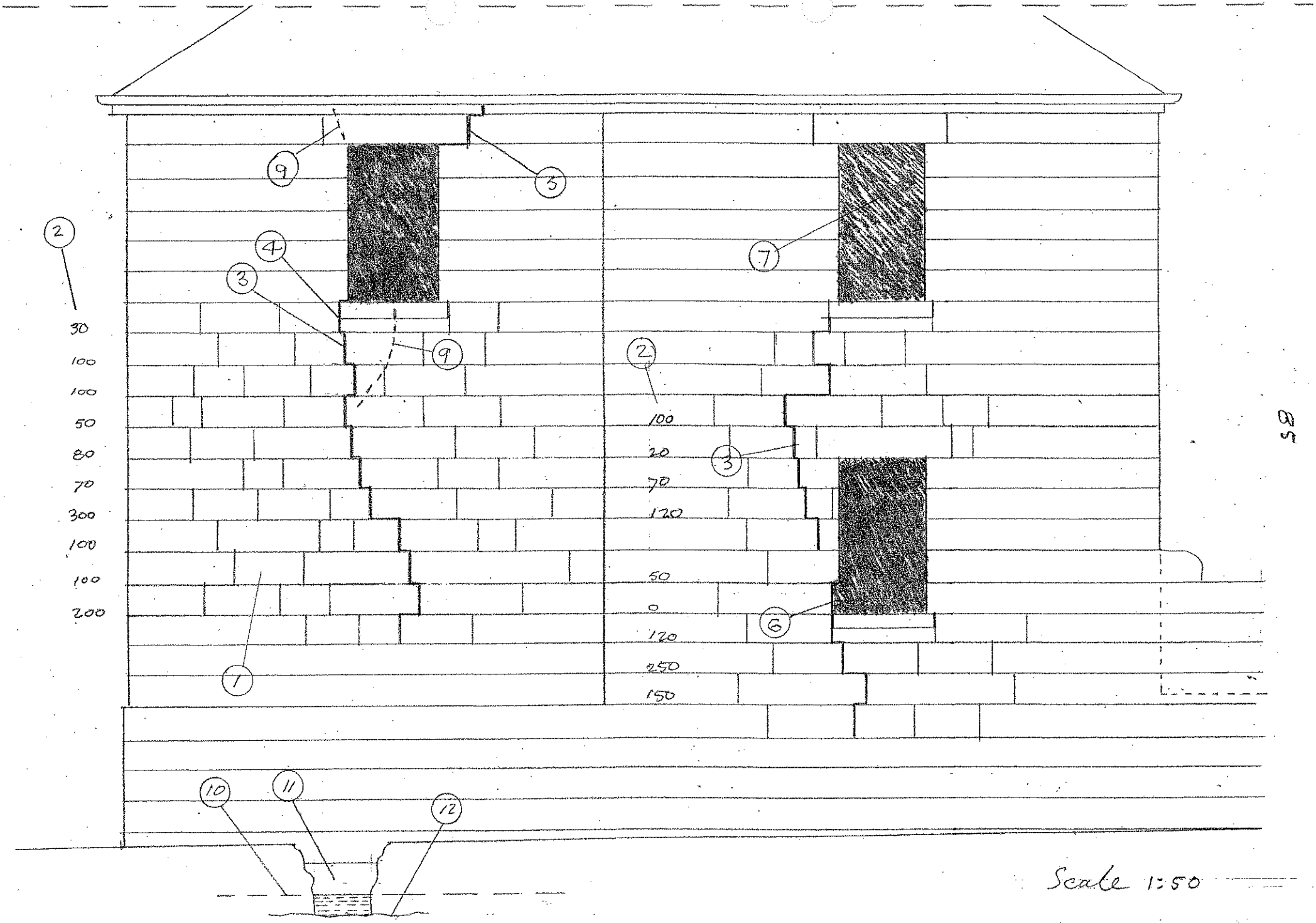
Scale 1:50

DETAIL 25 NORTH WALL

1. Good bond results in areas able to withstand internal stress.
2. Bond offset dimensions along lines of weakness.
3. Line of weakness due to small bond offsets. Note that stresses concentrate at the corners of openings therefore cracks often commence at the corners of windows.

4 + 5. This is an old crack which has been re-pointed some considerable time ago with what looks like greyish lime mortar (the original pointing is pink) but could be a composition mortar. Some of this mortar remains at the bottom left and top right of the window. At the top of the window this crack has opened 5mm since the re-pointing.

6. Thin reveal fillet of stone has fallen out.
7. Window opening.
8. Deleted.
9. Internal cracking of equal magnitude visible only on the first floor.
10. Apparent water table 500mm below ground level. Water rapidly flowed into a hole dug beside the wall through a fissure in the footing. This has been a wet year.
11. Rubble footing bearing on a thin layer of clay (?) above bedrock. Refer Detail 31. (P89) Flow of water into the hole hampered further investigation.
12. Sandstone bedrock 700mm below ground level.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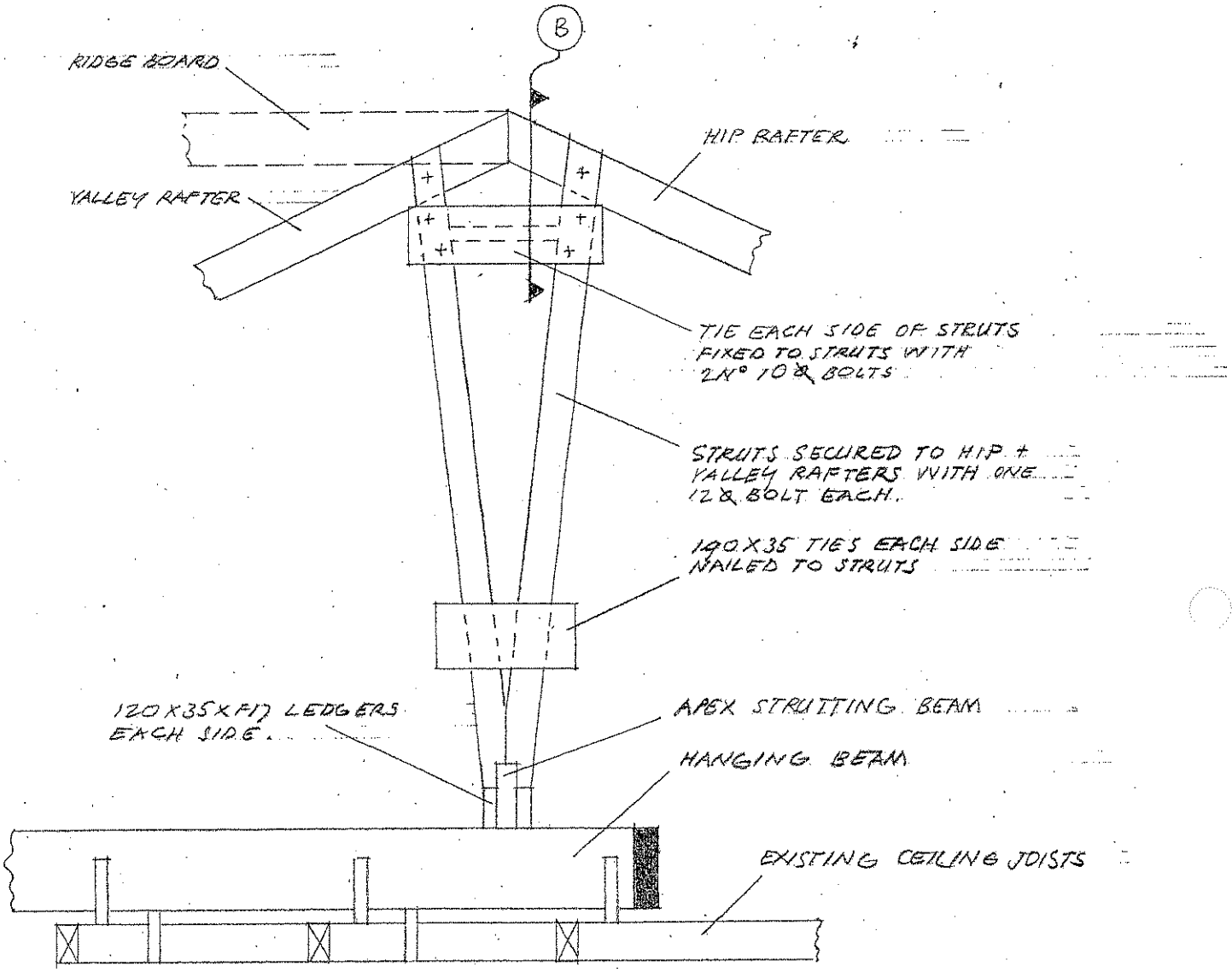
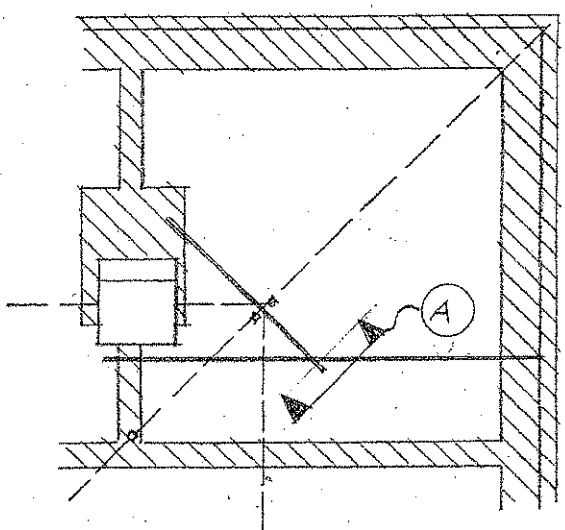
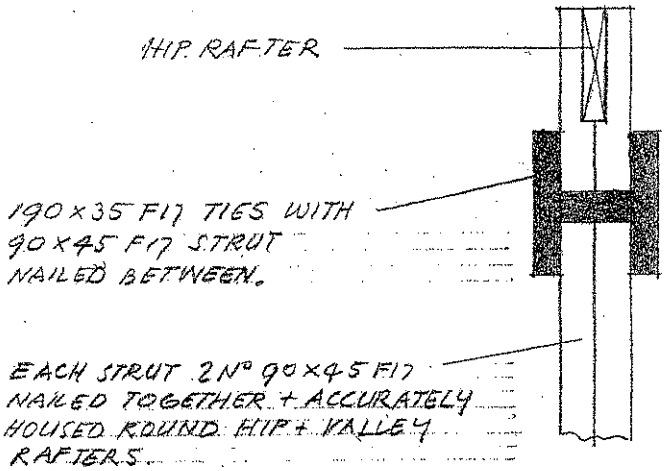
Scale 1:50



A 1:20

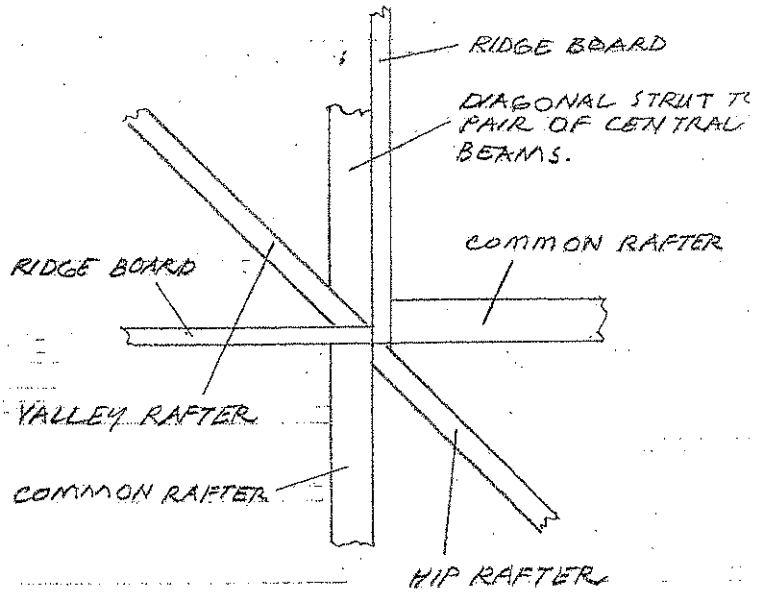


PLAN OF NE HIP 1:100

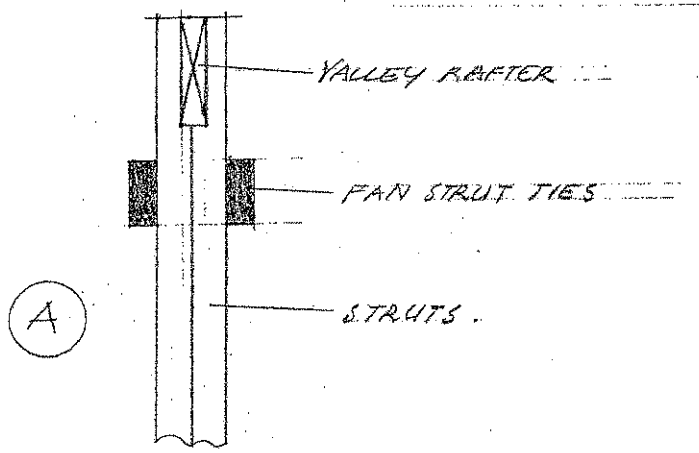


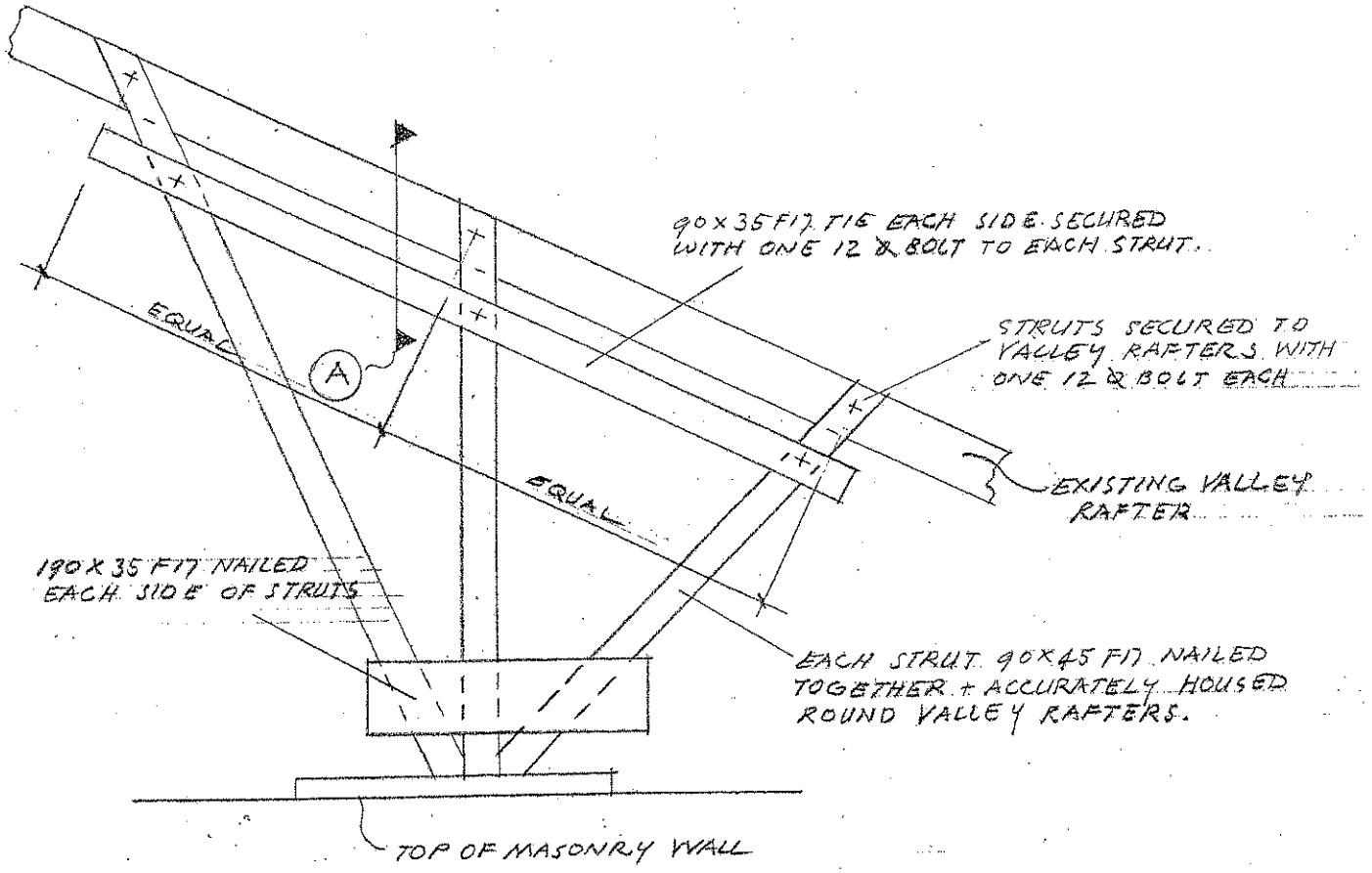
B 1:10

DETAIL 26 NE + SE HIP APEX STRUTS

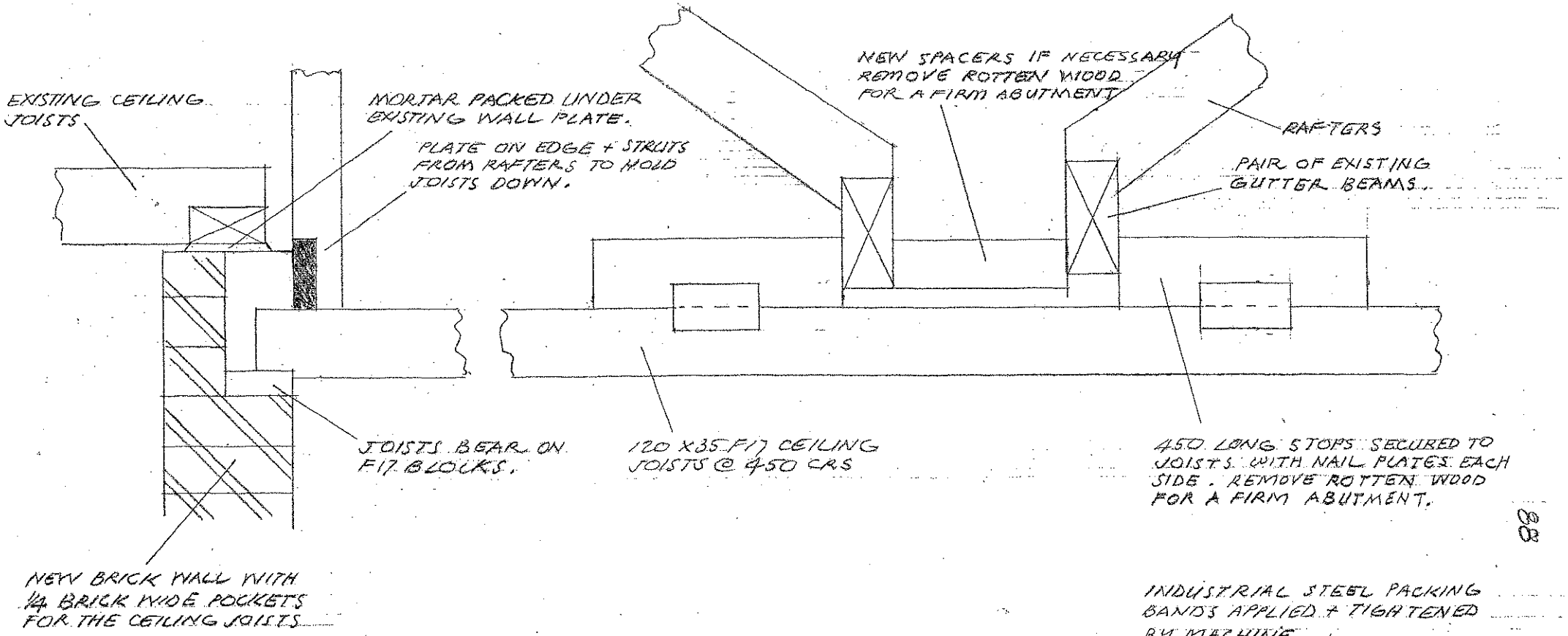


DETAIL (27) EXISTING HIP APEX PLAN 1:10

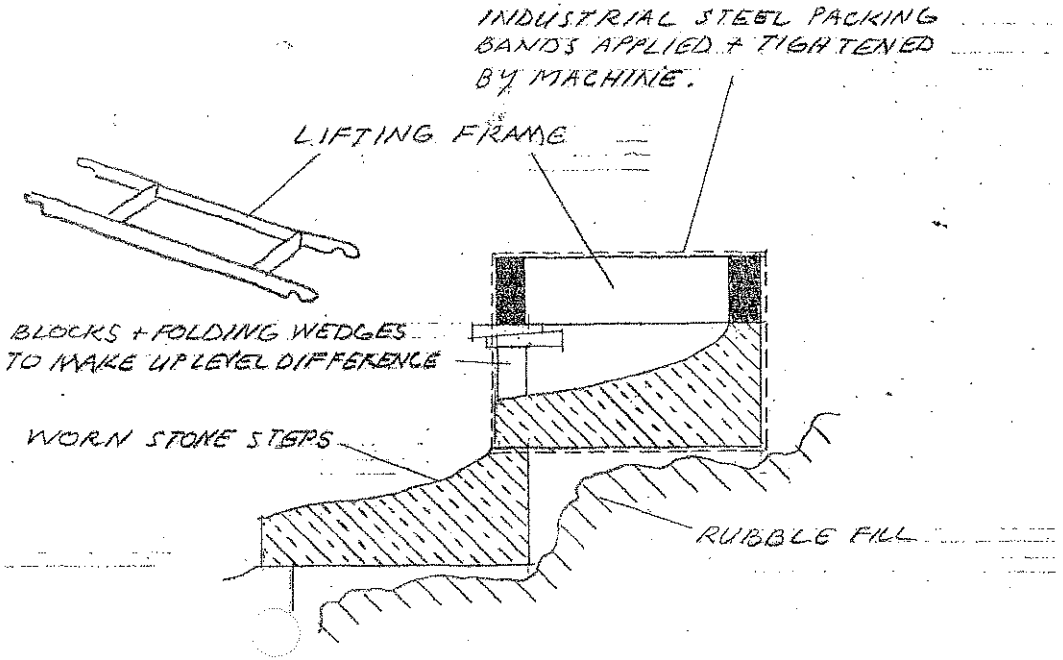




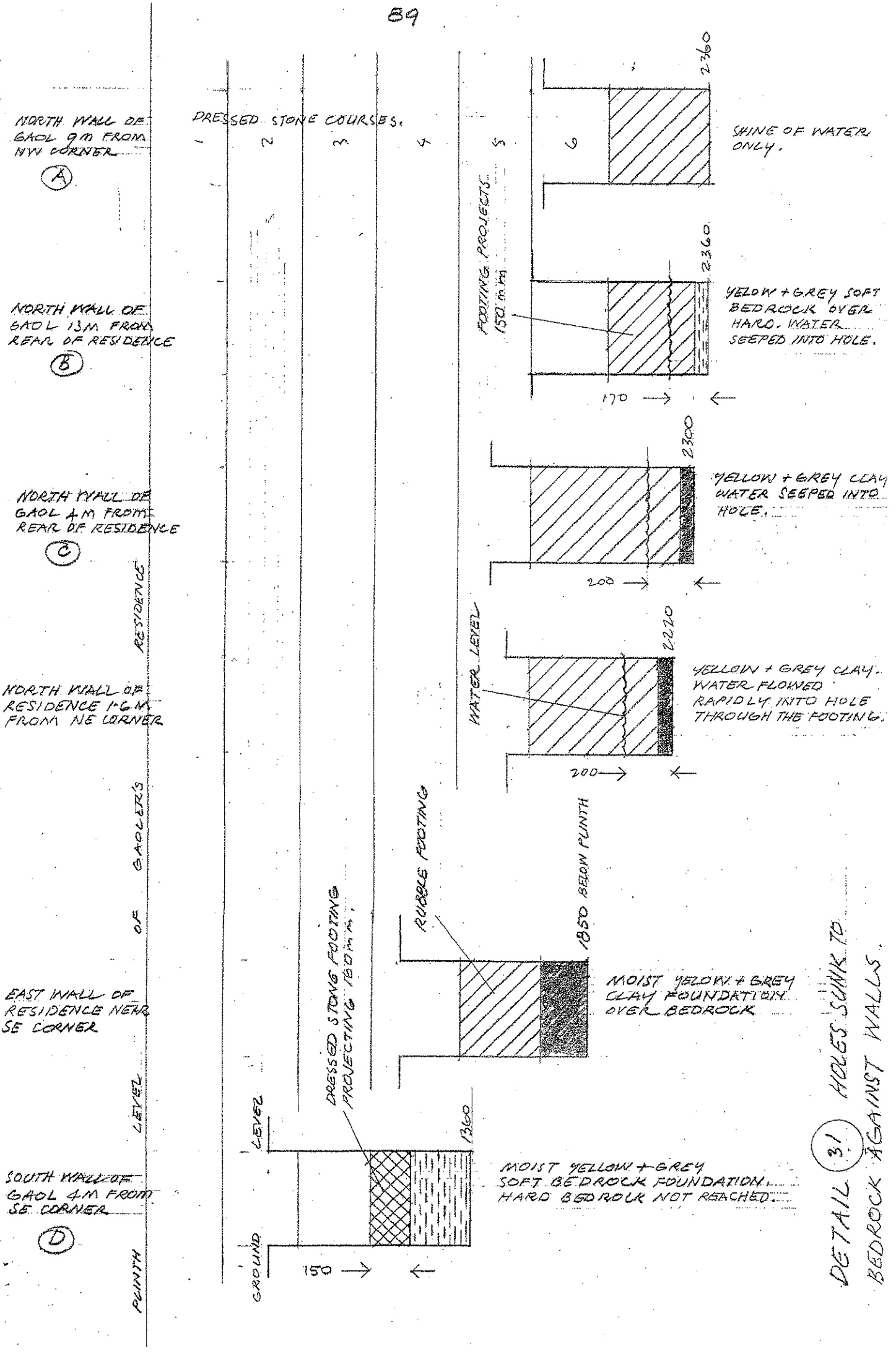
DETAIL (28) VALLEY RAFTER FAN STRUT. Scale 1:20



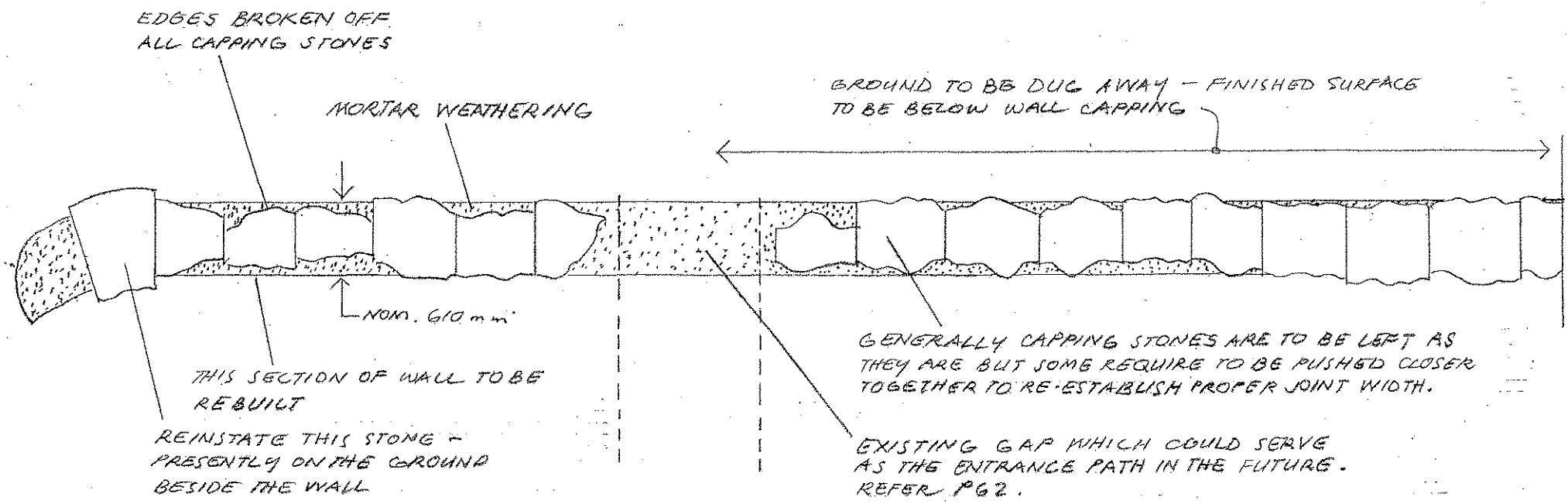
DETAIL (29) SMALL BEDROOM CEILING JOISTS 1:10



DETAIL (30) METHOD OF LIFTING STEPS 1:10

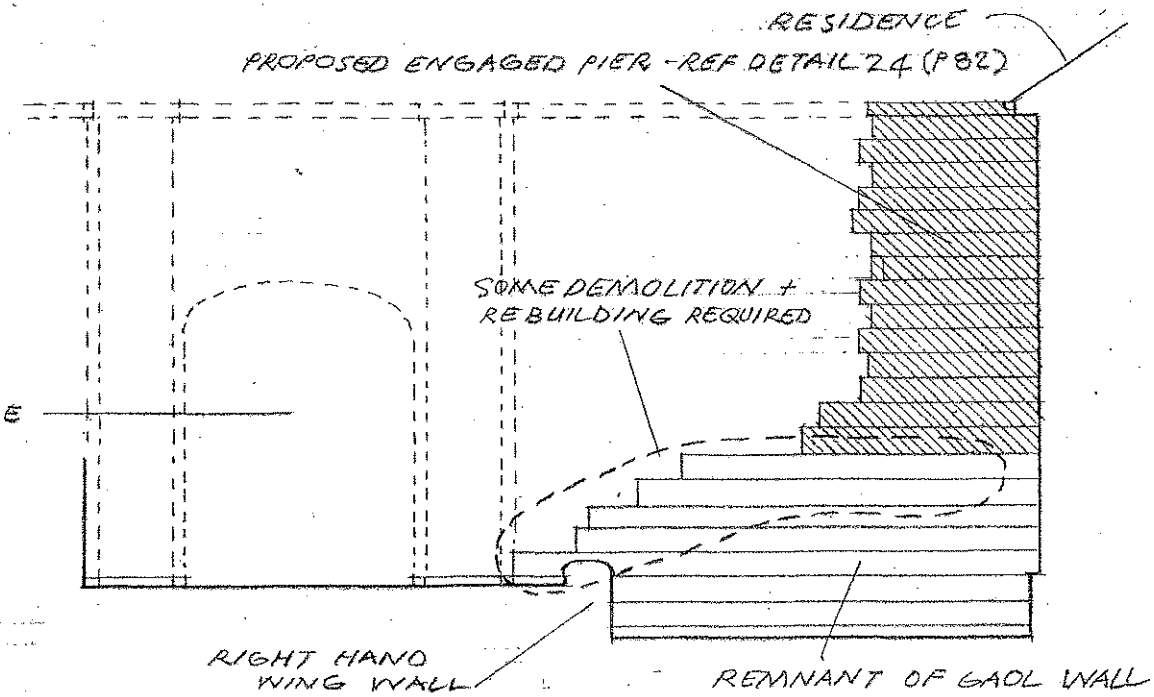


DETAIL (3) HOLES SUNK TO BEDROCK AGAINST WALLS.

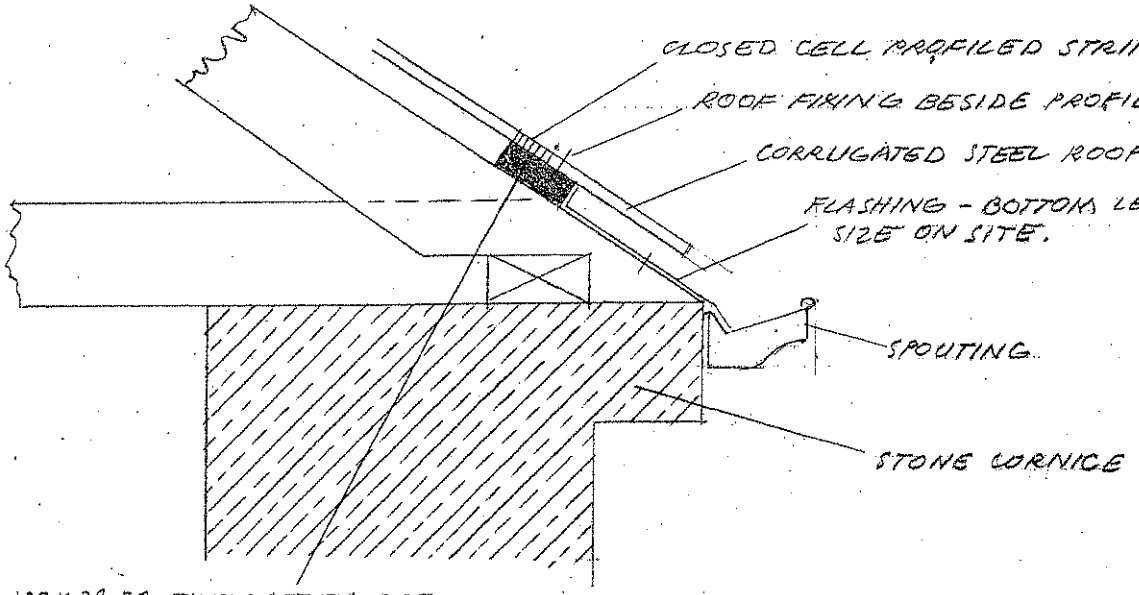


PLAN OF THE R.H. WING WALL AT THE GAOL ENTRANCE 1:50.

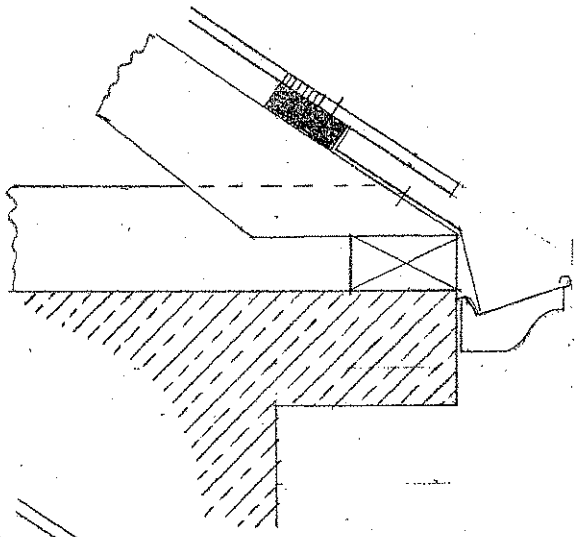
DETAIL 32



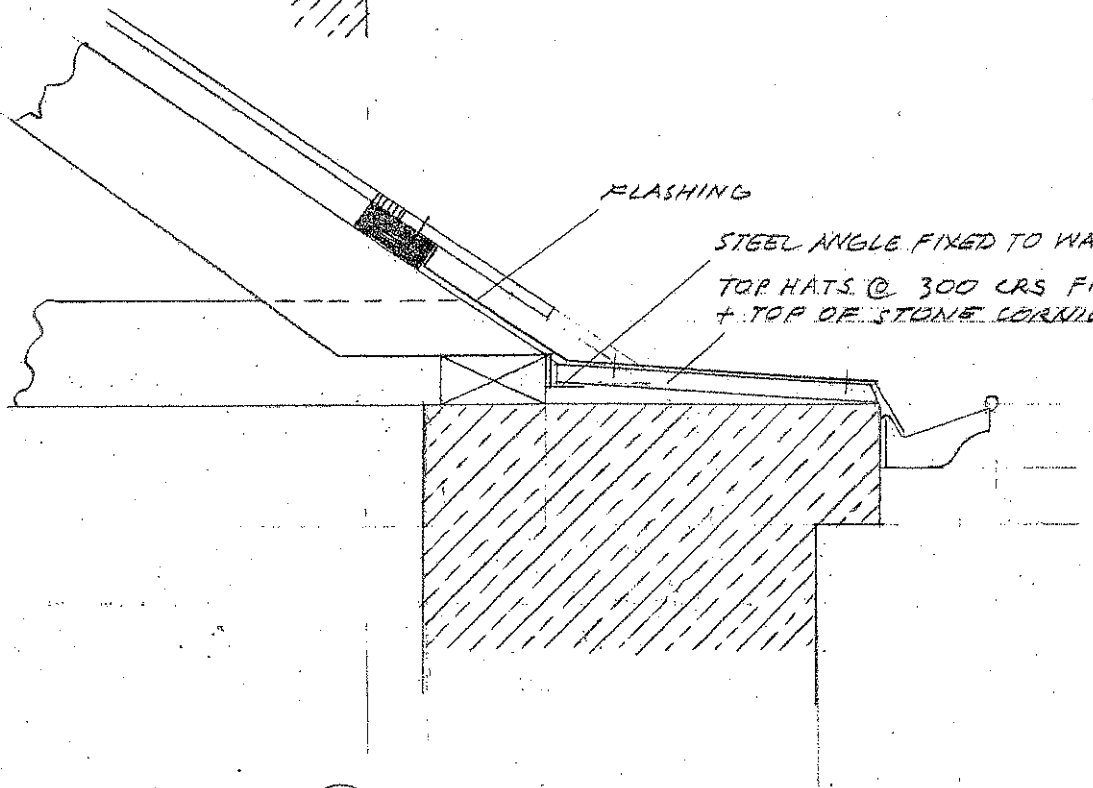
ELEVATION OF REMAINS OF EAST GAOL WALL + PROPOSED ENGAGED PIER. 1:100.



DETAIL (33) TYPICAL EAVE 1:10



DETAIL (34) EAST ½ OF SOUTH EAVE 1:10



DETAIL (35) WEST ½ OF SOUTH EAVE Scale 1:10

SPECIFICATION

1. Access

1.1 **Access to the site** shall be via the lane off Barrack Street, and to the building via the (back) door to the lobby.

1.2 **Access door.** In order to maintain security and facilitate access to the building a new back door and frame are to be made and installed and a modern surface mounted deadlock fitted. These are to replicate the original but are only to be remade after having been recorded and documentation prepared for the work by the heritage architect.

1.3 **The front steps** are out of bounds.

2. Electricity supply

2.1 **Existing power supply.** The electricity is not currently connected and until it is contractors must use cordless equipment or a generator.

2.2 **New power supply.** When the electricity is to be connected it is highly desirable that it be brought underground from the pole in Mason Street by drilling through the gaol wall below ground and rising in a surface mounted duct to a meter box between the back door and the lobby cross-walls. Distribution to the building would be via a duct to the first floor, pass through the wall into the floor and thence to the roof space via the small bedroom partition wall. This work should not be carried out without Tasmanian Heritage Council approval and supervision by the heritage architect.

3. Demolition

3.1 **Demolition not to start.** Demolition affecting the following items shall not be carried out until they have been adequately recorded by the heritage architect. Directions are to be sought on the status of the recording of information, and any other matters to be taken into account before starting work.

- Ceilings
- Timber floors and dado
- Fittings in the women's cook house
- Plaster including patching
- Wall paper
- Doorway, door, window and sink bench in the men's cook house
- The back doorway and door.

3.2 **Care** is to be taken to do no damage to those items not to be demolished, especially the stone mantelpieces.

3.3 **Remove** all demolished material from the site, except the ceiling lining boards which are to be cleaned, de-nailed and stacked in the parlour.

4. Excavation

4.1 **Archaeologist.** All excavation within the gaol and against the outside of the gaol wall where it is thought cesspits existed (indicated on a site plan of archaeological features prepared by Brad Williams, P 20, and where there are hinges on the gaol wall) is to be done in the presence of the archaeologist appointed by the Southern Midlands Council.

4.2 **Excavation method.** All such excavation, other than adjustment of the surface is to be done by hand unless given leave by the archaeologist to do otherwise. Care is to be exercised where gaol walls have been removed, ie in line with the south wall of the residence and approximately on the line of the swimming pool fence. Subsurface remains of these walls are not to be removed without permission from the archaeologist.

4.3 **Addition footings.** The stone foundations of the addition at the back door are to be removed but not before they have been recorded by the archaeologist.

5. Site works and paving

5.1 **Future entrance.** The entrance works described on P 62 of this report are only a suggestion to illustrate a point and do not form part of the works to which this specification relates.

5.2 **Surface drainage.** The areas behind the residence and to the south of it are to be finished to a uniform compacted surface to drain away surface water. Behind the building the surface is to be graded to a central pit connected to existing storm water drains while the area to the south is to be graded toward Barrack Street.

Finished surface level at the residence walls, the north gaol wall and the swimming pool fence is to be 100mm below the level of each door threshold. Gradients are not to be less than 1 in 100.

5.3 **The topping** is to be crushed sandstone (or similar porous material) of particle size from 20mm to dust, with a high percentage of fines but preferably low in clay, and laid to a nominal compacted thickness of 100mm.

5.4 **Pit.** Re-locate the pit on the RHS of the men's cook house door to the centre of the rear area and fill it with concrete up to the invert of the outlet.

5.5 **Asphalt footpath.** When replacing the asphalt footpath to the west of the gaol two holes are to be sunk down to bedrock against the wall one 1.5m from the NW corner and the other 3.0m from the SW corner for the purpose of recording of footings and foundations by the heritage architect. If the swimming pool is still in use a new path is to be formed using the same material as for the area at the back of the residence. If by this time the pool has been abandoned the area should be returned to grass.

5.6 **Subsurface drainage.** Pits and drains outside the wall on the north side of the gaol and residence to carry away sub-surface water cannot be proceeded with until

it is known just what is required for this purpose and a system designed and documented.

5.7 **An air drain** is to be constructed as detailed – concrete strength 20MPa; F52 mesh reinforcement; steel trowel finish; hot dip galvanized steel frame and grate; grate to be continuous (except for checkerplate at the same level at the doorways) but in sections for easy removal; connected to the existing storm water drains. Protect the stone walls against splashing during pouring

5.8 **Stormwater drains.** Existing storm water drains to the residence are to be modified as required.

5.9 **Swimming pool area drainage.** Improvements to the collection and removal of stormwater from the whole of the swimming pool area cannot be specified until an effective series of measures are identified or the pool is closed down.

6. Masonry

6.1 **Replacement stonework – NW and SW corners.** Joint width varies throughout from zero to 20mm. Joint width of the adjacent stones of a course should be adhered to except when too small and especially at the top of a course where a replacement stone is to be installed, and there is a need to ensure the joint is filled with mortar.

It is essential to follow the detail drawings which represent how the stonework is now and how it is required to be when finished. Replacement stones should be selected accordingly taking into account the required length and course height. Course heights vary throughout. All replacement stones shown on drawings (hatched) are to be single large stones replacing smaller ones.

6.2 **Method.** When installing replacement stones – remove the stones not required; clean out; wet down; lay on bedding mortar; install stone block (using dowels in the bed joint if necessary to prevent loss of mortar while getting the block in) flushing it to the surrounding stonework; fill the perpends to hold the stone in place; allow the mortar to dry a little then fill the top joint, progressively pushing the mortar in tight until the joint is full. Clean off smears with a brush and water while they are still wet. Precise angle grinder cut edges are to be dressed to appear hand worked. Any lichen, moss, and loose material adhering to the top, bottom and ends of blocks to be recycled is to be removed to provide a clean raw surface for the proper adherence of mortar.

6.3 **Before commencing replacement of blocks** in the SW corner the internal lintel to the men's cook house door and some stonework on the RHS of it must be replaced. Some careful investigation will be necessary to determine how much stonework needs replacing. In order to install reveal through stones at this doorway the door and frame must be removed, but only after they have been recorded by the heritage architect.

6.4 **Anchors.** Refer to details for delamination and cross-wall anchors. Both are to be installed by drilling through joints with an appropriate sized bit extended for the

purpose. Cross-wall anchors are to be chased into the brickwork deep enough to obtain full anchorage.

6.5 **Bed joint ties** used to reinforce corners are to be 4mm diameter stainless steel rod of appropriate length (as shown on the isometric projection drawings) and bent at right angles 50mm from the ends to turn up or down into perpends. Joints are to be raked out a minimum of 50mm and the ties set into new mortar.

6.6 **External cracks** following joints are to be raked out to a depth of 75mm and re-mortared making sure the joints are full and the mortar is pushed in tight. Clean out all loose mortar and dust and wet the joints before re-mortaring. Clean off smears with a brush and water while they are still wet.

Internal cracks corresponding to or likely to be related to external cracks/movement are to be dealt with in the same way, but before starting ensure details of plastering and previous patching have been recorded.

6.7 **South wall engaged pier.** Build a full height section of gaol wall as an engaged pier where the front wall of the gaol has been removed leaving a scar in the south wall of the residence. The pier must be keyed into the external stonework on both sides. This will require replacement stones being built in on the LHS, and those stones projecting on the RHS but not penetrating the existing wall being removed to allow longer stones to bond with those that do not penetrate the wall. Through stones are required, distributed throughout the pier at the rate of approximately three per 1.5 square metres of face area. The bond indicated in the isometric drawing is for illustration purposes only. The pier is to simulate a bit of wall left after the rest has been removed. To this effect part of the rubble core is exposed. The visible portion at least should be composed of genuine quarry waste clearly discernible but constructed so as to keep out the weather. Field stone should not be used in the core. If suitable coping stones cannot be found new stones will have to be provided. Before placing coping stones a detail is to be worked out to prevent water running back into the building from this coping. All exposed working of the stones is to be done by hand to match the existing stonework.

6.8 **The making good** of the remnant front or east wall of the gaol and the entrance wing wall will require some demolition and re-building – refer Detail 32 (P 90). Once rebuilt the horizontal surfaces of the remnant gaol wall are to be weathered with mortar built up to 25mm in the centre and finished to a slight curve. The wing wall's capping stones are all broken along the edges. Some are missing altogether. The gap in the capping should be retained as the place where a future footpath may traverse this wall. Refer THE ENTRANCE STEPS and a new entry (P 62). Here the wall should be weathered as for the gaol wall. The top of the wall should also be weathered wherever the capping does not provide cover. While some of the stones can remain untouched others require to be centred on the wall or pushed tighter together to maintain a uniform perpend.

The level of the ground is to be lowered – refer 5.2 of this specification. If this has not already been done the ground should be dug away from the wing wall to facilitate the making good.

6.9 **Weathering.** Whenever weathering with mortar is to be provided all moss, lichen and loose material is to be removed to leave a clean surface for the proper adherence of mortar.

6.10 **Stones rolling out** of walls are to be removed and built back in as for replacement blocks.

6.11 **The front steps.** The treads of the front steps, not including the bottom one, are to be removed using a lifting device illustrated in Detail 30 (P 88). They are then to be re-bedded in mortar and the rubble core progressively raised to support them. The lap of each step over the previous one is to be made with a thin bed of hydrated lime and stone dust. In bringing the rubble core up to support the treads maintain sufficient voids to allow water that passes through breaks in the treads to pass down through the fill.

Broken out sections are to be filled with a lime concrete and finished to the worn shape of each step. The broken edges to be covered by the concrete are to be cleaned to provide a raw stone edge. The concrete should be allowed to run under the broken edges to form a key. Use bagged concrete mix but replace the sachet of pure cement with an equal volume of hydrated lime and cement in the ratio of 3:1, accurately batched. In order to determine the suitability of this method before commencing the repair work carry out a trial repair elsewhere.

6.12 **Cleaning down.** Chemical cleaning up of work will not be permitted. Care is to be exercised to limit the smearing of stonework. Mortar smears are to be removed while still wet with water and a brush.

6.13 **Rear door lintel.** The broken lintel is to be propped and a 100 x 10 MS hot dip galvanized bar bedded into slots cut central to the lintel into the top of reveal stones, but not from the face of the wall. Bar to have 60mm bearing each end. The slots are to be cut deep enough to allow a thin bed of mortar to be placed along the full length of the bar, including inside the wall, the bar then propped up tight to the underside of the stone lintel and the cavity below at each end filled tight with mortar.

6.14 **Men's cook house door lintel.** The broken internal lintel is to be replaced with a new stone lintel which is to have at least 150mm bearing at each end. The procedure to be adopted will be the responsibility of the contractor and may depend on the results of further investigation. It is suggested that, in principle, the procedure should be prop both lintels, install the replacement reveal and corner blocks, replace faulty internal stonework immediately below the lintel, support the stonework above the lintel, remove the broken lintel and install a new one, then repair/renew the stonework above it.

6.15 **Men's cook house window lintel.** The broken external lintel is to be replaced with a new lintel, preferably recycled stone, in accordance with Detail 21 (P 77). The MS angle lintel is to be hot dip galvanized.

6.16 **Brick sill.** Re-build the men's cook house window sill using well formed sandstock bricks set on edge.

6.17 **Brick walls.** The two cross-walls separating the small bedroom from the parlour and kitchen on the first floor are to be rebuilt 230mm thick in English bond using modern pressed red clay bricks, preferably recycled. Refer FIRST FLOOR PLAN (P 28) and SECTION AA (P 30). Expose the tops of the ground floor walls and remove all loose material. Remove the masonite covering to the internal wall and cement mortar patching of the external wall to reveal and permit bonding with these existing walls. Bond depth to be 120mm. Bond with the existing walls is to be approved by the heritage architect before commencing construction. Brick gauge shall be – horizontally, 5 bricks and joints = 1200mm; vertically, to match the existing brickwork (nominally 20 courses = 1800mm). Lintels over the door openings are to be 2 x 100 x 10 MS with 110mm bearing each end. Provide pockets for the bedroom ceiling joists and a beam (to support the existing central pair of beams) and finish the top of the walls following the sag in the original wall plates. Refer Details 2 (P 67), 13 (P 73) and 29 (P 88). The beam is to be located 1160mm from the existing centrally located stud wall. In bonding the new brickwork into existing walls ensure that all pockets are clean and wetted down, before laying the new bricks into them and that all joints are filled tight with mortar. Bricks are to be wetted before use.

6.18 **Repointing.** Rake out loose pointing at least 20mm deep, clean out all loose particles, wet down thoroughly and repoint taking care not to smear the stonework. Joints are to be flush with the face of the wall, including chipped off corners but where a section of a block has spalled away the joint should be flushed to the inner surface. A sample patch of repointing is to be done in an inconspicuous location for the approval of the heritage architect. If approved the sample sets the standard for the job.

6.19 **Plinth.** The top of the residence plinth (north, east and south walls, and east gaol wall) is to be weathered with mortar.

6.20 **Mortar.** All mortar is to be accurately batched as follows:

(A) New work 3 : 1 sand : hydrated lime and cement (4 : 1 hydrated lime : cement.)
Bricklayers sand

(B) Replacement work, filling of cracks, re-bedding where there has been substantial loss of mortar, bonding new work to existing walls
3 : 1 sand : hydrated lime and cement (4 : 1 hydrated lime : cement)
sharp washed sand.

(C) Setting in the steel bar to the back door lintel, bedding of stone and steel angle lintels and the stonework immediately below the west end of the men's cook house door lintel 6 : 1 : 1 sand : hydrated lime : cement
sharp washed sand

(D) Repointing and weathering
3 : 1 sand : hydrated lime and cement (4 : 1 hydrated lime : cement.)
A washed sand selected for colour and particle size to match as nearly as possible the original pointing (pinkish river sand).

6.21 **Delamination in stones.** Where stones are delaminating and it is not possible to hold back the portion falling away with pointing it should be pulled away and spot stuck with an appropriate adhesive capable of performing under conditions of high moisture content (Epirez epoxy grout 2 with a suitable fine filler available from Build-Tech Supplies may be suitable).

6.22 **Chimneys.** Refer remedial work on P 54. Fissuring in the edges of stones should not be pointed up. Flashing chases require cleaning to provide raw stone surfaces for the adherence of mortar.

7. Carpentry and joinery.

7.1 **Roof and ceiling structure.** Before this work is due to start

- Ceilings should have been removed from all first floor rooms except the lobby.
- All bird deposits removed.
- Floors temporarily repaired.
- The small bedroom brick cross-walls erected and the wall plates re-supported.

For the remedial work in the roof the principal work sequence is

- Promote safe working conditions by adding 50 x 25 green HW or equal temporary battening top and bottom to ceiling joists to prevent them bowing and twisting when walked on, and adequate planking or sheeting for work platforms. When the roof work is complete the temporary battens are to be left in place, the bottom battens only to be removed when the ceilings are re-installed.
- Install hanging beams for the adequate support of the ceiling joists. As these serve as ties against roof spread they should be adequately nailed together at the lap.
- Install small bedroom ceiling joists.
- Install new beams (one above and one below) for the support of the existing central pair of beams.
- Install the Type 1, 2 and 3 roof ties.
- Restore structural integrity of the valley rafters and NE and SE hip apexes using either Alternative 1 or 2. Refer P 44. The alternative to be used is to be the subject of agreement between the contractor, the heritage architect and the Southern Midlands Council.
- Re-establish structural continuity in the SW hip apex.
- Install collar ties.
- Install ashlering to the south wall.

Mild steel ties are to be cleaned after fabrication and given one full coat of priming paint (red oxide zinc chromate or equal) in the shop, and touched up on site as necessary after installation. All bolts are to be galvanized.

Make good ceiling lining over first floor lobby after installation of the new beam cradles supporting the existing central pair of beams.

8. Roofing

8.1 **Chimney flashings.** New Lead apron and over flashings are to be provided to both chimneys. Flashings are to be turned into existing chases and pointed up or into 6mm deep angle grinder cuts and sealed with an appropriate sealant where delamination of stone has removed the top of the original chases. Pin over flashings to the stonework where necessary.

8.2 **Temporary removal** of some roofing will be necessary for remedial work to the roof frame.

8.3 **New roofing.** The residence is to be re-roofed with corrugated steel roofing and traditional roll top ridging, ogee spouting and 75mm diameter down pipes with soldered bends. Roofing, flashings and rainwater goods are to be galvanized steel. Provide concealed bird proofing, including shaped pieces to close off hip cappings, and eave flashings that can be cut to shape as required.

Provide new 76 x 38 green HW battens at 900mm centres generally and 100 x 38 ditto at eaves in a virgin location away from where battens have been fixed in the past. Refer Details 33, 34 and 35 (P 91).

The roofing is to be installed in accordance with the Lysaght product installation manual and the battens in accordance with AS 1684·2 – 1999. Down pipes are only to be fixed to plugs set into bed joints. Remove the timber facia to the south wall cornice.