



# The Morton Partnership

## Structural Engineers

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### STRUCTURAL ASSESSMENT REPORT OF CHURCH LANE COTTAGE, CHURCH LANE ALDHAM, IPSWICH SUFFOLK, IP7 6NP

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**Date:** January 2023

**Reference:** SA/BBR/21268~srep

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<b>Revision</b>	<b>Date</b>	<b>Comments</b>	<b>Name</b>
0	06/01/2023	Updated and reformatted, Issue to Client and Architect	SA
-	10/05/2022	Letter Report Format (Ref: 21268~01h)	SA

**Introduction**

- 1.1 Church Lane Cottage is a Grade II Listed building; the main and earliest parts of which are timber framed. Later additions are of brick construction.
- 1.2 I carried out an inspection at the property on 5 October 2021 for the purposes of reviewing the internal floor make up and foundation depth. On the same occasion, I generally observed the condition of the timber frames that form the property, along with the parts of the building which have been added to them, these being of single storey with lean-to roofs.
- 1.3 Following initial comments from the Local Authority regarding Listed Building Application (DC/22/02455), I revisited the property on 25 October 2022 to meet with the Architect and review a number of points. The report below and the appended drawings have been revised to reflect the discussions with the Architect.
- 1.4 I set out my survey observations below, to read as part of the revised Listed Building Application. I have in particular, considered the implications of the proposed improvement of the head-height in part of the property and in achieving a degree of improved insulation below limecrete slabs to most of the ground floor.

**2.0 General Arrangement and Structural Condition**

- 2.1 The property comprises modest timber frames with a single storey lean-to to part of the rear wall, and a single storey lean-to to one of the gable ends. Whilst I did not consider the historical development of the frame in detail, it would appear that there has been alteration in the past, with raising of the eaves, and that possibly the main part of the building is in fact formed with two separate phases of construction, the latter and the raising possibly being undertaken together.
- 2.2 One weatherboarded gable of the property faces onto Church Lane, and incrementally, at ground floor level, existing cementitious screed slabs step-up from this end of the property to the other. The external ground levels follow the same progression, the slope of the ground rising away from Church Lane. In the first room, which is the kitchen, the head room is notably tight.
- 2.3 Whilst the main part of the property is timber framed and generally rendered, the lean-to's in both cases are of solid 9" brick construction. There has been some rotation of the rear wall, which supports the lean-to roof, and there has been some settlement of the end lean-to, particularly to the front and rear corners.
- 2.4 On the occasion of my first inspection, I was able to view small trial holes into the ground, which identified the foundation depth relative to the inside floor level and the outside ground level. Typically, the foundations were shallow, but especially so to the end lean-to, where the formation level was virtually at ground level.
- 2.5 On my return visit, I inspected the depth of the footing to the rear lean-to and similarly found it was very shallow relative to the inside floor level in the existing bathroom.
- 2.6 I was not able to inspect all the timber frame members in detail, other than to a number of small trial holes. At first floor, and where exposed internally at ground floor level, the condition appeared reasonable. However, there are indications that there are problems with sole plates, seen from the trial holes and by misalignments. This is of course not uncommon, and particularly to the kitchen end of the property, some replacement and rebuilding of brickwork has evidently been carried out in the past. The appearance of this work identified that it was undertaken some years ago.
- 2.7 It is possible that there is also some decay in the outside face of posts and studs, particularly at their bottom ends, this will only be determined when the typically cementitious render is removed. More decay could be found, but it is not practical to expose more of the frame until the works commence and the building can be kept weathertight as it is repaired.

### 3.0 Proposals and Structural Implications

- 3.1 In order to improve the property for more comfortable living and energy economy, it is proposed to lower the finished floor level in the kitchen and to all floors, install a build-up of glass foam insulation below new breathable limecrete slabs. The typical depth of the new build up being 300mm. The breathable nature will be more suitable than the current concrete screed, it will force less moisture into the plinth walls and timber frame.
- 3.2 However, where the floor level is to be lowered, there is insufficient wall depth to allow this to be undertaken without disturbing the structure of the wall base and undermining the plinth. It is though, possible to overcome this issue by improving the wall footing, extending it to a deeper depth using a limecrete strip and rebuilding a plinth below the sole plate.
- 3.3 The proposed scheme also involves removal of unsuitable cementitious render and replacement with lime render over the existing timber frame. In this process the frame will be exposed fully and traditional like for like repairs can then be undertaken as necessary. It is anticipated the sole plates will generally need to be replaced. Local trial investigations have indicated decay to the outer and under face of the sole plates.
- 3.4 Conventionally, the replacement of sole plates is undertaken by removing a number of brick courses from the plinth below them, so that existing plate remains can be removed and new dry oak sole plates in lengths of, say 10 foot at a time, can be offered up and installed with temporary propping in place. Wherever possible this is to be done, retaining existing stud and post tenons, or where necessary carrying out bottom end repairs to these timbers. Where footings are to be deepened, plinths will need to be entirely rebuilt in red brick and lime mortar, a dampproof course will also be installed.
- 3.5 Appended to this report are drawings showing the existing levels and the proposals for the new floor slab construction, and associated work to the existing wall bases. These show the requirement for the proposed improvement work to the wall depths.
- 3.6 There are internal walls to which the foundation depth has been investigated. To these, the plinth walls are also inadequate in depth, and will need to be reconstructed at low level off new limecrete footings. There is no requirement within the scheme for any new form of footing under the chimney stacks, where necessary protective limecrete retaining kerbs will be formed as part of the new floor make-up. The base of the stairs will be re-supported on the new slab.
- 3.7 To the lean-to's to the existing bathroom and the gable end, the brick walls are very shallow into the ground and similarly will not allow for new floor construction with installation, to make them consistent with the rest of the ground floor. To the central room rear corner, a repair footing pad is proposed where there has been structural movement, and the internal floor levels relative to the wall depth allow wall retention.
- 3.8 At the far end of the property and to part of the rear lean-to to the existing bathroom where there has been movement, and the walls are of relatively short height (being single storey or less), it is proposed to rebuild these brick walls on new footings. The extent of rebuilding is shown on the proposed drawings. The condition of these existing low level walls is relatively poor, with aspects of rotation and settlement, as well as to the end lean-to, a foundation very close to ground surface level. There are a series of cracks to the walls of the end lean to, as well as a bellying out of the front wall. Whilst complex and costly works could perhaps be undertaken to underpin these walls and repair the cracks and restrict the rotation seen, given their more modern and modest nature and height, as well as the practical difficulty of safely carrying out the work, as stated, it is advised that reconstruction offers a more pragmatic approach.
- 3.9 To underpin the brick walls and safely carry their weight would require significant temporary works in difficult and cramped working conditions for the Contractors to operate in. Having considered the situation, in my opinion, reconstruction is the better option in this particular case.
- 3.10 It is proposed that these walls will be rebuilt to modern Building Control requirements (as will be required) as insulated wall on concrete footings. The lean-to roofs will be replaced as part

- of this work, the roof to the gable lean-to having partially failed, and comprising very small scantling timbers. This work will not impact the main timber frames.
- 3.11 The structural movement that has occurred is likely to be related to the situation of shallow footings and possible rainwater drainage defects in the past. There may also be an influence related to clay moisture levels. Rainwater drainage will be improved as part of the scheme, to help limit the risk of any further movement.
- 3.12 There has been a small degree of separation between the gable chimney stack and the end of the timber frame. It is not possible to determine whether this has been driven by stack movement or frame movement. The gable chimney stack appears relatively plumb, partly rebuilt, and it is possible the timber frame has moved away from it, driven by the decay of soleplates elsewhere. To avoid the frame pulling on the stack, rather than tying it in at high level, a lead protecting detail will be formed at the roof junction, which will accommodate a degree of movement without allowing water ingress. This is therefore a type of flexible interface.
- 3.13 During the works, when forming a new footing/floor slab to the end room alongside, a sequenced installation is required to avoid any ground disturbance close to the base of the chimney stack.
- 3.14 It will be necessary to replace the simple lean-to roof structures where the walls are rebuilt, these timbers being small scantlings to be removed to allow re-alignment and reconstruction with some level of insulation.
- 3.15 To remove the modern fletton internal brick wall between the kitchen and the rear lean-to, it will be required to strengthen the rail in the wall frame above. This can be achieved by strengthening the face of the frame with a new additional timber and carrying this at each end on to a new post. This arrangement is shown on the proposed drawing. The exact fixing configuration may need to be refined once the area is exposed during the works of refurbishment. The proposed detail carries the wall load above onto new footings.
- 3.16 Once the works at ground floor level are completed, the superstructure will be repaired and refurbished, including removal of cement render and replacement with lime render. This will be carried out to a separate Architectural specification, which does not form part of this report. However, this report should be read in conjunction with the Architect's drawings: CLC/P/1 and CLC/P/2.
- 3.17 This statement is to be read in conjunction with The Morton Partnership drawings 21268/01, 21268/02, 21268/03 and 21268/04. These are included in Appendix B. Further, there are selected photographs in Appendix A.

#### 4.0 Limitations

- 4.1 It should be stated that we have not inspected woodwork or other parts of the structure unless specifically detailed in the report, which are covered, unexposed or inaccessible and we are therefore unable to report that any such part of the property is free from defect.
- 4.2 This report has been carried out to the Client's requirements and no liability is intended or will be accepted from any third party whatsoever.
- 4.3 The limits of liability are restricted to the contents of this report. No opening up or investigation of foundations etc was carried out, the inspection being visual only unless specifically referred to in the report.
- 4.4 No checks on load bearing capabilities have been carried out.

**APPENDIX A**

**Photographs**

**RE: CHURCH LANE COTTAGE, CHURCH LANE, ALDHAM, IPSWICH**

*The following photographs have been compiled from those taken both on 5 October 2021 and 25 October 2022.*



**Photograph 01 – Property viewed from Church Lane**



**Photograph 02 – Property viewed from rear, showing end and rear lean-to's**

**RE: CHURCH LANE COTTAGE, CHURCH LANE, ALDHAM, IPSWICH**



**Photograph 03 – Trial pit typical, inspect walls/foundation shallow depth to plinth to timber frame walls (formation level identified at screw driver position)**



**Photograph 04 – Trial pit typical, end lean-to with single course of brick below ground level, directly onto earth**



**RE: CHURCH LANE COTTAGE, CHURCH LANE, ALDHAM, IPSWICH**



**Photograph 05 – Trial pit typical against main chimney stack and rear lean-to internal, wall base at floor level directly onto earth**



**Photograph 06 – Trail investigation reveals poor condition of soleplate, expected to be typical, but will be uncovered as cement render is removed**

**RE: CHURCH LANE COTTAGE, CHURCH LANE, ALDHAM, IPSWICH**



**Photograph 07 – End lean-to settlement cracks to south corner**



**Photograph 08 – End lean-to settlement cracks to west corner**



**Photograph 09 – End lean-to cementitious render repairs to damaged brickwork, typical**



**Photograph 10 – End lean-to bulge to north face due to rotation**

**RE: CHURCH LANE COTTAGE, CHURCH LANE, ALDHAM, IPSWICH**



**Photograph 11 – End lean-to separation of north wall of floor due to rotation**



**Photograph 12 – End lean-to settlement cracks to west corner (internal), typical, similar seen to south corner**



**Photograph 13 – End lean-to settlement cracks measured internally**



**Photograph 14 – Rear lean-to settlement cracks**



**Photograph 15 – Rear lean-to differential crack adjacent to bathroom**



**Photograph 16 – Slight separation between gable chimney stack and timber frame, where protective cover flashing is proposed to verge of tiles**

**RE: CHURCH LANE COTTAGE, CHURCH LANE, ALDHAM, IPSWICH**



**Photograph 17 – Modern fletton brickwork partition to be removed (100mm thick)**



**Photograph 18 – Wall frame over kitchen partition to be strengthened to allow modern fletton brickwork to be removed**



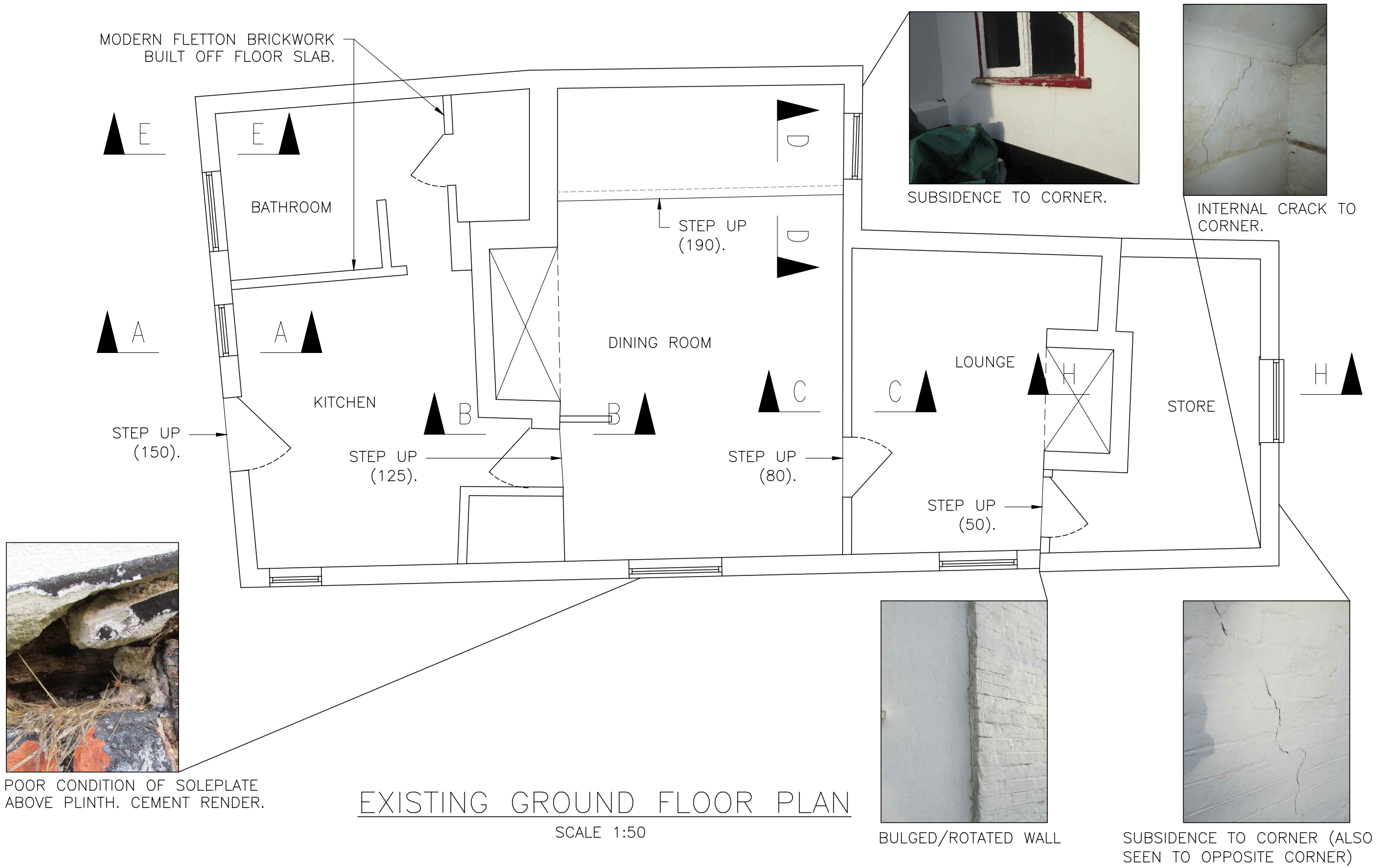
**Photograph 19 – Internal base to stairs to be re-supported on new limecrete slab**



**APPENDIX B**

**Structural Engineer's Drawings**

21268/01	Floor Plans Existing
21268/02	Floor Plans Proposed
21268/03	Detail Sections Proposed
21268/04	Detail Sections Proposed



EXISTING GROUND FLOOR PLAN

SCALE 1:50

NOTES:-

1. ALL DIMENSIONS TO BE CHECKED ON SITE AND NO MEASUREMENTS TO BE SCALED OFF THIS DRAWING.
2. IN CASE OF ANY DISCREPANCY THE ENGINEERS ARE TO BE NOTIFIED IMMEDIATELY.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECT'S AND SERVICE ENGINEER'S DRAWINGS AND SPECIFICATIONS.
4. NOTE - ON FLOOR MAKE UP NO GEOTEXTILE MEMBRANES SHOWN BUT THESE TO BE INCLUDED IN ACCORDANCE WITH SPECIALIST LIMCRETE FLOOR INSTALLERS REQUIREMENTS. DPC REQUIREMENTS AND LEVELS TO BE AGREED.
5. THIS DRAWING IS PREPARED FOR PLANNING, IT IS NOT A WORKING CONTRACTOR'S DRAWING FOR CONSTRUCTION, OR A FULL TECHNICAL DRAWING FOR THE PURPOSE OF BUILDING REGULATIONS.
6. THE DRAWING DOES NOT SHOW SEQUENCE OF WORKS, OR TEMPORARY WORKS, WHICH WILL NEED TO BE CONSIDERED IN DETAIL BY THE CONTRACTOR.

PLANNING			
C	FOR PLANNING	SJA	05.01.23
B	FOR PLANNING - DRAFT	SJA	17.11.22
A	FOR PLANNING	SJA	10.05.22
-	FOR COMMENT	SJA	23.03.22
REV	AMENDMENT	CHK	DATE

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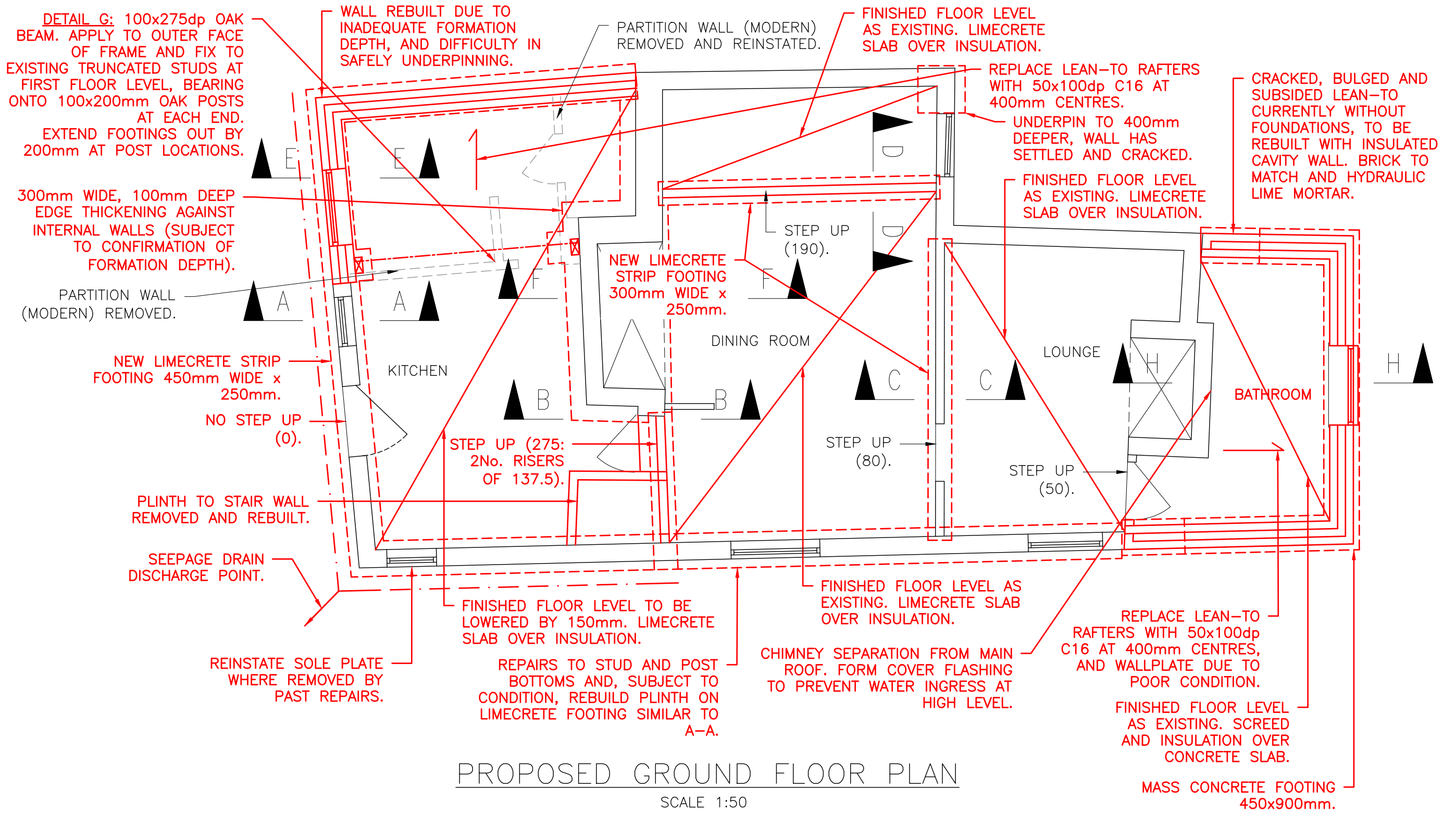
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PROJECT: CHURCH LANE COTTAGE  
CHURCH LANE  
ALDHAM

TITLE: FLOOR PLANS  
EXISTING

SCALE: 1:50 (A3) DRAWN BY: CJS  
DATE: FEBRUARY 2022 CHECKED BY: SJA  
DRG No. 21268/01 (REV C)



**PROPOSED GROUND FLOOR PLAN**  
SCALE 1:50

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WIP	WORK IN PROGRESS	SJA	25.02.22
REV	AMENDMENT	CHK	DATE

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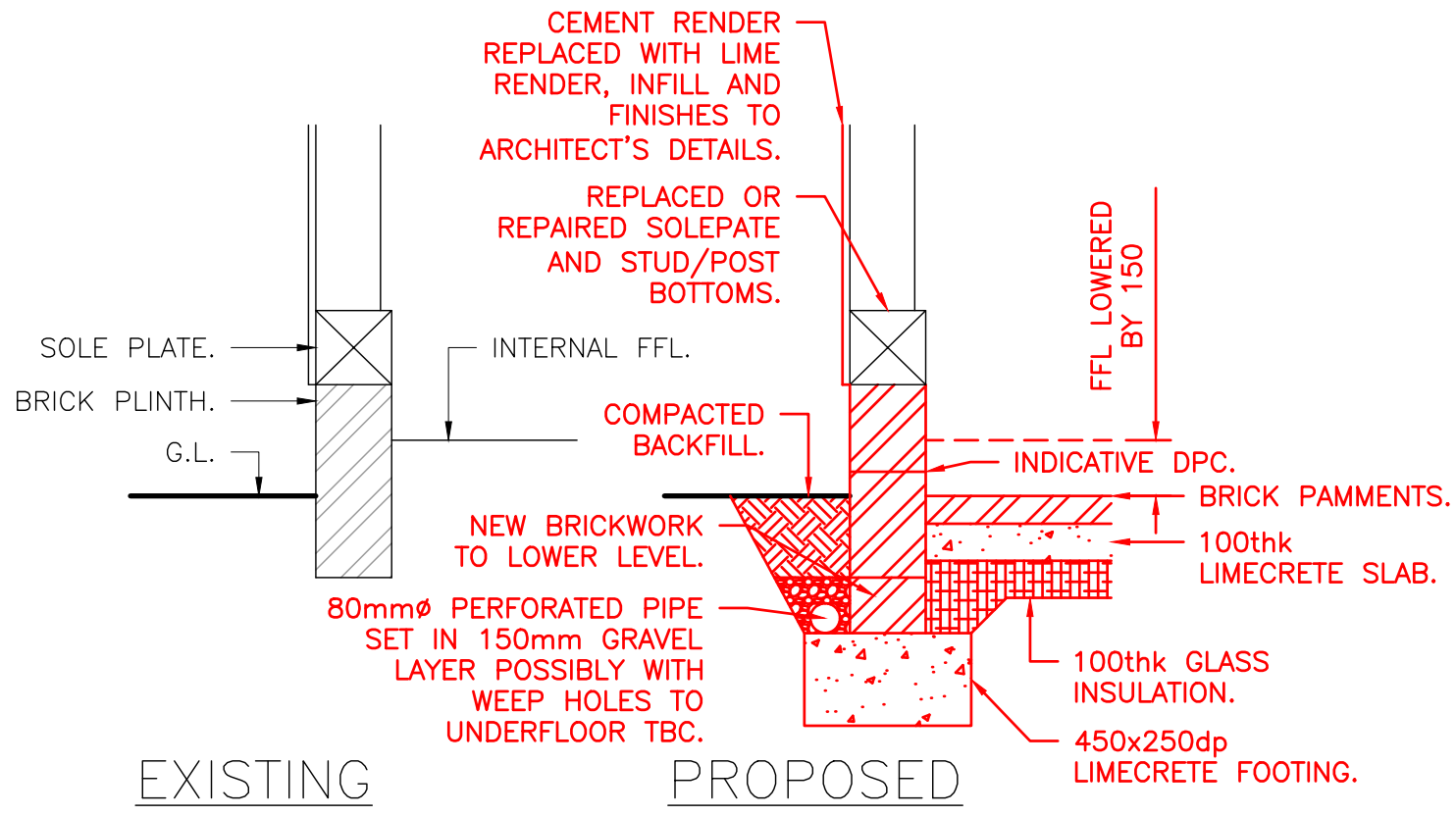
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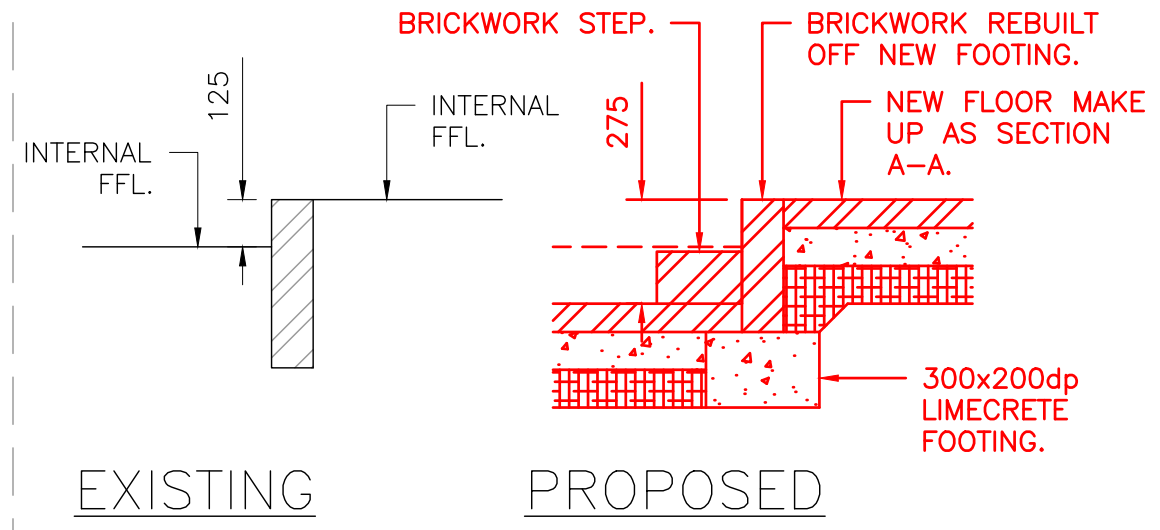
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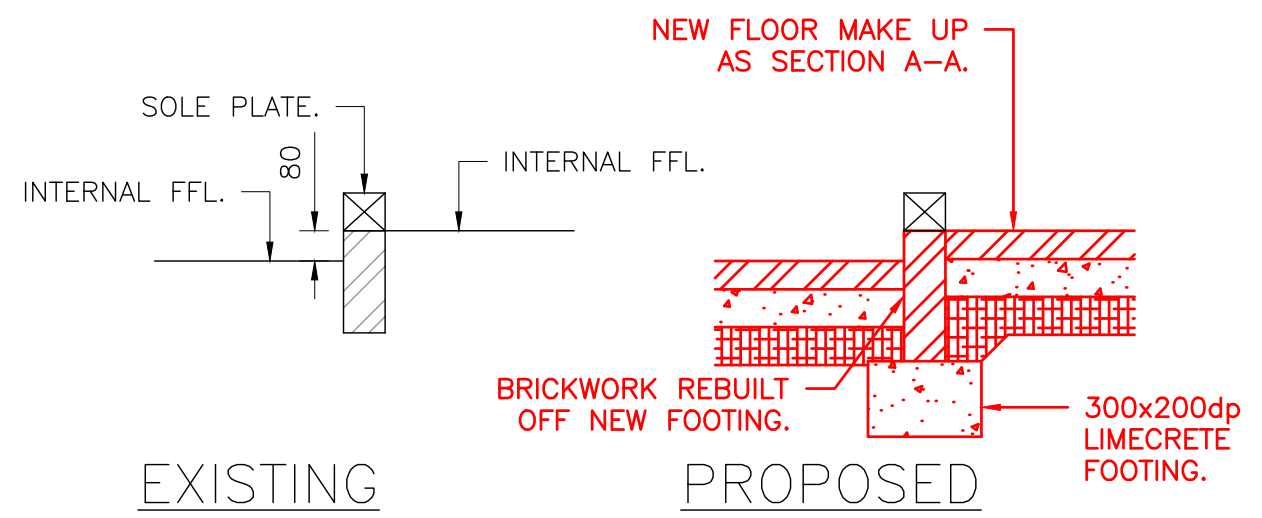
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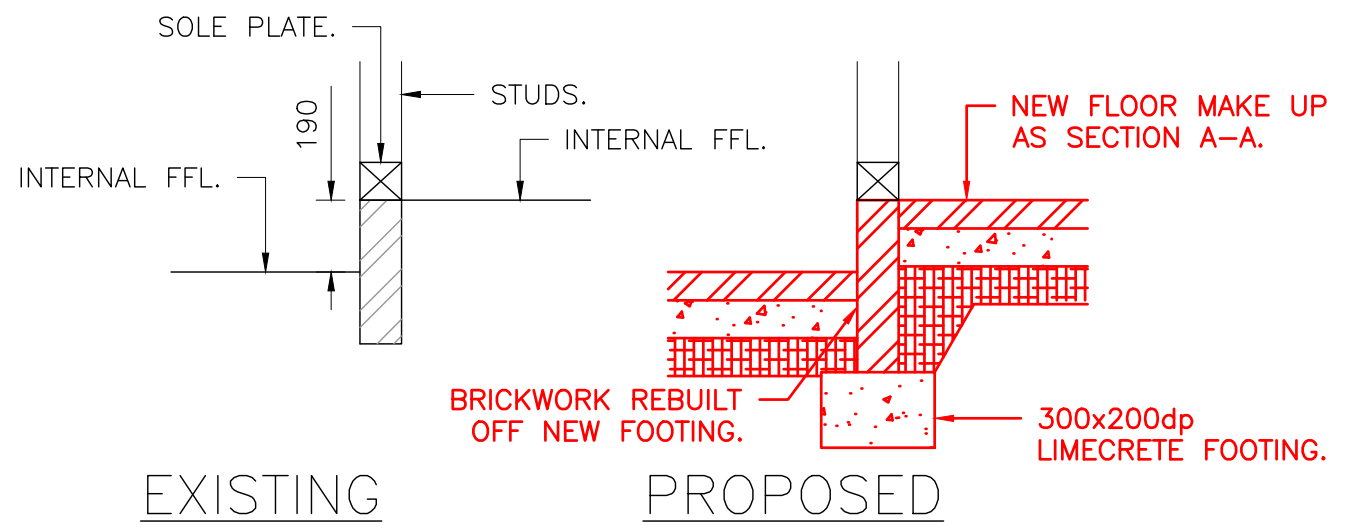
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SECTION B-B:  
SCALE 1:20



SECTION C-C:  
SCALE 1:20



SECTION D-D:  
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  7. TO CAVITY WALLS, INSULATION AND INNER BLOCKWORK TO BE TO CURRENT PART L (JUNE 2022) GUIDANCE.

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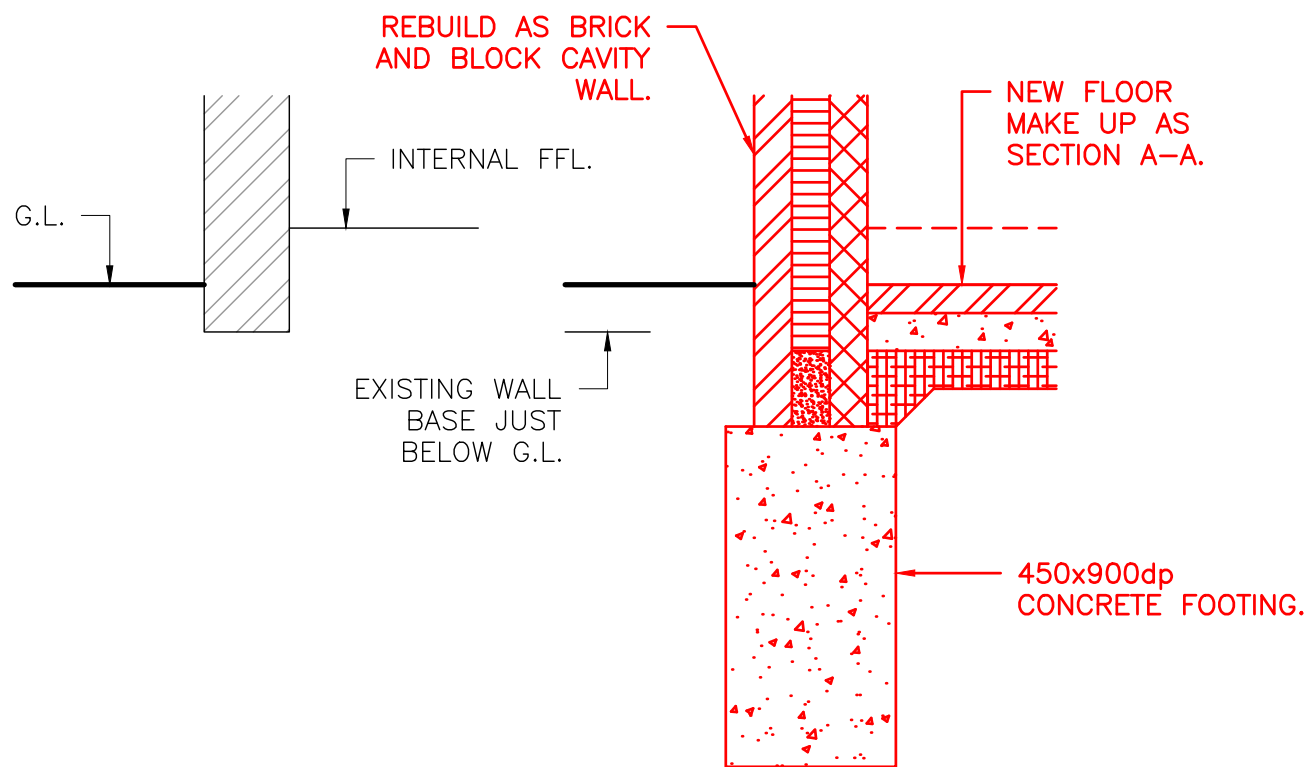
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PROJECT:  
CHURCH LANE COTTAGE  
CHURCH LANE  
ALDHAM

TITLE:  
DETAIL SECTIONS  
PROPOSED

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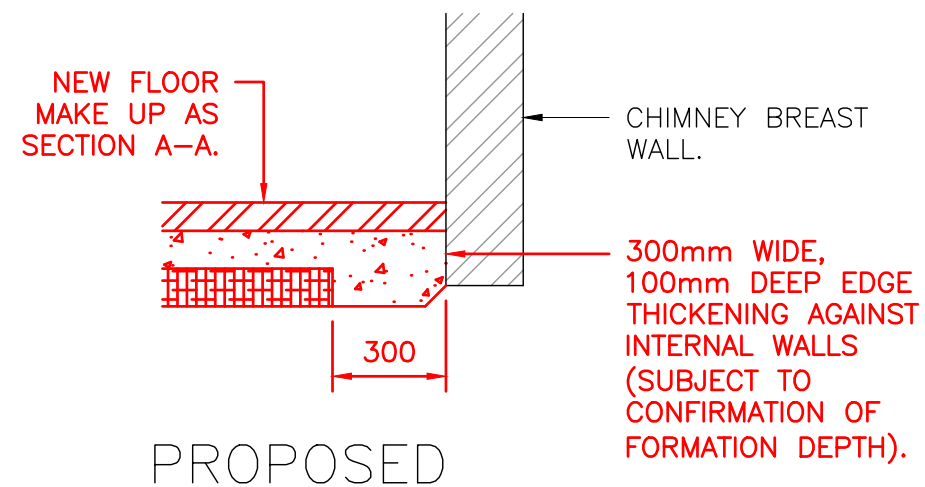
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EXISTING

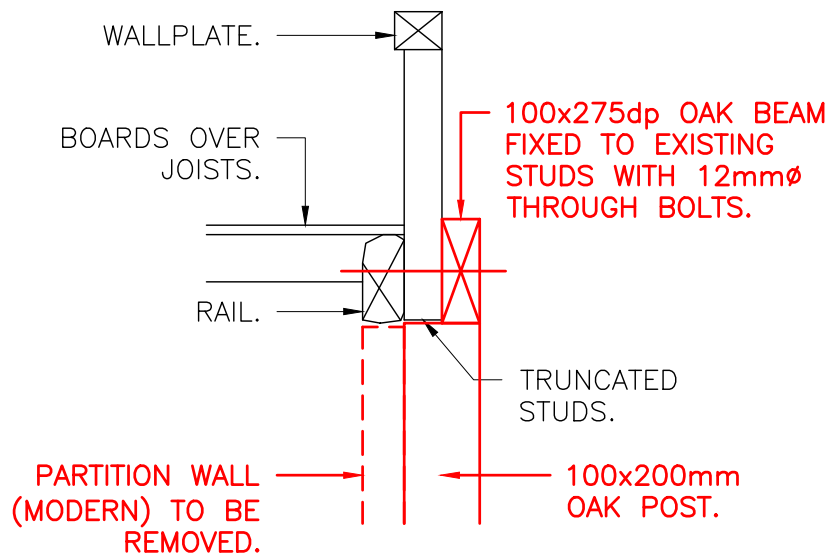
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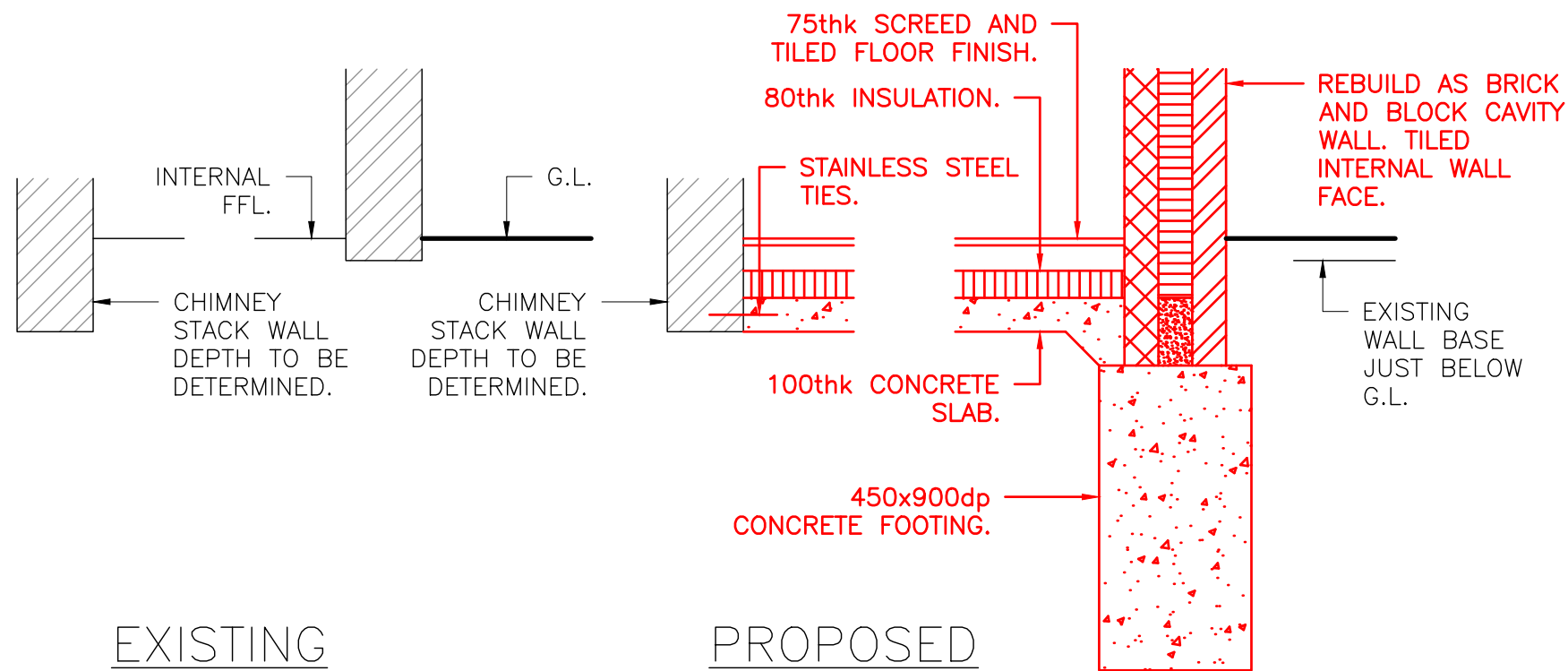


PROPOSED

SECTION F-F:  
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DETAIL G:  
SCALE 1:20



EXISTING

PROPOSED

SECTION H-H:  
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**PLANNING**

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