

Wellan

Structural Report

Burdrop Farm House, Burdrop

Oxfordshire, OX15 5RN

For Mr D Brace

October 2019

Wellan Ltd

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Approved



Date October 2019

Project No.....19/142

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1.0 Introduction

This report has been prepared at the request of Mr D Brace who is proposing to purchase the property.

This appraisal and report has been commissioned in order to advise on the structural condition of the building and advise on any defects. The report will therefore comment on the existing structure regarding defects and will provide advice and comments on measures necessary to provide long-term satisfactory structural performance of the property.

A site visit was made on 3rd July 2019 by Mr M Walker, B.Sc C.Eng. M.I.C.E. Mr Walker is a Chartered Engineer with more than 30 years of experience, much of which has involved investigating older buildings (including listed buildings), identifying defects and specifying remedial measures.

An external and internal inspection of the visible parts of the buildings was carried out including roof spaces where accessible. Inspection of the buildings was carried out from ground level and with the aid of a 2.4 metre ladder. Close examination of the upper parts of the walls, roof structure and external surface of the roof was, therefore, not possible. No opening up of the structure or foundations was carried out and the comments in this report are therefore based only on a visual inspection.

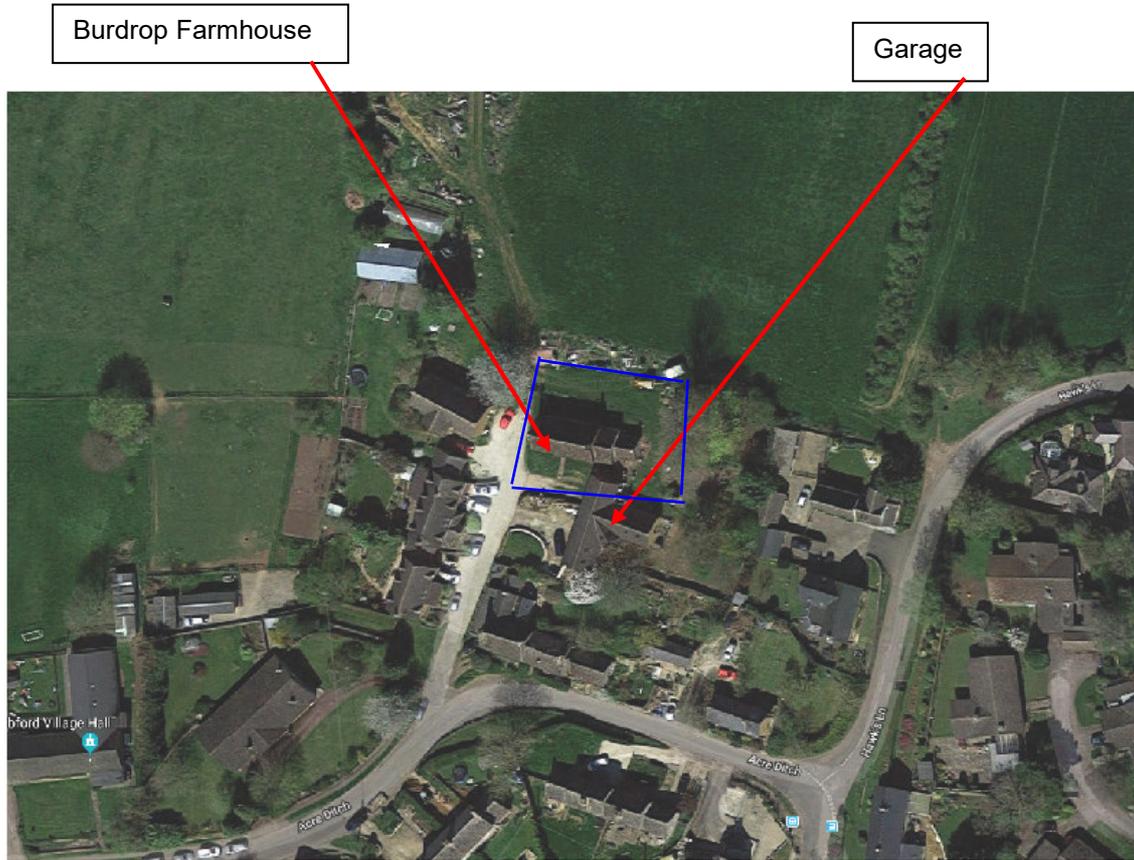
The comments in this report are illustrated by the sketches in Appendix B together with photographs.

An overall review regarding damp and timber condition are given in the report but an investigation by a specialist damp and timber company may be appropriate with their recommendations instigated as appropriate.

This report has been produced for the sole use of Mr D Brace in connection with his proposed purchase of the property and should not be relied upon by any other party or any other context.

2.0 Background, Description and Form of Construction

The property is sited towards the northern limit of Burdrop which is a small village contiguous with Sibford Ferris and Sibford Gower. There is open land to the rear (north) side but other buildings are located to the south



The main (part) three-storey building is indicated in the centre of the view above but its garage is part of a recently constructed new building to the south which also includes a separate house.



The house is constructed in Ironstone throughout with a pitched tiled roof. There are three co-linear sections with varying roof heights as shown below.



The main, taller element is three-storey (including the rooms in the roof space) and has clear evident vertical joint approximately at its mid-point as seen in the right hand photograph above. This 'straight' joint in the stonework is, somewhat unusually offset at the first floor level (as noted on SK/05) from one side of the internal cross-wall to the other. On the north elevation, shown in the two photographs above the construction varies across the joint. Coursed, reasonably well-dressed stone is to the left whereas the stone to the right is poorly dressed and only semi coursed. The joint occurs in the matching position on the front face, as shown below, but the stone is all reasonably well dressed and coursed.



There is also a slight step in the face of this joint where some degree of lateral movement has occurred in to the right hand side of the joint. The thickness of the internal cross-wall suggests that it was originally intended to be an external wall and the variation in style of stonework indicates that construction of the walls was not all contemporaneous. However, the offset in the joint suggests that the addition of second sections of wall (suspected to be the eastern section) was already intended to be constructed as a second cottage during the construction of the first and that the origins of the two elements were separated by only a short period in the early to mid-part of the 18th Century.

The intermediate height section was built with an externally accessed upper level via a short set of steps with an undercroft. The first floor is a recent replacement and the upper level is plastered to above eaves level, as shown below, suggesting a former ceiling at this level.



The original floor level is not known (probably lower) but it is quite likely that this space was used for storage possibly with animals kept below.

The easternmost single-storey element is more recent with construction in the 19th Century.

The roof structures throughout have been renewed using softwood rafters, purlins and a single, rather inelegant truss. The concrete plain tiles are laid over a bitumen based felt and date from approximately 60 years ago which probably reflects the age of the timber roof structure.

Many internal changes have been made to floors, partitions and stairs since this period. The current stair arrangement is clearly relatively modern and there must once have been two staircases to suit the two cottages. A former door opening can be seen in the west elevation as shown in the photograph below.



It is assumed that this dates from the use of the building as two cottages and that the ground level at this doorway was once lower. The raised ground at the western end is a potential source of dampness and this is discussed below.

In addition to the above, it is apparent that a considerable amount of repair/maintenance/refurbishment has been carried out in relatively recent times. New windows are readily apparent but it is clear that most of the external lintels have also been replaced. In some locations it is possible to see areas of repointing where stonework above the previous failing lintel has been repaired. This has clearly been part of a more widespread programme of maintenance to stonework that appears to have included replacement of some stones (presumably due to erosion/frost damage) as well as repointing.

There is a basement under the western element of the property which is accessed by steps from the opposite side of what would once have been the adjacent cottage. The steps appear original and this may suggest that the dividing wall was once intended to be an external wall. Alternatively the cellar could have been for the joint use of the two cottages as they were probably intended to both serve the same farm. The floor over the cellar is modern (estimated 20 years old and includes steel beams).

The garages that serve the property are integral with a recent development that include a separate dwelling.



These garages are constructed with modern 'split and tumbled' ironstone facing, as shown above left and a concrete blockwork inner leaf as shown above right. The plain tile roof covering incorporates a modern breathable roof felt and is supported on a 'cut' timber roof of rafters and purlins.

The British Geological Survey Map indicates that the site is underlain by the Northampton Sand Formation which is likely to be present, at this location, as ironstone. No superficial deposits are recorded and it is thus anticipated that foundation conditions would be very good.

The site is within Flood Zone (1 less than 1 in 100 year chance of flooding).

The building is listed under the Planning (Listed Buildings and Conservation Areas) Act 1990 as amended for its special architectural or historic interest. Any proposals for alteration will therefore be subject to an application for Listed Building Consent. The list entry is included in Appendix A.

3.0 Structural Details, Conditions and Comments Regarding Remedial Measures

3.1 Roof

3.1.2 Roof Over Three-Story Section

The roof over the western second floor bedroom has a plasterboard lining to the underside of the rafters but the purlins can be seen and span to the loadbearing cross-wall to the east of the stair with support from a truss at approximately half-way across this chamber, all as shown on SK/03 and in the photograph below



The purlin span is approximately 2.5 metres which is a little in excess of its capacity by modern design calculations but there is relatively little deflection. The rafter size could not be checked but again there is little indication of sagging. The principal rafter of the truss is not sagging significantly it is assumed that there is a horizontal tie within the floor but this should be verified.

The roof over the west section of the third floor has no ceiling lining so that the rafters and ceiling joists are exposed as shown below left.



Mineral wool insulation has been used between the rafters to provide some degree of insulation. However, it is insufficient to satisfy modern building regulation and is quite possibly causing condensation somewhere in its depth with limited opportunity for ventilation. It is recommended that this arrangement is remedied by the use of a vapour control layer, ventilation and better insulation.

A purlin can be seen in the left hand photograph which is spanning to the far wall at the east end of the three-storey element and to a truss at the right hand wall. This purlin can be seen to be sagging significantly. This purlin spans further than the others and it is not clear whether it was doubled up as can be seen, or if a second purlin was added (noting that a single timber section was used elsewhere) to address the shortcoming when it was noticed. The other single purlins are also deflecting but slightly less seriously. Although the sagging purlins are not currently causing serious problems it is recommended that they are reinforced.

The 75x50mm rafters are moderately sized by modern standards but their deflection does not give grounds for concern.

The photograph above right shows the principal rafter of the truss entering the external supporting wall. It is assumed that the feet of the truss principal rafters are tied by the substantial oak beam visible in the ceiling of the master bedroom below. This should be verified.

There is no current evidence of ongoing spread of the walls at eaves level. However, there is historic cracking in the west gable at its north end near to the support of the doubled up purlin and under the third floor window in the gable (see photograph below).



This is a result of the downslope thrust that occurs in the roof when a ridge purlin is not present and the horizontal force at the eaves is not resisted by floor joists. This cracking has continued in the wall below the second floor where it can be seen in the back of the master bedroom cupboard as shown below.



There is no evidence of current cracking between the ceiling and wall of the master bedroom and no current cracking in the west gable external face. Furthermore the ridge of this section of roof remains relatively straight.

There is some indication that a former crack has been repointed but not reappeared. It is assumed that the horizontal spread has ceased, possibly as a result of the replacement roof structure 60 years ago or as a result of doubling up the purlins. In any case, it would be relatively simple and cost-effective to improve tying between rafter feet and ceiling. This could be easily implemented as part of a refurbishment project as a preventative measure.

3.1.2 Roof Over Two-Storey Section

The intermediate level roof has also been replaced with modern softwood rafters and purlins. In this case the span between loadbearing walls is not sufficient to require a truss. Nevertheless, the purlins are somewhat undersized for the span and some degree of deflection has occurred. In this case the problem is exacerbated by the absence of either a ridge purlin or ceiling joists. A slight amount of dishing of the roof slope can be seen together with a slight dip in the ridge line as shown below.



Deflection of the purlins will frequently cause spread at the walls at eaves level if it is not restrained by ceiling joists (which are not present here). This can take the form of bowing in the eaves line or cracking in gable walls as noted in 3.1.1 above. There is again historic evidence of some cracking of this sort of the walls together with slight bowing of the north/south walls. However, there is no current cracking in the external walls and it is assumed, therefore, to have ceased. It would however, be prudent and cost-effective to implement prevention measures as part of a refurbishment measures. This could be carried out by any of the following

1. Strengthen existing purlins
2. Installing ceiling collars at purlin level
3. Install a ridge purlin

3.1.3 Roof Over Single-Storey

The replacement roof over this section is slightly more substantial using 200x75mm purlins and 100x50mm rafters



It is suspected that this roof structure may have been replaced more recently than the others. Although the purlins are still slightly undersized by current standards, there is little sign of deflection and the eaves are well tied by the ceiling joists. No action is necessary.

3.2 First and Second Floor

3.2.1 Second Floor

The second floor in both the east and west chamber comprises small joists which are above the plasterboard ceilings. They span to loadbearing walls and central substantial oak beams. The joists are small sections and it is assumed that they were originally exposed. The presence of original window openings in the east and east gables indicate that the second floor was always habitable space and that the floor construction was constructed to be suitable. It was not unusual, however, for the space within the roof space to be constructed to a lower specification with a less substantial construction than the first floor. This seems to be the case here as the second floor is slightly 'bouncy' compared to modern construction standards. The slightly excessive deflection is not causing any significant problems despite the heavy loads applied in the eastern room which is currently used for storage. It would be possible to improve the stiffness of the floor, if required, by laying a new plywood floor glued and screwed to the joists which would be retained.

3.2.2 First Floor

The first floors of the master bedroom (east side of three-storey section) is performing adequately. There is, however, some degree of flexibility in the western side. It appears that alteration and/or infilling of part of this floor was carried out as part of relocation of the stairs. The joists in this area have clearly been replaced and it is suggested that the central oak beam is retained with other joists replaced more adequately as part of refurbishment works.

3.2.3 First Floor in Two-Storey Section

As noted previously, this floor has been replaced with modern softwood joists and boards. The span is modest and the floor is performing adequately.

3.4 Walls

The external walls are faced with ironstone which is assumed to have been quarried locally. They are assumed to be 'rubble fill' throughout. There is considerable variation in the dressing and laying of the stone even within the three-storey section that is thought to have been constructed over a relatively short period. The shade of the local ironstone varies considerably according to the proportion of iron present and this varies quite considerably with location and depth within the quarry. It appears that the stone used may have been quarried at different times resulting in the variation of colour.

The external faces of the walls have also been subject to considerable repointing and, possibly some replacement of individual stones. This has, to some degree, hidden previous structural movement. Most of this is the result of deflection at roof level, as discussed above. Some element is due to failure of timber lintels that have now been replaced. This degree of interruption can sometimes lead to loss of integrity of a rubble fill wall with the two leaves delaminating and bulging becoming apparent. There is no evidence of this and nor is there any sign of diagonal (or other) cracking that would suggest that subsidence has occurred.

There is a small amount of bowing on the front wall as can be seen in the photographs below and marked on drawing SK/04 in Appendix B



The problem has also occurred, to a slightly smaller degree, in the rear elevation. Cracking has not reoccurred since the walls were repointed externally and replastered internally. However, it would be worthwhile to provide additional tying measures at floor level, as noted previously, as a preventative measure as part of refurbishment works. There is no requirement for this work to impact the historic structure.

There was no significant evidence of damp penetration at the west end where the external ground level is raised. However it may be prudent to consult a damp specialist in this regard.

3.5 Basement and Foundations

The floor over the basement has been completely renewed using a combination of softwood joists and steel beams as shown below left



This floor is clearly a relatively modern intervention and is performing well. However, a timber prop has been used to support the end of the steel beam from the bottom step as shown above right. Although not currently causing a problem, it is suggested that this situation is formalised.

Consideration should perhaps also be given to providing a fire resistant ceiling over the basement which houses an oil fuelled boiler.

There is clearly some degree of dampness present in the basement but it did not appear to be causing a problem at the time of inspection. If the basement is to be used for habitable purposes then comprehensive waterproofing measures will be required (probably by use of a cavity drainage membrane).

Foundations were not exposed but there is no evidence of settlement. It is possible that the building is founded on the ironstone that is known to be present in the area, or brash/gravel. These material provide a notably good foundation performance.

3.6 Garage

The garage building has clearly been completed in recent years. It is assumed that it was subject to planning and building regulation approval. This should be verified. The building appears to be performing satisfactorily. However, it is noted that purlins are present midway in the rafter slopes but without a ridge purlin. In this structural arrangement it would be usual to provide timber collars between the purlins. This can easily be done and is recommended.

4.0 Conclusion

This property is generally in fair structural condition particularly in view of its age. There is no requirement for immediate structural works but some relatively minor, non-intrusive preventative measures are recommended. These can easily be carried out as part of refurbishment project.

Appendix A

List Entry



BURDROP FARMHOUSE

Overview

Heritage Category:

Listed Building

Grade:

II

List Entry Number:

1046799

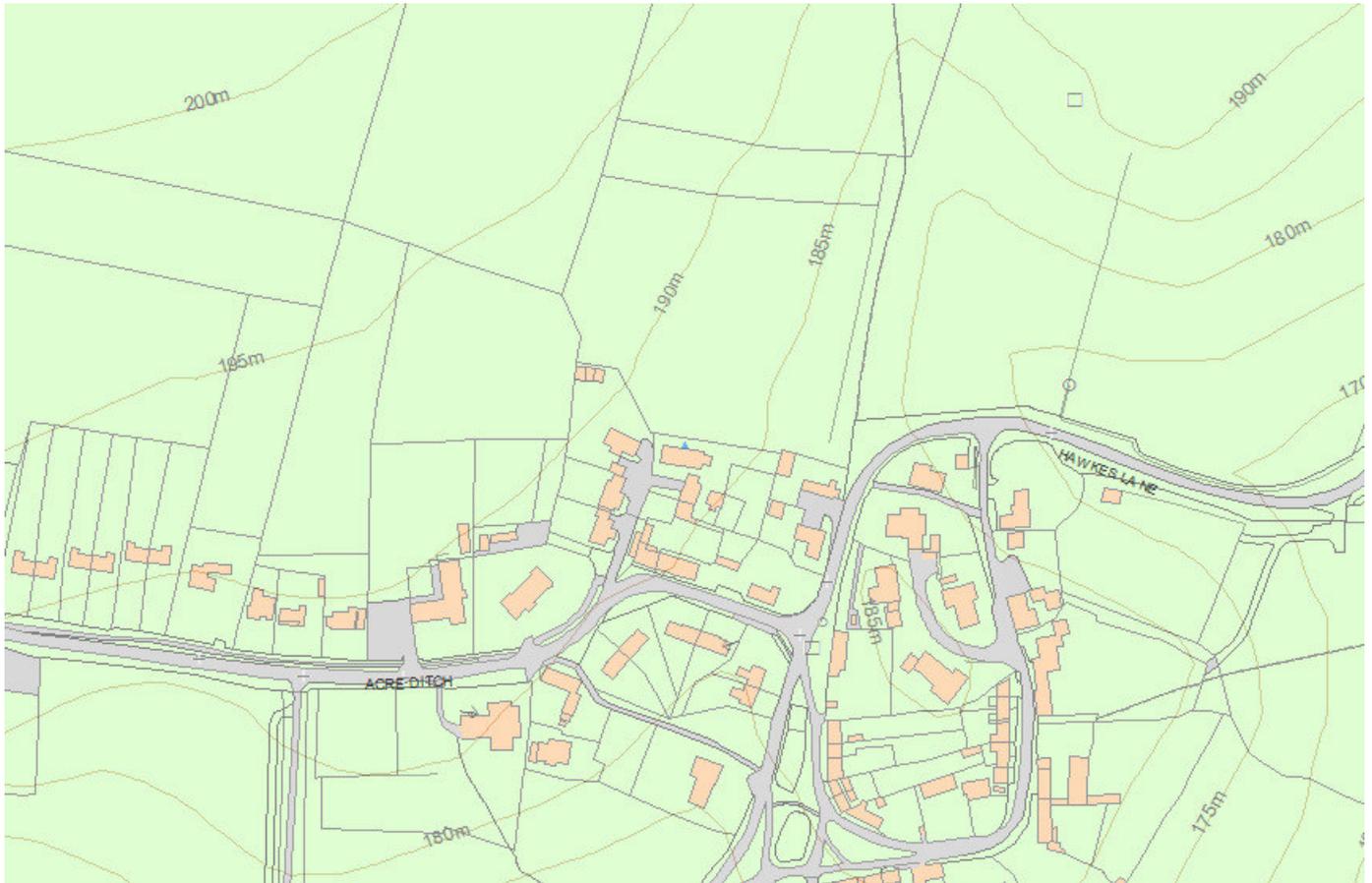
Date first listed:

20-Sep-1988

Statutory Address:

BURDROP FARMHOUSE

Map



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The above map is for quick reference purposes only and may not be to scale. For a copy of the full scale map, please see the attached PDF - **1046799.pdf**

The PDF will be generated from our live systems and may take a few minutes to download depending on how busy our servers are. We apologise for this delay.

This copy shows the entry on 28-Oct-2019 at 07:26:01.

Location

Statutory Address:

BURDROP FARMHOUSE

The building or site itself may lie within the boundary of more than one authority.

County:

Oxfordshire

District:

Cherwell (District Authority)

Parish:
Sibford Gower

National Grid Reference:
SP 35712 37914

Details

SIBFORD GOWER BURDROP SP3436-3536 16/169 Burdrop Farmhouse GV II Farmhouse now house. Mid C18 with C20 alterations. Squared, coursed ironstone. Steeply pitched C20-tile roof. Stone coped gables with moulded kneelers. Renewed blue brick end stacks. 3-unit plan plus extension on right. 2 storeys plus attic. 3-window range. Entrance off-centre to left has panelled/glazed door and hood. C20 windows to left on both ground and first floors within original openings; 3-light metal casements on right on both ground and first floors. Wood lintels throughout. Lower single-storey service extension on right. Interior not inspected.

Listing NGR: SP3571237914

Legacy

The contents of this record have been generated from a legacy data system.

Legacy System number:
244726

Legacy System:
LBS

Legal

This building is listed under the Planning (Listed Buildings and Conservation Areas) Act 1990 as amended for its special architectural or historic interest.

End of official listing

Images of England

Images of England was a photographic record of every listed building in England, created as a snap shot of listed buildings at the turn of the millennium. These photographs of the exterior of listed buildings were taken by volunteers between 1999 and 2008. The project was supported by the Heritage Lottery Fund.

Date: 28 Jul 2003

Reference: IOE01/11079/10

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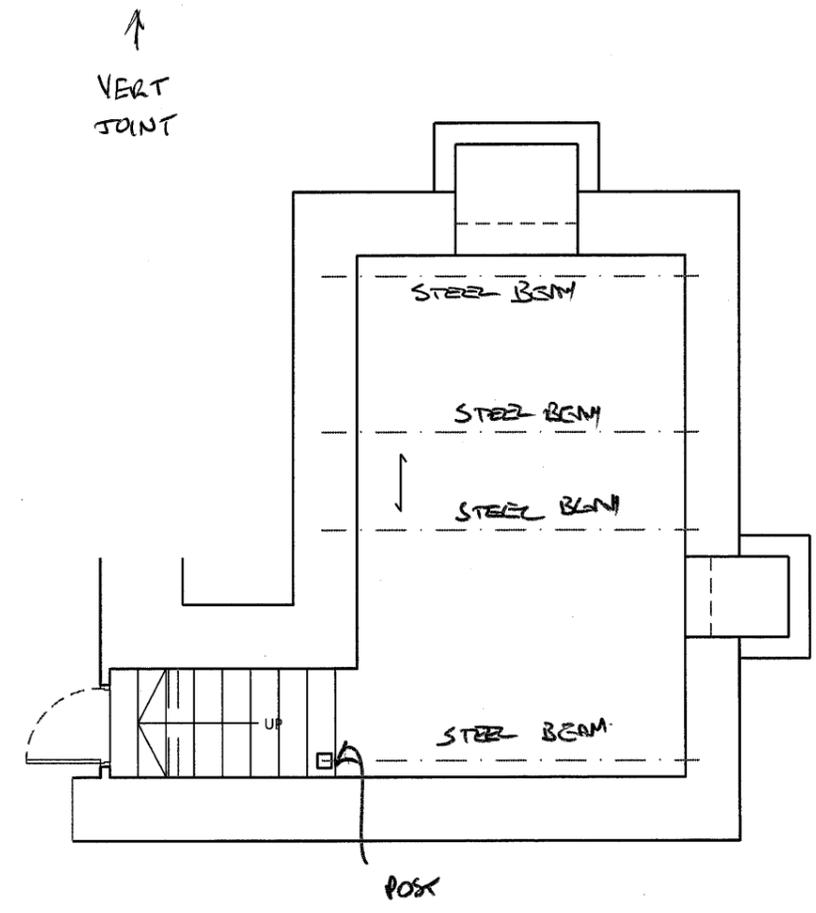
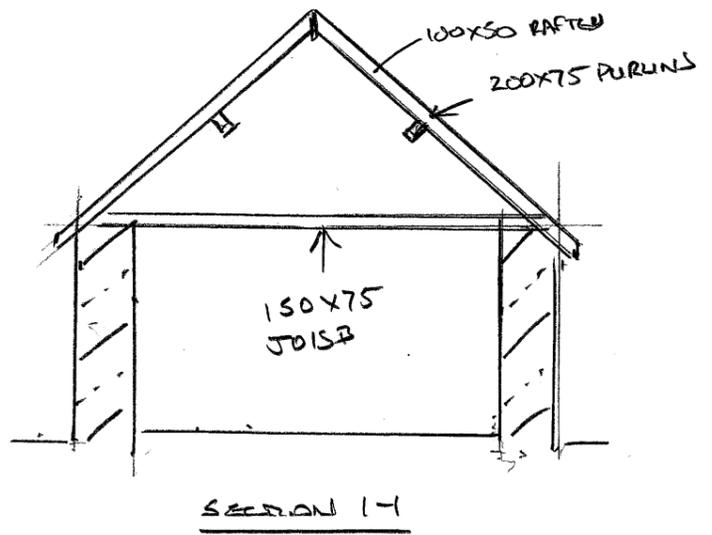
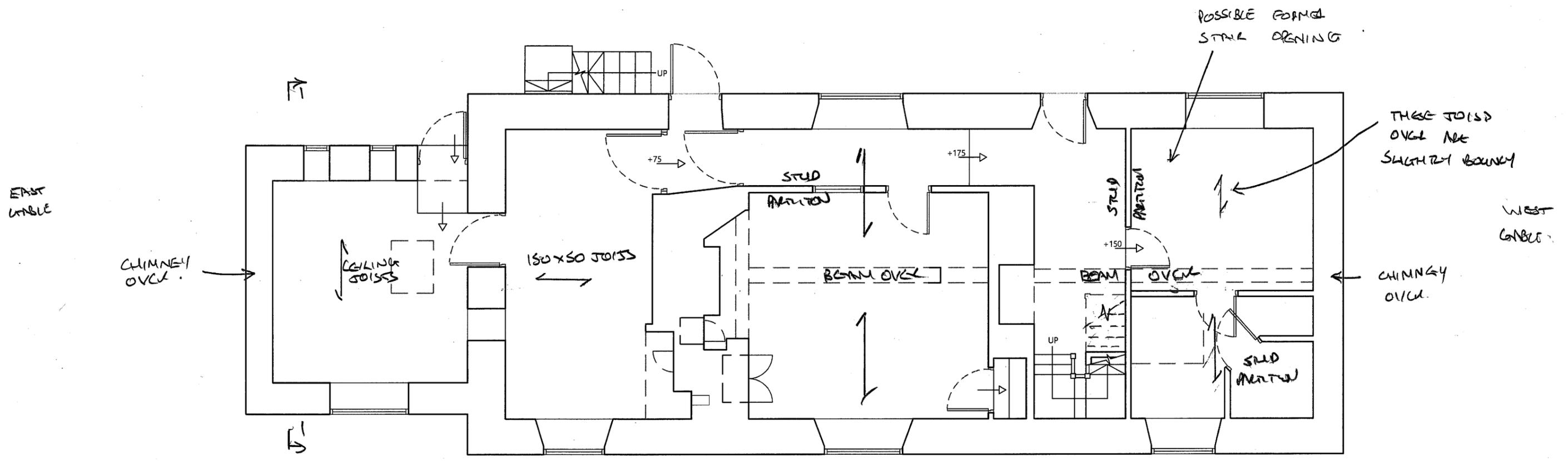
Archive image, may not represent current condition of site.



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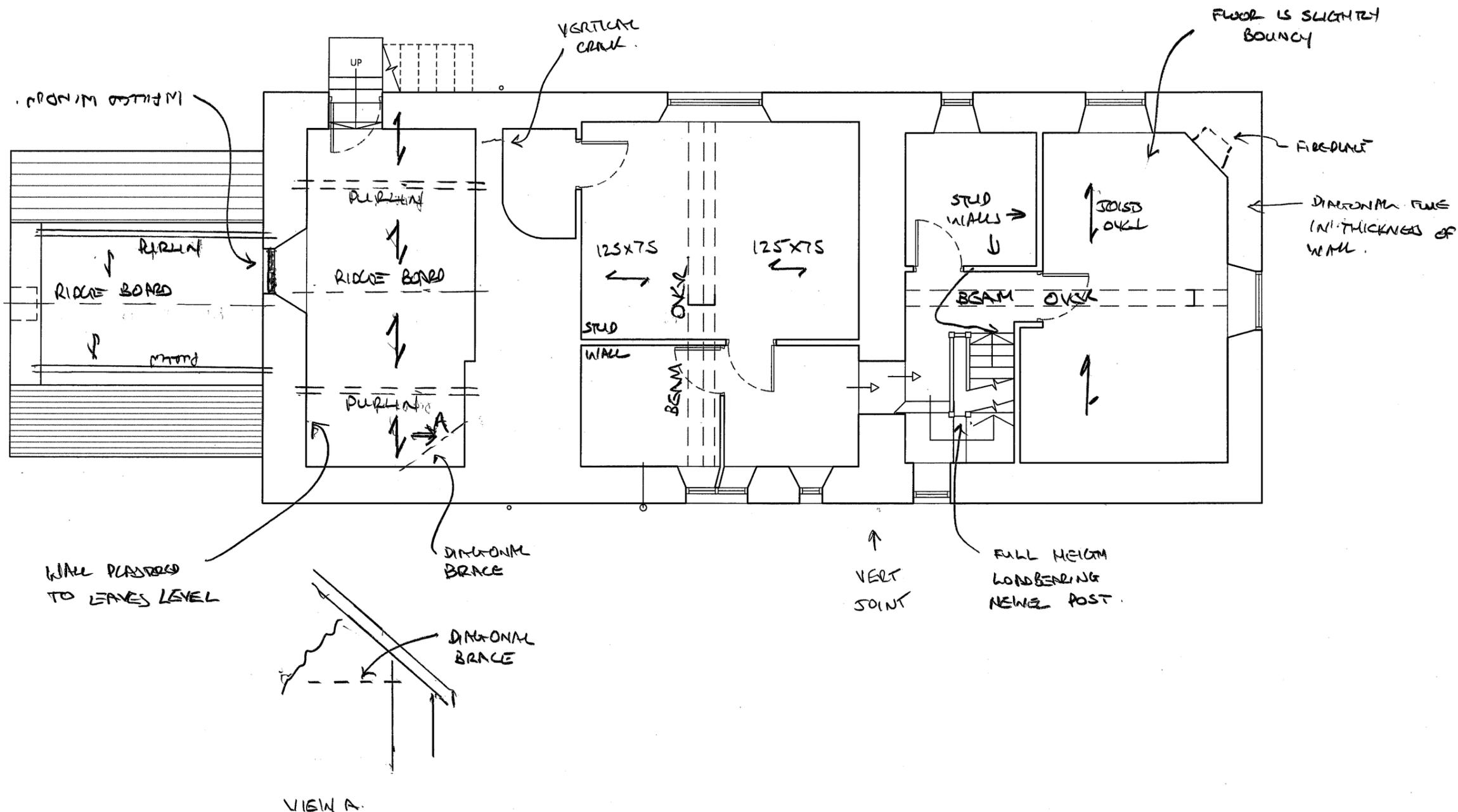
Appendix B

- SK/01 Ground Floor and Basement Plans Showing Construction Over
- SK/02 First Floor Plans showing Construction Over
- SK/03 Second Floor Plan Showing Construction Over
- SK/04 Front (South) Elevation
- SK/05 Rear (North) Elevation
- SK/06 Side (East and West) Elevations

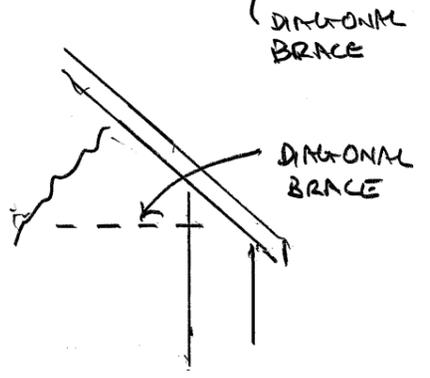


A3 DRAWING

Wellan Tel 01608 685753	Wellan House, Aylesmore, Warks, CV36 5EJ
Scale NTS Proj No 19-142	Title GROUND FLOOR & BASEMENT PLANS
Date SEPT/19 Drg No SK/01	SHOWING CONSTRUCTION OVER
	Project BURDOP FARMHOUSE



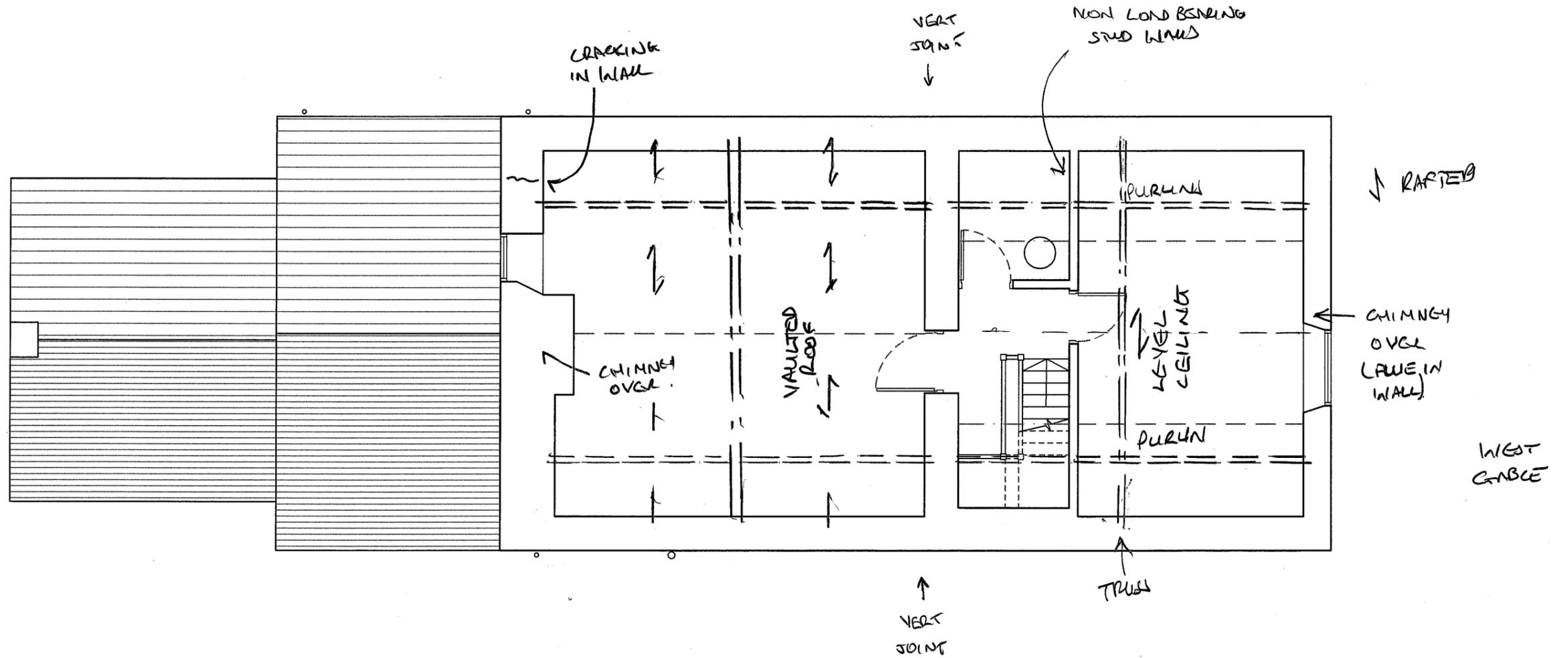
WALL PLASTERED TO LEAVES LEVEL



VIEW A

A3 DRAWING

Wellan	Tel 01608 685753	Wellan House, Aylesmore, Warks, CV36 5EJ
Scale NTS	Proj No 19-142	Title 1ST FLOOR PLAN SHOWING CONSTRUCTION OVER
Date SEPT 19	Drg No SK/02	Project BURDROP FARMHOUSE

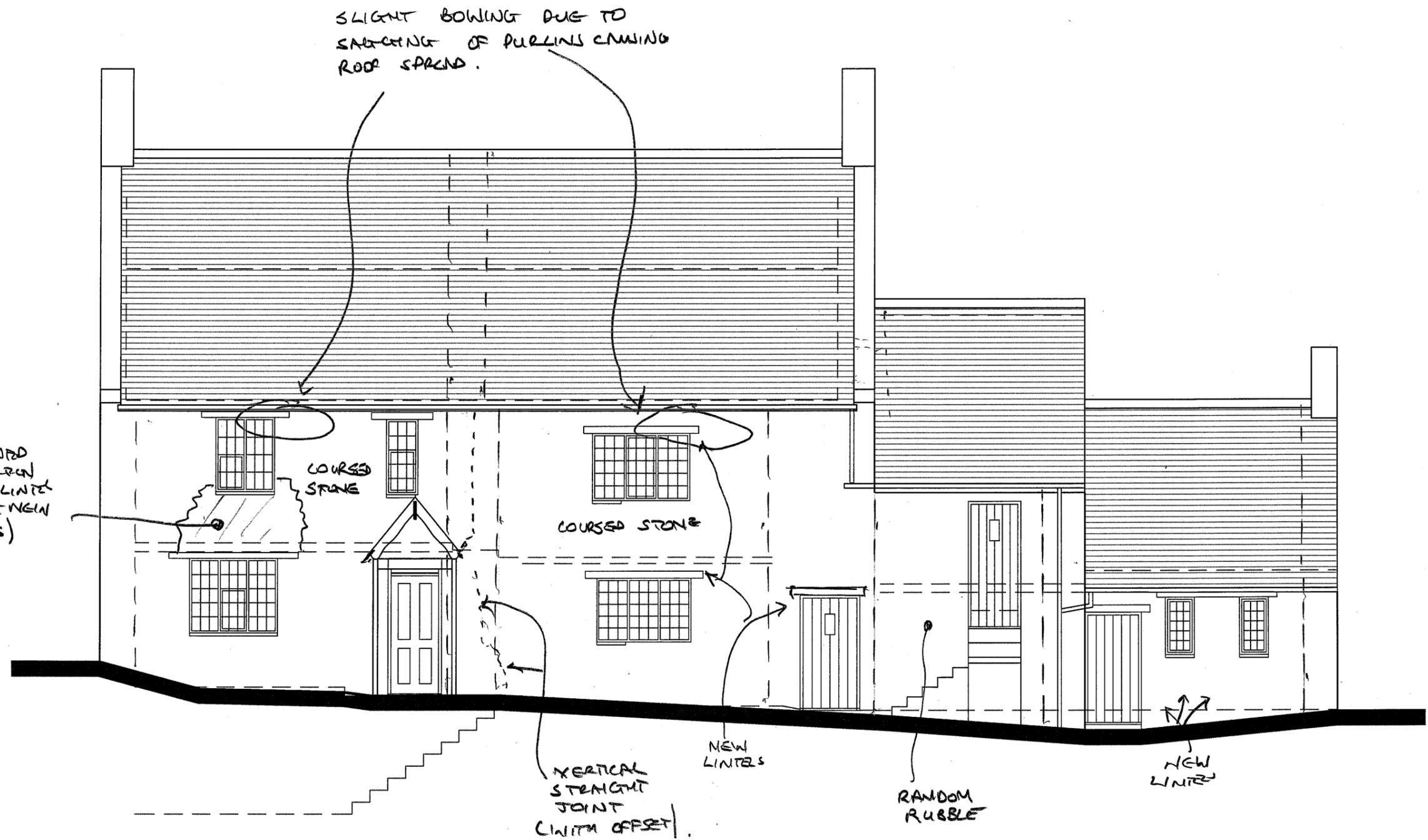


EXIST
GABLE



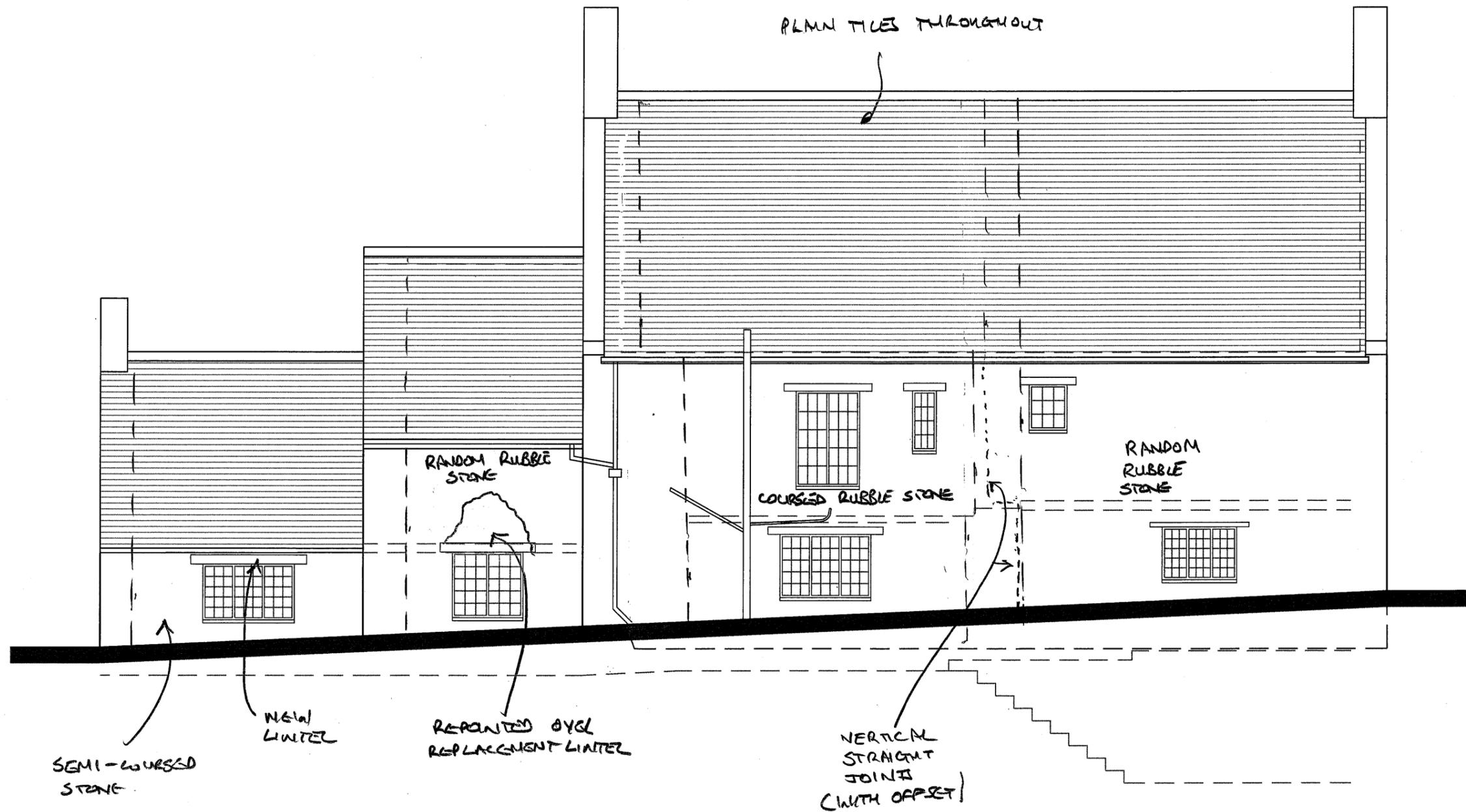
A3 DRAWING

Wellan Tel 01608 685753		Wellan House, Aylesmore, Warks, CV36 5EJ
Scale NTS	Proj No 19-142	Title 2ND FLOOR PLAN SHOWING CONSTRUCTION OVER
Date SEPT 119	Drg No SK/03	Project BURDOP FARMHOUSE



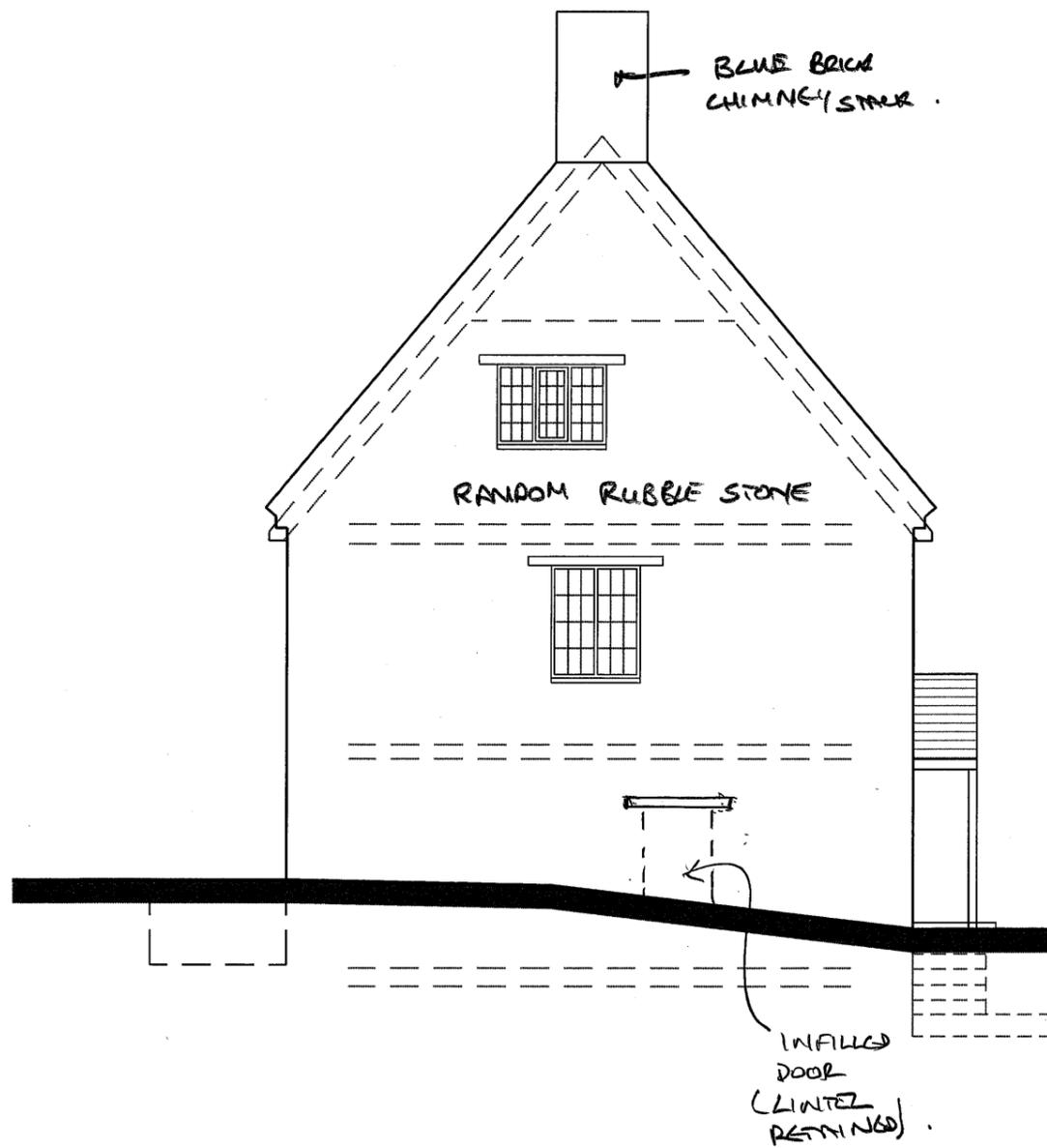
A3 DRAWING

Wellan	Tel 01608 685753	Wellan House, Aylesmore, Warks, CV36 5EJ
Scale NTS	Proj No 19-142	Title FRONT (SOUTH) ELEVATION
Date SEPT '19	Drg No SK/04	Project BURDROP FARMHOUSE

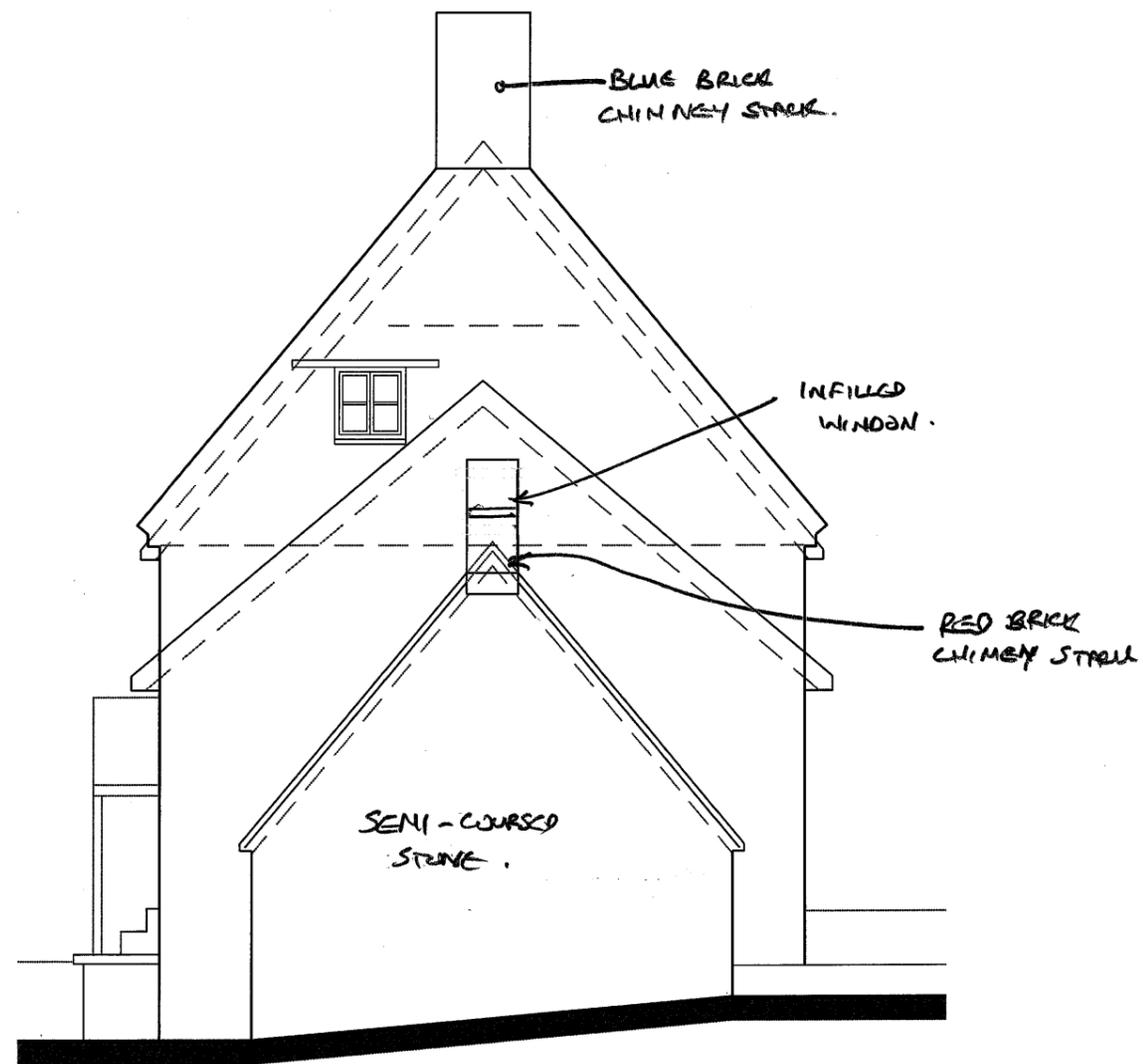


A3 DRAWING

Wellan	Tel 01608 685753	Wellan House, Aylesmore, Warks, CV36 5EJ
Scale NTS	Proj No 19-142	Title REAR (NORTH) ELEVATION
Date SEPT 19	Drg No SK/05	Project BURDROP FARMHOUSE



WEST ELEVATION



EAST ELEVATION

A3 DRAWING

Wellan Tel 01608 685753	Wellan House, Aylesmore, Warks, CV36 5EJ
Scale NTS Proj No 19-142	Title SIDE (EAST & WEST) ELEVATIONS
Date SEPT 19 Drg No SK/06	Project BURDROP FARMHOUSE