HW CONSULTING ENGINEERS LTD

HW CONSULTING ENGINEERS

STRUCTURAL REPORT
FOR RICKYARD'S BARN
BRADLEY LANE, ALTON

Job Ref: 1065

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1.0 INTRODUCTION

1.1. SCOPE

1.1.1. GRT Architects have commissioned HW Consulting Engineers to review the proposals to renovate and refurbish the existing listed Rickyard barn, Bradley Lane, Alton

1.1.2. The following report focuses on the demolition of the parts of the barn in the context of the construction works and the stability of the remaining structure.

1.1.3. The JS Wilks survey drawing 6708-2 should be read in conjunction with this report. References to elevation can be found on said survey drawing. This survey was undertaken, in part, to establish the allowable demolition of parts of the barn.

1.1.4. The JS Wilks survey drawing identifies parts of the building that are no longer structurally stable or may prove structurally unstable once construction is underway. None of the results of that survey and agreements made with the local authority are questioned within this report.

1.1.5. This report sets out to identify any additional areas of various structures forming Rickyard Barn, that are considered unstable or will become unstable as a result of construction work, instead of a typical condition survey.

2.0 BUILDING DESCRIPTIONS

2.1. FOUNDATIONS

2.1.1. Where exposed, the foundations consist of an extension of the stone wall perimeter. No widening of the stone work is present at the base and no concrete is found under the walls. This is typical of barns of this age and condition.

2.1.2. 2No. trial holes were dug along elevation 2 of units 1 and 2. Both holes identified the foundation description above. *Refer to photos 1.*

2.1.3. No trial holes were dug on unit 3 however due to the age of the barn and the condition and similarities in age and condition between units 1, 2 and 3, it is a fair assumption to make that the foundation detail is consistent across the various buildings.

2.2. EXTERNAL ENVELOPE

2.2.1. The envelope of the building consists of a single storey, solid stonework external wall construction.

2.2.2. A number of the walls are missing stone units and many of the walls are bowing both inward toward the building and bowing out away from the building. *Refer to pictures 2 and 3.* This bowing can also be witnessed in *photo 1.*

2.2.3. Part of the stonework forming the low level unit 2 has been on elevation 2 has been replaced with brickwork to the eaves. *Refer to photo 4.* This works appears to have been carried out after the original construction of the barn.

2.2.4. Many differing types of mortar can be seen between the masonry units to the envelope. None of this mortar has been tested.

2.3. INTERNAL STRUCTURE

2.3.1. 2No. buttressing walls are witnessed within the double height, single storey, unit 1 in addition to the end gables.

2.3.2. The internal wall closest to Unit 2 is split into two separate sections to allow access at high level. *Refer to photo 5.*

2.3.3. Internal walls are toothed into the external envelope where they abut one another.

2.4. ROOF

2.4.1. The roof is formed with rafters spanning from wall plate at the eaves to 2No. purlins at third points. A non-structural ridge timber connects the rafters abutting one another.

2.4.2. Supported by the rafters is a series of laths and Staffordshire blue roof tiles.

2.4.3. Rafters are circa 3”x3” in size with the grade undetermined.

2.4.4. Purlins are approximately sized at 6”-7” square. Grade undetermined. *Refer to photo 5.*

3.0 DEMOLITION CONSIDERATIONS

3.1. EXTERNAL ENVELOPE

3.1.1. JS Wilks survey drawing illustrates sections of the buildings envelope to be removed and rebuilt as part of the refurbishment works in red.

3.1.2. Following a detailed survey of the building, HW are unable to dispute any of the walls shown in red (to be taken down and rebuilt). It is considered prudent and commensurate with a good robust build to remove and replace these sections of the structure.

3.1.3. An additional two sections of the envelope have been further considered for demolition and have been identified in green.

3.1.4. The rear elevation of unit 3 is showing significant signs of bowing outwards. *Refer to photo 3*. It is considered prudent to remove this section of building and reinstate vertically. Due to the magnitude of the misalignment, structural instability during the construction period are a significant health and safety risk. The existing stonework should be reused in the reinstatement of this wall.

3.1.5. Elevation 4 of unit 1 has experience significant movement and is bowing outwards. This is mirrored about the centre of the building and is witnessed on elevation 2. The corresponding section of wall on elevation 2 is to be removed. It is the opinion of HW that the condition of elevation 4 is similar to that of elevation 2 and consequently, elevation 4 should too be demolished and rebuilt vertical. Both situation is having a direct affect on the stability of the internal wall at this junction. Refer to later discussion.

3.2. INTERNAL WALLS

3.2.1. The area of consideration internally are the walls buttressing and connected to the sections of wall to be removed on elevations 2 and 3 and is shown in green on the JS Wilk survey drawing

3.2.2. The damage witnessed to the internal buttressing walls appear to be a direct consequence of the movement experienced on the external elevation. *Refer to photo 7.* As the external has moved outwards, it appears to have dragged the internal wall with it producing large cracks within the internal wall.

3.2.3. As this wall is damaged as a result of the movement witnessed in the external elevation and the internal walls are toothed into the external elevation, the internal wall should be demolished and rebuilt upon a robust foundation. This will enable a robust and stable structure both parallel and perpendicular to the external elevations.

3.3. ROOF

3.3.1. The purlins are currently supported by the internal walls, which are showing significant sign of deterioration and damage as a result of movement.

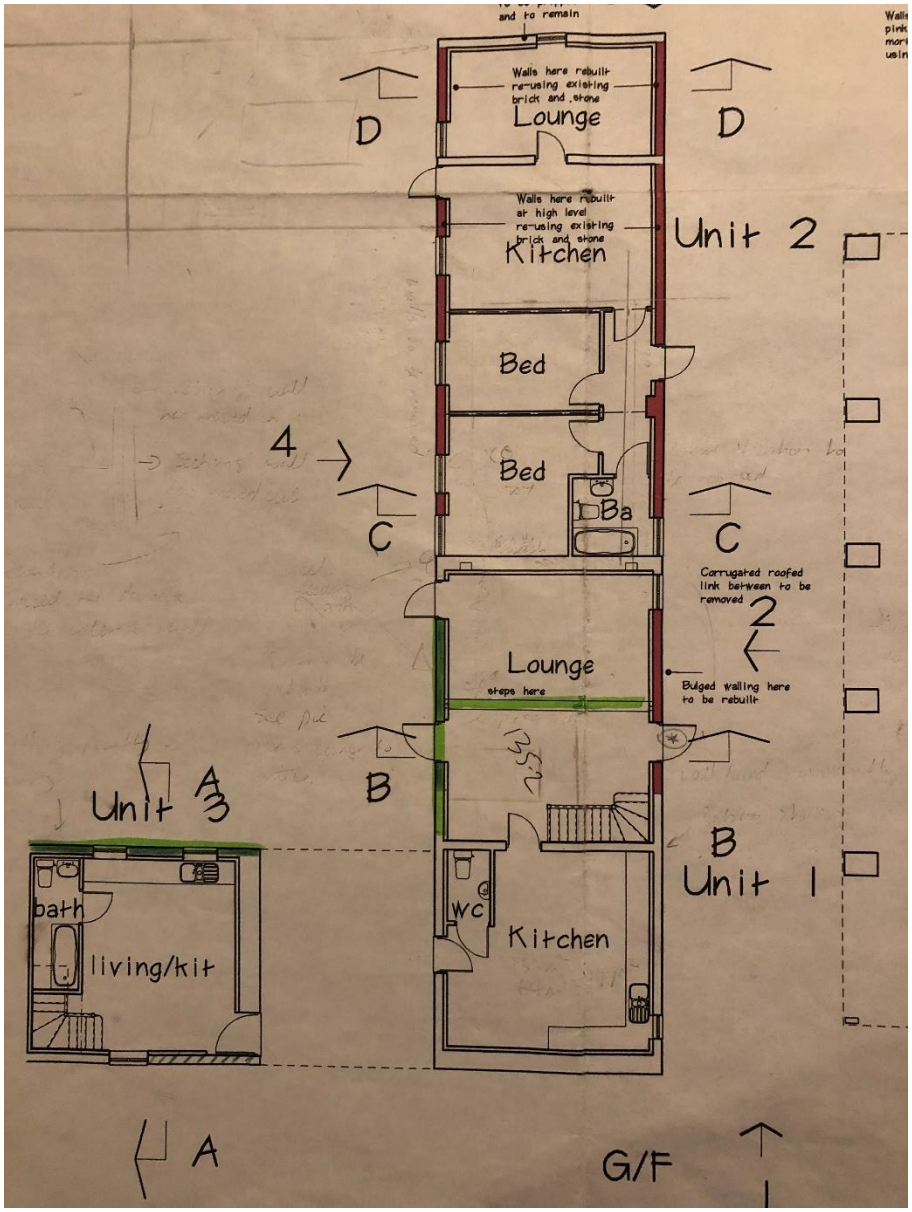
3.3.2. The rafters are supported at the eaves of the external elevations which, by in large are to be removed and rebuilt.

3.3.3. It is considered appropriate in the context of health and safety, that the timber roof should be removed prior to the demolition of the internal and external walls. Temporary propping of the roof in order to remove and rebuild the masonry is not considered appropriate or a safe method of reconstruction. Once the new walls have been constructed, the existing roof should be reinstated.

3.3.4. It should be noted that the as the building is to be repurposed as a domestic dwelling, additional load will need to be applied to the roof in the form of insulation and ceiling to the underside of the existing rafters. A new roof structure will need to be added to the existing structure to ensure the load can be safely transmitted to the walls and foundations. It is considered appropriate that to ensure the load can be carried effectively, the existing rafters should be removed and then replaced at the same time as the new structure to be added, ensuring both the new and old structure is performing a load carrying function.

APPENDICIES

JS WILKES DRAWING NO.6708-2 EXTRACTS



PHOTOS



Photo 1



Photo 2



Photo 3



Photo 4



Photo 5



Photo 6

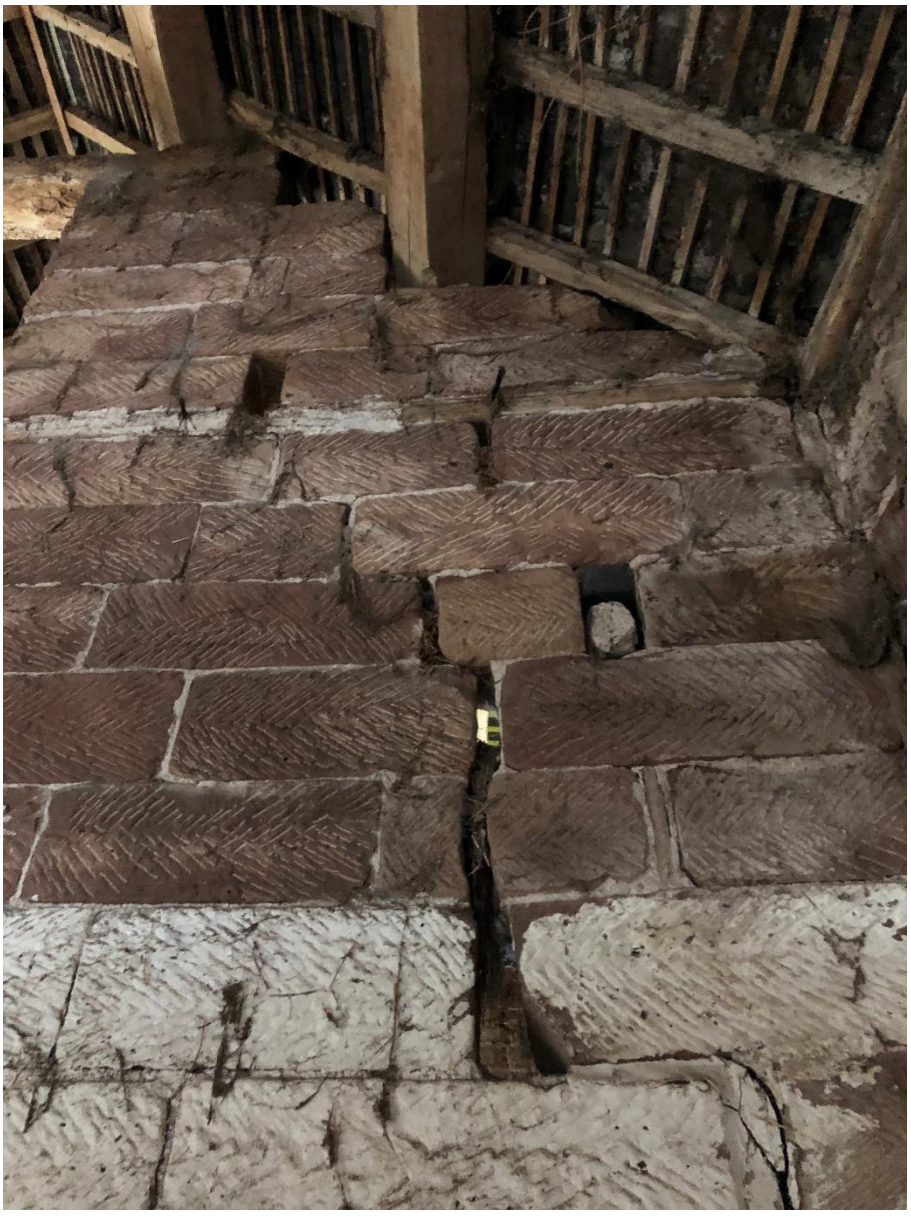


Photo 7



Photo 8