STRUCTURAL INSPECTION

BARN OPPOSITE THE DRAYCOTT ARMS PUBLIC HOUSE
DRAYCOTT ROAD
DRAYCOTT
STAFFORDSHIRE

On Behalf Of:

Mr G Plant

Beech Farm

Teanford

Staffordshire

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01	May 2017	Final	Senior Engineer: Ian Titley IEng AMIStructE

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1. Introduction

1.1. We were instructed by Mr G Plant to carry out a structural inspection of the existing derelict barn on Draycott Road, immediately opposite the Draycott Arms Public House. It is our understanding that Mr Plant plans to refurbish the barn and convert it into living accommodation.

1.2. A visual inspection of this barn took place on Friday 28 April 2017 in cool, dry weather conditions. Mr Plant and his architect were present at the time of the inspection.

2. External and Internal Inspection

2.1. The barn under consideration is approximately 34 x 6m in plan area and is constructed throughout in solid brickwork with a clay tiled roof.

2.2. The barn appears to have been constructed in several stages, and the vertical joints between the different stages of construction are clearly visible externally and can be seen on the photographs contained within the body of this report.





2.3. A large beech tree is present immediately adjacent to the western gable of the barn, and it can be seen that severe damage has occurred to the front corner of this gable.





2.4. The damage noted in 2.3 is attributable in part to the timber lintel over the left hand opening having failed at its left hand bearing. The timber at this point appears to have crushed, causing the brickwork above to collapse downwards.

2.5. Whilst the tree immediately adjacent does not appear to have been the primary cause of the damage to this corner, some root disturbance has occurred at foundation level, which has exacerbated the effects of the timber lintel failure.

2.6. The collapse of the brickwork above the failed lintel has also caused the failure of the roof timbers at this point.

2.7. Immediately adjacent to the right hand eaves of the second of the two large openings at this end of the barn it can be seen that a straight nick joint is present within the brickwork above the lintel. This would be indicative of the last two bays of the barn having been constructed at a different time than the remainder.

2.8. A further straight nick joint is present approximately 4m further along the barn, which coupled with a change in the pitch of the roof at this point is again indicative that this section may have been constructed at a different stage.

2.9. As far as we are aware, the remainder of the barn was constructed as a single unit and the nature of the brickwork would lead us to believe that the larger portion of the barn is the original structure and the two/three bays at the western end are later additions.

2.10. Brickwork was noted as being broken and displaced in the area of the second section of the barn i.e. immediately adjacent to the right hand end of the timber lintels to the two large openings.

2.11. The remainder of the front face of the barn appeared reasonably plumb and in adequate condition, however it was noted that tie bars in pairs had been inserted above door head level in several places along this elevation. We recorded 5 pairs of tie bars, and on looking inside the barn it was noted that these barns were being used to restrain the ends of the original king post trusses. This would lead us to believe that at some time in the past, some roof spread has occurred, leading the owner at the time to insert these ties in order to arrest this movement.





2.12. It was noted internally that a steel lightweight frame had been inserted at two positions in order to provide supplementary support to the roof purlins where the kingpost trusses had failed.



2.13. Notwithstanding the above, when viewed from the outside, the roof line appeared to be in reasonable condition with slight dipping between the trusses and roof frames, but otherwise appeared to be relatively weather proof.

2.14. The exception to this is of course the area where partial collapse has occurred at the south western corner.

2.15. Whilst the foundations were not exposed to allow a full inspection, it should be noted that on the eastern gable and on the northern (roadside) elevation, that the natural rock strata were visible, and it was noted that the brickwork was founded directly on this rock strata. As such, we would not expect any movement at ground level to have occurred.



2.16. The brickwork to the two gables and to the rear roadside elevation appeared to be in reasonable condition, with no discernible signs of movement other than slight flaring of the two gables at the apex. This is fairly common in buildings of this construction, especially where some deflection to the roof purlins and/or rafters has occurred as it is natural for the apex brickwork to be pushed outwards.

3. Recommendations & Observations

3.1. The building has suffered severe movement at the south western corner due to the failure of the lintel spanning over the end opening to the front wall. This movement has been exacerbated by root pressure from the adjacent large beech tree.

3.2. Elsewhere in the building some loose brickwork is present, chiefly towards the western end of the front elevation, but other than this the brickwork itself appears to be in good condition.

3.3. The roof construction has been supplemented by two lightweight steel frames, and this together with the tie bar arrangement would lead us to believe that roof spread has occurred at some time in the past but has been arrested by the provision of these measures.

3.4. Provided that these measures remain in-situ or can be replicated efficiently by means of alternative methods of restraint then we see no reason why the roof coverings need to be removed and replaced.

3.5. There are a few areas where repair is required, but wholesale replacement should not be structurally necessary.

3.6. We understand that it is the clients intention to remove three of the five internal cross walls in order to achieve the room layout that he wishes, and whilst this is not structurally impossible it needs to be noted that the removal of these walls also removes lines of restraint to the front and rear main walls.

3.7. If these walls are to be removed then we would strongly suggest that either a brick pillar is left in at each position or alternatively a wind post is provided again at each position in order to replicate the restraining effects of the cross walls.

3.8. A detail of a wind post is included below.

3.9. With regard to the roof, we understand that part of the roof is to be converted into an open area to allow first floor bedrooms to be accommodated. We do not have detailed drawings of the proposed arrangement but removal of any of the trusses and/or the steel frames will require some strengthening or replacement to the primary purlins.

3.10. We would therefore strongly suggest that any new first floor walls are placed on the line of new ground floor walls, such that they can be constructed off a proper foundation or a thickening in the proposed new ground floor slab. In this way the internal walls will provide valuable support to the roof areas in question. We will be able to re-visit this situation once more details regarding the room arrangements are available.

3.11. The existing floors are concrete throughout, but have no threshold at any of the door levels, and we would strongly recommend that the existing floors are taken up and a new insulated concrete floor slab provided throughout.

3.12. This floor slab can incorporate thickenings at each of the proposed new wall levels internally and also can feature a thickening to the edge to accommodate any new blockwork skin that may be required for insulation and thermal reasons.

3.13. The above floor slab will need to be constructed in such a way that a formal threshold is introduced at the entrance door positions. The floor should also be designed to incorporate insulation either below the slab or on top of the slab sandwiched between slab and sand-cement screed.

3.14. All of the lintels on the existing door and window openings are either in-situ brick arches or timber. Whilst the former does provide some aesthetic value it can be seen that a number of the arches are slightly flattening as you would expect over time.

3.15. In addition the timber lintels are showing signs of rot and beetle infestation. We would strongly recommend that all the lintels to doors and windows require replacement with a proprietary Catnic or similar lintel. This should be incorporated and put into practice once the proposed treatment of the inner skin has been addressed and decided upon.

3.16. To conclude the building appears to be in a reasonably good condition other than the obvious areas of collapse at the south west corner. Should this corner be rebuilt and the other measures listed above put into place, then we see no reason why this building cannot be offered up for conversion into residential accommodation.

3.17. We would request that further details are provided with regard to the first floor in order that we can address this fully, but we are of the opinion that the building is suitable for conversion without wholesale demolition.