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STRUCTURAL APPRAISAL
OF

BARN AT

LOFT SHAY FARM
CLITHEROE ROAD
KNOWLE GREEN
PRESTON
PR3 2YQ

FOR MR. & MRS. STEPHENSON

Project No.: 2016-205
Date: September 2016

Structural Appraisal: Barn at Loft Shay Farm, Clitheroe Road, Knowle Green

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1.0 Introduction

1.1 On the instructions of Mr & Mrs Stephenson, and their agent, ML Planning Consultancy Ltd, a structural appraisal was carried out at the above property on Monday 22nd August 2016.

1.2 The purpose of the appraisal was to assess the structural condition of the barn as part of a planning application to convert the building into a dwelling.

1.3 The barn is considered as one structure, with two catslide elements projecting forwards to the front elevation, which are considered to be later additions. Works have been undertaken to rebuild the front wall of one of these buildings, but it is not a recent alteration. The barn is visible on the 1847 OS map of the area, but only the northern catslide part can be seen.

1.4 Our report should be read in conjunction with ML Planning Consultancy Ltd drawing for the project, LF/GS/1130P.

1.5 This report is based on a visual inspection of relevant and readily accessible areas of the property only, carried out from ground level externally and internally.

1.6 This report comprises a structural survey only and does not cover specialist areas such as timber, damp or drainage surveys.

2.0 Findings

2.1 Generally

2.1.1 The subject building is a large barn primarily of stone construction, under a duo-pitched profile sheet roof, with two single storey elements forming cat-slide roofs with the main barn. It occupies a level site to the east of Loft Shay Farm house and is set well within the farm curtilage, accessed via a surfaced drive from the road.

2.1.2 The barn was being used for general storage at the time of inspection.

2.1.3 The property has been in the ownership of our clients since 1981, and during that time, no works have been done to the barn in terms of remedial works, alterations or repairs.

2.2 External Observations

2.2.1 The front of the barn faces south west, towards the farm house. The barn sits under a profiled sheet roof, which pitches from front to back. The ridge and eaves lines are level and the covering to the roof is free from undulations or depressions, which may otherwise indicate shortcomings in the structure below. The roof projects over the large barn door in the center of the elevation, however its timber eaves beam is suffering from wet rot at its northern most bearing. Rainwater goods are present across the eaves lines, but they are in poor condition.

2.2.2 The barn is primarily of random, rubble stone construction, which is generally considered to be in good condition, despite some weathering of the mortar joints. The front elevation of the southern single storey element has been reconstructed in concrete blockwork, but in the absence of any render covering, the mortar joints and the face of the blocks are well weathered.

2.2.3 The large barn door opening is formed by a very shallow arch of stone voissours, with a keystone at the apex. There is an arched timber below, but this is considered to simply give fixity to the door, rather than be a lintel. The two window and pedestrian door opening each have concrete lintels over, suggesting all to be a more modern insertion into the masonry. Despite the front elevation masonry to the southern outrigger having been constructed in blockwork, the side elevation adjacent to the barn door opening, remains as stonework, and the two panels of masonry have been bonded together.

2.2.4 The random rubble stonework to the north western gable of the barn is very weathered, however despite this, there are no specific lines of enlarged mortar joints and the elevation remains to be plumb. The timber purlins project through the stonework, and each is visibly suffering from wet rot. There are three pedestrian doors at ground level, each with sandstone jambs and lintels, apart from the eastern most opening where the lintel has been replaced with a concrete section, permitting the opening height to be raised. A lintel from the adjoining building has been cut into the quoins of the stone barn, and the quoin below has been damaged presumably when these openings were formed / altered.

2.2.5 The south eastern gable has been offered a good deal of weather protection, in recent years at least, by the addition of a modern portal framed building. The pointing to the elevation remains to be flush, having not been weathered, and it is generally plumb and free from structural defects. A second, modern building has also been constructed against the rear elevation, with its blockwork having been crudely cut into the stone quoins at the end of the stone barn. The valley gutter between the two roof pitches has failed and water has been able to pour down the face of the stonework for some considerable time, permitting the growth of algae and the deterioration of the mortar. At the other end of the gable, although the side of the cat-slide extension is also of stone construction, a line of enlarged joints is evident where the two panels of masonry have been joined. Although the

workmanship is not particularly high quality, there is no evidence that the two parts of the barn are parting company. Although the door has been infilled, the pedestrian opening to the side of the cat-slide extension has a stone lintel over

2.2.6 The rear elevation of the barn has also been offered a good degree of weather protection by the adjacent building. Unfortunately, this building obscures the roof of the stone barn from view, so no comments can be made about the rear pitch. The elevation has a large arched opening similar to that on the front elevation, but it has been infilled with stonework, however a smaller pedestrian door has been formed next to it, the formation of which has damaged the quoins at the reveal of the opening. The masonry to the elevation remains to be plumb and free from structural defects.

2.3 Internal Observations

2.3.1 The roof of the main part of the barn is supported on three lines of timber purlins per pitch, which in turn bear onto the respective gable walls and two timber queen post trusses. The purlins were noted to be slender in terms of section sizes, but conversely the trusses are generous, even for the greater load of slates which they would originally have been subjected to. Whilst close inspection of the timbers was not possible; from ground level, they do not appear to be suffering from any wet rot or excessive wood boring insect damage.

2.3.2 The internal wall is of brickwork construction and extends to the underside of the partial first floor only, with the joists to that floor being supported off the front and rear elevations and two perpendicular beams. This brickwork has not been bonded into the inner face of the front or rear elevation walls, however there is no evidence of movement between them.

2.3.3 The ground floor walls below the first floor have been rendered, however there is nothing in this area, or the remainder of the internal aspects of the barn which is indicative of structural movement. A little cracking was noted below one of the bearings to the trusses, however this is relatively minor and not of significance at this time.

2.3.4 Although the barn door opening to the rear elevation has been infilled, as noted externally, the quoins to one side have been disturbed in creating the adjacent pedestrian door, so much so that the lower quoins will need replacing in order to reform this opening.

2.3.5 An insitu concrete floor is present throughout the barn.

3.0 Conclusions and Recommendations

3.10 From the findings summarized previously it is apparent that generally this barn remains to be in very good condition. Whilst there are some localized short comings such as where the building has been extended or tacked onto, on the whole, it remains to be structurally competent.

3.11 Some areas of rebuilding will be inevitable at those junctions where the barn has been extended, however these are considered primarily to be limited to each end of the south east facing gable where the outrigger has been tacked on, and where the modern blockwork has been tied in. At the junction with the outrigger, rebuilding can be kept to a minimum and most likely done as part of the repointing exercise, however being conservative, we would estimate that an area of $2m^2$ of rebuilding should be allowed for. At the other end, where the blockwork has been bonded in, the modern building is to be demolished and so the blocks should be carefully removed, once the gable is adequately propped, and then reinstated with stone quoins, bonded into the rear elevation of the barn. Again, being conservative, we would recommend that an area of $3m^2$ be allowed to be rebuilt. Although there is little in the way of rebuilding warranted, repairs will be needed to the north western gable where the lintel has been inserted from the adjoining building, again which is to be demolished. The same can be said for the reveal to the rear elevation barn door opening, where a only a localized repair is warranted due to the formation of the adjacent pedestrian opening.

3.12 The roof structure of the barn is in good condition, however in order to permit the insertion of a formal first floor, the queen post trusses will have to be lost. We would therefore envisage a new steel ridge and purlins spanning between the gable walls and onto the internal load bearing wall. The timber eaves beam to the projecting roof over the front elevation barn door will also have to be replaced. This would preferably be a steel section, which could be clad in timber, but a suitably designed timber section could be provided if necessary.

3.13 Given the size of the barn, it is considered that although the internal wall does not go beyond first floor level, and being brickwork has not been bonded into the front and rear elevations, it will have offered a good degree of lateral stability into the building, and should therefore be retained. The new first floor wall above should continue in solid masonry, which will serve to enhance the later stability of the barn and provide points of support for the new roof structure.

3.14 It is envisaged that the new first floor will be of timber construction, which would be supported off the external walls and internal load bearing walls, with a steel beam supporting the joists over the living area. With the external walls being in good condition, we do not deem it to be necessary to block line this walls, but the required insulation could be accommodated within a dry lining system.

3.15 Although the arched opening to the rear elevation is not visible externally, the arch is very shallow and although no cracking was noticeable internally, it is therefore more prone to failure than a tighter radius arch. Given that the opening has been infilled, we would recommend that the contractor be cautious when reforming the opening that none of the voissours or keystone have the opportunity to move.

3.16 Considering the barn generally, it is envisaged that the blockwork to the front elevation of the southern outrigger would need to be repointed as part of a general repointing exercise, prior to the application of render. The stonework should be repointed with a suitable lime mix, once the returns with the buildings which are to be demolished have been repaired

3.17 Whilst there is nothing to suggest any shortcomings in the substructure of the barn, we would recommend the excavation of trial holes to establish the level of the existing foundations. This will require exposing not only to confirm compliance with current Building Regulations, but also to ensure that there is sufficient depth below ground level to accommodate a new insulated ground bearing slab. Any shortcomings will need addressing by means of underpinning.