Visual Structural Survey of the Barn Timber Roof Structure at 87 Studley Lane, Calne, SN11 9NH

Report: 2324-R01
Revision: A

August 2023

Client: Bowood Estates

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6 High St, Devizes, Wilts, SN10 1AT t: 01380 724 213 f: 01380 721 753 e: team@mlde.co.uk w: www.mlde.co.uk

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1.0 Brief and Scope of Work

MLDE were commissioned by Marcus Lee, on behalf of Bowood Estates, to provide a visual structural condition report on the timber and thatch roof structure of the adjoined barn element belonging to 87 Studley Lane, Calne. Items not noted or commented upon within this report have not been inspected or reviewed.

The purpose of this report is to advise on the current condition of the timber roof frame and surrounding structure in order to determine the need for any intervention to maintain the listed building fabric of the thatched cottage.

The inspection of the building consisted of a number of visits to the property to carry out a systematic structural review of various aspects, all of which were carried out from ground level only. No opening up works took place and the inspections were non-invasive in nature and therefore it is possible that some defects may not have been identified or disclosed during the survey. This consisted of a visual review of the visible structure only. No other items were considered beyond the primary structure. Mechanical and Electrical installations, etc. should be reviewed and commented upon by an appropriate specialist where necessary. Any comments made within this report, outside the scope of the main visual structural survey, have been made in passing only and do not constitute that they have been inspected.

The inspections were carried out across a number of visits, most recently on the 13th May 2022 in bright conditions. This report has been produced for the private use of the Client and their agents, and cannot be sold or copied to a third party without the prior written permission of MLDE.

2.0 Overview

The building in question is a small thatched cottage with an adjoining barn element in the centre of the village of Studley, approximately two miles West of the centre of Calne. The building was given the status of a grade two listing in July 1986 but is believed to have been constructed at some time in the 18th century.

A coherent simple thatched roof covers the entire building, supported on a timber frame below, which is believed in the barn portion to have been replaced in it's entirety at a time shortly before the property was listed. Rubble stone walls support the timber frame, with a central partition wall, housing a large fireplace, dividing the building into the main house and a separate smaller barn/garage area. The property is one and a half stories high, with a small wooden mezzanine to the barn side allowing for closer inspection of the timber roof structure.

The nature and form of the roof structure are limited in design quality. In an attempt to increase the usable height within the barn space, a low-level tie between the base of the rafters was never included. This results in unresolved forces acting at the bearing points of the rafters, generating a thrust force on the rubble stone walls.

The perimeter side walls are inherently laterally weak due to the linear nature of the structure and have little structural capacity to support any outward thrust loading from an unresolved roof structure.

In several places, most notably in the "restrained" corners of the spaces, the walls on which these rafters bear have been displaced outwards and caused fracturing of the stonework bonding. The level of damage within the walls will continue to increase as the timber roof structures suffer from ongoing creep deflections, imparting a greater outwards thrust force on the walls and an increased level of damage to the building as a whole.

This issue of large displacements is not so apparent within the main house area of the building, as the increased number of cross walls provide greater support for the roof structure.

Large cracks are visible in these walls below the main supporting timber beams of the half height mezzanine within the barn. As the stone is restrained by the mezzanine in these areas, it is now beginning to separate from the rest of the wall which is slowly progressing outwards as the thrust on the walls increases. These zones of the walls need to be consolidated.

3.0 Summary and Conclusion

It is very structurally apparent that the lack of resolution of forces within the roof structure of this thatched barn is having a detrimental affect on the condition of the rubble stone walls and supporting structure as a whole. The current load path and structural resolution of the forces within the building needs to be limited in manner to minimize the magnitude of outward thrust of the roof structure applied onto the supporting walls.

In order to mitigate the current structural limitation within the current timber roof structure, it is proposed to add a steel armature which will directly pick up the current vertical dead loads of roof along the ridge zone. The addition of this armature will remove the resultant dead load lateral thrust force applied onto the wall structure.

Provided these thick section rubble stone walls are primarily solely loaded axially, the ongoing lateral displacement of the walls will be very limited. Some slight secondary ongoing outward movement of the walls will inevitably take place as generically shallowly founded thatched buildings do naturally suffer from this. Uncontrolled water run off from the roof covering causes damage to the substrate around the base of the structure. The water run off issue is a fundamental problem for all buildings of this type of construction, unless hard pavings collect and direct the roof water away from the perimeter of the walls.

The proposed insertion of a steel armature to limit the damage to the current timber roof structure is believed to be the least intrusive intervention. This will ultimately resolve the primary structural problem currently present in the poorly designed roof and will not require the removal or damage of any listed fabric.

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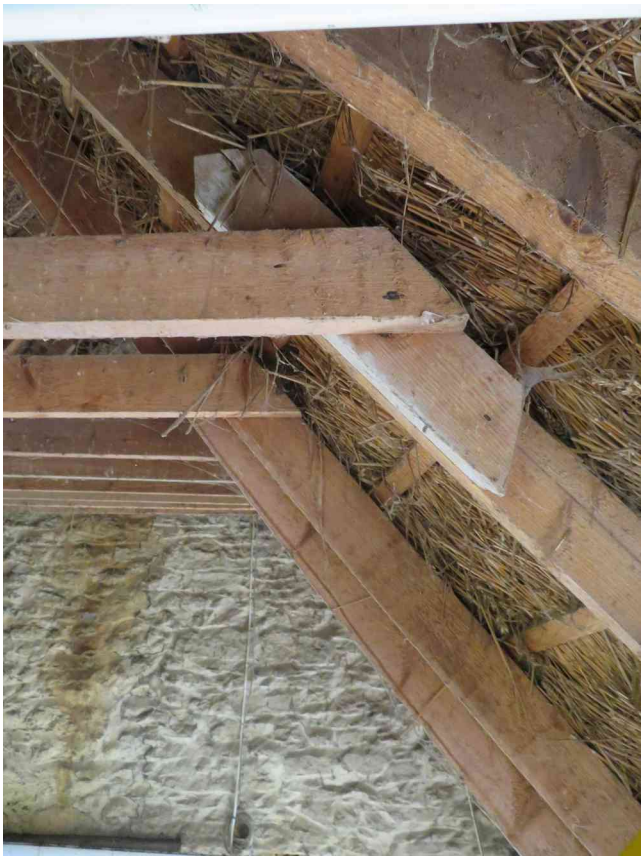


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