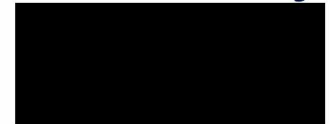




STRUCTURAL ENGINEERS

[CONSULTING CIVIL & STRUCTURAL ENGINEERS]



L-22035.001

25th August 2022

Mark Benns
Paul Bancroft Architects
80 South Rd,
Oundle,
Peterborough
PE8 4BP

Dear Mark,

Re: The Manor House, Polebrook

1.0 Introduction and Brief

Further to your instructions we confirm having visited the above property to undertake a visual structural inspection and report on the duo-pitched roof located over the southern half of the dwelling. We have attached building floor plans in Appendix C that cover the building layout and room names.

External inspection of the building has been carried out from ground level by visual or optical sighting.

The internal inspection was made within the limits of ready accessibility and any parts that were covered, unexposed or inaccessible were not inspected.

We offer the following comments for your consideration.

This report is to be read in conjunction with our "Limitations of Structural Inspection" a copy of which is enclosed.

2.0 Description of the Site and Local Geology

The property is formed with squared coursed Limestone walls. The duopitched roofs are formed with cut timbers and timber trusses clad predominately in Collyweston Slate. The property dates to the 17th Century and is grade II listed.

Inspection of the British Geological Survey Map of the area suggests that the local topography consists of Kellaways Sand member. From online borehole records local to the site we anticipate near surface naturally deposited soils will comprise sandy Clays.

3.0 Observations and Investigations

The damage category of cracks is referenced in accordance with BRE Guidance 251: Assessment of damage in low rise buildings. The damage categories are explained at the end of this report in Appendix A. We have included photographs to this report in Appendix B highlighting the points raised in the following, additional photographs were taken and can be provided upon request. Floor plans from survey information are included in Appendix C.



As can be seen from the adjacent images and those in the photographic index the cut roof is in a poor state of repair. The purlins are undersized and angled to the roof pitch promoting significant levels of deflection and roof thrust at eaves level

There is significant rot and infestation in the timber members. The bottom image also indicates the ceiling joists are overstressed and the deflection in the tonged and grooved boarding is visually evident.

Some new timbers have been introduced to the southern end of the roof void where the ceiling level is raised. Steel "L" straps have also been installed to tie the southern gable to the cut roof members.



We understand that as part of proposed refurbishment works that the Collyweston slate is scheduled for removal to facilitate repairs, introduction of breathable membrane and insulation prior to re-slatting with reclaimed Collyweston slate. As this is the case, we recommend that new timber purlins be installed alongside the existing and located vertically about their stronger axis. New trusses can be formed either side of the existing to support the new purlins and additional rafters can be installed between the existing to close centres.

New ceiling joists or proprietary Posi Joists or similar can be designed and installed to span from flank wall to flank wall to form the new floor deck suitable to support loads associated with habitable space. These can be installed alongside the existing ceiling joists if required.

There are new stud walls proposed as part of the remodel for habitable space within the roof void. These can be locally strengthened together with the new floor joists under to offer intermediate support to the new purlins and reduce the applied loads onto the new trusses.

4.0 Conclusions and Recommendations

As noted, it is our opinion the timbers within the section of roof inspected have suffered loss of section through rot and infestation. The purlins are angled to the slope of the rafters, as such they are working about their weaker axis and have suffered significant levels of deflection causing thrust and wall rotation at eaves level.

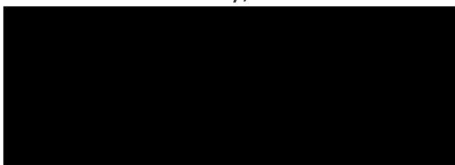
As it is proposed that the Collyweston slate is scheduled for removal to facilitate repairs, introduction of breathable membrane and insulation prior to re-slating with reclaimed Collyweston slate now is the time to introduce new roof timbers to strengthen and enhance the structural integrity and stability of the cut roof.

We recommend the following works be considered following removal of the Collyweston slate.

- Install new timber purlins about their vertical axis built into the gable walls and supported from new strengthened truss members that flank the existing.
- Provide timber wedges from the purlin to the existing rafters to offer full support.
- Provide new timber rafters along side the existing, where the existing have been subject to loss of section due to rot and infestation, birdsmouth new rafters on to purlins and wallplates.
- Have a specialist inspect and treat the timbers as required to ensure new timbers are not affected.
- Install new floor joists/ Posi joists to span from flank wall to flank wall to provide new floor deck suitable for habitable loading.
- Utilise the new stud walls and floor joists to split the span of the purlins and reduce loads onto the new truss members.

We trust this brief report is of assistance however should you have any points requiring clarification then please do not hesitate to contact our office.

Yours sincerely,



A J WEBB. B.Eng (Hons), C.Eng, M.I.Struct E.
for SEA Structural Engineers Ltd

Appendix A

BRE Digest 251: Assessment of damage in low-rise buildings

Six categories of crack are identified, which linked the width and number of cracks to the type of repair that was appropriate.

Damage categories with descriptions of typical damage. Ease of repair in italics.

0 - Hairline cracks of less than about 0.1 mm which are classed as negligible. No action required.

1 - Fine cracks that can be treated easily using normal decoration. Damage generally restricted to internal wall finishes; cracks rarely visible in external brickwork. Typical crack widths up to 1 mm.

2 - Cracks easily filled. Recurrent cracks can be masked by suitable linings. Cracks not necessarily visible externally; some external repointing may be required to ensure weather-tightness. Doors and windows may stick slightly and require easing and adjusting. Typical crack widths up to 5 mm.

3 - Cracks that require some opening up and can be patched by a mason. Repointing of external brickwork and possibly a small amount of brickwork to be replaced. Doors and windows sticking. Service pipes may fracture. Weather-tightness often impaired. Typical crack widths are 5 to 15 mm, or several of, say, 3 mm.

4 - Extensive damage which requires breaking-out and replacing sections of walls, especially over doors and windows. Windows and door frames distorted, floor sloping noticeably. Walls leaning or bulging noticeably, some loss of bearing in beams. Service pipes disrupted. Typical crack widths are 15 to 25 mm, but also depends on number of cracks.

5 - Structural damage that requires a major repair job, involving partial or complete rebuilding. Beams lose bearing, walls lean badly and require shoring. Windows broken with distortion. Danger of instability. Typical crack widths are greater than 25 mm, but depends on number of cracks.

In general, categories 0, 1 and 2 with crack widths up to 5 mm can be regarded as 'aesthetic' issues that require only redecoration. Categories 3 and 4 can generally be regarded as 'serviceability' issues, that is, they affect the weathertightness of the building and the operation of doors and windows.

Category 5 presents 'stability' issues and is likely to require structural intervention.

BRE Digest 251, and in particular the table above, is now used widely in the industry as a way of categorising cracks and determining whether any intervention is necessary.

It should be stressed that these comments are a simplification of the assessment needed to properly classify damage to housing. Several factors, including whether the widths of the cracks are increasing with time, can affect the classification. BRE Digest 251 should be consulted when carrying out any assessment and a building professional should be consulted where damage is significant.

Appendix B
Photographic Index

1. Significant loss of section.



2. Undersized purlins deflected under applied loads.



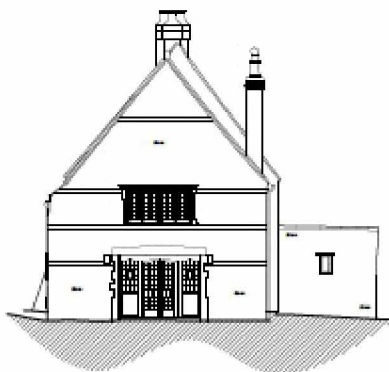
3. Purlins and rafters to southern end in better condition with L straps to gable



4. Existing trusses with rot and infestation.



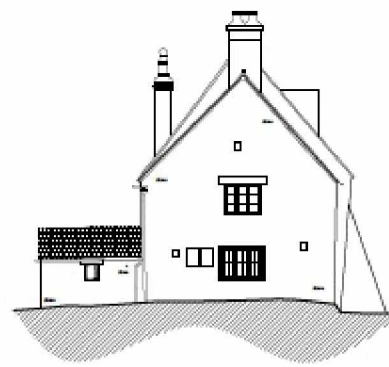
Appendix C
Floor Plans – Area within red box inspected



SOUTH ELEVATION
1:100



EAST ELEVATION
1:100



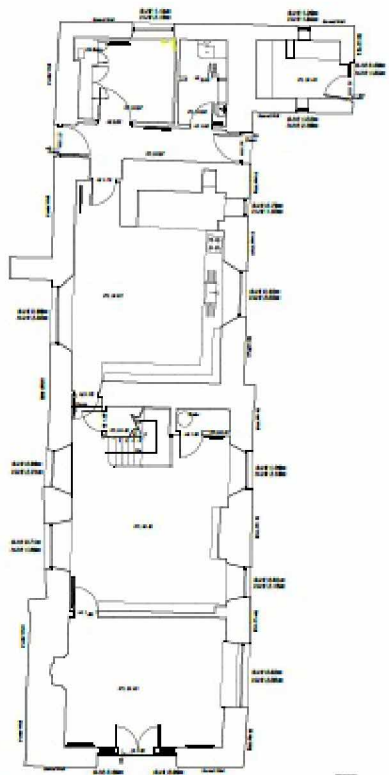
NORTH ELEVATION
1:100



WEST ELEVATION
1:100

Strip existing Collyweston roof, carry out structural repairs and fit breathable membrane with insulation before re-slating with the reclaimed Collyweston slate.

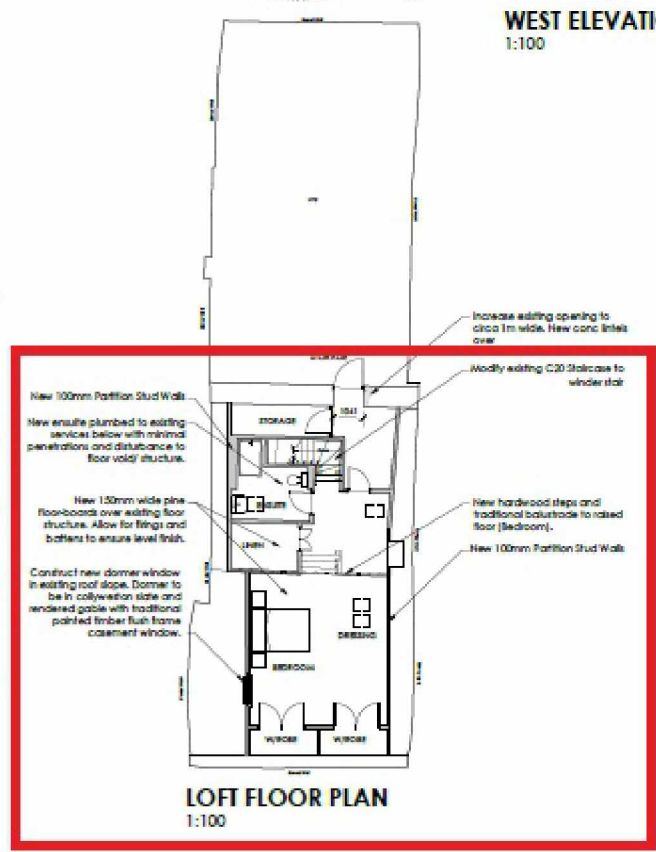
Construct new dormer window in existing roof slope. Dormer to be in Collyweston slate and rendered gable with traditional painted timber flush frame casement window.



GROUND FLOOR PLAN
1:100



FIRST FLOOR PLAN
1:100



New 100mm Partition Stud Walls.

New ensuite plumbed to existing services below with minimal penetrations and disturbance to floor joist structure.

New 150mm wide pine floorboards over existing floor structure. Allow for fittings and battens to ensure level finish.

Construct new dormer window in existing roof slope. Dormer to be in Collyweston slate and rendered gable with traditional painted timber flush frame casement window.

Increase existing opening to circa 1m wide. New conc. lintel over.

Modify existing C20 Staircase to winder stair.

New hardwood steps and traditional balustrade to raised floor (Bedroom).

New 100mm Partition Stud Walls.

LIMITATIONS OF STRUCTURAL INSPECTION

GENERAL

This report is confined to an inspection of the structural elements of the property only. Therefore, the report excludes any inspection or comment on Timber Infestation, Methane/Radon, contamination, electrical and mechanical installations, decorative conditions, damp proofing, non-structural timber fixings, fittings, mouldings, coverings, and all other non-structural matters. This report does not constitute a full structural survey, but we would be pleased to carry out this if so instructed.

METHOD OF INSPECTION

External inspection of the building has been carried out from ground level by visual and optical sighting. This method means that parts of the structure may be incapable of inspection, and we cannot confirm that they are free from defect. Special arrangements (where practicably possible) would need to be made before inspection of these areas could take place.

ROOF STRUCTURES

It should be noted that roofs and roof timbers can be subject to deterioration, and it would be necessary for you to make specific arrangements for the inspection of this area if you require confirmation about the condition.

UNEXPOSED PARTS

Internal inspection is made within the limits of ready accessibility, and it is not normal practice to lift floor coverings or floorboards, remove panels or plaster, or move heavy items of furniture. Consequently, we have not been able to inspect woodwork or any other parts of the structure which are covered, unexposed or inaccessible and we are therefore unable to report that any such part of the property is free from defect. Such unexposed parts may contain problems and you will need to make special arrangements for these areas to be investigated (where practicably possible) if you require confirmation about their condition.

FOUNDATIONS

Foundations were not inspected.

FOUL AND SURFACE WATER

Subsurface drainage was not inspected.

STATUTORY REQUIREMENTS

Enquiries with local or statutory authorities have not been carried out. Whilst attention may be drawn to any apparent breaches of statutory requirements relative to the building or site, the absence of any such comment does not imply compliance with such regulations.

TREES AND SHRUBS

Where trees and shrubs in close proximity to the property have been identified as a possible cause of the structural movement or defect we have made recommendations as to removal or management of these trees and shrubs, tree species identified within this report should not be relied upon for the design of foundations. We do, however, recommend that advice be sought from a qualified Arboriculturist registered with the Arboricultural Association on the species of trees and shrubs, in particular water demand, and the need for tree removal/shrub reduction or removal, prior to any action taken on our recommendations. Tree species noted are assumptions and must be confirmed by a suitably qualified Arboriculturist.

DISCLOSURE TO A THIRD PARTY

This report may not be relied upon by a third party for any purpose without the written consent of this practice. Furthermore, this report has been prepared and issued specifically for the benefit of the addressee and no responsibility will be extended to any third party for the whole or any part of its contents.