PCC Consultants

The Annexe,
11 Meadow Lane,
South Hykeham,
Lincoln LN6 9PF

T 01522 695 540
E info@pcoleconsult.co.uk
www.pcoleconsult.co.uk

Structural Engineers Inspection

Agricultural Barn
Red House Farm
Main Street
Brothertoft
PE20 3SW

PCC Document Management	
Job Number:	10397
Date of Issue:	February 2021
Author:	Peter Cole

PCC Consultants Ltd. is registered in England and Wales No. 07668238.
Registered Office: Holly House, Meadow Lane, South Hykeham, Lincoln LN6 9PF

Contents

1 INTRODUCTION

1.1 Instructions

I have been instructed by Origin Design Studios, on behalf of Mr and Mrs Robinson, to undertake a structural engineer's inspection of the barn located at grid reference: TF 27434 46142, Main Road, Brothertoft, PE20 3SW. The survey is to identify if the barn structure is suitable for conversion to residential use.

1.2 Basis of Report

This report has been prepared from visual observations made during the course of a structural engineer's walkover survey which was carried out on 5 February 2021. At the time of the inspection no monitoring, long term investigation or testing of the materials of construction had been undertaken and no trial holes excavated to confirm ground conditions or the configuration of existing foundations.

1.3 Report Limitations

This report does not constitute a full structural survey and does not contain information normally dealt with in a surveyor's report. Specifically excluded from this report are the following aspects:

1. The decorative condition of the property.
2. The property location and valuation.
3. The condition of wall, floor and ceiling finishes, coverings and insulation.
4. The condition of services.
5. The condition of external drives, patios, slabs or the like.

This report is a non-destructive visual inspection only and as such I am not in a position to comment upon any latent defects or defects not readily identifiable from a walk over inspection of the building. I have not inspected any inaccessible voids nor carried out an inspection of drains or the like.

1.4 General Description

The building is located on a flat, level site, approximately 7 kilometres to the north west of Boston. The building originally was in two parts, an open sided barn or cart shed and an enclosed brick-built storage barn. The walls of the barn are formed in solid nine-inch brick masonry. The roof to the cart shed failed and collapsed following a storm in November 2020. To make the building as safe as possible Mr Robinson ensured thar the roof timbers to the cart store were made safe by lowering these to the ground.

The intact enclosed storage building has two well formed brick arch opposite each other on the east and west walls. These form interesting architectural features and should be utilised within the proposed conversion.

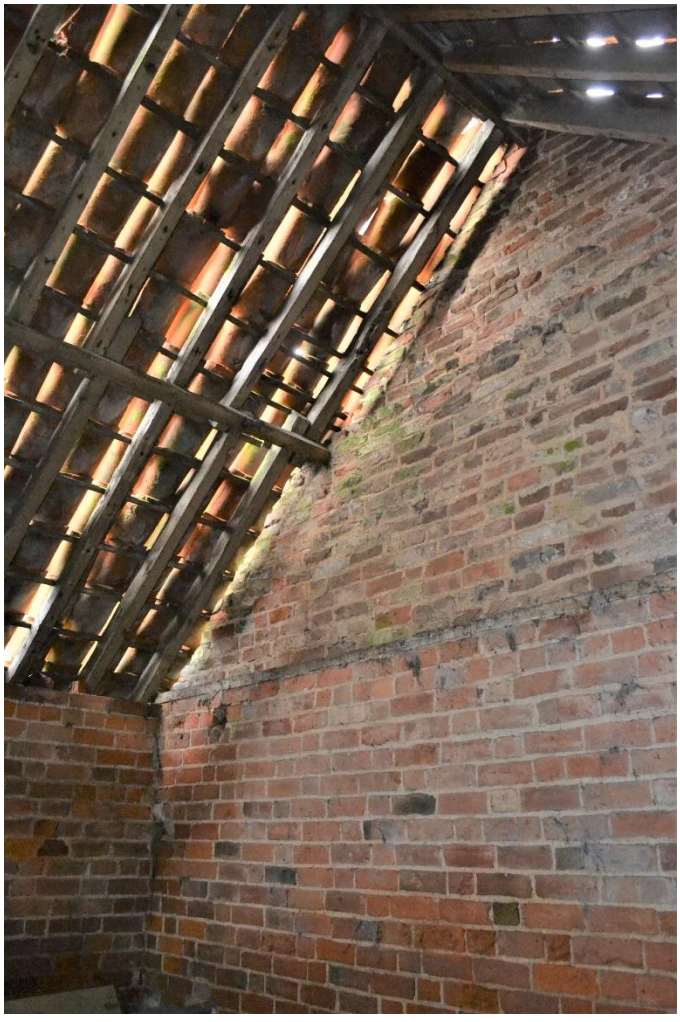
The original enclosed store barn dates back to at least 1889 and is shown on the 1:2500 Ordnance Survey Map, and by 1905 the barn had been extended to include the cart store and formed a typical U-shaped range of buildings. We include in Appendix 1 of this report an extract from the 1905 Ordnance Survey map showing the U-shaped barn in its original form, circled in red. The eastern wing of this range of buildings is now longer present but was present up to 1976. This would therefore indicate that the barn is of some architectural and heritage interest, and renovation to form a dwelling would appear to have significant conservation merit. There is even an argument that the building could be extended to form the original U-shaped range of buildings that was evident until, at least, 1976.

The overall impression is that the building is in good condition and shows no indication of significant structural movement or distortion.

2 STRUCTURAL OBSERVATIONS

2.1 Roof Construction

The pitched roof construction to the enclosed store area is formed in rafters, with collars providing lateral support to the wall plates and preventing roof spread. As with all timber roof structures on traditional barn buildings, it will be necessary to undertake repairs to the roof members as these are usually affected to some degree by rot and wood boring beetle infestation. The roof should be stripped of the existing covering of pantiles and battens. The wall plates rafters and purlins and ties should be checked for evidence of rot or infestation. Any areas where rot or infestation has caused a loss of structural capacity will require splicing, or in extreme cases, replacement. All timbers should be treated to give long term resistance to rot and infestation.



Subject to the repairs outlined above, the roof structure appears to be sufficiently robust to support allowances for snow loading and dead loads including existing pantiles and to support new loading required for the conversion. This includes new dead loads including standard services, insulation, and new internal finishes. It is

observed that the stability and robustness of the roof has been proved as the roof has been in place for 130 years.

The cart shed roof may be reconstructed in a form that replicates the original construction. Use should be made of construction forms used extensively during the late Victorian building for agricultural buildings such as hardwood timber beams for the bam above the open northern elevation, circular steel or hardwood post supports and tied rafters of king-post trusses supporting purlins and rafters.

2.2 Walls

Despite the fact that the northern section of the building is an "extension", both the original part of the building and the extension date back over 130 years, and the "extended" building is shown on the historic map in Appendix A.

The primary load-bearing structure is formed from nine-inch solid masonry with additional reinforcing return wall within the building, dividing the structure into a cellular form.

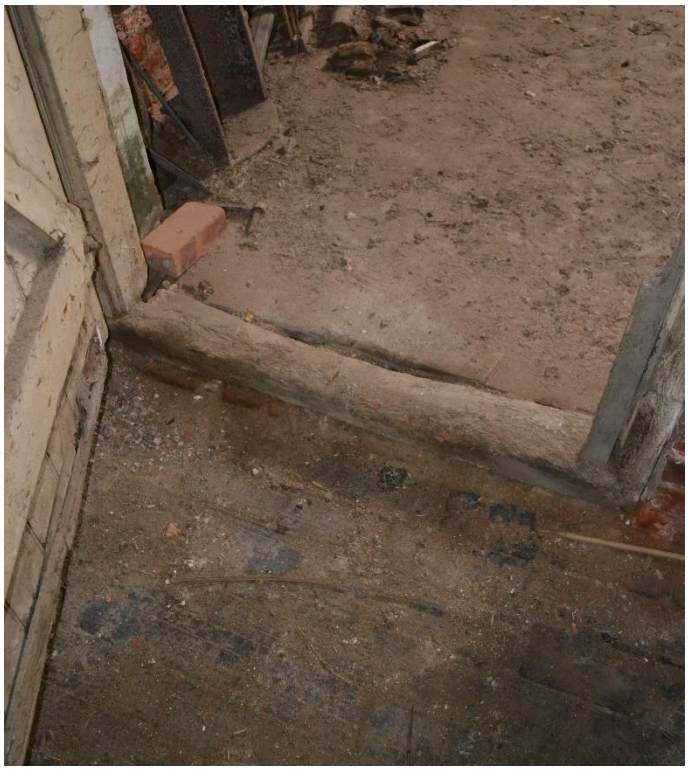
In general, the brickwork appears to be in good condition, showing no obvious evidence of any significant structural movement, although some minor fracturing has occurred and there is some relatively minor misalignment of the southern gable wall. These minor fractures may be repaired by the repointing work that is necessary due to weathering of the masonry. Some bricks have eroded more significantly and should be replaced. This is normal on a barn of this age where the occasional brick is more porous and less resistant to saturation and frost damage. The good condition of the brickwork is exemplified by the

internal view of the south facing arched door opening included within the text. There is no "springing" of the arch and the chamfered bricks forming the piers either side of the door show a high standard of construction.

Repair to the northern gable wall will be required where this was damaged when the cart shed roof collapsed. It is observed that the collapse was due to the poor condition of the roof as a result of rot and infestation of the timbers and through no failure of the walls or foundations of the original building. We include within the text a photograph of the building prior to the failure of the roof. The projecting buttresses that formed the northern wing of the U-shaped barn should be re-modelled as piers to provide a stable and robust form to the northern end of the east wall.

2.3 Floor Construction

The existing floor may either be broken out and re-constructed or left in place as I understand that it will be necessary to raise the floor level due to flood risk considerations. If the floor is raised it may be advisable to raise the external level to prevent retaining wall loading to the brick elevations. The existing floor will act as a suitable base to support a new floor including insulation, hardcore fill and a concrete slab.



3 GENERAL COMMENTS, RECOMMENDATIONS & CONCLUSIONS

3.1 General Comments and Recommendations

Notwithstanding the fact that this building has suffered general exposure and deterioration over a period of time, it is apparent that the external walls are in good condition and display no obvious evidence of major structural movement, except where affected by weathering or impact damage. Any minor fracturing may be repaired by normal re-pointing.

The roof structure may have suffered from rot and infestation. It will be necessary to examine the roof timbers when the roof is stripped to determine what repair work will be required. Splicing and supplementing the existing timbers should be undertaken where necessary.

3.2 Conclusions

It should be appreciated that this report has been prepared from a single visual inspection of the property and that I have not at this stage undertaken any monitoring, long term investigations or testing of the materials of construction. However, this barn is considered suitable for conversion to residential use and displays no obvious indication of ongoing or progressive structural movement. The external envelope of the building primarily is robust and, although some areas of reconstruction to the walls are necessary, and the roof to the cart shed must be reinstated, the building is suitable for conversion.

P J Cole BSc CEng FIStructE MICE
PCC Consultants Ltd
Chartered Structural Engineers

February 2021

Signed: _____
On behalf of PCC Consultants Ltd

27 February 2021
Date: _____

4 APPENDICES

4.1 APPENDIX 1 – Historic Map

59
14·761

58
12·887

67
17·803

63
1·170

60
10·282

57
12·340

61
13·963

56
8·237

48
2·215

Brothertoft Hall

62
25·716

54
28·229

Grave Yard

Church
50
·829

Sunday School

53
·118

Lodge

Pump

Peart's Farm

52
·766

62
·530

Vicarage

B.M.11·6

33
·739

51
5·870

Brothertoft

37
20·594

35
10·258

34
10·582

B.M.10·1

Pump

OS County Series: LINCOLNSHIRE 1:2,500 1905

4.2 APPENDIX 2 – TERMS & CONDITIONS

Structural Engineer's Survey and Report

1. The structural engineer shall mean the director or employee of PCC Consultants Ltd who undertakes the inspection of the property.

2. The property shall mean that building that is to be inspected and shall include all external walls retaining structures and solidly constructed outbuildings. It will not include timber sheds, substantial ranges of derelict barns or the like, swimming pools, ornamental ponds, paths, drives or patios.

3. The report is intended for the sole use of the client mentioned in the introductory section of the report, their mortgage company and their insurance company. The report must not be reproduced or transferred to any third party without the written consent of PCC Consultants Ltd. PCC Consultants Ltd may agree that the report may be re-issued to a third party within six months of the date of the original inspection subject to an administrative fee. Beyond six months, a re-inspection of the property will be required which will attract a full inspection fee.

4. We reserve the right to refuse to issue copies of our report to third parties, other than those named in paragraph 3 above. We reserve the right to vary the conclusions should further information be revealed or become available at some future date.

5. The scope of the report will be defined in Section 1. The report will not cover the condition of the DPC, dampness and condensation or the condition of the timber elements of the property with regard to rot or infestation. The report does not cover those aspects covered in a full survey and excludes the condition of wall floor and ceiling finishes, window and door frames, decorations and building services including gas, water, electrical and drainage services.

6. A structural engineer's inspection and report is usually required because a general surveyor or property purchaser has identified structural movement, fracturing or other defect which has caused concern. The inspection will focus on the building structure only and will include an external and internal inspection of roof voids (where adequate and safe access is available), the load-bearing walls, and floors. The inspection will

be restricted to visible parts of the structure and any heavy items of furniture and carpets or other fixtures and fittings will not be moved or removed.

7. The structural engineer will not remove plant growth from external walls and will advise the client where plant growth restricts the inspection.

8. During the process of undertaking repairs or alterations, or as a result of more extensive investigation, further defects may be encountered that could not have been identified by a non-intrusive investigation. We reserve the right to alter the conclusions of this report in the light of such discovery.

9. Should we observe or become aware of any significant defect that falls outside the scope of our report, we are required, by the Institution of Structural Engineers Code of Conduct, to comment on the defect. If we do identify such defect, this does not imply any requirement upon us to evaluate the financial costs or implications of such observations and will be included in the report with a note to indicate that the defect "is not included within the scope of our report". It is then the responsibility of the instructing client to make any further investigations that are required to evaluate the costs of any further surveys, investigation or repairs that may be required. This requirement does not imply that the scope of our report extends beyond the scope stated in section 1 of this report or the terms and conditions set out above.