w www.jcconsultancyltd.com
e info@jcconsultancyltd.com

Boston Office: 01205 317540
Morgan House, Gilbert Drive, Boston, Lincolnshire, PE21 7TQ

Louth Office: 01507 601214
Meridian House, 41 Eastgate, Louth, Lincolnshire, LN11 9NH

j c consultancy ltd
consulting structural & civil engineers

STRUCTURAL APPRAISAL REPORT

Haresign Barn, Glenside South, West Pinchbeck, Lincolnshire



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Property;-	**Existing Barns;-** Haresign Barn, Glenside South, West Pinchbeck, Lincolnshire PE11 3ND	**Instructed**;- Sept 2016
Client:-	**G Start, J Cassidy & E Sneath** c/o **G R Merchant Ltd** 4 Wright Mews, 12A Park Road, Holbeach, Lincolnshire PE12 7EE	**Survey & Report by**;- J. Ellington BSc. CEng MIStructE FRSA MIoD J. Hicks BEng(Hons) MSc PgDipCHE MIoD
Reference:-	JC/16/08/3353	**Issued**:- Sept 2016

Directors
J C Ellington BSc. CEng MIStructE FRSA MIoD
C E Norton
J L Hicks BEng(Hons) MSc. PgDipCHE,.MIoD

J C Consultancy is a trading style of **J C Consultancy Limited**
Registered in England 05973101
Trading Address Morgan House Gilbert Drive Boston Lincolnshire PE21 7TQ
Registered Office 75 High Street Boston Lincolnshire. PE21 8SX
VAT Reg. No. 895 1511 07

The Institution of Structural Engineers

STRUCTURAL APPRAISAL REPORT,

Haresign Barn,
Glenside South,
West Pinchbeck,
Lincolnshire
PE11 3ND

Our Ref;- JC/16/08/3353

SYNOPSIS

The report provides commentary of observations made during a structural appraisal survey, and identifies the defects witnessed within the fabric of the building.

The report describes that the remaining walls and foundations that form the barns have survived reasonably well considering the age and previous use, and concludes that the barn is suitable for sensitive restoration and conversion into a habitable dwelling.

The report recommends and describes various low key strengthening and remedial details to the roof, walls and floors that should be conducted as part of any conversion process.

CONTENTS

1.0 BRIEF

2.0 INTRODUCTION & SCOPE

3.0 GENERAL DESCRIPTION

4.0 SURVEY OBSERVATIONS AND DEFECTS LOG.

5.0 CONCLUSIONS & RECOMMENDATIONS

6.0 PHOTOGRAPHS

1.0 BRIEF

1.1 JC Consultancy Limited was requested by G.E.Start, J.E. Cassidy & E.O. Sneath, to assess and comment on the structural condition of an existing barn, known as Haresign Barn, Glenside South, West Pinchbeck, Lincolnshire.

2.0 INTRODUCTION & SCOPE

2.1 The barn is located in a rural location on Glenside South, West Pinchbeck.

2.2 The client owns the property and has instructed a structural appraisal report to be carried out in order to assess possible options for future development. This instruction was provided by the clients agent, G R Merchant Ltd via email correspondence dated 23rd September 2016.

2.3 This report is solely for the purposes of the client and no other third parties.

2.4 JC Consultancy Limited visited the property on 26th September 2016 in order to carry out a structural appraisal survey.

2.5 Weather conditions at the time of the survey were dry and cold.

2.6 This report is limited to elements of the structural fabric of the property, i.e roof, walls and floors, and comments only upon their structural condition and performance.

2.7 The report does not contain observations, comments or recommendations to any non structural items including, but not limited to drainage, electrical, heating and plumbing services, timber work and decorative plasters.

2.8 Decay associated to damp, fungal attack, insect infestation or contamination is outside the scope of our appointment or report. Any reference to decay associated to damp, fungal attack, insect infestation or contamination to either structural or non-structural items are observations only. As such we recommend that further advice is sought from specialists in the fields of damp, fungal attack, insect infestation or contamination in order to guarantee peace of mind from these potential defects.

2.9 The inspection was of a visual nature only. There has been no opening up works involved in this investigation. Wall finishes or floor finishes, including carpets where applicable have not been removed or lifted during the inspection.

2.10 Any part of the structure that was hidden, covered or otherwise inaccessible, either by permanent finishes such as, but not limited to wallpaper, decorative plasters, suspended ceilings, or carpets, or by items of furniture, either fitted or freestanding, have not been inspected or commented upon. We therefore cannot guarantee that any such parts are free from defect. It should be noted that the barn has been previously used for the housing of livestock, therefore straw and other associated debris was present. As such some of the internal fabric was hidden, covered or otherwise inaccessible.

2.11 The performance of foundations may be referred to within this report; however the existing foundation system has been inspected, and as such we cannot guarantee that it is free from defect throughout.

2.12 The performance of the existing ground strata and general ground conditions may be referred to within this report; however the existing ground conditions have not been inspected therefore comments made will be based on analysis sought from indicative desktop sources including but not limited to the 'British Geological Society'. These sources generally provide sound interpretation, however local anomalies can occur, and as such we cannot guarantee their accuracy.

2.13 The observations and defects noted within this report should not be read as a comprehensive inventory of each and every single item witnessed during our survey. Instead the records should be taken as an indication of the condition of the property in general, and should demonstrate the likely defects that may be present elsewhere in areas of the fabric that have not been surveyed or recorded.

3.0 GENERAL DESCRIPTION

3.1 The property consists of a part single storey, part two storey, u-shaped range of agricultural barn type structures, located on a slightly sloping site. The barn is predominantly surrounded by open fields to the rear and is located directly off the highway known as Glenside South.

3.2 The construction date of the barns are unknown, but it is likely that they were constructed during the late 1800's to early 1900's.

3.3 The construction of the property consists of;-

Roof

Part slate, part profiled sheeting roof covering over a raised collar tied cut roof consisting of timber rafters, collars, purlins and ties. External covered areas consist of open fronted stores, with mono pitched roofs supported on timber posts.

External Walls

Predominantly 330/215mm wide, traditional solid wall construction consisting of clay masonry units laid in a lime based mortar, with various masonry piers located throughout.

Internal walls

The internal cross walls are generally constructed of 215mm wide traditional solid walls consisting of clay masonry units laid in a lime based mortar.

First Floor

Generally timber floor joists spanning over between a combination of steel beams and loadbearing walls, with floorboards over.

Ground Floor

The ground floor was not surveyed in detail due to debris and materials present, however it could be seen to be made up of a part concrete slab system, the specification of which is unknown, and part earth.

Foundations

Foundations were not exposed, however it is likely they consist of shallow corbelled masonry foundations bearing onto the strata below.

3.4 Published Geological records show the building to be within an area where the soil sequence consists of a solid formation of Oxford Clay Formation (Mudstone) overlain by Tidal Flat Deposits (Clays & Silts).

3.5 There are no mature trees in close proximity to the barn, however there is a small tree / bush and areas of vegetation growing adjacent to the masonry elevations.

4.0 OBSERVATIONS AND DEFECTS LOG

The observations and defects noted within this section of the report are notes taken during our site visit. They should not be read as a comprehensive inventory of each and every single item witnessed during our survey. Instead the records should be taken as an indication of the condition of the property in general, and should demonstrate the likely defects that may be present elsewhere in areas of the fabric that have not been logged, surveyed or recorded.

4.1 **Roof**

- A slate roof covering is present in part – there are only localised areas of missing / slipped tiles.
- The remainder of the roofs are profiled sheeting – No missing sheets were noted.
- The ridge is predominantly level along its length, only slight distortion noted.
- The slate roofs are displaying signs of minor dishing to both of the roof slopes.
- When viewed internally, the majority of the purlins, rafters and ties are present but they are deflecting considerably between their supports. Many have fractured and evidence of significant water ingress was noted throughout.
- A small degree of roof spread has occurred at the eaves level on the remaining roof.
- Rainwater goods are missing throughout.

4.2 **Walls**

- The walls forming the single storey barn, are generally free from major structural defects. When viewed along its length, the walls appear reasonably plumb.
- The two storey Store is accommodating a degree of movement.
- The east facing side elevation wall has distorted and displays a reasonable amount of outward bulging.
- Cracking was noted over and adjacent to the large door opening which has now been partially in-filled on the East facing elevation.
- Outward movement to the top of the walls was noted.
- The rear section of the two storey barn (over the Covered Area) has suffered from vertical downward movement. A wide crack is noticeable at the junction between the main two storey barn and the two storey section over the covered area.
- Minor stepped cracking and displacement of masonry was noted to the gable walls.
- Lower levels of masonry adjacent ground level were weathered in parts, presumably from continued wetting and splash back from surface water. This was particularly noticeable on the single storey barn adjacent to the road.

- Internally, brick units at lower levels have become defaced / perished presumably due to the presence of livestock.
- Localised areas of weathered mortar joints and pointing were noted throughout the elevation.
- Timber lintels have failed over openings.
- A small tree / bush is present adjacent to the rear facing gable elevation.

4.3 **Ground Floors**

- The floors have been used for the storage of goods and possibly livestock and as such the condition of the floors reflect this.

4.4 **Foundations**

- Foundations were not exposed, however the superstructure is not displaying any major signs that would suggest the foundation system as a whole is under excessive stress.
- The rear section of the two storey barn (over the Covered Area) has suffered from vertical downward movement, which suggests that the foundations in this area have settled at some point in the history of the building.

5.0 CONCLUSIONS AND RECOMMENDATIONS.

5.1 The barns are in a reasonable condition considering their age and previous use, and we feel that they are suitable for conversion into a residential dwelling, without losing any significant amount of original masonry fabric or general structural form.

5.2 The basic rectangular shape of the single storey Stable block, together with the presence of cross walls, results in it being generally a robust structure which displays little in the way of significant movement.

The two storey Store barn has accommodated a degree of movement over its lifetime. The east facing side elevation wall has distorted and displays a reasonable amount of outward bulging. This will have been contributed by the large now in-filled door opening that is located within the elevation, together with a lack of full restraint due to only part of the barn having a first floor structure. Further outward movement to the top of the walls is likely to have been the result of a small degree of roof spread.

The rear section of the two storey barn (over the Covered Area) has suffered from vertical movement, which will have been exacerbated by the open fronted nature of the Covered Area at lower level.

Low key strengthening works will be required to various areas of the existing masonry construction, but it is envisaged that works will be focused upon retaining and restraining the existing fabric as opposed to large areas of demolition and rebuilding.

The open fronted covered areas (timber post and roof constructions) that are accessible from the Yard have been exposed to the elements and as such their condition reflects this. It is assumed that these areas will not be utilised as part of any conversion scheme, and instead will be carefully taken down to form part of a new Courtyard Area.

5.3 In structural terms many of the defects which have been highlighted within the Observations and Defects Log have little or no significance to the overall robustness of the building. The majority of loss of the original fabric is due to the materials being subjected to the elements and previous use. Ensuring the barns are weather-tight should be addressed even if a full conversion or restoration is not going to take place. Failure to do so will accelerate the decay and deterioration of the remaining fabric.

5.4 The roof structures of all the barns are in a poor condition. It is unlikely that the existing elements will be able to be sensibly strengthened to allow them to accommodate additional loadings from insulations, plasterboard and finishes. We do anticipate that a replacement roof will be required throughout. The roof should be engineer designed in such a way that thrust is not placed upon the supporting walls in order to reduce its susceptibility to future stress.

All wall plates installed to the top of the walls should be strapped using galvanised straps at 2000mm centres.

We envisage that the majority of the existing slate roof covering can be carefully removed, stored and reinstated after the installation of the new roof structure. It is presumed the existing corrugated profiled sheeting present elsewhere will need to be replaced with a slate system.

5.5 The walls of the barns are predominantly sound, but will require attention in order for them to perform satisfactorily.

The cause of the localised areas of cracking and movement to elevation walls are likely to be the result of a combination of the roof defects, the previous use of the barns, and the growth of vegetation adjacent the base of the walls. Any remaining trees, stumps and vegetation in close proximity should be removed.

Some suitably located tie bars and pattress plates should be installed across the two storey barns essentially tying the East and West facing elevation walls together. These should be installed at mid height level and can be threaded between the first floor joists in the floor zone.

The barn walls should only require low key stitching, localised areas of replacing individual brick units and small areas of re-pointing. Any minor cracks / fractures should be stitched using the 'Helifix' masonry repair system, which involves installing remedial 'Heli-bar' rods into the bed joint of the masonry over the location of the fracture at regular vertical centres. More information can be seen at www.helifix.co.uk

Any areas of hard cement re-pointing previously carried out on the elevations should be carefully removed and replaced with a sympathetic soft lime based mortar. Other small areas of weathered masonry joints should be repointed in a similar fashion. There is not the requirement for all elevations to be repointed, and as such only the localised required areas should be addressed.

Lintels and arch backing timbers should be replaced throughout. Any internal timber lintels should be replaced with suitable precast concrete or steel box lintels.

The open joint on the masonry that has formed between the two storey elements on the West facing elevation will require infilling with toothed masonry units. Helifix bed joint reinforcement can also be installed to provide a rigid elbow restraint.

5.6 The existing mezzanine floor and support beams appear in reasonable condition. Any areas of decayed joists can be replaced. Floor boards will need replacing throughout. We recommend that a plywood diaphragm is screwed and glued to the top of the floor joists prior to the relaying of the floor boards.

In order to provide additional restraint to the outer masonry walls, it would be preferable for the whole of the first floor area to receive a mezzanine floor. Suitable infill floor joists should be installed in those areas required.

Once all joists are installed, full depth blocking should be inserted between the joists and galvanised steel straps should be installed over the joists / blocking at regular 2000mm centres. These should be installed to gable and long elevation walls.

The existing steelwork beams and columns supporting the upper storey appear in reasonable condition. If they are to be retained as part of any scheme, paint finishes will need to be re-applied as they have been exposed to the elements. A new steel plate should be installed to the top of the beams to ensure that the supported masonry above is not overhanging.

5.7 The ground floors will need to be replaced with a ground bearing, reinforced concrete ground floor slab that is suitable to accommodate loadings from the proposed use, including any partitions.

The floor should also incorporate insulation and damp proof systems as specified by the architect to meet current regulations. The floor slab should be engineer designed to take into account the ground conditions present on this site.

We recommend that a new floor slab in the rear section of the two storey barn (formerly the Covered Area) is engineer designed in order that it can provide assistance to the walls in the form of a reinforced concrete raft / underpin. Pockets can be cut into the masonry in a hit and miss type arrangement at slab level, and reinforced ‘fingers’ can be cast into the pockets in conjunction with the slab. This will eliminate any further vertical movement of the structure. In addition, the foundations supporting the steelwork posts to the covered areas should be inspected and strengthened if deemed insufficient.

Whilst the rest of the foundations to the barns appear to be performing satisfactorily, we recommend that further loadings imposed upon them as part of the conversion process is kept to a minimum.

Any new foundations required should be constructed to suit the ground conditions encountered. Care should be taken when constructing new foundations adjacent the existing corbelled masonry foundation system.

5.8 Whilst reference to damp is outside the scope of this report (see 2.9), it appears that the structure has suffered from a degree of water penetration over the years. This will have been encouraged by both the open fronted nature of the rear barn, and previous use by livestock etc. In addition, due to the large quantities of timbers within the barn, the likely hood of insect / beetle attack on a small number of the timbers is high.

As discussed in this report it is likely that a high proportion of existing timbers will need to be removed from the barns during the conversion process. However, If any timbers are to remain or be re-used it is essential that further surveys and advice from specialists in the field of damp and timber decay should be carried out prior to commencement of works in order to ensure that damp and timber decay are not trapped within the fabric following conversion. Any repairs recommended by the third party reports should be carried out accordingly.

5.9 There is a lack of suitable rainwater discharge gutters and downpipes throughout which has resulted in the continued wetting of masonry and localised areas of timbers. Rainwater goods should be repaired / installed throughout all areas of the barn complex to allow reliable discharge of rain water.

In order to relieve the base of the walls from continued wetting and saturation it would be prudent to allow for the installation of a French drain around the perimeter of the wall, complete with gravel apron. This should reduce the extent of splash back.

5.10 We recommend that all the trees / bushes / stumps adjacent to the elevations are removed. Due to the potential presence of clay soils we recommend that no planting of further species are carried out within 5 metres of the existing fabric walls.

5.11 We recommend that all repair details and designs are produced and submitted by a suitable Architect and Engineer who appreciate the sensitive nature of the existing barns. In addition we recommend that all works are carried out by contractors who have experience dealing with repairs to properties of this nature.

JC Consultancy Limited
Consulting Structural & Civil Engineers

Sept 2016

6.0 PHOTOGRAPHS. *(Records of photographs taken during Site Survey)*



Photograph # 1



Photograph # 2



Photograph # 3



Photograph # 4



Photograph # 5



Photograph # 6



Photograph # 7



Photograph # 8



Photograph # 9



Photograph # 10



Photograph # 11



Photograph # 12



Photograph # 13



Photograph # 14



Photograph # 15



Photograph # 16



Photograph # 17



Photograph # 18



Photograph # 19



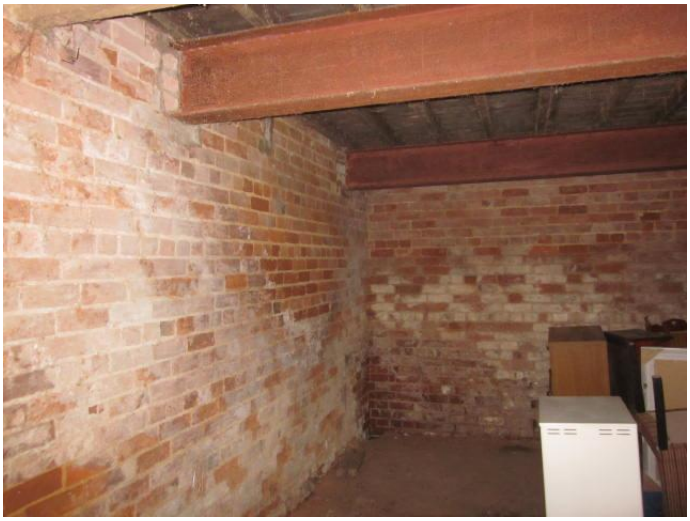
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Photograph # 21



Photograph # 22



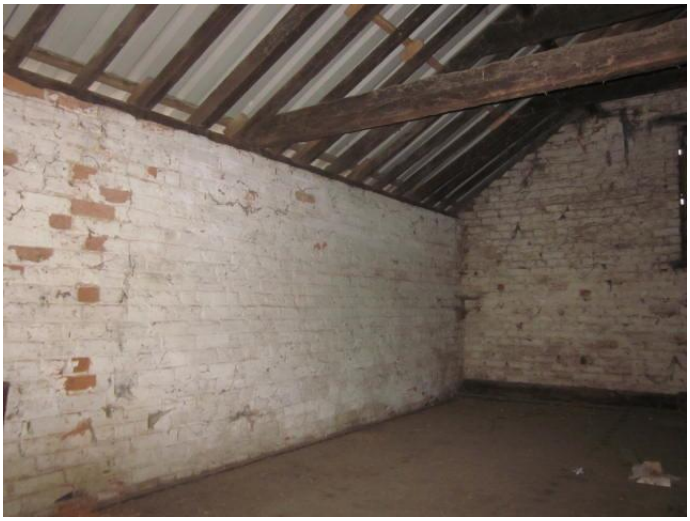
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Photograph # 24



Photograph # 25



Photograph # 26



Photograph # 27



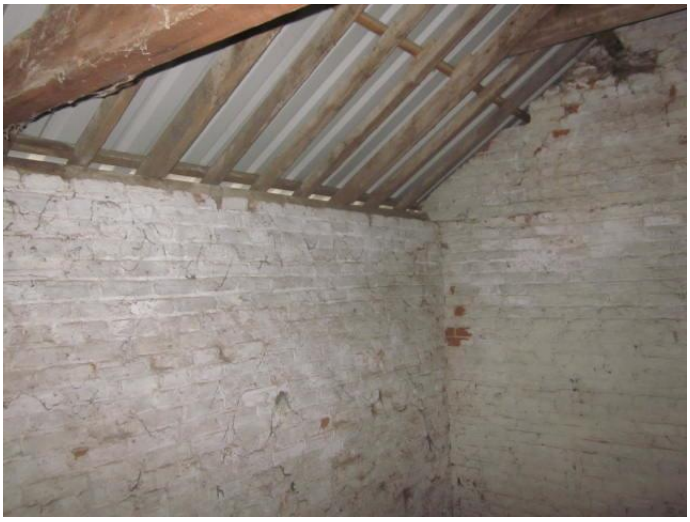
Photograph # 28



Photograph # 29



Photograph # 30



Photograph # 31



Photograph # 32



Photograph # 33



Photograph # 34



Photograph # 35



Photograph # 36



Photograph # 37



Photograph # 38



Photograph # 39



Photograph # 40



Photograph # 41



Photograph # 42



Photograph # 43



Photograph # 44



Photograph # 45



Photograph # 46



Photograph # 47



Photograph # 48

END OF REPORT