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STRUCTURAL APPRAISAL REPORT,

Barn at
Ravens Bank,
Whaplode St Catherines,
Spalding,
Lincolnshire.



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Property;-	**Existing Barn,** Ravens Bank, Whaplode St Catherines, Spalding, Lincolnshire.	**Instructed**;- Sep 2013
Client:-	**Mr K Crick** 93 All Saints Road, Peterborough PE1 2QT	**Survey & Report by**;- J. Ellington BSc. CEng MIStructE J. Hicks BEng(Hons) MSc
Reference:-	JC/13/09/1490	**Issued**:- Oct 2013

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The Institution of Structural Engineers

STRUCTURAL APPRAISAL REPORT,

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Our Ref;- JC/13/09/1490

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 concludes that the barn is in a reasonable condition, but careful consideration should be given as to its suitability for sensitive restoration and conversion into a habitable dwelling.

The report states that whilst the barn appears to have lost only a small amount of its original fabric during its lifetime, it is suffering from a degree of structural movement and a lack of general maintenance, and as such a significant amount of intervention will be required in order to achieve a sympathetic repair.

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

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1.0 BRIEF

1.1 JC Consultancy Limited was requested by Mr K Crick, to assess and comment on the structural condition of an existing barn located off Ravens Bank, Whaplode St Catherines, Spalding, Lincolnshire.

2.0 INTRODUCTION & SCOPE

2.1 The barn is located in a former farmyard off Ravens Bank, in a semi rural location, on the outskirts of Whaplode St Catherine's in South Lincolnshire.

2.2 The client is currently in the process of purchasing the freehold of 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 client via email

2.3 This report should be read in-conjunction with any relevant documentation prepared and issued by the clients' architect, Remway Design Limited.

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

2.5 JC Consultancy Limited visited the property on 1st October 2013 in order to carry out a structural appraisal survey.

2.6 Weather conditions during the survey was dry and sunny.

2.7 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.

2.8 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.

2.9 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.

2.10 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.

2.11 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 the barn was currently being utilised as storage for agricultural type items, and as such, some of the internal fabric was hidden, covered or otherwise inaccessible. In addition, much of the external elevations and roof covering is covered with vegetation.

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

2.13 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.

2.14 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 full height, rectangular shaped agricultural barn type structure, with a single storey side addition, located on a predominantly level site off the highway known as Ravens Bank.

3.2 The construction date of the barn is unknown, but it is likely to been constructed during the late 1800's to early 1900's.

3.3 The construction of the property consists of;-

Duo-pitched Roof

The main barn has a slate roof covering over a traditional cut roof consisting of timber rafters, collars, purlins and ties.

The side addition has a profiled cement sheet roof covering over a traditional cut roof consisting of timber rafters, collars, purlins and ties.

External Walls

A combination of 330mm / 215mm wide traditional solid wall construction consisting of clay masonry units laid in a lime based mortar predominantly in an English Garden Wall style bond.

There are 2No. large concrete buttresses propping the rear elevation masonry wall.

Ground Floor

Floors are a combination of earth and a rough, solid ground bearing concrete slab that has been installed to part of the main barn.

Foundations

Foundations were not exposed due to the presence of a concrete plinth that had been cast around the base of the walls, however it is likely that they consisted of corbelled masonry foundations bearing onto the solid 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 West Walton Clay Formation (Mudstones and Siltstones) overlain by top-soil and drift deposits of Tidal Flat Deposits (Silts and Clays.)

The foundations of this building will be located within the drift deposits of silts and clays as the solid formation of Clay is at a considerable depth.

3.5 There are a number of trees within 5-10 metres of the barn walls. There is a large Ash tree within 10 metres of the north facing gable elevation wall and a number of smaller Silver Birch and Holly trees growing adjacent to the rear elevation.

A large proportion of the elevation masonry is covered in vegetation, principally Ivy.

4.0 OBSERVATIONS AND DEFECTS LOG

(Read in conjunction with Section 2.14 of this report)

4.1 **Duo-pitched Roof**

- A number of slates are missing to the roof covering. The ridge is sagging along its length, between principal rafters and roof dishing is apparent to both the East and West facing roof slopes.

- Rainwater goods are missing throughout.

- When viewed internally, the purlins, rafters and ties are present, but are deflecting considerable between their supports.

- There is evidence of water ingress throughout the barn roof.

- The roof has spread at eaves level and the roof has racked considerably towards the South facing gable elevation.

4.2 **Walls**

Front (West Facing) Elevation.

- When viewed externally along its length, there appears to be an outward bow to the wall located at eaves level. The majority of the elevation cannot be inspected due to vegetation.

- There are significant diagonal stepped cracking (+30mm) to the single storey addition elevation. The cracks travel full height from eaves, around a upper doorway, and to the foundation.

- When viewed internally, there is stepped cracking (+ 2-5mm) over the large door opening and diagonal stepped cracking (+10mm) to the LHS of the elevation, adjacent the South facing gable. The RHS of the elevation cannot be inspected due to the presence of storage boxes

Rear (West Facing) Elevation.

- When viewed externally along its length, there has been considerable outward movement to the wall located at eaves level. The majority of the elevation cannot be inspected due to vegetation.

- 2No large concrete buttress structures are present at each end of the main barn. The buttresses are approximately 2.4m high and project out in the order of 1.8m.

- When viewed internally, there are a number of stepped diagonal cracks (+2-10mm) over the large door opening. The door opening has been previously in-filled, and a smaller opening installed within.

- Full height vertical cracks (5-20mm) are present to both the LHS and RHS of the elevation, adjacent the North and South facing gables.

South Facing Gable Elevation.

- When viewed externally the majority of the elevation cannot be inspected due to vegetation.

- Masonry at verge level is missing.

- When viewed internally, there are a number of stepped diagonal cracks (+2-5mm) over the door opening.

- A high level, centrally located window opening has been in-filled.

- Diagonal stepped cracking (+20-30mm) is present to the LHS of the elevation, adjacent the East facing elevation.

North Facing Gable Elevation.

- When viewed externally the majority of the main barn elevation is hidden by the single storey addition. The remainder is partially covered by vegetation.

- Stepped cracking (+20-30mm) is present to the LHS of the single storey addition elevation.

- When viewed internally, there are a number of stepped diagonal cracks (+2-5mm) within the main barn gable.

- A considerable, full height vertical crack (25-35mm) is present to the RHS of the elevation, adjacent the east facing elevation.

4.3 **Ground Floors**

- The ground bearing slab is uneven and rough, however there is no evidence of excessive settlement to the concrete slab.

4.5 **Foundations**

- Foundations were not exposed, however they appear to be struggling to safely distribute the loadings of the superstructure. A degree of the cracking to the walls suggests that the foundation system has been under excessive stress during its lifetime.

5.0 CONCLUSIONS AND RECOMMENDATIONS.

5.1 The barn is in a reasonable condition, but careful consideration should be given as to its suitability for sensitive restoration and conversion into a habitable dwelling. Whilst the barn appears to have lost only a small amount of its original fabric during its lifetime, it is suffering from a degree of structural movement and a lack of general maintenance, and as such a significant amount of intervention will be required in order to achieve a sympathetic repair.

5.2 With the extent of previous repointing noted, together with the presence of buttressing, it has to be considered that the barn has suffered from progressive structural movement during its lifetime, and thus any repair scheme submitted will need to address the long term stabilisation of the barn as a whole, as well as localised repairs to individual elements.

5.3 The small, single storey addition that is attached to the North facing elevation is in a poor condition and has been subjected to significant structural movement. The walls are distorted and in our opinion this area is considered to be beyond sympathetic repair. We would recommend that careful demolition and rebuild of this part of the barn is considered in any scheme designs.

5.4 The roof structure of the barn is in a poor condition and we do anticipate that significant replacement works will be required. Strengthening works to timbers will be required, and it is envisaged that considerable replacement of excessively decayed / distorted timbers may be required following a more in-depth inspection by an experienced joiner. We recommend that a full replacement of the roof structure is allowed for at this stage.

We envisage that the existing slate roof covering can be carefully removed, stored and reinstated after the installation of the new roof structure. Additional slates will be required as there are a number missing to both roof slopes.

5.5 The walls of the main barn have suffered from previous movement that can be seen in the form of cracks and fractures. Whilst the fractures look concerning, they should only require low key stitching and re-pointing. We recommend that the ‘Helifix’ masonry repair system should be utilised where possible, 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.

5.6 The walls' ability to safely accommodate not only their self weight, but additional loadings from a new roof, ceilings and first floor structure will need to be considered carefully, and we feel, in their current form, they will be unsuitable to be retained as a loadbearing element.

It is likely that an alternative method of support will need to be introduced, and we envisage that an independent steel frame, installed inside the barn, supporting both a new roof and first floor structure, is likely to be the most sensible solution. The steel frame will need to be supported on independent concrete pad foundations, or alternatively could be supported off a suitably designed concrete floor slab.

5.7 With the introduction of a steel frame, the walls of the barn essentially become a cladding system only. As such, its primary function will be to provide a weatherproof envelope.

Therefore, 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. With the amount of vegetation present that will need to be removed, it is likely that all elevations in this case will need to be repointed.

The buttresses are contributing to the overall stability of the masonry and should remain in-situ as part of any scheme.

5.8 The ground floor slab 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 partitions and the independent steel frame if required.

The floors 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.

5.9 The foundations have obviously suffered from a degree of stress over the lifetime of the building, and as such we recommend that further loadings imposed upon them as part of the conversion process is kept to a minimum. As previously discussed, upon the installation of a independent steel frame, the masonry walls will in effect only be supporting their own self weight and will act as a cladding system only. With this in mind, we do not foresee the requirement to repair the foundations unless further investigations / scheme [proposals dictate it.

5.10 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. In addition, due to the large quantities of timbers within the roof, the likely hood of insect / beetle attack on a small number of the timbers is high.

As such it is essential that further surveys and advice from specialists in the field of damp and timber decay should be carried out 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.

5.11 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.

5.12 We recommend that the trees and vegetation that are in close proximity of the building are removed. The remaining species on the site within 10 metres of the existing fabric of the barns should be carefully maintained to a sensible height as a minimum.

5.13 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 barn. 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
October 2013

6.0 PHOTOGRAPHS.



Photograph # 1
Barn – West Facing Elevation / South facing Gable



Photograph # 2
Barn – West Facing Elevation



Photograph # 3
Barn – South facing Gable



Photograph # 4
Barn – East Facing Elevation / Buttress



Photograph # 5
Barn – East Facing Elevation / Buttress



Photograph # 6
Barn – East Facing Elevation / Vegetation



Photograph # 7
Single Storey Addition Barn – North Facing Elevation



Photograph # 8
Single Storey Addition Barn – North Facing Elevation



Photograph # 9
Barn - Roof



Photograph # 10
Barn - Roof



Photograph # 11
Barn - Roof



Photograph # 9
Barn – Roof / North Facing Gable Elevation



Photograph # 10
Barn – Roof / North Facing Gable Elevation



Photograph # 11
Barn – Roof / West Facing Elevation



Photograph # 12
Barn – Roof / West Facing Elevation

END OF REPORT