YENDALLS ENGINEERING LTD.

Consulting Civil & Structural Engineers

Structural Appraisal

Manor House Farm Barn

Troutsdale – North Yorkshire

Job No. Y15/241

Prepared By:-

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Date:- November 2015

Checked By:- D.J.Yendall

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Manor Farm Barn
Troutsdale
North Yorkshire
YO13 9PS

Your Reference:
Our reference: Y15-241-L01-PR
Date: 30 November 2015

For the attention of:- Peter Rudsdale

Dear Sir,

Manor Farm Barn - Troutsdale
Structural Appraisal

Yendalls Engineering were requested to undertake an appraisal of the existing building forming the development area that is subject to an application for planning permission. YEL's remit was to make observations of the building with a view to determining the extent of remedial works that would be required and the amount of structure that can be utlised as part of a conversion. The building is listed as a Grade II Listed building on the National Heritage List for England.

1. **Location** – The farm is located approximately 2.5km north of the village of Snainton (located on the A170), in Troutsdale on an unnamed road approximately 500m north of the Snainton Lane, and to the north west of Troutsdale Beck.

2. **Description** - The development comprises a stone-built stable block and ancillary building that is an annex to the Manor Farm Cottage. Constructed in the early 19th century the building is approximately 25m x 6m in plan and is single-storey. The inspection did not extend to the adjoining stone barn to the North East of the building, nor to the farmhouse. Stone work is dressed on the outer skin, with a random rubble inner skin of substantial thickness. The roof is a traditional duo-pitch, pantile roof covering and has stone coped gables with stone kneelers at the eaves junction. To the north east of the building a more modern farm building stands independently of barn alongside the full length of the building and has a higher eaves level. This building is steel-framed, duo-pitch portal with steel-profiled cladding.

3. **Observations** – The front elevation had four stable door openings in the dressed stone veneer wall and a further window opening and a door opening to an attached annex that serviced the original stables (see Plate 1 in appendix). The stone walls are in the order of 500mm in thickness and have a dressed sandstone outer leave with a random rubble stone forming the mass of the wall. Both stone and mortar looked to be in reasonable condition. Granite lintels formed the outer leaf support for the wall to create a square opening and the inner masonry was supported on timber arched lintels (Plate 2). At eaves level there were 8 circular vent holes penetrating the wall and these were in vitrified clay. A vertical crack was noted at the window position extending form the cill to the ground. To the front of the elevation is a raised, level concrete hardstanding of similar datum to the internal ground floor that is generally, approximately 500mm above ground level. The north eastern gable end, Plate 3, when viewed externally is in poor condition, with major mortar erosion and with the mortar being soft and crumbly to the touch (Plate 4). The eastern stone kneeler at eaves level is displaced and rotated slightly from its original position. The rear wall is half submerged by compacted bedding and manure from cattle abutting the wall to a level of approximately 1.2m in depth. In several places the wall had been partly demolished presumably by cattle pushing against the wall resulting in failure/partial collapse of the wall (See Plates 5 and 6). The adjacent steel structure forming the adjoining barn was seen as independent of the stone barn but did not form part of the inspection.

Viewed externally, the roof covering appeared to be in reasonable condition with no significant sag evident. Externally there is no significant sagging evident. When viewed internally the construction comprises traditional common rafters forming the slopes, spanning onto timber purlins (one per slope) and these in turn span onto either triangular timber support frames or masonry crosswalls at typically 2.9m centres. Timbers appear to be in reasonable condition and quality with only a few members subject to wet rot in areas of prolonged exposure to the elements. Beetle/insect infestation was noted throughout, but timber loss was not considered significant. Trusses did not look to be under any significant distress although one truss had shear deflection of the bottom boom and another truss had been stiffened at some time in the past as shown on plate 8.

Inspection internally revealed that the floor slabs are uneven and inconsistent and should be broken out and replaced. Internal crosswalls had broken from the front and

rear walls from ground to eaves level in some cases and in the worst case movement was as great as 100mm, Plate 7. Elsewhere several vertical cracks were present under purlin bearing positions. Timber tie beams were evident at eaves level and cracking near to these was also evident. The front wall to the property had rotated outwards at eaves and so was not vertical.

4. **Discussion** – The main front elevation forming the main stable block is in satisfactory condition but is not vertical and in its present condition is reliant upon the roof alone as lateral restraint. Intersecting walls have been rendered ineffective as a result of significant cracking. The rear wall is not intended for stacking wet manure against it and this could result in structural instability of the whole building. Damage to the walls will require reconstruction using reclaimed material where possible. To ensure overall stability of the structure is maintained it is essential that structural ties be incorporated from front to rear on gable end and at dividing walls with face plates visible on each elevation just below eaves level. The gable end has severe mortar loss and should be taken down and re-built using the reclaimed dressed stone and random rubble to suit. The coping stones to gables should be removed and made more weatherproof and the kneeler stones reset to line and level.

   Avoid lateral loading of the rear wall from the adjacent barn by good housekeeping or by providing an effective internal barrier to avoid further damage to the wall. All manure against the walls should be removed as soon as possible.

   Ground floor slabs should be removed and replaced.

   Foundations should be exposed in several locations in order to determine the width, depth and type of foundations used to confirm their suitability.

   Roof timbers are generally in good condition but there are some members that are reaching the end of their effective life and may require replacing. Calculations indicate that the roof timbers are generally adequate and may be considered for re-use in their present condition providing that they are effectively treated against fungicide, insect/beetle infestation and rot. Consideration should be given to truss improvement work to at least two of the trusses. One for excessive shear deflection and the other to improve its appearance from that of a previous repair, if it is to be retained.

5. **Recommendations** – From our findings it is possible to conclude that the existing buildings are predominantly satisfactory and would require only nominal intervention as part of any re-development to ensure that they can provide continued service.
   a) The walls will require re-pointing using softer lime based mortar with some flexible joints introduced where necessary. Total reconstruction will be required to the gable end and minor reconstruction to the rear wall using reclaimed stone materials and traditional lime mortar techniques.
   b) Timber lintels internally should be replaced using reinforced concrete lintels to suit the wall thickness whilst leaving the present out leaf granite stones alone.
   c) The roof structure should be checked fully for structural adequacy and timbers strengthened, replaced or stiffened where necessary.
   d) Internally, new slabs should be incorporated on order to comply with current standards, with an inner cavity and blockwork wall introduced to the whole perimeter wall.
   e) Through ties and restraint straps with remedial ties are required to all intersecting walls and gables to restore the structural integrity of the building. The lack of verticality of walls can be tolerated structurally providing that the ties are provided.
   f) Expose existing footings in several locations to determine depth, width and suitability of footings.

Yours faithfully,

D.J.Yendall

Appendices - Photographs

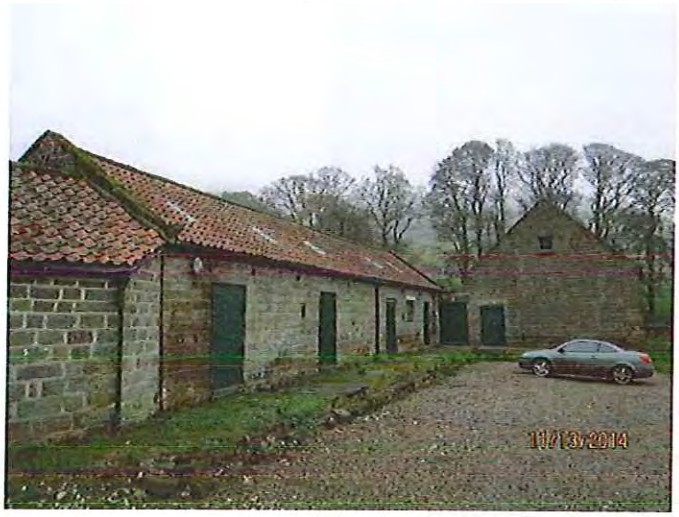

Plate 1
Front Elevation

Plate 2
Timber Lintel

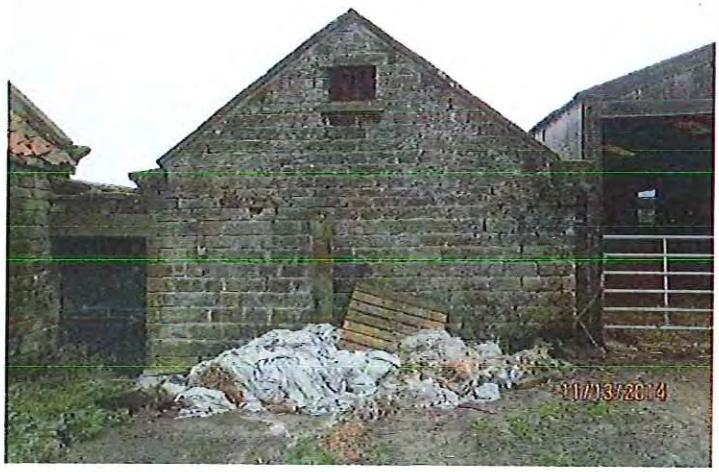

Plate 3
Gable Elevation

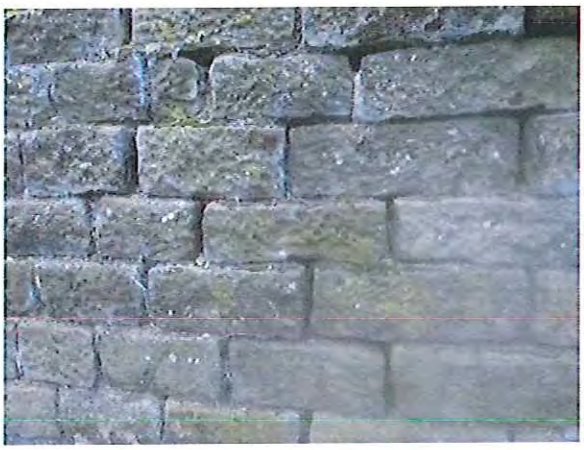

Plate 4
Mortar Loss to Gable

Plate 5
Damage to Rear Wall

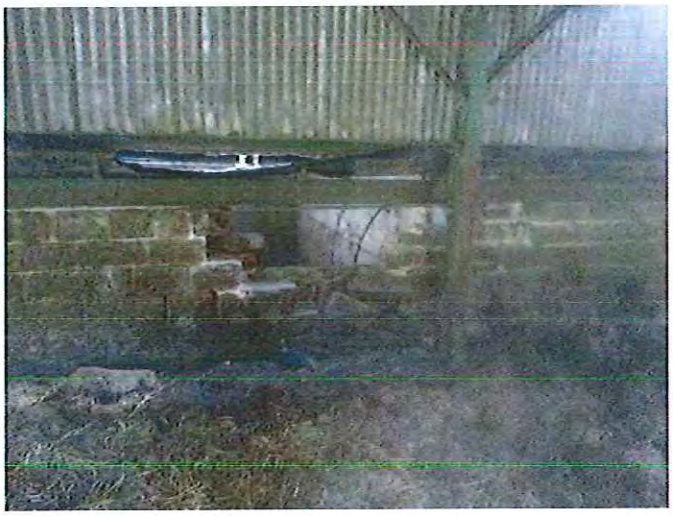

Plate 6
Further Damage to Rear Wall

Plate 7
Wall Separation

Plate 8
Stiffened Truss