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STRUCTURAL INSPECTION AND REPORT

ON

EXISTING OUTBUILDINGS

AT

**GLEN FARM, THE CLIFF
INBURNDALE, SLEIGHTS
NORTH YORKSHIRE**

NYMNPA
24 NOV 2010

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STRUCTURAL INSPECTION AND REPORT**OUTBUILDINGS TO GLEN FARM, IBURNDALE, NORTH YORKSHIRE****1.0 INTRODUCTION**

1.1 At the request of the owner, Mr Judson I was commissioned to carry out a visual inspection and prepare a report on the structural condition of the existing outbuildings block which I understand is to be converted into holiday accommodation units.

1.2 I subsequently carried out such an inspection on 31 October 1999.

2.0 HISTORY

2.1 The age of the property is unknown but its general form and constructional detail suggests mid to late 19th Century.

2.2 The block has been built over two, or possibly three, different periods.

2.3 Part of the outbuildings have been used for housing cows and possibly horses whilst I understand that the other single storey section was formerly used as a piggery.

Fees troughs are existing built into wall

3.0 BASIC CONSTRUCTION

3.1 The outbuildings, situated parallel to and immediately adjacent to the main highway through Iburndale, basically comprise thick natural stone walls supporting pitched roofs.

3.2 The longer axis of the block runs approximately east/west with a two storey section forming the eastern section (former cow byre) and the remainder the single storey, former piggery section.



- 3.3 Whilst the pitched roofs are generally pantile covered there is a section of corrugated asbestos covered roofing over the western or former piggery section.
- 3.4 The existing ground floors are of concrete construction.
- 3.5 A suspended timber first floor is provided to the two storey section, with access via a timber staircase at the eastern end of the block.
- 3.6 The site has a slight slope from east to west and an existing access road runs alongside the eastern gable.
- 3.7 With the exception of a double door opening at the north extension corner all other doors and windows in the external walls have substantial stone lintels. There are no openings onto the roadside or gable elevations.

4.0 **STRUCTURAL DEFECTS OBSERVED**

EXTERNAL



(a) **North (Inner Courtyard) Elevation**

- 4.1 Open joints in the external stonework were noted at the north west corner and at low level mid-length of the block.
- 4.2 Further rough and open jointed stonework was recorded at the north east corner, again at low level.
- 4.3 Significant stepped cracking of the external stonework was observed above the 'left side' bearing of the timber lintel to the 2.4m wide double door opening.

4.4 Viewed from courtyard level the roof ridge line to the two storey section appeared somewhat irregular and deflected.

(b) East gable

4.5 Although there is evidence of previous pointing having taken place there are still significant areas with open joints.

4.6 Some slight outward bulging/twisting of the higher section of the gable wall was noted.

4.7 It was deduced that the external ground levels adjacent to this gable wall are about 300mm above the adjacent inner floor level.

(c) South Elevation (Highway Side)



4.8 A distinct vertical 'butt' joint is evident between the sections of the block which have obviously been built at different times.

4.9 Some slight longitudinal misalignment/twisting was observed along the line of the south elevation wall.

4.10 Previous pointing has been carried out but sections of this have either fallen out sometime ago or are in imminent danger of doing so. In some areas holes/voids/erosion were noted in the stonework.

4.11 Small hairline cracking was seen in the central and western sections of this wall.

4.12 A 300mm wide strip of infill concrete has recently been placed between the south wall and the highway. This now appears to prevent surface water ingress to foundation level whereas previously road surface water percolated into the sub soil strata.

(d) West Gable to Single Storey Section

- 4.13 Erosion of isolated stones noted.
- 4.14 The gable wall exhibits an outward bulge towards the top.
- 4.15 Open joints were observed, particularly at low levels on the wall.

(e) West Gable to Two Storey Section

- 4.16 Evidence of open jointing to stonework.

INTERNAL



(f) General

- 4.17 The existing door/window openings appear to have timber lintels to the inner "leaf".

(g) Single Storey Former Piggery Section

- 4.18 The existing timber roof members are overspanned.
- 4.19 The inner face of the west gable exhibits a pronounced outward incline.
- 4.20 The internal walls are generally rough plastered but with the exception of a movement line in the west gable, they do not show any significant defects.

(h) Ground Floor Areas of Two Storey Section

- 4.21 Woodworm infestation was seen in the suspended first floor timbers.
- 4.22 Hairline cracking was observed in the cross wall adjacent to the old piggery section.
- 4.23 A noticeable outward bulge was seen in the south or roadside wall in the middle cow byre.
- 4.24 Severe cracking was recorded on the inner north wall above the old 'tree trunk' timber lintel to the double door opening.
- 4.25 The timber lintel itself is badly decomposed.



(j) First Floor Areas of Two Storey Section

- 4.26 Signs of roof water penetration, particularly onto the east gable wall.
- 4.27 Significant dampness and plaster deterioration and some hairline cracking to the east gable wall.
- 4.28 It was noted that timber purlins, some of regular and others of 'rough' section are positioned normal to the roof slope rather than in the more structurally efficient vertical position. Some purlins exhibited significant splits and shakes.
- 4.29 Wide cracks were noted in the cross wall adjacent to the former hay loft access dormer doors on the north side roof.
- 4.30 Further hairline cracking in the plasterwork was observed at the side of the low level opening through the cross wall.

4.31 In the most westerly upstairs room there were signs of the outer walls having been pushed outwards by the horizon ^{fail} thrust from roof construction.

4.32 The cross wall between the western and central room is not tied to the external walls and diagonal cracking was also noted to the side and above the low level opening between these two rooms.

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5.0 CONCLUSIONS

5.1 Overall, with the exception of a number of relatively minor structural deficiencies, this property appears to be in a reasonable structural condition. However, a number of items do need rectification.

5.2 The major cause for concern is the condition of the existing timber lintel to the double doors in the north wall and the masonry above, supported by this lintel. Full replacement of the 'inner' and 'outer' lintels and local rebuilding of cracked and defective internal/external walls local to the lintel is required.

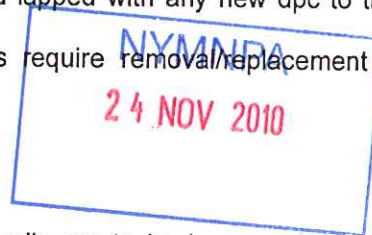
5.3 The roof structure is, for the majority, in poor condition. It is understood that the roof is to be raised to provide increased headroom to the first floor and ideally should be replaced utilising new, vertically positioned, timber purlins, suitably designed for the span, seated on concrete padstones and incorporating underfelt/insulation/plasterboard lining to satisfy 'modern' Building Regulation requirements.

5.4 Outward bulging of some external walls has been, I conclude, caused by a combination of outward horizontal thrusts from the roof construction at the top of the unrestrained walls and a small amount of 'historical' foundation settlement.

5.5 However, whilst some localised cracking of main load bearing walls was noted there is no evidence of significant differential foundation movement having taken place. Since the loads to be applied to the first floor of the structure in its proposed new role are similar, if not lighter, than those to which it has been previously subjected (granary/hayloft) there would appear no reason to contemplate underpinning of these walls.

In addition, small settlements caused by long term water ingress to the roadside walls should now be prevented following the infill concreting of the small verge by the Highway Authorities.

5.6 Floor levels at the eastern gable of the block are below general external ground levels. The incorporation of vertical waterproof tanking to this section of wall, up to 150mm above the existing ground levels and lapped with any new dpc to the main walls, is required. Existing concrete floors require removal/replacement and to incorporate a dpc and insulation layer.



5.7 It is understood that the height of the side walls are to be increased and the roof raised to increase the first floor headroom. This will potentially create increased horizontal thrusts at new wall plate level. The new roof construction should incorporate apex ceiling ties and proprietary 'L' shaped restraint straps between the first floor and side walls. Straps between first floor/roof structure and the gable walls should also be provided.

The additional sections of wall should be positively tied and bonded to the existing cross and gable walls.

5.8 Advice should be sought from the local Building Control Officer regarding the suitability of the existing first floor and a specialist's report is required to comment upon and make recommendations relating to woodworm infestation to the first floor

timbers is these are retained. All new timbers incorporated into the structure should be woodworm treated.

6.0 RECOMMENDATIONS

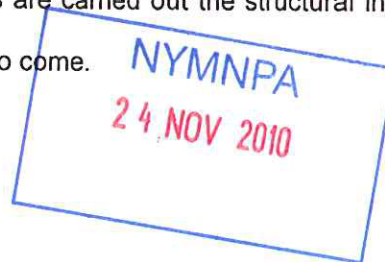
- 6.1 Rake out loose/defective mortar and repoint these plus all open bed/perpend joints to external stonework. Repointing to be minimum 30mm deep in sand/lime/cement mortar. Fill all holes and voids in stonework.
- 6.2 Carefully rake out and replace/repoint all individual badly eroded/poor quality stones, particularly at low levels on the north wall.
- 6.3 Obtain specialist advice re installation of a dpc to all external and retained internal walls.
- 6.4 Excavate below access road adjacent to east gable; provide vertical bituminous tanking membrane, linked to the new horizontal dpc. New tanking layer taken 150mm (minimum) above external ground levels.
- 6.5 Remove existing and provide new concrete ground floor slabs, laid to level and incorporating dpc/insulation layers, on prepared /compacted hardcore layer 150 mm minimum thickness.
- 6.6 Take off existing pantiles ridge/copping stones and provide new purlins/rafters/ apex ties (woodworm treated). Either, replace existing tiles or, if in unsuitable condition, provide new handmade pantiles. Provide insulation, felt underlay, plasterboard and skim liner and flashings etc as required. Re-bed original stone ridge/gable coping stones.

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- 6.7 Provide substantial steel strap 'L' shaped ties at 450mm max centres between the first floor construction and the outer walls to help prevent any further outward bulging of the external load bearing walls from potential horizontal roof thrusts ties to be plugged and screwed to masonry and securely fixed to timberwork.
- 6.8 Replace lintels above double door opening. Repair or rebuild defective/cracked stonework above, both internally and externally.
- 6.9 Cut back and repoint all cracks to internal plasterwork.
- 6.10 Take down stonework local to roof dormer. Check the nature of the existing cracking problem and rebuild/repoint as necessary.
- 6.11 Obtain advice from Building Control officer on the acceptability of the existing timber floors.

Obtain specialist advice on condition of first floor timbers with woodworm infestation. Replace/supplement as necessary. All new timberwork to be woodworm treated.

I am of the opinion that if the above repairs are carried out the structural integrity of the building will be assured for many years to come.



LIMITATIONS

The observations and conclusions given in this Report are, of necessity, based on a visual inspection of those areas which were readily accessible to view at the time of the visit.

There may well be other underlying defects which were not readily apparent at the time and which could affect the conclusions reached and the cost of remedial work

C Fenby C Eng. MICE, MIStruct.E