

STRUCTURAL INSPECTION

OF

**BARN AT WITTONS FARM
BOLTON-BY-BOWLAND**

ON BEHALF OF

MR STEPHEN FLANAGAN / IWA ARCHITECTS

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1.0 INTRODUCTION

Instructions were received from IWA Architects, acting on behalf of the building owner, Mr Stephen Flanagan, to carry out a structural inspection of a barn building at Wittons Farm, Bolton-by-Bowland. The barn has until recently been used for agricultural purposes.

It is proposed to convert the barn to residential accommodation. The purpose of the inspection was to assess its current structural condition and to make recommendations on any essential structural repairs considered necessary as part of conversion and general refurbishment works.

Mr John Reid BSc CEng MICE MStructE of Reid Jones Partnership Ltd carried out the structural inspection on Monday 26th June 2017. Photographs taken during the survey are included within Appendix A. Key plans are shown in Appendix B.

The inspection was of a visual nature, and no opening up of the fabric of the building was carried out.

This report shall be for the sole use of IWA Architects, Mr Flanagan and his professional advisors and shall not be relied upon by any other party without the full written consent of Reid Jones Partnership Ltd.

2.0 DESCRIPTION

For orientation purposes, the right- and left-hand sides of the building are those viewed when standing at the front of the property and looking directly at the front wall. The wall with the main arched entrance doorway is deemed to be the front wall of the building.

The property is a stone-built barn and has the date 1826 marked on the keystone of the arch above the main front door. It is generally single-storey, with a small first floor workshop accessed from an external stone stair located at the front right-hand corner (**photo 1**). A hay loft is provided above livestock stalls, also on the right-hand side of the barn. There is a single-storey lean-to shippon at the rear of the main barn, extending its full length (**photo 2**).

The walls of the barn are of traditional, solid, random stone masonry. The main roof is of stone slabs supported on timber rafters, timber purlins and timber queen-post trusses in the middle part of the barn, or sloping timber beams at the front (**photo 3**). The roof of the shippon is of modern steel sheeting supported on timber purlins and sloping timber beams. The upper floor of the hayloft is of relatively modern construction, of timber boarding on sawn timber joists supported by steel beams and posts (**photo 4**). The floor of the workshop is of older, perhaps original, construction, with rough timber boarding and hewn timber beams. The floor of the main part of the barn is of earth or stone cobbles. The floors of the shippon and other livestock areas are of concrete.

3.0 OBSERVATIONS

The following observations were made during the inspection of the property: -

Internal – Roof Timbers

- In the main part of the barn, areas of missing and broken slates have allowed rainwater to cause localised damage to the roof timbers.
- The rafters and purlins closest to the left-hand gable are worst affected, in particular the lowest purlin on the left, which shows signs of advanced decay (**photo 5**). All purlins which are supported on the left-hand gable wall show signs of decay (**photo 6**).
- The roof truss closest to the left-hand wall shows signs of staining and localised decay (**photo 7**).
- A purlin above the workshop shows signs of water staining and localised decay (**photo 8**).

Internal – Walls

- There are signs of separation between the internal wall and the right hand gable wall, with a vertical crack forming at the junction (**photo 9**). A steep diagonal crack was noted close to where the rear wall joins the right-hand gable wall (**photo 9a**).
- A timber lintel above an opening in the wall between the hay loft and the workshop shows signs of widespread insect infestation. The opening has now been filled with stone masonry (**photo 10**).
- A wide vertical crack extending over most of the height of the left-hand gable wall has been filled with mortar (**photo 11**).
- There is a vertical crack in the wall on the left-hand side of the main entrance, extending from door head to roof level on the inside face (**photo 12**), and from ground level to roof on the outside face (**photo 13**).
- In the room to the left of the main entrance, the first floor has been removed leaving holes in the walls where the floor timbers had been supported (**photo 14**). The area above the window is badly distorted and bulges inwards.
- The rear wall leans towards the shippon, most noticeable at the left-hand side (**photo 14a**).

Internal – First Floor

- The timber first floor to the workshop shows extensive signs of decay (**photo 15**).

External

- A tapered vertical crack of up to 5mm in width has formed between the right-hand wall of the shippon and the main barn wall (**photo 16**).
- The right-hand gable wall curves outwards, with a bow of around 50-100mm at the top (**photo 17**).
- The stone arch above the main entrance door bows outwards (**photo 18**).
- There is a crack of around 10mm in width at mid-height near the front of the left-hand gable wall (**photo 19**).
- The vertical crack towards the rear of the left-hand gable wall noted internally also appears on the outer face. It has been filled with mortar but has re-opened to a width of around 10mm (**photo 20**).
- The left-hand gable wall shows a slight inward lean at the top.

4.0 CONCLUSIONS AND RECOMMENDATIONS

The barn is in reasonable condition and no signs of serious structural defect were noted.

The roof timbers of the main barn are in reasonable condition but have experienced localised decay where subjected to rainwater ingress due to missing slates, or to damp penetrating the stonework at purlin, truss and rafter bearings. We would recommend that the rafters are replaced, the purlins inspected and replaced where necessary, and the main timber roof trusses inspected and repaired as required, with particular attention given to the truss bearings at the walls.

The roof of the shippon is of modern construction, with profiled steel sheeting and treated sawn timber. Though no signs of structural defects were noted, the roof structure will need to be replaced or strengthened if a heavier slated roof covering is proposed.

The original first floor in the workshop is badly decayed and should be completely replaced. The more modern floor to the hayloft is in good condition, though again may need to be replaced as part of any proposed conversion works.

The walls are reasonably straight and vertical apart from where noted in the previous section. Defects are generally associated with a lack of bonding at wall junctions, and cracking due to thermal movement. No signs of significant foundation movement were noted. Cracks in the stonework should be repaired by stitching, either with bonding stones or with steel reinforcement set in epoxy resin or concrete bond beams. Minor cracks and open joints in the stonework should be raked out and pointed with lime mortar. The upper part of the right-hand gable wall may need to be re-built to correct the outward lean. We would recommend that all timber lintels are removed and replaced with new concrete items. Poorly consolidated areas of stonework, mainly to in-filled windows or doors, should be re-built.

The existing ground floor should be removed and replaced by a new concrete ground slab, insulated to current standards.

APPENDIX A
PHOTOGRAPHS



Photo 1 – Front of Barn



Photo 2 – Rear of Barn



Photo 3 – Roof Structure



Photo 4 – Underside of Hayloft above Livestock Stalls



Photo 5 – Left-Hand Gable - Decayed Purlins and Rafters



Photo 6 – Missing Slates and Damaged Timbers



Photo 7 –Stained and Decayed Roof Truss



Photo 8 – Stained and Decayed Purlin over Workshop



Photo 9 – Separation between Right-Hand Gable Wall and Internal Wall



Photo 9a – Steep Diagonal Crack where Rear Wall joins Right-Hand Gable



Photo 10 – Decayed Timber Lintel

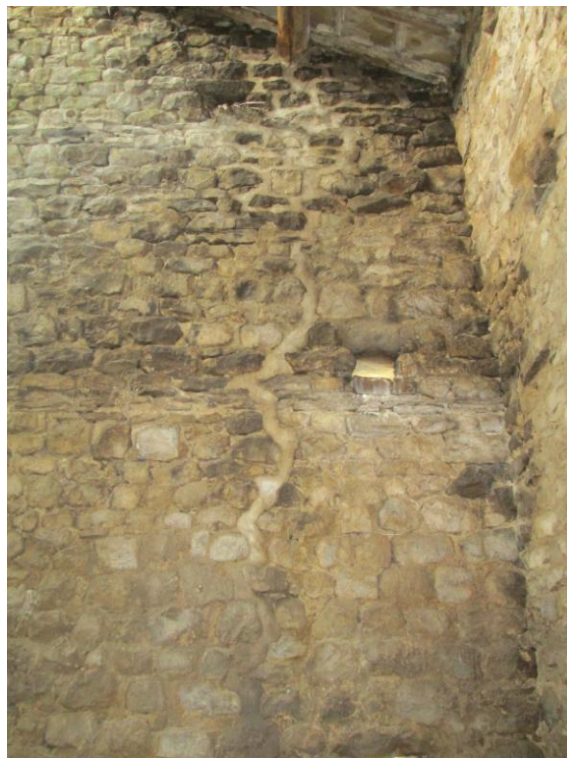


Photo 11 – Repaired Crack in Left-Hand Gable Wall



Photo 12 – Crack in Internal Face of Wall on Left-Hand Side of Entrance



Photo 13 – Crack on External Face of Wall to Left-Hand Side of Entrance



Photo 14 – Holes in Front Wall where First Floor Removed



Photo 14a –Rear Wall leaning towards Shippon



Photo 15 –View of Decayed Workshop Floor Beams



Photo 16 – Separation between Shippon and Barn



Photo 17 – Outward Curvature of Right-Hand Gable



Photo 18 – Outward Bow of Arch Stonework above Main Entrance



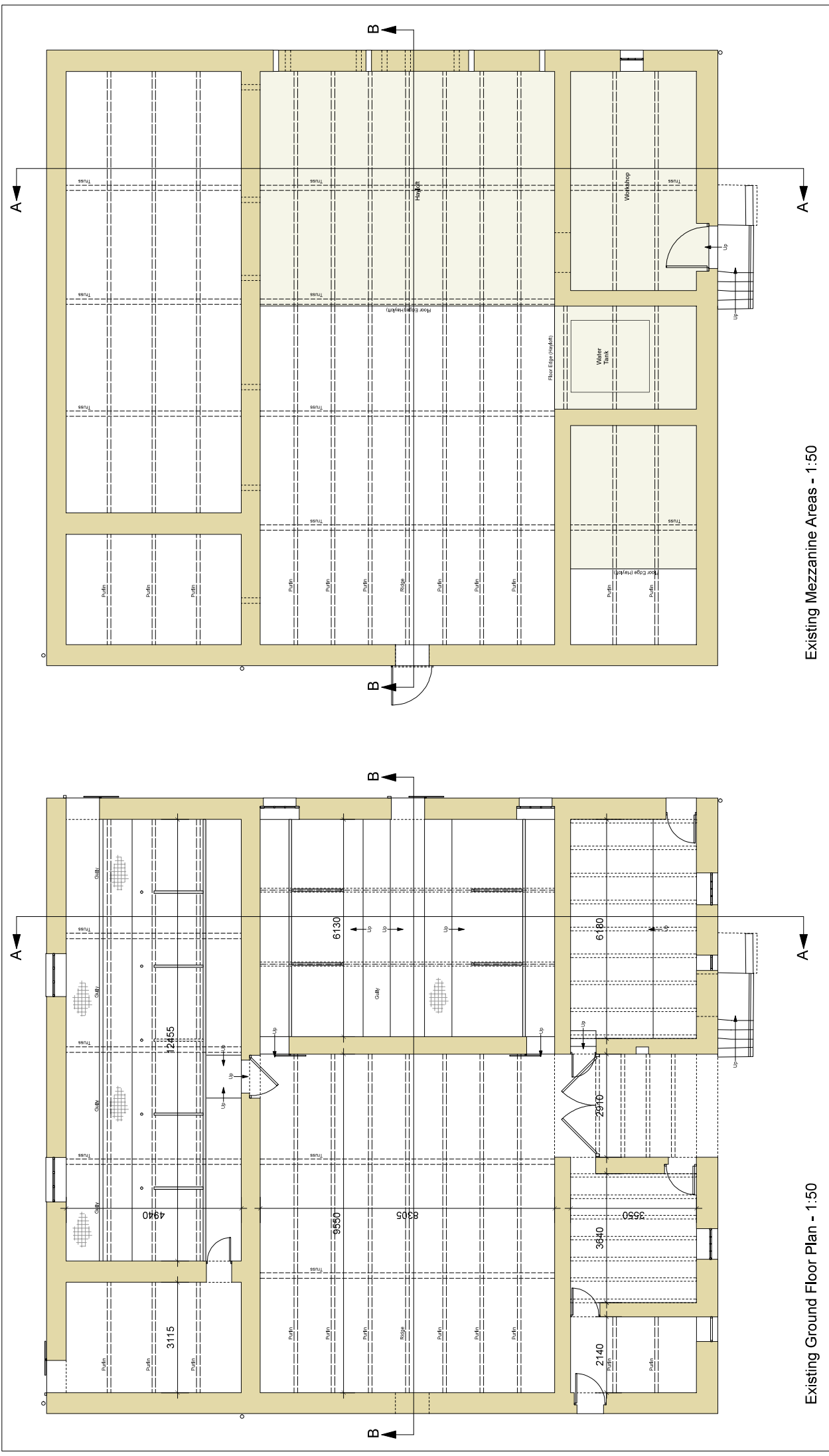
Photo 19 – Crack in Left-Hand Gable Wall (Front)



Photo 20 – Crack in Left-Hand Gable Wall (Rear)

APPENDIX B

EXISTING PLANS, ELEVATIONS AND SECTIONS



Existing Ground Floor Plan - 1:50

Existing Mezzanine Areas - 1:50

Size	Description
1:50	1:50

Wilkone Farm
Forest Beck, Bolton-by-Bowland

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Existing Plans

Draw. No.	1822-E.003	Rev.	1
Date	Nov '11	Scale	1:50@A1

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Dimensions should not be scaled. All dimensions to be checked on site.

1:50

0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100

