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**VISUAL STRUCTURAL INSPECTION  
OF THE  
BARN BUILDING  
ADJACENT TO  
ARLECDON FARM  
ARLECDON  
CUMBRIA**



**FOR**

**MR PARSONS**

**Reference - WDS/05/9333/REP01**

**Date - 22/07/2025**

**WDS/05/9333/REP01**

## **1.0 BRIEF**

- 1.1 WDS Limited were instructed by Mr Parsons to carry out a structural inspection of the Barn Building adjacent to Arlecdon Farm, Arlecdon. The purpose of the inspection was to verify whether the existing barn building is adequate to convert into dwellings. The survey was limited to a visual, non disruptive inspection of the building where access allowed.
- 1.2 The buildings comprises two storey detached barn which is formed in random sandstone rubble filled masonry walls which support a traditional timber rafter, purlin and king post truss roof structure. The first floor comprises a joisted structure supported off walls and timber beams, the ground floor comprises a ground bearing concrete slab. There is a single storey lean-to off the rear of the building, we understand that this is to be demolished as part of the conversion scheme. Off the right hand gable is a ramp which leads up to the first floor level; this comprises flank retaining walls which support the infill ground which forms the ramp; the right hand gable wall of the barn is retaining up to first floor level..
- 1.3 The original building is well over 100 years old.
- 1.4 The inspection was carried out on the 26<sup>th</sup> June 2025. On the day of the inspection the weather was overcast but dry.
- 1.5 It should be noted that there may be faults with the building which are masked or hidden by finishes that are not normally identified during a non disruptive inspection.
- 1.6 The foundations to the buildings were not exposed at the time of this inspection therefore no comment can be made as to their condition at this time.
- 1.7 For the purposes of this report all locations will be referenced as if looking at the front elevation of the barn, that is the elevation which faces the adjacent highway.

## **2.0 OBSERVATIONS**

- 2.1 Generally the walls appear to be in an adequate structural condition. Externally the masonry is weathered and in need of pointing. There are some minor cracks apparent however these are due to historic movement. There are also a number of timber inserts and lintels which have been affected by infestation and rot and in need of replacement. The left hand gable wall has been subject to structural movement with a significant outward bow apparent.

Furthermore there is separation cracking at the front left hand corner caused by the movement to the gable. It appears that some remedial works have been carried out to the gable over the years including partial rebuilding in block however the gable is still excessively out of plumb. The gable is in need of demolition/rebuilding. See photograph 01 attached.

- 2.2 The retaining wall to the approach ramp leading to the entrance on the right hand gable is bowing outwards and has locally failed. See photograph 02 attached.
- 2.3 As noted the rear lean-to is to be demolished. These have rotated away from the main barn with significant separation cracking apparent between the extension and main barn walls. See photograph 03 attached.
- 2.4 The roof structure is to be retained as part of the barn conversion. The roof appears adequate however the various timber elements to be retained will need inspected by a timber specialist to check for infestation and rot. Similarly a structural assessment of the elements will need made to current structural design standards where they will carry additional loading, this may dictate strengthening works. See photograph 04 attached.
- 2.5 We understand that the first floor structure will be replaced as part of the conversion scheme, therefore no further comment will be made concerning the floor joists.
- 2.6 The foundations to the property were not exposed during this inspection however considering the use of the building we see no issue with the existing walls and foundation structures supporting the loading associated with a domestic property. We would however recommend that trial holes are excavated at the corners of the barn to expose the depth of the footing. This is required to ensure that the floor slab specification can be provided such that undermining of the walls is prevented during construction.

### **3.0 DISCUSSION/RECOMMENDATIONS**

- 3.1 The left hand gable to the barn needs rebuilt from ground to roof line off a new foundation and fully built into the return front and rear walls. Elsewhere the walls are in an acceptable condition with no significant structural remedial works necessary. The provision of a refurbished roof structure and first floor will greatly enhance the lateral rigidity of the barn. As a minimum the walls need re-pointed and all timber inserts and lintels replaced with precast concrete elements. Any cracked masonry should be re-tied by inserting 750mm long Spanlite lintels into the wall across the crack location at 450mm

vertical centres. Alternatively where the stone masonry is to remain exposed Helifix Ltd's masonry crack stitching system can be adopted.

- 3.2** The roof structure, if to be retained, will need inspected by a timber specialist to check for infestation and rot and treated accordingly. It is likely that the purlins will need strengthened as will the rafters to accommodate the additional loading associated with a new insulated roof build up.
- 3.3** If the access ramp off the right hand gable is to be retained then the bulged masonry flank wall will need locally rebuilt.
- 3.4** We recommend that a trial hole is excavated at each corner of the barn to expose the base level of the wall such that the ground floor slab and insulation detail can be specified to ensure that undermining of the wall does not occur during construction.

#### **4.0 CONCLUSION**

- 4.1** The barn building is generally in an adequate structural condition, however the left hand gable will need rebuilt (less than 20% of the existing total wall areas) and general refurbishment of the masonry walls is necessary. It is our opinion that following the completion of the remedial works outlined above the barn will be structurally suitable to be converted into a domestic property. The conversion of the property into a dwelling will remedy all current faults and strengthen the building thus securing its long-term retention as a heritage asset.

For and on behalf of WDS Limited

Tom Short BEng (Hons) CEng MICE



PHOTO 01 SIDE VIEW ON GABLE AND CRACKING



PHOTO 02 VIEW ON ACCESS RAMP RETAINING WALL





PHOTO 03 REAR LEAN TO SEPARATION CACKS



PHOTO 04 VIEW ON ROOF STRUCTURE