



Project Title:
Wern Farm - Barn Surveys, Tredunnock, Usk, NP15 1PE

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FCE (Wales) Ltd

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STRUCTURAL APPRAISAL

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1 Introduction

- 1.1 Austin Partnership have been appointed by FCE (Wales) Ltd to undertake a structural appraisal of two existing barns at Wern Farm in Usk, South Wales.
- 1.2 The purpose of this report is to consider the age and condition of the structure, its previous use, the type of construction, any nearby buildings or structure and its suitability to be converted for change of use.
- 1.3 An inspection of the property was undertaken on the 5th November 2020 by Gavin Fairclough BSc (Hons) CEng MStructE, of Austin Partnership Ltd. The weather on the day of the survey was dry and sunny.
- 1.4 We have been advised that the client is intending to convert the existing agricultural buildings into residential dwellings for holiday lets.
- 1.5 This report covers the findings from the visual, non-intrusive survey. No testing, sampling or analysis has been undertaken as part of this survey report.
- 1.6 The contents of this report only refers to the two existing barns shown in the photographs included within this report and does not cover any other buildings on site.



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The conclusions resulting from this study and contained in this report are not necessarily indicative of future conditions.

2 Observations

- 2.1 The two existing barns under discussion are located on Wern Farm, in Tredunnoch, near Usk in South Wales. The grid reference is ST 37942 95382, Easting = 337942 and Northing = 195382. The location is indicated on the satellite image below (Figure 1). At the time of writing, FCE (Wales) Ltd are developing proposals to convert the existing barns into residential dwellings for holiday lets.



Figure 1 - Wern Farm location

- 2.2 The two agricultural buildings are thought to be around 20 years old.
- 2.3 The buildings are single storey and have a monopitch roof. The roof covering is a corrugated metal sheeting, which is supported off a series of timber purlins. The purlins are in turn supported by a series of timber rafters, which bear directly onto concrete blockwork walls. Typically there are blockwork piers at the locations where the rafters bear on the wall. There is concrete slab at ground level. It is assumed that the slab is ground bearing and that there is a reinforced edge thickening below the masonry walls.
- 2.4 Barn 1 (see Photograph 1) is approximately 5.8m wide, 12.7m long and the height varies from 2.9m to 2.7m. The wall panels are a mix of single skin blockwork (100mm thick) and block on flat (215mm thick), generally with stretcher bond pattern. The blockwork is generally fairfaced. There are piers which are 440mm square and positioned at a maximum spacing of 4.7m.
- 2.5 Barn 2 (see Photograph 2) is approximately 4.35m wide, 13m long and the height varies between 2.7m to 2.4m. The wall panels are a mix of single skin blockwork (100mm thick) and block on flat (215mm thick), generally with stretcher bond pattern. The blockwork is generally fairfaced. There are piers which are 440mm square and positioned at a maximum spacing of 4.6m.

- 2.6 Both buildings have 100 x 100 timber purlins spaced at approximately 1050mm centres with a maximum span of 4.7m. Timber rafters, which are 275 x 75mm, support the roof purlins and have a maximum span of 5.8m.
- 2.7 There are no other adjoining buildings. There is an elevated fuel tank next to the entrance of Barn 1.
- 2.8 Barn 2 has had part of the front wall rebuilt. This new section is not fairfaced blockwork.
- 2.9 There were no movement joints in the wall panels. Typically these should be located at a maximum of 6m centres to allow for thermal expansion and contraction.
- 2.10 The edge purlins have been strapped to the blockwork walls. Generally, the purlins are visibly deflecting at mid-span. The size of the timber is inadequate for current design standards.
- 2.11 The timber rafters bear on the full thickness of the blockwork piers meaning the ends are exposed on the external face. It is unclear whether the existing timbers are tanalised.
- 2.12 There is a hole in the metal corrugated roof in Barn 2.
- 2.13 There are signs of cracking to several corners of the buildings. Stepped and vertical cracks (up to 7mm width) extend through the mortar joints and blockwork. There are also some open and loose mortar joints which indicate movement. The cracks and open joints are signs of thermal movement and differential settlement.
- 2.14 There is a stepped crack in the corner of Barn 2 that is wider at the top when compared to the bottom. This suggests local subsidence.
- 2.15 There is significant vegetation growth on several external elevations. This should be removed to prevent damage to the blockwork walls.
- 2.16 There are several trees in close proximity to the buildings. Trees absorb water from the soil which can cause consolidation and settlement of shallow foundations. The tree roots can also damage any nearby foundations.





Photograph 1



Photograph 2



Photograph 3



Photograph 4



Photograph 5



Photograph 6



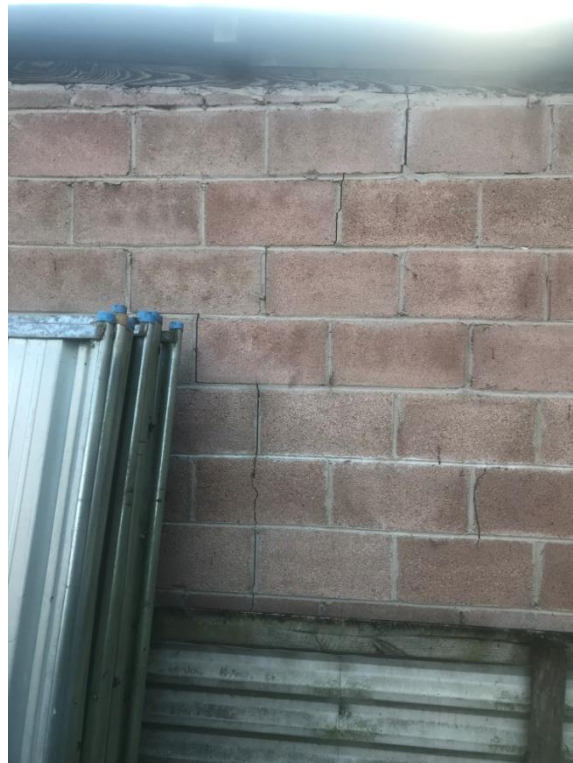
Photograph 7



Photograph 8



Photograph 9



Photograph 10



Photograph 11



Photograph 12





Photograph 13



Photograph 14



Photograph 15



Photograph 16





Photograph 17

3 Recommendations

- 3.1 The existing barns have been built as agricultural storage buildings. Therefore, they do not comply with current building regulations for residential properties and would require significant works in order to convert them.
- 3.2 Prior to any demolition/construction works commencing, the Principal Contractor should ensure that all existing services are located and disconnected from the building. Electricity and water services need to be isolated or disconnected before any demolition work begins. If this is not possible, pipes and cables must be labelled clearly, to make sure they are not disturbed.
- 3.3 Due to the age of the existing buildings it is unlikely that there is any asbestos present, however it is still recommended that a R&D (Refurbishment & Demolition) asbestos survey is undertaken prior to any demolition/construction works commencing. The survey will identify any materials containing asbestos that will need to safely removed and disposed of by a licensed contractor.
- 3.4 The roof in Barn 2 is damaged and needs to be repaired. If the properties are to be converted into residential dwellings the entire roof structure would need to be replaced.
- 3.5 The existing walls are not of cavity wall construction and are not insulated. There are several cracks which are likely to have been caused by thermal expansion and differential

settlement. If the properties are to be converted into residential dwellings the wall structure would need to be replaced.

- 3.6 There are several trees in close proximity to the barns. If the properties are to be converted into residential dwellings the trees should be removed (we would recommend an arborculturalist is consulted) and the foundations would need to be replaced.
- 3.7 Below ground drainage for foul and storm water connections will need to be installed if the properties are converted to residential dwellings.

4 Conclusions

- 4.1 The client is looking into the feasibility of converting two existing barns into residential dwellings for holiday lets.
- 4.2 The form of construction is loadbearing masonry and typical of agricultural store buildings.
- 4.3 We are of the opinion that both buildings are exhibiting signs of structural distress and serviceability failure. Therefore, we are of the opinion that these buildings are not suitable for conversion without significant repairs and reconstruction works, meaning that the demolition of the existing barns and construction of new purpose built units would be the best and most cost effective solution.

