



Project Title: Willow Farm, Fenn Lanes,
FENNY DRAYTON, CV13 6BJ

Client: Mr C Hunt

Report Type: Structural Appraisal Regarding
Conversion of Agricultural Barn

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Project No. PW-23-03-03



19 Coleridge Place
Bourne
Lincolnshire
PE10 9WA
T:01778 420269
M:07902 538309
E:peter.wood@pwstructural.co.uk

Tel: 01778 420269
Mob: 07902 538309

19 Coleridge Place
Bourne
Lincolnshire
PE10 9WA

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**STRUCTURAL APPRAISAL REGARDING CONVERSION OF
AGRICULTURAL BARN INTO PRIVATE RESIDENCE**

1.0 Introduction

1.01 This report has been prepared following receipt of instruction to inspect the barn and assess the existing structure in consideration of the alterations required in respect of the proposed conversion of the structure into a private residence.

1.02 This inspection report is intended to identify the condition of the structural elements and review their structural capability for incorporation into the proposed private residence.

1.03 An inspection visit was made in the morning of 17th April 2023. The inspection was carried out during overcast conditions with light rain.

1.04 The inspection was non-intrusive.

2.0 Synopsis of Observations and Recommendations

- 2.01 The integrity of the main structural members of the barn is generally good and, with some minor strengthening, they could be integrated into a development to provide support for the proposed domestic dwelling within the footprint of the existing barn.
- 2.02 The roof covering is considered to be asbestos cement and if so proven, should be replaced.
- 2.03 New perimeter blockwork walls, and new floors, will require the installation of a damp-proof course/membrane.
- 2.04 Existing timber purlins and sheeting rails could be upgraded to steel work to support the addition loads
- 2.05 Steel diagonal bracing should be provided in the plane of the roof and in the elevations of the western barn.
- 2.06 Building Foundations could not be observed.

3.0 Observations

- 3.01 The barn structure comprises of four steel portal frames which divide the building into three equal bays. Each frame consists of four columns and five haunched rafters which are bolted together. The portal frame action provides stability in one direction. In the direction parallel to the ridge, stability is provided by timber eaves beams, purlins and sheeting rails and possibly by the external cladding.
- 3.02 It is apparent that the building is made up of an original single span barn and two extensions. The first extension is a simple “lean-to” extension to the east of the original barn. The second extension is a portalised frame further to the east. The eaves of the second extension are higher than the first extension eaves by over 1m. This would require snow-drift loading to be considered in the proposed development.
- 3.03 Each end elevation includes a steel gable post which extends up to eaves level.
- 3.04 The roof covering of the barn is corrugated sheeting which may incorporate asbestos in its manufacture. The sheeting is supported by timber purlins and fixed to the purlins using large diameter screws fixed into the purlins. The purlins provide lateral support to the portal frame. Some minor additional bracing between

would be required to support a modern insulated roof

- 3.05 The wall sheeting to the original barn and extension 1 is single skin steel profile cladding. It is fixed directly to timber sheeting rails. The profile is similar to the TKS1000-4 profile currently produced by Kingspan.
- 3.06 The second extension is open on one long side. The gable ends are clad with vertical timber pales spaced to allow an airflow to pass between the pales.
- 3.07 The steel frame is in good condition with almost negligible corrosion visible.
- 3.08 The floor is a ground bearing concrete slab with finished floor level being nearly 400mm above existing ground level.

4.0 Suitability for Conversion

- 4.01 It is understood that the conversion should include a mezzanine floor, in the original building only, to provide additional accommodation.
- 4.02 The steel frame is considered adequate to support the external envelope of the proposed residence and the proposed mezzanine floor with suitable remedial works. The mezzanine floor reduces the effective length of the existing overstressed stanchions and thereby provides adequate strengthening.
- 4.03 The existing purlins can be incorporated within the new building but will require some additional bracing to meet building regulations
- 4.04 The existing cladding, if retained, will need to be insulated. Consideration will need to be given to “cold-bridging” effects during the detailed design phase.
- 4.05 The UK interactive Radon Map indicates that the maximum radon potential for the 1km square that covers the site is less than 1%. If a radon report confirms this then any new lowered slab can be a ground bearing slab with a combined radon/damp proof membrane below.

5.0 Conclusion

- 5.01 The existing building is suitable to be converted into a domestic residence in line with the Building Regulations, keeping the intrinsic structure of the barn and retaining its overall envelope. Structural design details need to take into

consideration the overall stability of the building during the construction and subsequent phases of the life of this building.

Peter Wood, Director
BSc CEng MICE MStructE