

Popeley Farm, Gomersall – Addendum to structural inspection report for planning (Barns 1 & 2)

Version: 1.0

Description: For client and planning approval

Introduction

Following our previous report on Barns 1 and 2 at the Popeley Farm site (dated 04/09/2023), we have been informed of changes to the construction of the proposed dwellings which materially change the conclusions of our initial report.

The previous report stated that the steel frame barns were suited to conversion subject to the following structural recommendations (copied from the original Barn 1 report, but also relevant to Barn 2):

- *The roof covering being specified with a sufficiently lightweight build-up to manage the spreading effect at the eaves and stresses / deflections in the purlins,*
- *Lateral and longitudinal stiffening / bracing of the portal frames may be required to manage wind deflections, notably on the open side. This may most conveniently be achieved by provision of masonry or timber infill panels between the frames to form the building envelope.*
- *The foundations and the soil they bear upon should be exposed during works and confirmed against the likely increase in loading associated with conversion to a dwelling.*

Proposed changes

We have become aware of changes to the proposed building envelope of both barns which involves retaining the / installing profiled steel cladding and roof sheets to form the weatherproof building envelope.

These changes are highlighted in the following drawings supplied to us:

- *23.111.1109A – Unit A Elevations As Proposed (003).pdf*
- *23.111.1209A – Unit B Elevations As Proposed (003).pdf*
- *23.111.1210A – Unit B Elevations As Proposed (003).pdf*

Structural implication

The implication of this is significant structurally since:

- Once repaired, made good and sealed for continued use, the profiled sheets to the walls and roof will be a similar weight to what is currently being supported by the steel frames. Assuming new elements such as insulation, membranes etcetera can be arranged independently of the sheets, the overall loading on the frames will be largely unchanged, which implies that the steel frames would remain suited without further modification. (Refer to the first bullet point in the introduction section above).
- The existing steel frames lack any formal bracing for stability. To date, the lateral stiffening has been taken care of by virtue of the 'stressed skin / diaphragm'¹ action of the cladding sheets, and this function may be assumed to continue in the future if the sheets are retained. Lateral stiffening is less of a concern in the updated scheme since the profiled steel envelope is much more tolerant to movements arising from lateral forces and the roof sheets are likely to form a diaphragm to transfer any lateral loading to the very stiff gable panels to manage

¹ Profiled steel cladding and roof sheets can act in a 'stressed skin' / 'diaphragm' manner to stabilise the steel frames by virtue of their inherent in-plane stiffness to transfer lateral and longitudinal (wind) loads to the foundations.

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any undesirable lateral deflections. (Refer to the second bullet point in the introduction section above).

- A small change in the loading on the steel frames implies a similar small change to the loading on the foundations and therefore it may be implied that the existing foundations to the steel frames are likely to be suited to further service. This said, it is always good practice to expose foundations during any redevelopment project and therefore we believe that this recommendation should remain. (Refer to the third bullet point in the introduction section above).

Updated conclusions

Our updated conclusions are that Barns 1 and 2 are suited for conversion, subject to the following general recommendations:

- Retain/reinstall/install the profiled steel cladding and roof sheets, with sufficient connection to the primary steel frames and between the sheets to develop a stressed skin / diaphragm bracing effect to stabilise the frames.
- Checks on any cement fibre type roof sheets / cladding present for asbestos before starting works.
- The unknown foundations and the soil they bear upon should be exposed during works and confirmed for suitability.