

Popeley Farm, Gomersall – WORKSHOP Structural inspection for planning

Version: 1.0

Description: For client and planning approval.

Summary

An inspection of two steel portal frame barns, one traditional masonry field barn and one masonry workshop structure at Popeley Farm was performed by Richard Lines C.Eng, MStructE on the 16th of February 2023. The four buildings have been named Barns 1 – 3 and the workshop, see section 1.0 for locations and definitions.



Figure 1: Satellite image of Popeley Farm, with the four structures inspected highlighted red (base image credit: Google Earth Pro.)

The workshop is suited to conversion subject to the following recommendations:

- Underpin the masonry walls to firm ground,
- Provide adequate drainage to the rainwater downpipes,
- Check the capacity of the timber roof structure by calculation according to the proposed roof build-up, strengthening or stiffening as required,
- Inspect all timbers to be retained and replace the missing strut elements from the two incomplete trusses,
- Make good any cracks,

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- Replace all lintels, and
- Reinstall the weathertight envelope to protect the timber structure behind, checking the cement fibre type cladding to the gables for asbestos before starting works.

This inspection was concerned only with the structural aspects that were visible at the time. The structure was not dismantled, and it is assumed that the aspects visible were representative of the rest of the structure.

Any recommendations that are made are from the point of view of the author on the potential for conversion from a structural perspective and does not make any conclusion on the economics of conversion or the likelihood of the proposals achieving planning permission or meeting current building regulations.

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1.0 Site observations and layout

The inspection described in this report was carried out on a cool, overcast day with brighter intervals by Richard Lines C.Eng, MStructE on the 16th of February 2023. The barns are situated off of a private track from Muffit Lane, Gomersall in open grazing land. The site is situated on top of a small hill and is locally flat. No large scale drainage or geotechnical issues were apparent.

According to the British Geological Survey, the local bedrock geology is that of the 'Thornhill Sandstone' formation. In terms of surface deposits, no information is provided by the BGS geology viewer.

No local borehole records were available from the BGS, however clusters of investigations have been carried out around the extents of open land that Popeley Farm is situated on.

- To the north west, (BGS ref SE22NW476) trial pit investigations indicate sandstone at around 600mm below ground level,
- To the northeast, borehole (BGS ref SE22NW1102) indicate firm clays to around 4.5m below ground level,
- To the south southeast, borehole (BGS ref SE22NW489) indicates around 500mm of clay overlying coal, and
- To the southwest, borehole (BGS ref SE22NW340) indicates weathered mudstone clays / mudstone directly underneath the topsoil.

The site is **within** the coal mining reporting area according to the Coal Authority interactive viewer.

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Reference to the various barn and workshop structures, in this report are made according to the definitions made in Figure 2. Figure 3 shows a more detailed plan of the structures with an indication of the arrangement of primary structural elements.

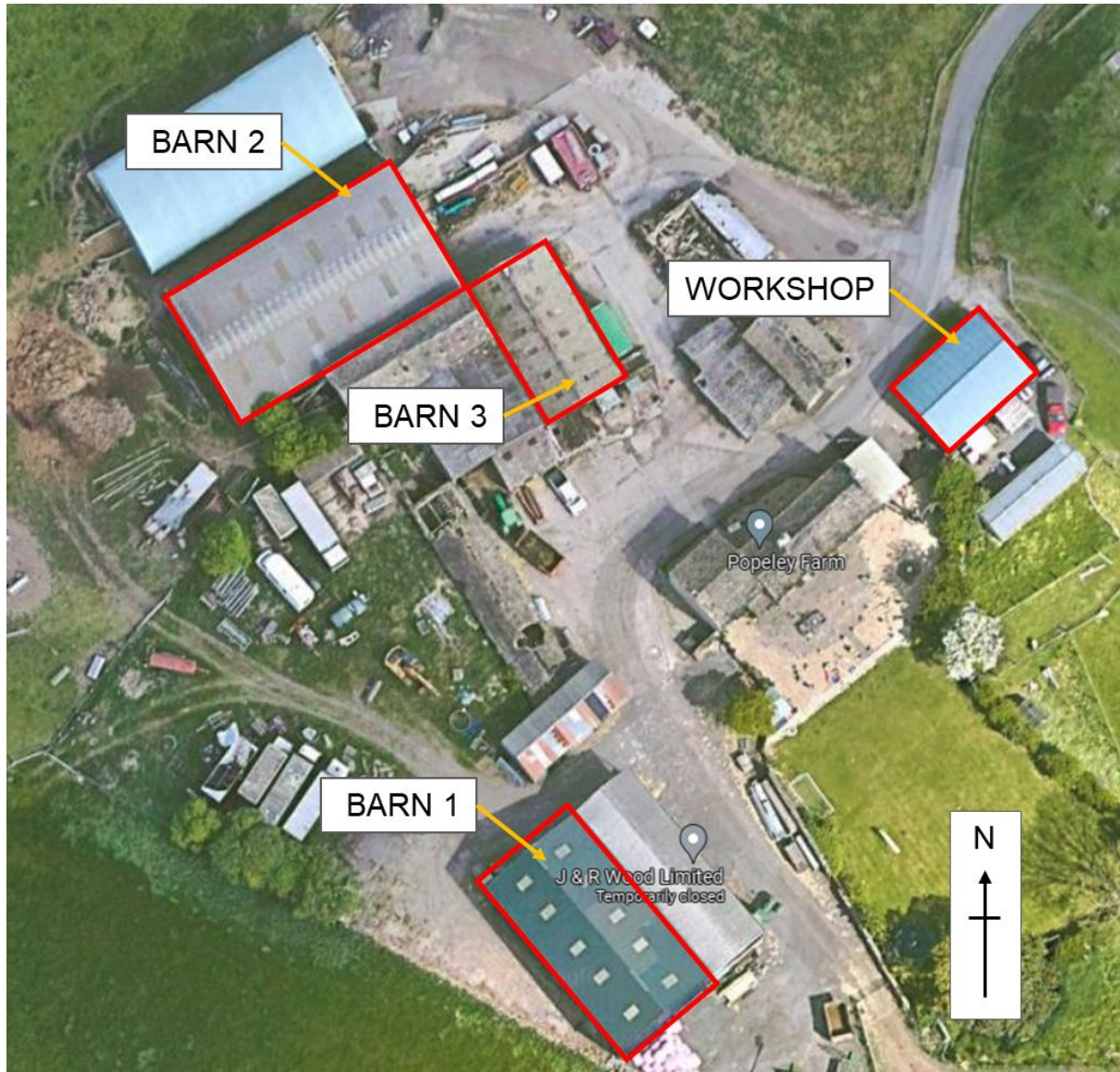


Figure 2: Site layout and nomenclature of the barn and workshop structures (base image credit: Google Earth Pro.)

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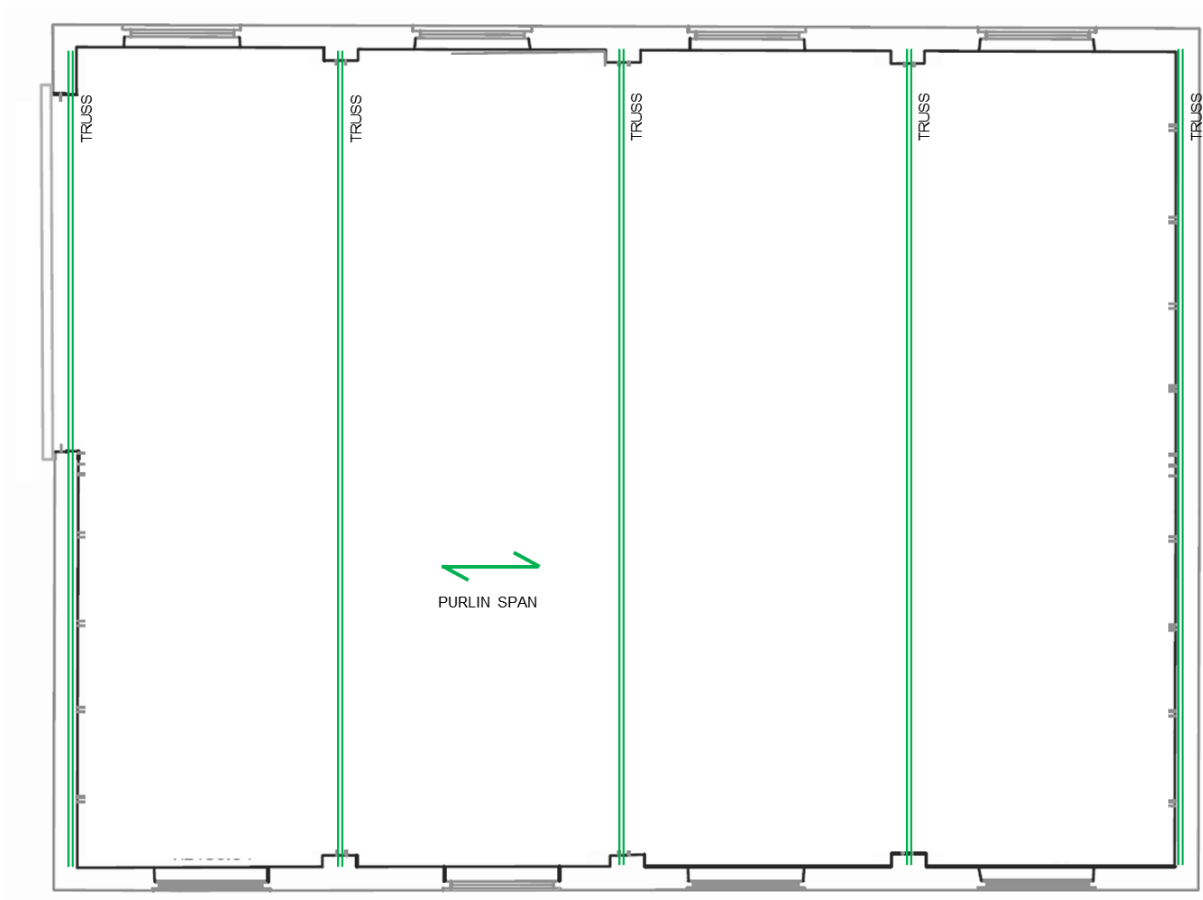


Figure 3: Workshop general structural arrangement (base image modified from MET Consultancy Group. original survey drawings)

2.0 Workshop

2.1 General comments

The workshop is a relatively lightweight construction, with a lightweight roof and provided with poor drainage and / or shallow foundations.

The masonry has remained stable to date and features piers under the truss locations intended to support and break the span of the side elevation panels.

Significant cracks are present which is related to the rainwater downpipes discharging at the rear gable, which has caused the gable to sink in the softened soil.

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- Inspect all timbers to be retained and replace the missing strut elements from the two incomplete trusses,
- Make good any cracks,
- Replace all lintels, and
- Reinstate the weathertight envelope to protect the timber structure behind, checking the cement fibre type cladding to the gables for asbestos before starting works.

2.2 Roof

The roof construction over the workshop is formed from profiled metal roof sheets, supported by five slender timber purlins per slope and five slender kingpost type trusses, two of which form the gable 'spandrel panels'.

The timber generally appears to be in good condition and free from significant decay or infestation. The capacity of these timbers should be checked against the proposed roof build-up by calculation. Strengthening works may be required, especially to the purlins.

Two of the five trusses have had the queen post timbers removed to facilitate roof storage, which should be replaced.

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Figure 4: Internal view of the roof in the Workshop.



Figure 5: One of two trusses in the workshop missing a queen post

2.3 Walls

General comments

The workshops are a basic masonry construction, with a red clay brick substructure which gives way to a cavity format of synthetic stone masonry units above. The lower portion of the walls are approximately 40mm wider than the upper portion with bevelled 'plinth' type units at the transition. Therefore it is supposed that the lower masonry format is a 100mm inner, 50mm cavity and 140mm outer, which transitions to a 100-50-100 format above.

Piers have been provided at the truss bearing locations which measure approximately 350 x 130mm (gross) measured from the inner face of the rendered walls.

South-western gable

The southwestern gable forms the primary opening into the workshop and features a sliding steel door mounted from the truss tie beam. Viewed externally, there is a small crack of around 2mm width running vertically, the cause of which is not immediately obvious.

The corrugated cement fibre cladding to the truss which forms the apex of this gable has become broken and detached at its lower edges and has exposed the untreated timber tie beam of the gable truss to the elements. The cladding should be reinstated to protect the timber structure behind.

The cement fibre cladding should be tested for asbestos.



Figure 6: External view of the south-western gable

North-eastern gable

The north eastern gable features two tapering cracks, the larger of which is around 20mm wide at eaves level and tapers to nothing at ground level. A second tapering crack is present which is 5mm at its widest point at eaves level and tapers to nothing at around mid-height of the masonry panel.

These tapering cracks typically relate to a rotational movement of the masonry panel. This rotation is most likely related to the rainwater downpipe which discharges directly to the ground at the northern corner.

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Figure 7: External view of the north-eastern gable, noting tapering cracks.



Figure 8: Detail view of the tapering cracks in the north-eastern gable

North-western elevation

The north-western elevation features four window openings, each complete with a cast in-situ concrete lintel. The trusses are located to bear on the masonry between these openings. The in-situ lintels are in a mixed condition, with some having lost their cover on the bottom outer corner. The inner leaf is a timber provision.

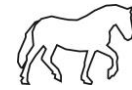
Following a level laser along a bed joint of the exposed red clay substructure masonry reveals that the masonry has dropped by around 65mm. This downward progression is greatest at the north-eastern gable and has developed a system of tapering cracks in the north-western elevation.

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Figure 9: Internal timber lintels and cavity in the north-western elevation

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Figure 10: The north-western elevation

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Figure 11: Internal and external tapering cracks in the north-western elevation

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Figure 12: Loss of cover to the cast in-situ concrete lintels.

South-eastern elevation

The south eastern elevation is obscured by a number of light lean-to structures, but shares a similar drainage arrangement and features a similar cracking pattern to the North western elevation. The cast in-situ lintels on this elevation have also lost cover to the bottom corners on the outer face.



Figure 13: Cracking to the masonry and lintels in the south-eastern elevation, noting the rainwater downpipe to image RIGHT.

2.4 Floor and foundation

The floor is a smooth concrete provision, which is likely to be suited to conversion provided no structural elements (such as columns) are supported by the floor surface

These floors are unlikely to be insulated or have modern damp proof provisions.

The foundations were not exposed for inspection, but are likely to be compromised due to the observed saturation of the soils which they bear onto from the rainwater drains. These foundations are likely to require underpinning.

Formal drainage should be provided to a suitable soakaway.



Figure 14: Detail view of the drainage provision to the downpipe on the eastern corner.

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Figure 15: The smooth concrete floor provision.

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3.0 Conclusions

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