ANTHONY-JOHNSON
Consulting Engineer Ltd

Site Address:

4 Clay Drove
West Pinchbeck,
Spalding.
PE11 3NB

Overview:

It is proposed that an existing barn be converted to residential use under a class Q application and the purpose of this survey report is to therefore consider the structure and the structural elements that might be retained as part of the conversion.

External Overview:

The barn comprises a duo pitch roof set to external elevations with gables each end, all rising to form a single story structure . The building is clad in timber on all elevations. Cladding on side and gable elevations is overlaid with felt, providing a water tight finish, preserving the underlying timber.



Image 1.0: External view of structure

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The roof structure is finished with a corrugated steel sheeting, laid to falls, running from Apex to eaves and suitably shedding rainwater away from the side elevations of the structure.



Image 2.0: View on rear elevation of structure

The roof structure appears visually straight, horizontal and without deviations. All elevations of the structure appear visually true running vertical and horizontal without significant deviations.

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Image 3.0: View on side elevation of structure showing intact roof.

A double timber door provides access via a concrete ramp at one end of the structure. The door is set within the timber framework to the gable end.

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Image 4.0: Double timber door to gable end

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Internal Review:

Internally, side elevations of the timber structure are formed of studs set at suitable centres, rising from a sole plate to the underside of wall plate at eaves level.



Image 5.0: Side elevation of structure

Timber rafters run from eaves to apex with intermediate support provided by a purlin. A high-level ceiling binder runs between opposing rafter pairs and provides support to the underside of the purlin. The entire roof structure is clad in timber boarding resulting in the formation of a solid structure with plate action within the roof structure removing torsion or twist from the horizontal plane of the building.

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Image 6.0: View of roof structure

Timber ranking props rise from side elevations to the underside of high-level ceiling binders, providing the structure with rigidity against horizontal sway perpendicular to the side elevation of the structure.

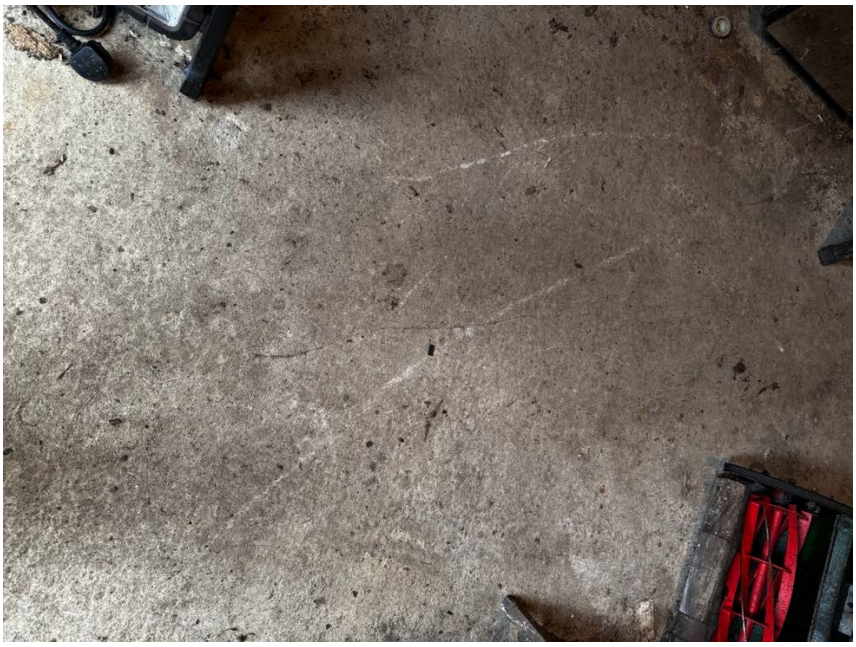


Image 7.0: View of existing concrete floor

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The floor is finished in a hand tamped concrete, likely mixed on site and laid in situ. The concrete floor appears in good condition with limited cracking reflective of restraint and the lack of suitable expansion joints. Vertical movement of the slab is not evident, indicating that it has been laid to a suitable sub-base.

The interior of the structure appears free from decay and timbers appear intact, functioning as originally intended, without deflection or deviation.

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Conclusion:

The existing building has been formed such that the ceiling binders prevent spread of the roof and side elevations when subjected to snow or wind loading in the plane of the building. Wind loading applied perpendicular to the side elevations of the building is carried via Gable elevations, raking timber bracing, plate action within the roof structure and flexure within the wall plates. These mechanisms of restraint should be replicated or retained as part of the proposed conversion.

Given the condition of the existing structural elements, it is considered that they may be subsumed into a proposed residential conversion. The conversion may retain timber framing to external elevations, including the existing cladding. The timber roof structure should be retained in its entirety. The structural elements are sufficient to allow for the replacement of existing corrugated steel sheeting with composite insulated steel panels. The existing concrete floor maybe subsumed into the proposed residential conversion.

Work should be carried out to ensure that the building meets current regulations through the introduction of sufficient insulation and materials sufficient to suitably limit the spread of fire.

The formation of internal partitions subdividing the building would allow for the removal of the raking braces with existing wall plate providing sufficient against sway. The partitions coupled with insulation and finishes would be sufficient to ensure a suitable fire rating is achieved.

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