



SHOWELL FARM
Showell
Chippenham
SN15 2NU



STRUCTURAL REPORT
ON
THE OLD GRANARY

Date of inspection

3rd October 2025

HEAD OFFICE BTA Structural Design Ltd, Street Farmhouse, Shipton Moyne, Tetbury GL8 8PN
T 01666 880532 F 01666 880541 E post@bta.co.uk

LONDON OFFICE 17 Devonshire Mews, London W4 2HA T 020 8995 0567

JGB Birdwood MA CEng MICE MStructE

Registered in England - number 4605547 address as Head Office

1. Introduction

We were appointed by Mr & Mrs Gary Bennett of Showell Farm, Showell, Chippenham Wiltshire SN15 2NU to report on the structural condition of The Old Granary framing at Showell Farm and its suitability for conversion to residential use.

This report is concerned only with this structural issue, all other aspects of the property are outside our report.

This report is prepared for the use of the above-named Client in connection with a planning submission only and is not to be relied upon by third parties without our specific written authorisation.

No exposing work was carried out. This report is based on a visual inspection.

A site visit was carried out in the morning of Friday 3rd October 2025. Weather conditions were overcast with short spells of light rain.

This report contains photographs of The Old Granary taken on the day of the inspection.

2. General Description

Showell lies about 3km due south of Chippenham. Showell Farm is located in the southern part of the hamlet, not far from the A350 main road.

The topography is generally level at about 50m Aod in this area. The immediate surrounds are open farmland.

The Old Granary is located directly south of the farmhouse. It is a listed building.

The Old Granary is a two-storey framed building, approximately 4.7m long by 4.3m wide by 6.5m high. It is raised off the ground by 8Nr. mushroom-shaped staddle stones. The ridge line is orientated on an east-west axis.

On the day of the inspection, the building was surrounded with scaffolding.

3. External Observations

Roof

The roof is duo pitched with a gradient of about 48°. There are half-height bonnet hips at each end, which face eastwards and westwards. The roof is currently sheeted with a weatherproof underlay. There are no battens or tiles fitted.

Each face of the roof appears to be of uniform gradient with no significant sagging or undulations present.

Walls

The barn comprises oak-framed walls throughout. None of the walls contain any masonry.

The framing comprise the following timber sizes :-

- 160 x 140mm corner posts
- 160 x 140mm centre posts
- 145 x 100mm intermediate posts
- 145 x 95mm intermediate posts
- 125 x 95mm intermediate posts
- 75 x 75mm gable posts

Each corner post is braced to two orthogonal directions with 145 x 95mm oak braces.

The south and west walls are unclad. The north wall has a significant amount of oak cladding. At the east wall, there is a small section at first floor level which is oak clad.

The cladding is double-boarded in places. Generally these comprise 30mm thick vertical boards set behind 20mm horizontal boards.

The roof gables have a layer of thermal insulation battened in place.

All of the external walls appear to be straight, square and vertical.

Base

The barn is set on 8Nr. 750mm high staddle stones, one in each corner and an intermediate stone on each elevation apart from the eastern side. The eighth stone is under the centre of the building.

The staddle stones are in two parts. They comprise a traditional 450mm square based truncated pyramid topped with a circular domed capstone. The latter minimises the pathway for moisture to travel into the base rails and beams.

It is unclear why there is no intermediate staddle stone on the east elevation.

The building is sitting hard onto all staddle stones. This indicates minimal and recent localised settlement.

4. Internal Observations

Roof

The primary roof structure comprises a central raise-collar truss spanning 4.3m north-to-south. This truss has 250 x 100mm principal oak rafters and a 130 x 95mm collar. The latter is set 800mm above eaves height, being lapped and bolted to each principal rafter.

There is a ridge beam, along with a single row of purlins to each roof pitch. The purlins are canted and are typically 95 x 145mm deep. They span between gables and the central truss, being tenoned into the face of the latter in a staggered arrangement.

The roof has in-plane bracing struts present.

The rafters are 100 x 80mm and spaced an average of 440mm apart. Plywood sheathing is overlaid on to these rafters. The base of the rafters bear onto 190 x 100mm eaves beams.

The primary gable beams are 170 x 150mm deep and are again sheeted on their external face with plywood.

Floors

The first floor has a 240 x 195mm central spine beam spanning north-south. The ends are shouldered into the central wall posts.

The first floor spine beam receives 140 x 60mm floor joists set at an average of 350mm spacing. The joists are notched into each side of the spine beam and span about 2.3m onto 100 x 75mm edge beams.

The first floor is partially decked with plywood.

The ground floor has a perimeter base frame comprising 215 x 140 mm deep oak beams. There is a 240 x 290mm deep central spine beam. This beam is orientated north-to-south, matching the span of the corresponding beam at first floor level.

The oak posts forming the walls of the building have pegged mortice and tenon joints into this base frame.

The ground floor joists are typically 145 x 60 mm and set at a similar spacing to those at first floor.

The ground floor is partially decked with Stirling board.

Annex

There is a small single-storey annex located 2.4m to the north of the Old Granary. This comprises a random rubble stone wall to eaves level and a timber framed roof structure.

The roof covering on this annex is profiled clay tiles.

5. Comments & Conclusions

Existing Building

The Old Granary is a robust, traditionally built, framed structure with generously proportioned beams, posts, joists and roof members.

The timber structure has undergone repairs and maintenance over its lifetime. These repairs have ensured its current excellent condition.

There is one section of the base framing, along the south side of the building, which is highly weathered. There are a few wall posts sitting on this beam, but no floor loading.

Proposed conversion

At the time of this report, we have no details of the proposed conversion of this building. However, it is likely to involve some or all of the following:

- Fully weathertight and insulated roof.
- Insulated and fully clad external walls.
- The addition of windows and doors as necessary.
- A combination of glazed screens and timber framing as a weatherproof link between the Old Granary and the adjacent annex.
- Refurbishment of the small annex area.

The conversion of these buildings can, in our opinion, be carried out without major construction of structural elements.

We will be pleased to answer any questions on this report.

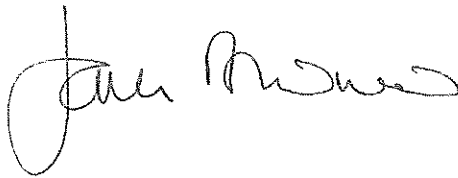
Inspector & Author



Sean J. Shanks BEng

1067/ SJS

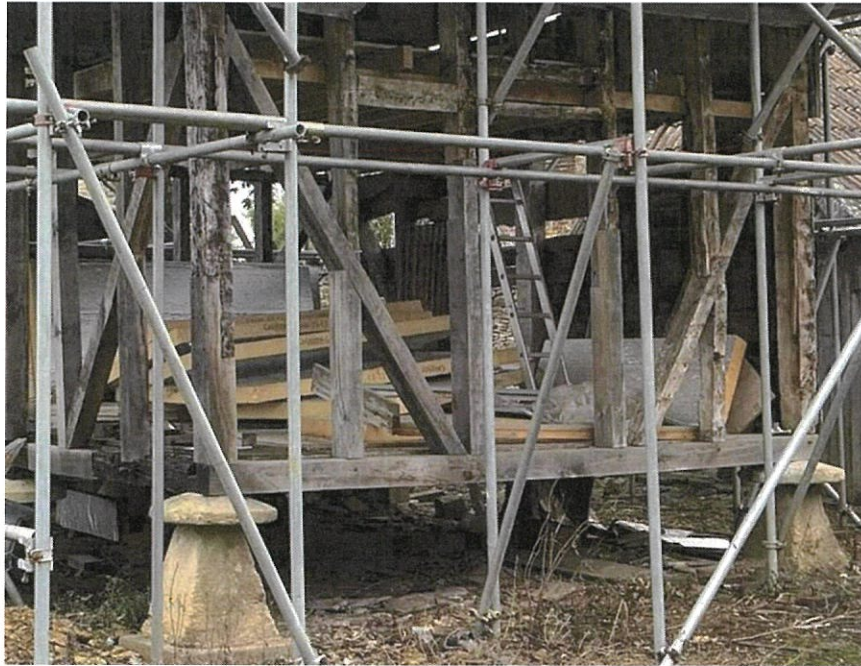
Checked



James Birdwood MA CEng MICE FStructE

1067/ JGBB

PHOTOGRAPHS



1. East Elevation Showing Base Supports



2. West Elevation Showing Gable End



3. Typical Base & Corner Post Bearing



4. View on Underside of Base Framing



5. Typical Base Frame & Post Connections



6. First Floor Joists End Bearings



7. Underside of First Floor Structure



8. First Floor Spine Beam



9. Spine Beam Shoulder & Typical Notching



10. Typical Corner Post Head Arrangement



11. Roof Bracing, Purlin & Rafters



12. Typical Bonnet Hip Timbers



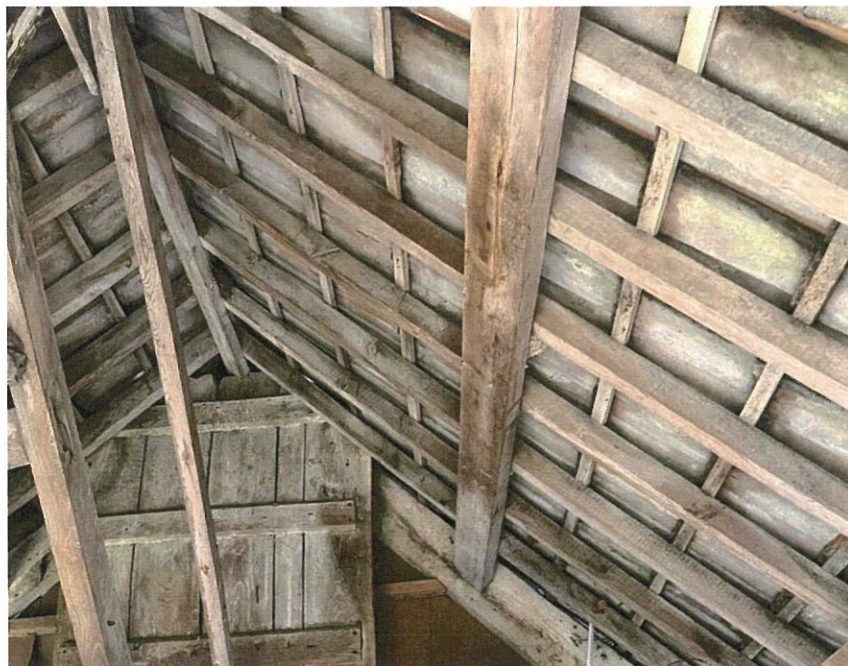
13. Roof Truss, Collar & Purlin Arrangement



14. Principal Rafter Bearing Detail



15. Annex Building



16. Annex Roof

CALCULATIONS

		Dead	Imposed
		Width (mm)	
Walls	Finishes	0.07	
	Plywood	0.13	
	Posts	0.32	
	Insulation	0.05	
	Services	0.05	
	Plywood	0.13	
	Cladding	0.25	
		<u>1.00 kN/m²</u>	
First Floor	Finishes	0.07	
	Flooring	0.15	
	Joists	0.20	
	Sound Insulation	0.10	
	Services	0.05	
	Ceiling	0.18	
		<u>0.75 kN/m²</u>	<u>1.50 kN/m²</u>
Pitched Roof	Stone Tiles	1.00	
	Battens & Underlay	0.05	
	Insulation	0.02	
	Rafters	0.15	
	Plywood	0.13	
	Ceiling Finishes	0.16	
		<u>1.51</u>	
	Roof Pitch 48		
	Plan Load	<u>2.26 kN/m²</u>	<u>0.30 kN/m²</u>

Common Rafter Design to BS 5268
Project : 1067 Showell Farm
The Old Granary

Single span s/s rafter with u/d only.
 Load is unfactored DL + IL as plan load

Rafter Loading & Geometry

DL =	2.26	kN/m ²	Spacing =	0.44	m
IL =	0.30	kN/m ²			
Horz length of rafter	2.10	m			
Pitch	48.0	deg			
Rafter Length	3.14	m			
Loading	1.13	kN/m			
E timber	C24	10800	N/mm ²		
Softwood Density	580	kg/m ³			
Rafter depth	90	mm	I =	6.08	x10 ⁶ mm ⁴
Rafter width	100	mm	Z =	135.00	x10 ³ mm ³
M _{applied}	0.62	kN.m			
App. stress	4.60	N/mm ²			
Allowable stress	=	1.25x1.134x1.1x5.3			
	=	11.69	N/mm ²	Stress check ok	
Defl'n	=	9.7	mm	Deflection acceptable	
Length x 0.003	=	9.4	mm		
Rafter Weight (plus 20%)	=	0.14	kN/m ²		

Location: Floor Joists

Timber beam to BS5268-2:2002



Simply supported
beam subjected to
vertical loads.

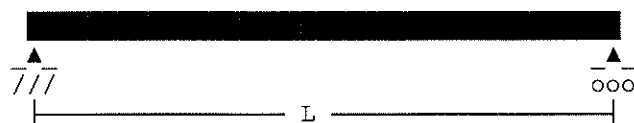
Beam span	L=2.3 m
Dist. from left support to start	Lau(1)=0 m
Distance from left support to end	Lbu(1)=2.3 m
Dead load (unfactored)	Gku(1)=0.263 kN/m
Imposed load (unfactored)	Qku(1)=0.525 kN/m
Maximum span bending moment	0.52107 kNm
Design shear force	Fve'=0.9062

Design axial load (+ve comp)	Fa=0 kN
Depth of section	d=140 mm
Width of section	b=60 mm
Eff length for bending about xx	Lex=2300 mm
Eff length for bending about yy	Ley=0 mm
Length of bearing	lb=75 mm
From BS5268-2 Table 18, bearing is < 75 mm from joist end.	
Bearing Modification factor	K4=1.0
Strength class C24 to Table 8.	
Timber service class adopted	tmclass=2
Timber service class modification factor	K2=1 as Table 16.
Duration of loading	K3=1
Depth factor	K7=(300/d)^0.11=1.0874
Load-sharing modification factor	K8=1.1
No notches exist at the support	K5=1.0

	Member: 140 mm x 60 mm
	Strength class C24 to Table 8.
	Moisture service class 2
	Bending stress 2.6585 N/mm ²
	Permissible bending 8.9715 N/mm ²
DESIGN	Deflection 2.048 mm
SUMMARY	Limiting deflection 6.9 mm
	Shear stress 0.16182 N/mm ²
	Permissible shear 0.781 N/mm ²
	Bearing stress 0.20138 N/mm ²
	Permissible bearing 2.64 N/mm ²

Location: Spine Beam

Timber beam to BS5268-2:2002



Simply supported
beam subjected to
vertical loads.

Beam span	L=4.25 m
Dist. from left support to start	Lau(1)=0 m
Distance from left support to end	Lbu(1)=4.25 m
Dead load (unfactored)	Gku(1)=1.575 kN/m
Imposed load (unfactored)	Qku(1)=3.150 kN/m
Maximum span bending moment	10.668 kNm
Design shear force	Fve'=10.041
Design axial load (+ve comp)	Fa=0 kN
Depth of section	d=240 mm
Width of section	b=190 mm
Eff length for bending about xx	Lex=4250 mm
Eff length for bending about yy	Ley=0 mm
Length of bearing	lb=75 mm
From BS5268-2 Table 18, bearing is < 75 mm from joist end.	
Bearing Modification factor	K4=1.0
Strength class C24 to Table 8.	
Timber service class adopted	tmclass=2
Timber service class modification factor	K2=1 as Table 16.
Duration of loading	K3=1
Depth factor	K7=(300/d)^0.11=1.0248
Load-sharing modification factor	K8=1.0
No notches exist at the support	K5=1.0

	Member: 240 mm x 190 mm
	Strength class C24 to Table 8.
	Moisture service class 2
	Bending stress 5.8488 N/mm ²
	Permissible bending 7.6864 N/mm ²
DESIGN	Deflection 13.361 mm
SUMMARY	Limiting deflection 12.75 mm
	Shear stress 0.3303 N/mm ²
	Permissible shear 0.71 N/mm ²
	Bearing stress 0.70463 N/mm ²
	Permissible bearing 2.4 N/mm ²