

Class Q Structural Inspection

Client: J M KNAPP & SONS LIMITED

Project: Former Agriculture Barn, Lutterworth Road, Burbage

Project No: 26-22876

Document No: 0-030

Issue: 3

Date: 03 September 2026

Engineer:



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1. Introduction

- 1.1. Further to instructions we visited the former barn and agricultural buildings at Lutterworth Road, Burbage on 8th May 2026.
- 1.2. The property is a series of buildings that was used for agricultural purposes until at least 2012. It appears to have been used as a feed store, water tower and pumphouse. There was originally a greenhouse at the front of the site that is has been demolished and the brickwork lower walls are all that remain.
- 1.3. The purpose of our visit was to undertake a visual structural inspection of the buildings prior to a Class Q planning application to convert them to residential accommodation.
- 1.4. We did not inspect woodwork or any other part of the structure which was not visible or inaccessible, and we are unable, therefore, to advise that any such part is free from defect.
- 1.5. This report may not be used or relied upon by any unauthorised third party, or for any other proposed use than that specified above, without the explicit written agreement of Diamond Wood and Shaw Limited.

2. Class Q Eligibility (Planning Context)

2.1. Based on our inspection and available evidence, the buildings are considered to satisfy the principal eligibility requirements of Schedule 2, Part 3, Class Q of the GPDO.

2.2. Lawful Agricultural Use

The buildings were in established agricultural use prior to 20 March 2013, with supporting evidence available via historic imagery (including Street View records dating back to 2012).

2.3. Permanent Construction

The structures comprise fixed and permanent buildings, constructed from steel, masonry and timber elements, and are neither temporary nor mobile in nature.

2.4. Floorspace Compliance

The cumulative floorspace of the buildings does not exceed the maximum threshold of 1,000 m², and individual units will comply with relevant size limitations under Class Q.

2.5. Site Constraints. The buildings are:

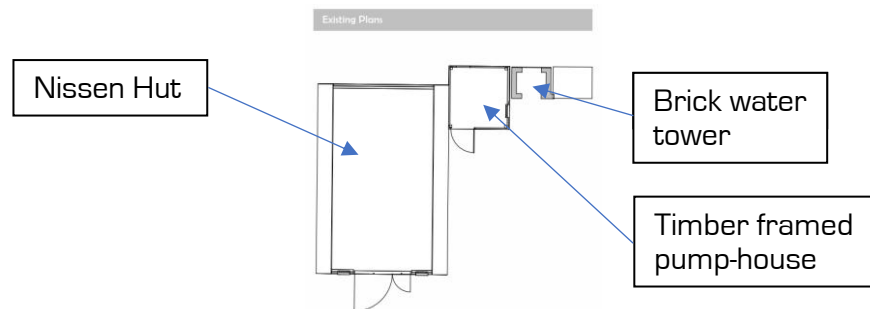
- Not listed
- Not located within restricted designations
- Not subject to any known planning constraints that would preclude Class Q development

2.6. Structural Capability

Importantly, the buildings are structurally capable of functioning in their current form, and do not exhibit defects that would necessitate substantial rebuilding. The proposed works are therefore considered to constitute conversion, rather than reconstruction.

3. Observations

- 3.1. The buildings are of mixed construction as indicated on the accompanying plan.



- 3.2. The principal structure comprises a corrugated steel Nissen hut of agricultural origin, historically utilised for storage. The building is formed from semi-circular steel corrugated steel sheeting forming both the roof and wall envelope.

- 3.2.1. The building is generally watertight and enclosed, with the corrugated metal sheeting forming a continuous external envelope. The roof operates as an enclosed and weather-resistant structure in its current form. It is anticipated that thermal upgrading measures, including internal insulation and lining, will be required as part of the proposed conversion.

3.2.2. The front and rear walls are formed in timber frame

construction that is generally performing well, albeit is currently uninsulated.

These elements are considered suitable for retention and upgrading.

3.2.3. The concrete ground floor slab is in excellent condition, free from cracking, movement and is suitable for re-use. Any upgrade works required will relate to thermal and damp performance, rather than structural integrity.

3.2.4. The primary steel roof exhibits no signs of distortion, instability or buckling typically associated with a failing or corroded roof structure. The geometry remains true and stable in its present form. The structure represents a sound and serviceable loadbearing system, capable of supporting conversion works without structural rebuilding.

3.2.5. Structural calculations have been provided in Appendix C to demonstrate the suitability of the curved corrugated panels, blockwork walls and foundations under the new loads.

3.3. Adjacent to the hut is a detached structure comprising of a 1.5 storey loadbearing brick structure, consistent with a former water tower. The brickwork is in good condition and is suitable for re-use. The building is generally dry inside indicating a level of weather-tightness suitable for conversion.

3.3.1. A lightweight timber pumphouse, of later construction has been built between the brick tower and the Nissen Hut. This building is dry inside and appears to be performing well. This is likely to be built off the concrete slab which is in good condition and is suitable for re-use.

3.3.2. The timber walls and roof are currently uninsulated and require thermal upgrading as part of the conversion works.

3.3.3. These buildings are to be used as external storage and as a studio, rather than forming part of the floor area of the main dwelling.”

4. Conclusions and Recommendations

- 4.1. The buildings are considered to be structurally sound, permanent and capable of functioning in their current form, with no evidence of defects requiring substantial structural rebuilding.
- 4.2. The proposed development can be undertaken as a conversion, with works limited to repair, upgrading and internal adaptation, without alteration to the primary structural systems.
- 4.3. The scope of works should be controlled to ensure that interventions remain proportionate and consistent with conversion, in particular avoiding wholesale removal or replacement of structural or envelope elements.
- 4.4. Subject to the above, it is our opinion that the buildings satisfy the structural requirements of Class Q, and are suitable for conversion to residential use.
- 4.5. A schedule of works has been prepared and included in Appendix B describing the works required to convert the main building in accordance with the Class Q regulations.

Appendix A – Photos



Photo 1 – Front Elevation



Photo 2 – Internal view



Photo 3 – Water Tower



Photo 4 – Pump house

Appendix B– Schedule of Works

The following schedule has been prepared to assess the extent of the proposed development against the requirements of Schedule 2, Part 3, Class Q of the Town and Country Planning (General Permitted Development) (England) Order 2015 (as amended).

The assessment has regard to established case law and appeal decisions which confirm that Class Q permits the conversion of an existing agricultural building, but does not permit works amounting to its substantial rebuilding or reconstruction. In particular, consideration has been given to whether the building would remain capable of functioning as a building prior to conversion and whether the proposed works are proportionate to the conversion of the existing structure.

For the purposes of this assessment, the proposed works have been categorised as follows:

Status	Classification	Assessment Outcome
	GREEN	Works that comprise repair, maintenance, improvement or adaptation of retained building fabric and structural elements, and are considered wholly consistent with a conversion under Class Q.
	AMBER	Works that may be capable of being undertaken as part of a Class Q conversion where they are limited in extent, proportionate to the conversion proposed, and ancillary to the retention of the existing building. Such works require consideration in the context of the development as a whole to ensure they do not cumulatively result in substantial rebuilding.
	RED	Works that would constitute substantial rebuilding, reconstruction or replacement of the existing building or its primary structural components, such that the proposal would cease to represent a conversion and would extend beyond the scope of development permitted under Class Q.

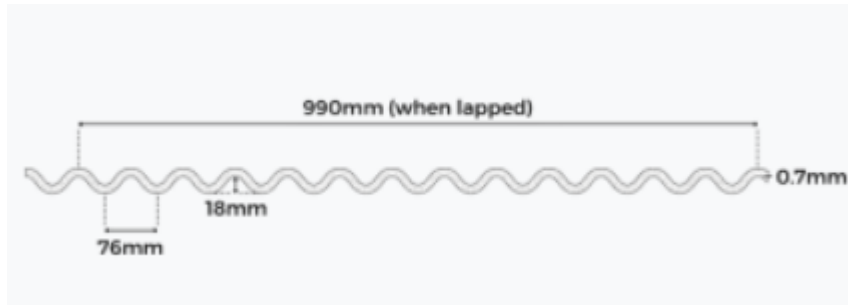
The categorisation of individual elements should not be considered in isolation. The overall assessment of Class Q compliance is based upon the extent of works proposed to the building as a whole, having regard to the retention of the existing structure, envelope and loadbearing elements.

Schedule of Works			
Status	Classification	Element	Proposed works
●	GREEN	Roof	Retain the existing corrugated metal roof. Seal joints and screw-fixing points as necessary. Install 75 mm high-performance thin-profile insulation beneath the roof sheets, together with an airtight membrane and vapour barrier, while maintaining the corrugated ribs to provide ventilation. Install ridge and eaves ventilation as necessary. Install internal ceiling finishes as required.
●	GREEN	Block walls	Retain the existing block walls. Install insulation, airtight membrane and vapour barrier generally in accordance with the roof build-up, adapted as necessary to suit the wall construction. Provide additional mineral wool insulation at eaves level to satisfy the energy assessor's requirements. Install internal plasterboard finishes as required.
●	AMBER	Timber framed Gable walls	Retain the existing timber-framed walls as part of the primary building envelope. Undertake localised repairs where necessary and provide a high-performance insulated wall build-up, breather membrane, airtightness layer and internal finishes to match the thermal specification of the roof. Retain the existing openings to the front elevation and form two new openings to the rear elevation, including associated timber lintels and framing, to accommodate glazing and access arrangements ancillary to the proposed residential conversion.
●	GREEN	Concrete Floor Slab	Retain the existing concrete floor slab. Apply a liquid damp-proof membrane and airtightness layer linked to the wall construction to provide continuity of the building envelope. Provide a floating timber floor construction and finished floor layer above to protect the membrane system whilst maintaining the existing floor level. The existing slab will be retained as part of the conversion, with compliance achieved through the overall performance of the building fabric and services rather than replacement of the existing floor structure.
●	GREEN	Brick water tower	Retain the existing loadbearing brick structure as the principal structural form of the building. Undertake localised brickwork repairs and repointing as required and provide internal insulation, finishes and associated conversion works necessary to facilitate residential occupation.

●	AMBER	Timber pump house	Retain the existing timber-framed structure as part of the primary building envelope. Undertake localised repairs where necessary and provide a high-performance insulated wall and roof build-up, breather membrane, airtightness layer and internal finishes. Retain and adapt existing openings where required, together with associated timber framing and lintels, to accommodate glazing and access arrangements ancillary to the proposed residential conversion.
●	GREEN	Internal layout	Install internal partitions to create bedrooms, bathrooms, circulation spaces and ancillary accommodation.
●	GREEN	Building services	Install water, drainage, electrical, heating, hot water, ventilation and telecommunications services necessary for residential occupation.
●	GREEN	Internal fit-out	Install kitchen, bathroom, fixtures, fittings, finishes and associated domestic accommodation.
●	GREEN	External works	Construct drainage infrastructure, hardstanding, access arrangements and domestic curtilage works associated with the proposed dwelling.

Appendix C – Calculations

Roof is constructed from galvanised steel corrugated sheets



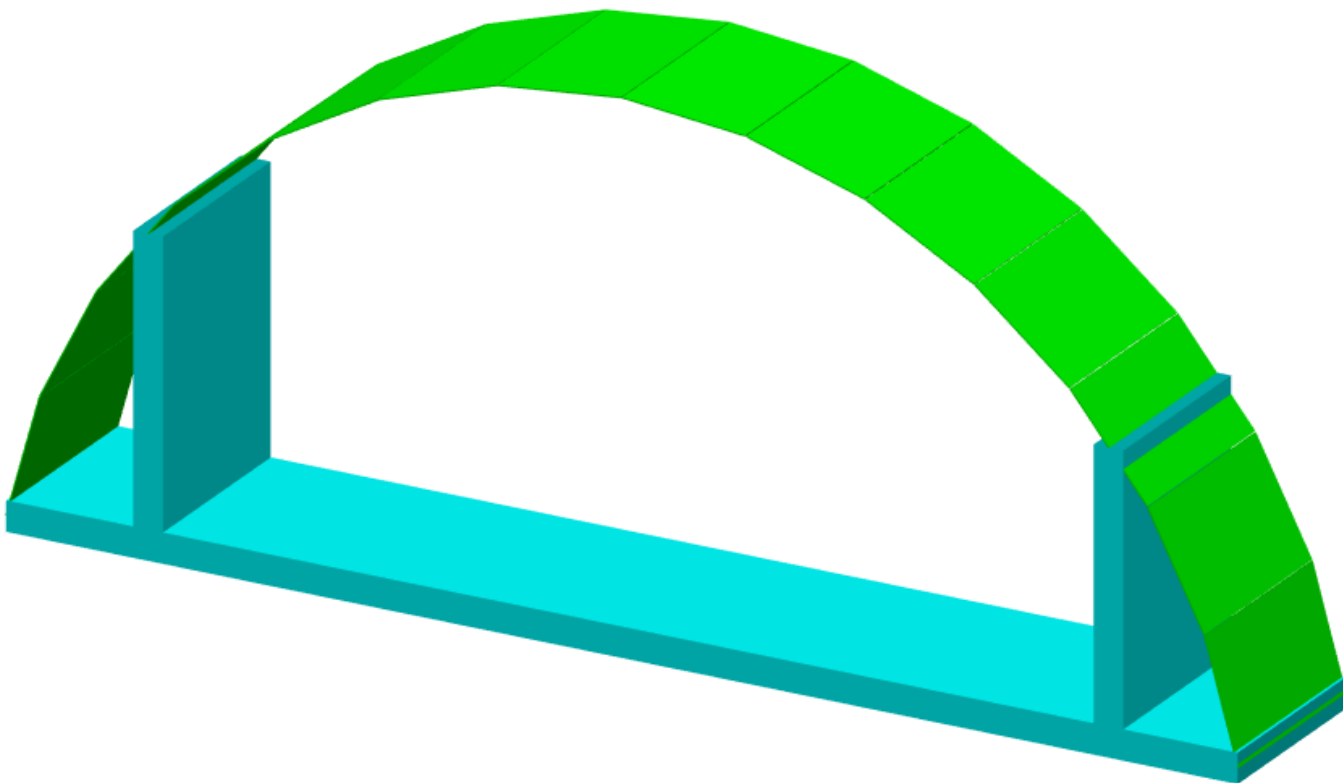
$$I_{xx} \approx 3.3 \times 10^4 \text{ mm}^4/\text{m}$$

$$h = \sqrt[3]{\frac{12 \times 33000}{1000}}$$

$$h = \sqrt[3]{396}$$

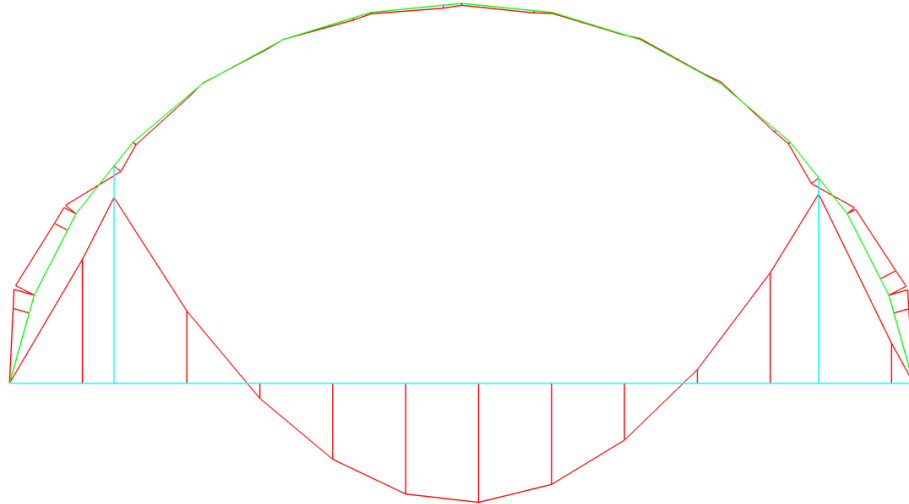
$$h \approx 7.34 \text{ mm}$$

Use 7mm thick plates in analysis.



P:\2026 Amber Jobs\26-22876 - Class Q Lutterworth Rd Burbage\03 Calculations\Structure\Drawing1.\$5

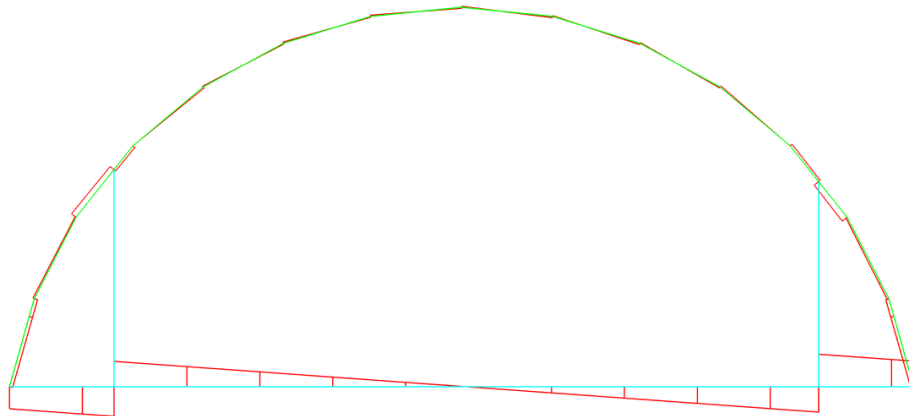
MasterFrame : Graphics



Load Case 002 : Live Only (Serviceability) Bending Moment Diagram - Full Frame - Front View

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MasterFrame : Graphics



Load Case 002 : Live Only (Serviceability) Shear Force Diagram - Full Frame - Front View

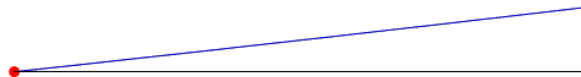
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AXIAL WITH MOMENTS

Member SBL1Id 2 @ Level 1 in Load Case 1

Member Loading and Member Forces
 Loading Combination : 1 UT + 1.4 D1 + 1.6 L1

D1 D 077.010 (kN/m³)



Member Forces in Load Case 1 and Maximum Deflection from Load Case 2						
Member No.	Node End 1 End 2	Axial Force (kN)	Shear Force (kN)	Bending Moment (kNm)	Maximum Moment (kNm)	Maximum Deflection (mm @ m)
4	1	12.227C	-1.549	0.000		3.056
	5	11.772C	-1.677	-1.011		@ 0.363

Classification and Properties (BS 5950: 2000)

Section (54.94 kg/m) 7x999.9 Flat 54.94 [S 275]
 Class = Fn(b/t,py) 142.84, 275

(Axial: Non-Slender)

Plastic

Auto Design Load Cases

1

Local Capacity Check

$F_{vx}/P_{vx} = 1.677 / 1039.396 =$
 $M_{cx} = p_y.S_{xx} \leq 1.2 p_y.Z_{xx} = 275 \times 12.25 \leq 1.2 \times 275 \times 8.17 =$
 $P_z = A_g.p_y = 69.99 \times 275 =$
 $n = F/P_z = 12.227 / 1924.808 =$
 $S_{rx} = F_n(S_{xx}) = 12.25, 0.006$
 $M_{rx} = S_{rx}.p_y = 12.25 \times 275$
 $(M_x/M_{rx})^{2.1} + (M_y/M_{ry})^{2.2} = (1.011/2.695)^{1.667} + (0)^{1.667} =$

0.002
 2.695 kN.m
 1924.808 kN
 0.006
 12.25 cm³
 2.695 kN.m
 0.195
 Low Shear
 OK
 OK

Compression Resistance P_c

$\lambda_x = L_{ex}/r_{xx} = 100 \times 100 / 0.627 / 0.2 =$
 $P_{cx} = A_{area}.p_{cx} = 69.99 \times 18.224 / 10 =$

313.3
 127.554 kN
 Warning
 Table 24 c

Lateral Buckling Check M_b

M_b = M_c Fully Restrained

2.695 kN.m

Simplified Approach

$p_y.Z_x = 275 \times 8.17$
 $F/P_{cx} + m_x.M_x/p_y.Z_x = 12.227/127.554 + 0.593 \times 1/2.2$
 $F/P_{cy} + m_{LT}.M_{LT}/M_b = 12.227/1924.808 + 1 \times 1/2.7$

2.246 kN.m
 0.363
 0.382
 OK
 OK

Therefore existing corrugated sheets are acceptable.

FREE STANDING MASONRY COLUMN (MAJOR AXIS BENDING)

Wall Loading

Dead and Live @ this level
 Lateral Load

$g_k = 1.5 \text{ kN}, q_k = 2 \text{ kN}, e_x = 20 \text{ mm}, \gamma = 20 \text{ kN/m}^3$
 $W_k = 0 \text{ kN/m}^2$

Wall Data

Column Height
 Units and Mortar Strength
 Blocks Ratio
 Partial Safety Factor γ_m
 Support Conditions (0200)

$h = 1.500, h_{ef} = 1.0 \cdot h$
 Units Strength = 3.6, Mortar designation (iii)
 Unit height = 215, Least horizontal dimension = 100
 Normal manufacturing, Normal construction
 Free Standing Wall, Bottom Cont.

2.15
 3/2.7
 Table NA.1

Masonry Column (Major) $b=1000, t=100$
 Bricks Flexural Strength Concrete blocks
 Wall Construction Solid Concrete block wall
 $f_k=2.7, g_d=0.045, f_{kx,\lambda}=0.359$
 $\beta=0.533, a_y=0.5$
 $\text{List}(f_k, g_d, f_{kx,\lambda})$
 $\text{List}(\beta, a_y)$
 $\text{List}(\text{Area}, I_x, Z_x, b_{ef})$
 Limiting Dimensions $\text{Area}=1000, I_x=833333, Z_x=16667, b_{ef}=100$
 $\lambda < 27, h < 18 \cdot t_{ef}$

2.7 N/mm² f_k Table 2

Annex F OK

Design for Vertical Load

$Fr = \beta \cdot \text{Area} \cdot f_k / \gamma_{mc}$ $0.533 \cdot 1000 \cdot 2.7 / 3$
 $Fd = 1.4 \cdot g_d \cdot 1 \cdot \text{Area} + 1.6 \cdot Q_k$ $1.4 \cdot 0.045 \cdot 1 \cdot 1000 + 1.6 \cdot 2$

47.97 kN
9.5 kN $\leq Fr$ OK

Design for Horizontal Load

$Mr = f_{kx,\lambda} \cdot Z_x / \gamma_{mf}$ $0.359 \cdot 16667 / 2.7$
 $Md = 1.4 \cdot a_y \cdot b_{ef} \cdot W_k \cdot h^2$ $1.4 \cdot 0.5 \cdot 100 \cdot 0 \cdot 1.5^2$

2.216 kN.m
0 kN.m $\leq Mr$ OK

Therefore existing blockwork walls are acceptable.

Foundation Reference	Roof		1. Floor		2. Floor		Wall		Total		Width required
	Span	Load	Span	Load	Span	Load	Height	Load	Gk	Qk	
	m	kN/m ²	m	kN/m ²	m	kN/m ²	m	kN/m ²	kN/m	kN/m	
Foundation A	6	0.5		0.75	0.00	2	1.5	2.4	5.10	1.80	0.1
		0.6		2.5		2.5					

Therefore existing foundations are acceptable.