Woodbridge Town Council

Structural Report on Woodbridge Art Club Building, Tide Mill Way, Woodbridge

May 2022

01-05-112552 NPS-R-S-001

Client:	Woodbridge Town Council (c/o Mr Greg Diaper – Town Clerk)	
Purpose of Report:	Structural condition survey & report on Woodbridge Art Club Building	
Prepared by:	Jason Richardson BEng (Hons) CEng MIStructE Chartered Structural Engineer	
Report Issued:	Signed:  **Jason Richardson** BEng (Hons) CEng MIStructE	Date: 1st June 2022
Report Checked:	Signed:  **Jason Richardson** BEng (Hons) CEng MIStructE	Date: 1st June 2022
Reference Materials:	Visual survey undertaken at the property by Jason Richardson on Thursday 19th May 2022	

Preamble

This Report is specifically for the use of the Client and no liability is accepted for its use by any other person.

The scope of this Report is described in detail later. If there is any doubt as to the extent of the brief, then please contact NPS Structural Engineering Department immediately.

Inspections and investigations are carried out within the limits of ready accessibility. Therefore, it is possible that conditions exist other than those exposed. We have not inspected parts of the structure which are covered, unexposed or inaccessible, and we are therefore unable to report that any such part of the property is free from defect.

This report does not deal with harmful materials within the construction, such as asbestos. A specialist should be consulted regarding any concerns relating to such matters.

Where appropriate, this Report provides recommendations in principle. It does not cover any detailed requirements of any works or further investigations. If remedial works or further investigations are recommended, they should be carried out in accordance with an approved specification. If you require specifications or site visits to approve any subsequent works or investigations, then your further specific instructions within a reasonable period of notice will be required.

Our conclusions assume that subsequent to the issue of our report, the structure is properly maintained and the risk of a structurally detrimental supervening event occurring is suitably managed.

Scope

NPS Structural Engineering Department have been appointed based on the following scope of service :

1. Visit Woodbridge Art Club, address 15 Tide Mill Way, Woodbridge, IP12 1BY, to undertake visual structural inspection of the building.

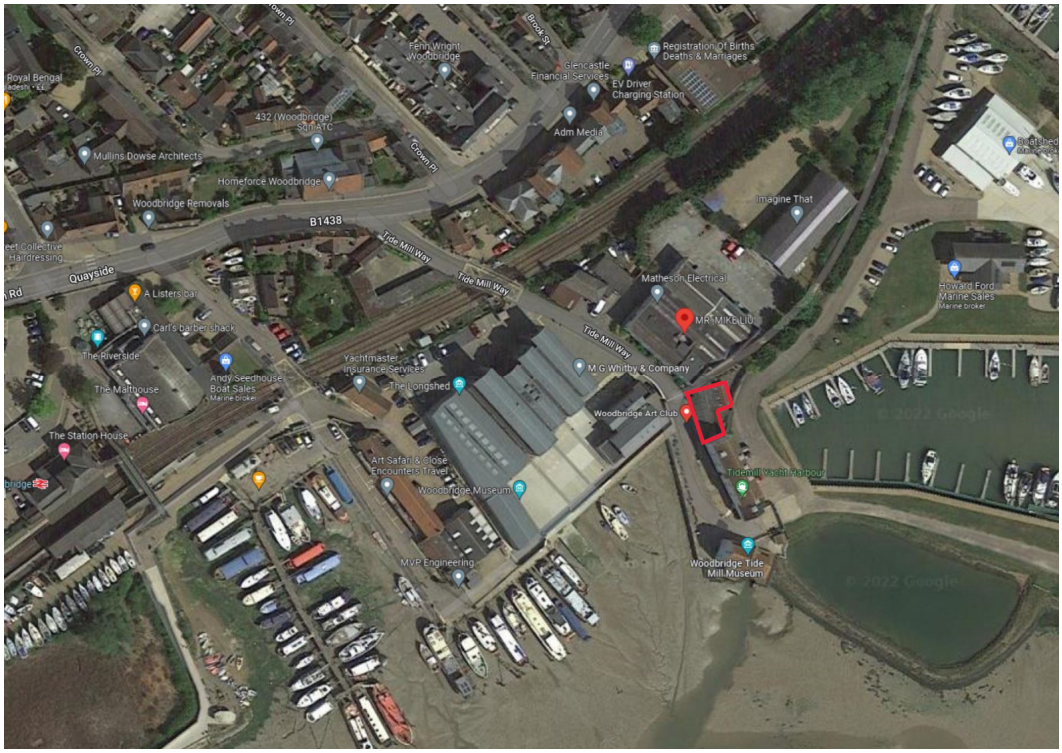
2. Formally report on our findings, drawing conclusions and recommendations as appropriate.

The contents of this report are thus so confined.

1.0 Site Visit

1.1 Woodbridge Art Club, address 15 Tide Mill Way, Woodbridge, IP12 1BY, was visited by Jason Richardson on Thursday 19th May 2022, to carry out a visual structural inspection. Inspections were undertaken internally & externally to all readily accessible areas.

1.2 The aerial view extract below shows the location of Woodbridge Art Club.



Aerial View from Google Earth showing location of Woodbridge Art Club (Red Outline)

2.0 Description

Woodbridge Art Club is a single storey building situated on the bank of the River Deben in Woodbridge.

The building comprises two sections; these being the original single storey building which fronts Tide Mill Way and adjoins a 4 Storey residential building, and a smaller footprint rear extension to the building on the NE side.

The original building is thought likely to have been built as part of the adjoining Mill / Granary at its SE end circa late 1800's, and was used as a store room up to the late 1950's. The building was subsequently obtained by Woodbridge Art Club in 1973 and renovated for opening in 1976. The construction of the building is generally typical for its era, comprising Queen Post timber trusses to form a duo-pitched roof, supported on load bearing brick masonry construction.

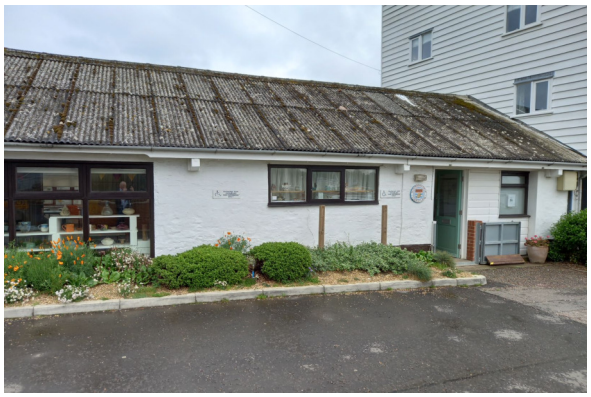
The more recent rear extension was completed in 1998 and is of more contemporary construction, most likely comprising timber framed or cavity wall construction, with gang nail timber roof trusses to form the duo-pitched roof.

Where the two areas adjoin, part of the roof valley is glazed and the ceiling open internally between trusses to shed light into the extension.

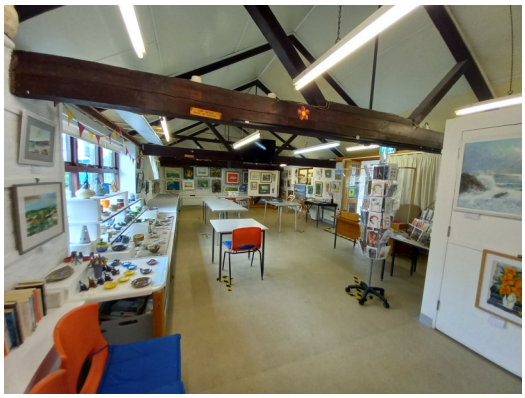
It is understood that the building was subjected to severe flooding in 2013 with water rising internally to circa 0.5m above floor level.

The property appears to be fully located on the SE of the local flood defence line, directly adjacent to Tide Mill Way flood gate and flood wall.

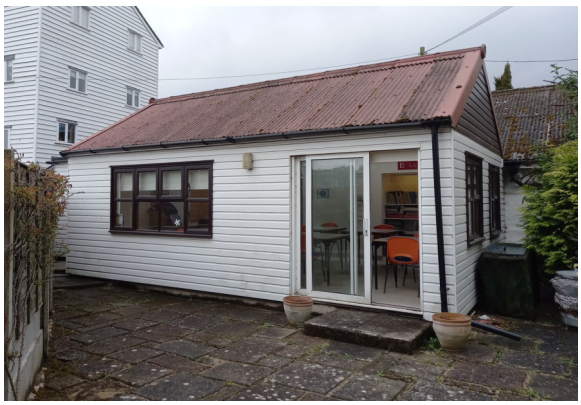
Photograph No.'s 01 & 02 below show general views of the original building externally and internally, and photograph No.'s 03 & 04 show general views of the extension externally and internally.



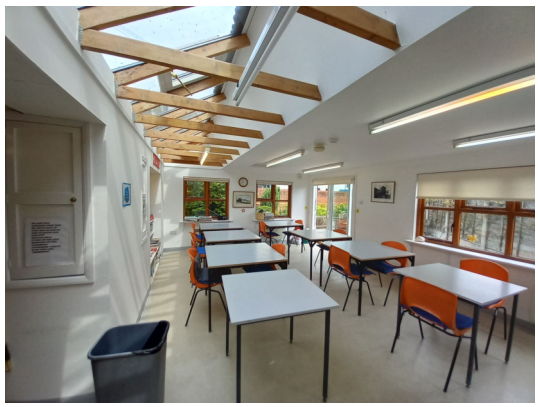
Photograph No. 01



Photograph No. 02



Photograph No. 03



Photograph No. 04

3.0 Inspection

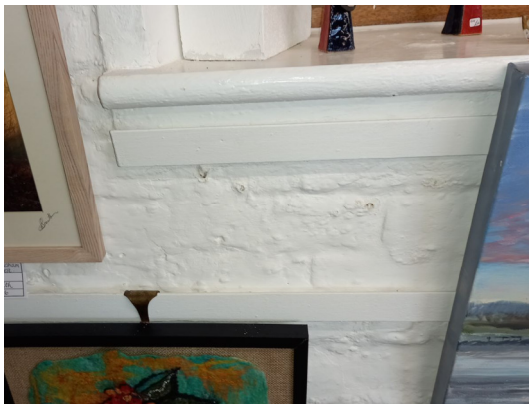
3.1 Internal - Original Building

Internally, the original building comprises an open plan Studio area in the NW side of the building, and smaller Kitchen, W.C. and Storage rooms at the SE end, adjacent to the main entrance off Tide Mill Way. A loft area exists over the Kitchen / W.C. area which is accessible from within the Studio area. A small area of stud partition walls exist in the SE end of the Studio which houses a storage area and kiln room.

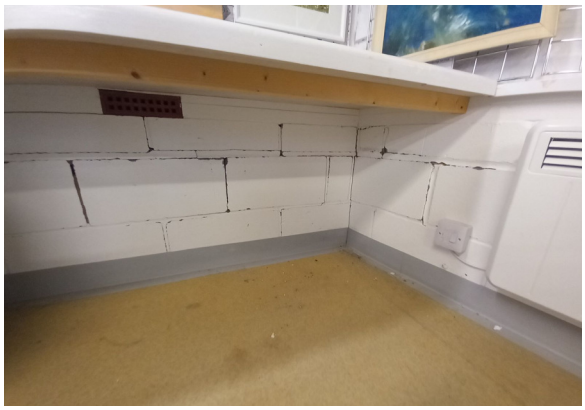
The walls to the building comprise load bearing brick masonry which are typically in the order of 300mm thickness, but thicker immediately above ground level where the wall thickness steps out externally. These are painted white throughout. Inspection of these did not reveal any evidence of structural distress or damage, with areas observed appearing to be functioning satisfactorily as required.

There is an area of more recent blockwork masonry in the NW corner of the Studio, beneath a low level display shelf where storage crates are kept, where cracking damage to the blockwork is apparent. This wall appears to only support the display shelving and it is likely that the damage observed is caused by impact from the storage crates.

Photograph No.'s 05 and 06 show a typical view of the internal load bearing brick masonry wall, which is predominantly covered by art displays, and the cracking damage to the blockwork respectively.



Photograph No. 05



Photograph No. 06

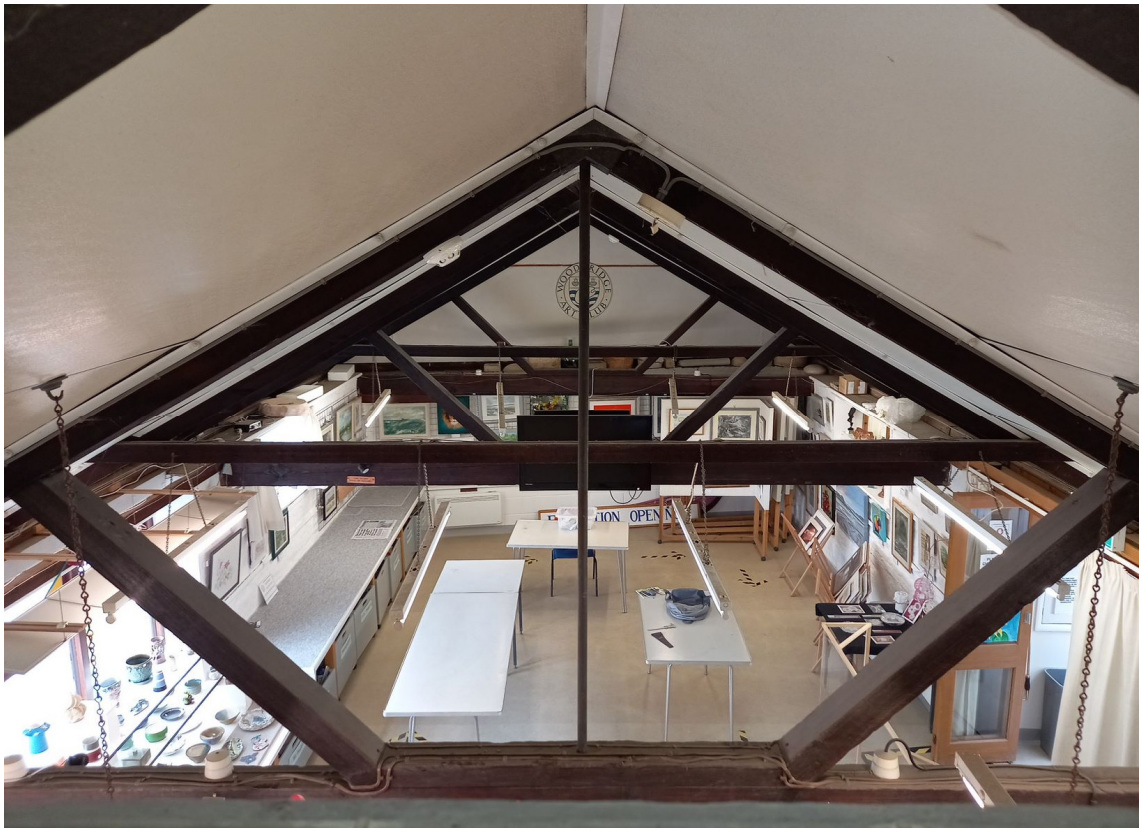
The floor to the Studio and adjoining areas feels solid under foot and is thought most likely to comprise a ground bearing concrete floor slab. No evidence of structural damage or defects to the floor slab was observed during our inspection.

The roof structure comprises a combination of timber Queen Post trusses and Raised Collar trusses. The trusses are typically at approximately 1.9m centres along the length of the building, alternating between Queen Post / Raised Collar trusses. The span of the trusses across the building is approximately 5.7m.

Queen Post truss member dimensions are generally as follows; Tie = 250mm Dp x 115mm Wd, Struts = 100mm Dp x 115mm Wd, Rafters = 145mm Dp x 115mm Wd, Steel Rod = 29mm Diameter.

Raised Chord truss member dimensions are generally as follows; Chord = 100mm Dp x 50mm Wd, Rafter = 145mm Dp x 50mm Wd.

Photograph No. 07 below shows a general view of the Studio area roof trusses looking NW from the loft access area.



Photograph No. 07

It appears that the Raised Collar trusses are a more modern addition to the building's roof structure, with the heavier section Queen Post trusses being the original roof structure. There is evidence to the Queen Post truss rafters that they originally supported a purlin at approximately mid height / at strut position along each rafter, due to the presence of unused notches / mortises. This can be seen on the Queen Post truss rafters within the loft space.

Within the loft space it was possible to observe the existing roof covering build up where timber roof boards are sagging. This generally comprises tongue & groove timber boarding spanning between trusses, with timber battens spanning on top of the boards between trusses, which in turn support corrugated asbestos roof sheeting. The roof sheeting is believed to contain asbestos, however, this is not confirmed from our survey and report.

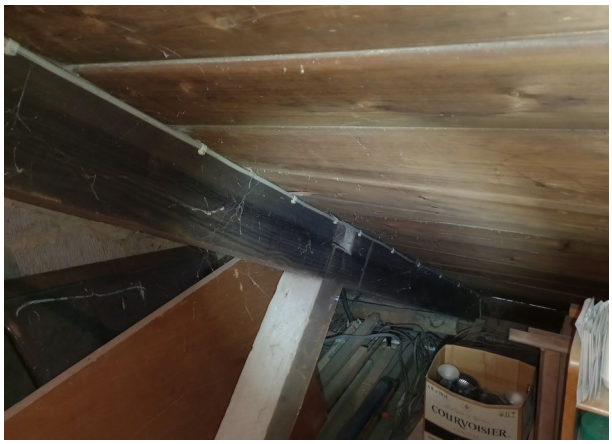
Within the loft space the apex detail of the Queen Post trusses could be closely observed. This comprises a custom made steel shoe which the steel rod is connected to. Within the loft the steel shoes are suffering from moderate surface corrosion.

Also noticeable in the loft space is evidence of beetle infestation to the Queen Post truss rafters. This appears only minor at the time of our inspection.

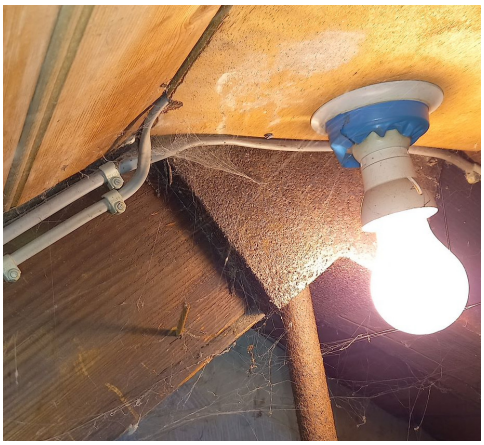
Within the loft space there is also evidence of water ingress staining to some parts of the roof boarding and truss rafters.

Within the loft space there is a significant amount of storage. The loft floor joists could not be directly observed, however, these are thought to span between the heads of the blockwork walls that form the W.C. / Kitchen areas below, which are relatively short spans, and there was no evidence to suggest that the current storage is in excess of the loft floors structural capacity.

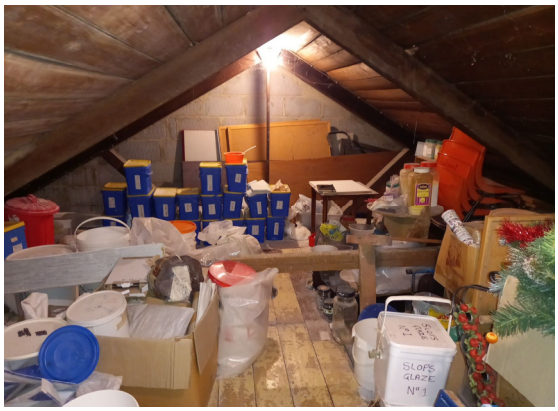
Photograph No.'s 08 - 11 below show the purlin notch to a Queen Post truss rafter and boarding, the steel apex shoe to a Queen Post truss, storage within loft space with Raised Collar truss visible and collar approximately 400mm above floor level, and evidence of beetle infestation to truss rafter, respectively.



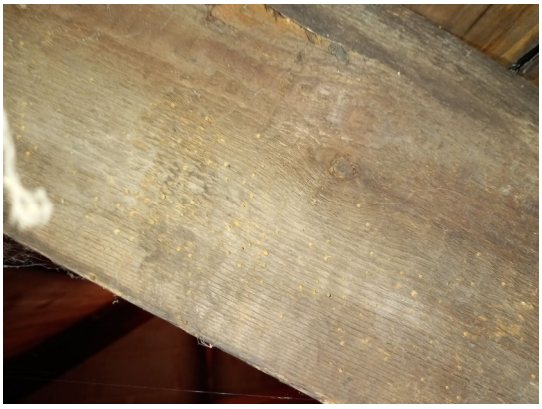
Photograph No. 08



Photograph No. 09



Photograph No. 10

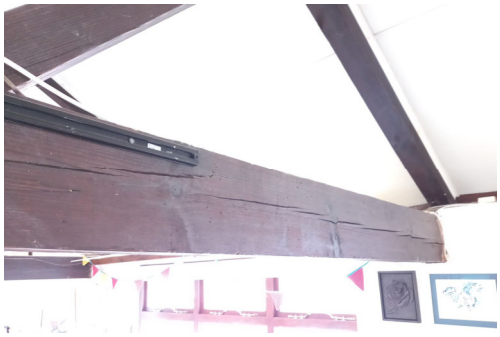


Photograph No. 11

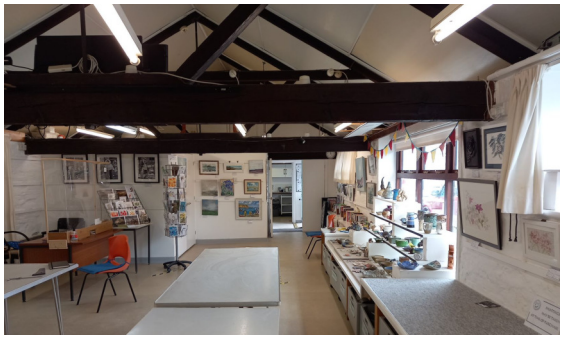
General visual inspection of the timber trusses within the Studio area did not reveal any noticeable signs of structural distress. There is some evidence of splitting along the grain direction to the larger timber Chord members to the Queen post trusses. This is typical of shrinkage on larger timber sections and is not considered to be of structural significance. No visual evidence of noticeable deflection of truss members was apparent, with all truss joint nodes and bolted connections viewed appearing to function satisfactorily.

Some nominal service loading such as visual display and lighting is supported by the trusses. This does not appear to be causing any distress to the trusses.

Photograph No.'s 12 – 13 below show a splitting bottom chord of a Queen Post truss and a general view of trusses with straight bottom chords and rafters / stuts, respectively.

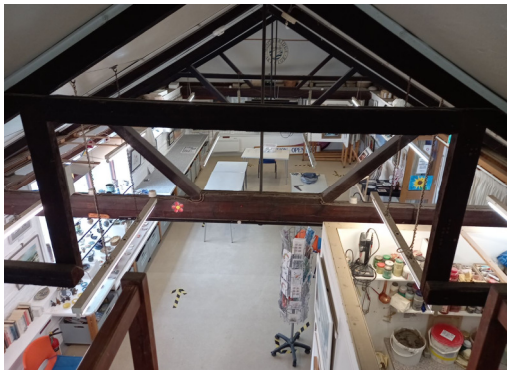


Photograph No. 12

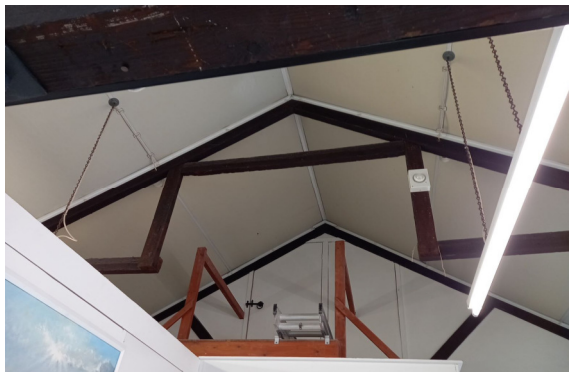


Photograph No. 13

At the location where loft access is provided, to provide clear access, the bottom chord / collar, of the Raised Collar truss has been cut. This compromises the trusses ability to behave structurally as a truss, potentially making it unsafe depending on whether it, or other parts of the roof were locally strengthened to accommodate the trusses modification when originally altered. There does not appear to be any noticeable distress to this area of the roof however, so it is likely that the roof is managing to span between adjacent trusses, albeit in a way it was not originally intended to. Photograph No.'s 14 – 15 show the cut truss.



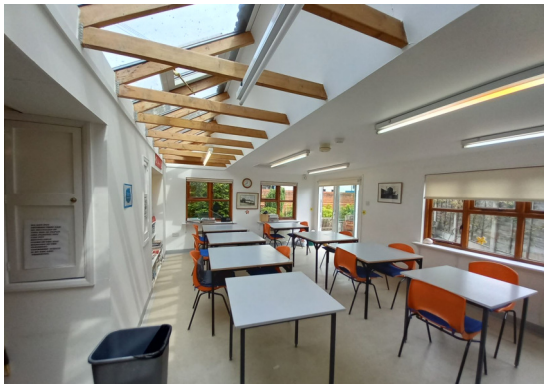
Photograph No. 14



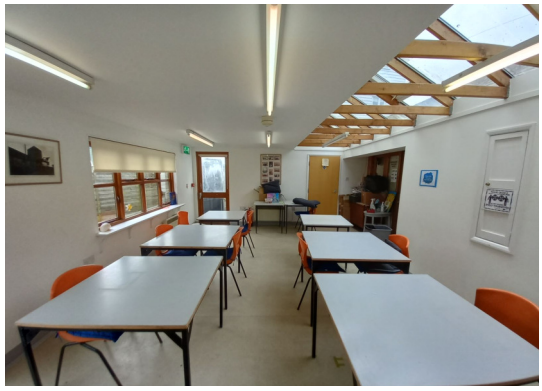
Photograph No. 15

3.2 Internal – Extension Building

Inspection of the more recent extension did not reveal any significant evidence of structural damage or distress internally. Visible parts of the gang nail roof trusses along the glazed section of the roof valley appeared satisfactory. Wall finishes & walls appear sound and vertical. Door & window head lintels did not show any significant evidence of distress. Photograph No.'s 16 – 17 below show general internal views of the extension looking NW & SE respectively.



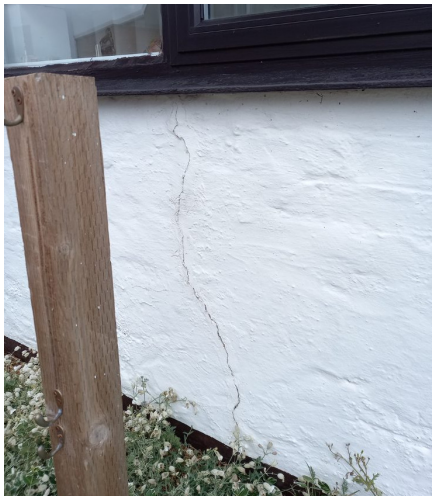
Photograph No. 16



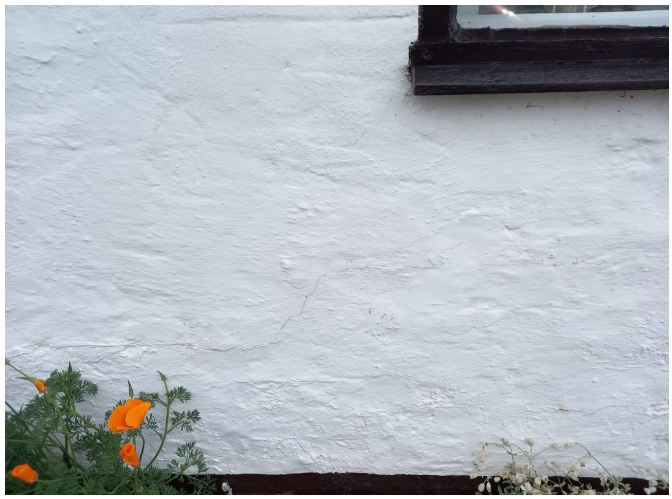
Photograph No. 17

3.3 External – Original Building

On the SW elevation on Tide Mill Way, there is a generally vertical crack below the window adjacent to the main entrance. Photograph No. 18 shows this crack which is in the order of 1 – 2mm width. The crack appears to have been re-pointed historically, and subsequently reopened since paint coating has been applied.



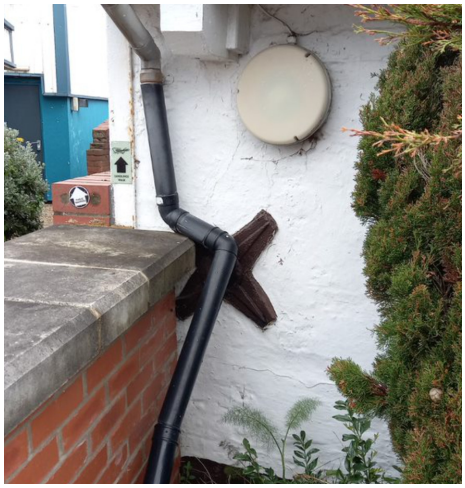
Photograph No. 18



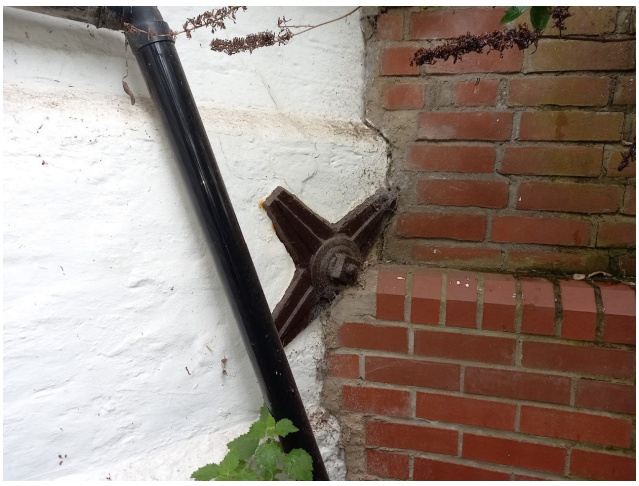
Photograph No. 19

A hairline stepped horizontal crack also exists to the bottom left corner of the same window, on the NW side, as shown in Photograph No. 19.

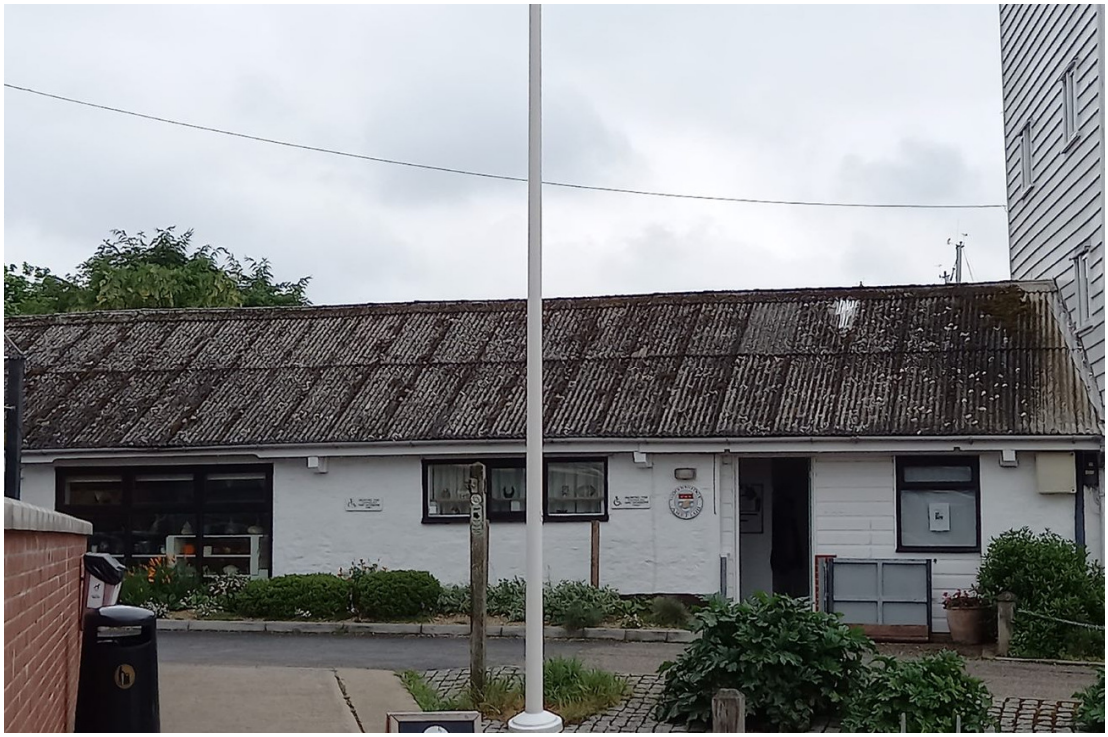
At the NW corner of the building, further minor horizontal cracking is present just below an 'x' shaped pattress plate. There is also hairline cracking just above the patress plate, beneath the external wall light. Photograph No. 20 shows this area of the wall. Photograph No. 21 shows the opposite 'x' patress plate on the NE corner of the building. The patress plates and nuts to the tie rod appear to be functioning as intended with no evidence of damage or distress.



Photograph No. 20



Photograph No. 21

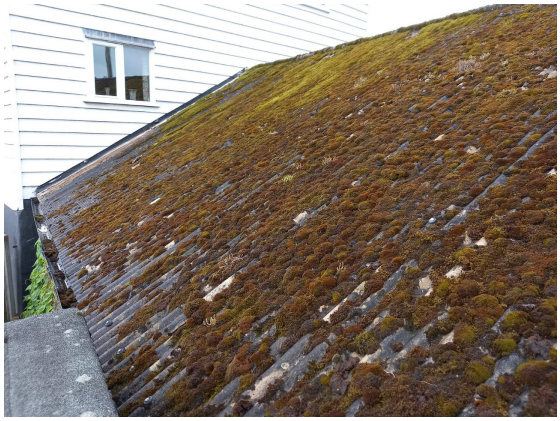


Photograph No. 22

Photograph No. 22 shows the Western elevation view with the majority of the roof visible. Visual inspection of the roof did not reveal any noticeable deflection or deformation, suggesting the existing roof structure is functioning satisfactorily in its present condition.

On the Eastern side of the roof, there is significant moss growth to the roof surface and areas of damaged roof sheeting. When saturated the moss will increase overall weight to the roof, however, as with the Western view of the roof, there is no evidence to suggest the roof is not functioning structurally as required.

Photograph No.'s 23 & 24 show the Eastern side roof views.

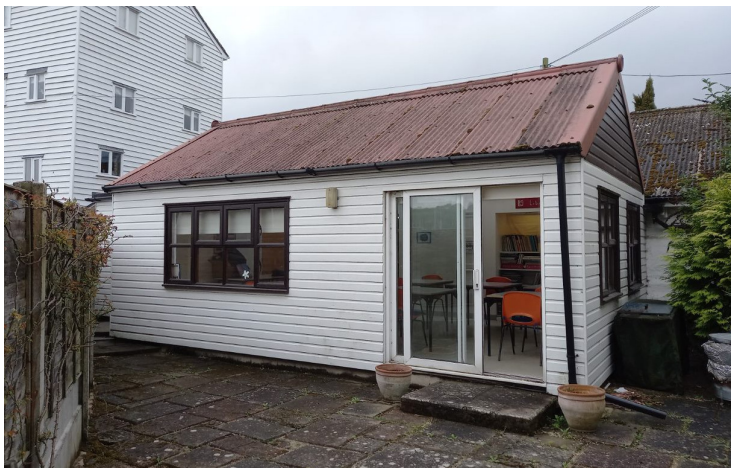


Photograph No. 23

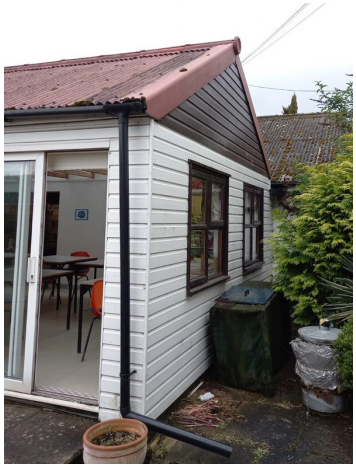
Photograph No. 24

3.4 External – Extension Building

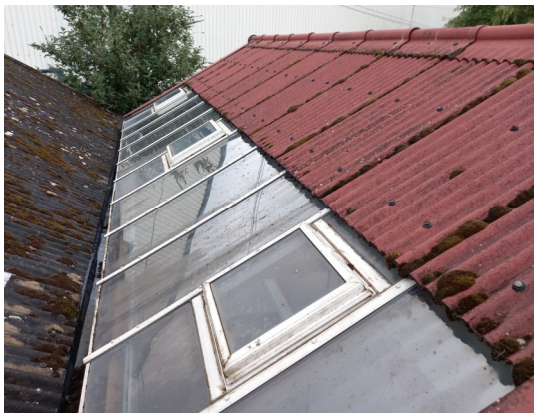
External visual inspection of the extension building did not reveal any noticeable signs of structural distress. Walls appear to be vertical with shiplap timber cladding boards generally in good condition and not showing any signs of underlying structural distress or damage. The roof structure appears to be functioning satisfactorily with no noticeable deflection or evidence of structural distress. Photograph No.'s 25 – 28 show general views of the extension and its roof area.



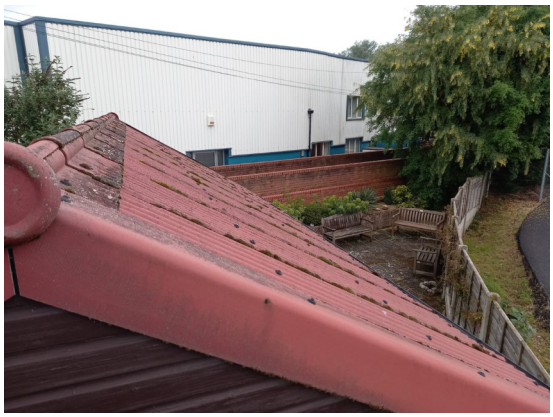
Photograph No. 25



Photograph No. 26



Photograph No. 27



Photograph No. 28

4.0 Conclusion & Recommendations

In summary, from our inspection, there are no major structural issues to highlight for the original and extension buildings.

General observations are as follows :

- Cracking observed to the original buildings brickwork is only minor / hairline, and is thought most likely to be attributed to thermal and natural movement of the building fabric. There are no movement joints in the masonry, and it is typical for movement joints to be provided at maximum 12m centres, or within 6m of a return wall for brick masonry. The building is approximately 15m length, and is therefore susceptible to cracking due to natural movement in lieu of movement joint provision. The cracking observed is not therefore considered to be structural and is only aesthetic in nature. The cracks could be monitored to check they are not progressive, but we do not feel this is necessary at this point in time unless more noticeable damage becomes apparent. Where cracking in masonry is present, masonry repairs such as full stitching of new brickwork, or installation of Helifix stainless steel rods could be considered to re-establish full strength of the masonry walls.

- The cut Raised Collar truss at the loft access doesn't appear to be causing an issue, however, this is not structurally correct, and should therefore be considered for strengthening / repair / replacement so that it functions as a structural roof truss as originally intended.

- Within the loft, there is storage of materials and this does not appear to be causing any distress to the loft floor structure of supporting walls. It should be noted however that storage weights should not be increased beyond what currently exists without undertaking structural assessment of the loft floor structure to confirm actual structural capacity.

- It is our understanding that replacement of the existing roof coverings is under consideration.

  Based on our findings, the existing roof structures are currently functioning satisfactorily structurally, with the primary existing roof structures likely to be suitable as part of a roof refurbishment scheme. This is on the basis that new roof sheeting, insulation, ceiling treatment, and services are effectively the same weight or less than what presently exists. It is likely that a net increase of dead weight to the roofs in the order of 5-10% will be structurally acceptable, however, load increases above this may be feasible but should be fully assessed by a structural engineer before undertaking any such refurbishment.

  During our inspection, representatives of Woodbridge Town Council were present, and ideas such as lightweight insulated single ply roof decking, or a lightweight roof decking with insulated false ceiling were discussed. Our initial view is that the existing primary roof structure is likely to have sufficient strength for such options, providing the above comments are taken on board.

- Due to evidence of beetle infestation and damp damage to some primary structural members, we recommend that a timber treatment specialist is appointed for advice in treatment and long term protection of structural timber members.

- In the event of a roof refurbishment scheme going ahead, where existing primary roof structure is retained, further inspections of bearings and connections should be undertaken to confirm suitable structural condition. Items such as steel bolts, rods, nuts, washers, screws,

straps, ties, shoes, should be inspected for corrosion and repaired or treated as required to protect them and provide extended lifetime of the roof structure.

- The existing timber boarding to the original building roof acts as a diaphragm / sarking to help distribute lateral loads to the end walls of the building. Where a new roof covering is provided, the diaphragm must be re-established either through sarking or suitable bracing.

This concludes the findings and recommendations of our report at this time. Should you have any queries or wish to discuss any of the report in more detail please contact us.

END.