





**Christmas Tree Barn
Mill Lane
Weybread**

STRUCTURAL ENGINEER'S APPRAISAL REPORT

DOCUMENT CONTROL

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1.0 INSTRUCTION

- 1.1 J P Chick & Partners Limited was appointed by T Kent Builders to undertake a visual structural inspection of the existing building to appraise its suitability for conversion to residential function. Our reporting and liability is therefore limited accordingly.

2.0 DETAILS OF SURVEY

- 2.1 The property was inspected on Thursday 13th May 2021. Weather conditions at the time of the inspection were dull, overcast and with temperatures in the region of 12°C. The property was inspected from ground level external and from ground level internally.

3.0 GENERAL DESCRIPTION

- 3.1 The property comprises a single storey mono pitched timber frame building, located on a rural plot on the edge of the village of Weybread. The property features a corrugated fibre cement roof sheet of mono pitch construction supported on timber purlins, bearing on to intermediate timber frames along the length of the building. The building measures approximately 19m x 7m and is clad externally with treated plywood boarding. Rainwater is discharged to the low eaves at one end of the building.

4.0 GENERAL OBSERVATIONS

External Observations

4.1 North Gable End

- 4.1.1 The north gable end is clad in treated plywood and features personnel doors at both sides. The wall presents as plumb and in good alignment with no obvious distress. The principle timber support structures are in good condition with a modest degree of decay to the timber feet where they are constructed into the concrete pad footing and restrained within steel support brackets.

The timber frame wall infill is constructed on a shallow block plinth which appears to be performing satisfactorily with a modest degree of weathering associated with age present along the northeastern corner. There is a degree of vegetation, mostly in the form of nettles growing around the northeast corner and along the east elevation, which partly obscures the inspection.

4.2 East Elevation

4.2.1 The east elevation presents the low eaves side of the building and is entirely clad in treated timber boarding and features 3 No. horizontally orientated strip windows. The wall presents as plumb and in good alignment with no obvious variation along the length. A single rainwater gutter is present along the full length, discharging to the south end. A view of the roof structure reveals slight ponding towards the mid span, most noticeable towards the southern end of the roof. As with the north elevation the wall structure is constructed off a shallow concrete blockwork plinth. At the south end the rainwater discharge is below ground to an unknown outlet, presumably a soakaway or similar.

4.3 South Gable End

4.3.1 The south gable end is of mono pitch construction featuring the plywood boarding constructed onto the timber frame. Large double doors are connected at the westward side with a smaller personnel door positioned on the east side of the elevation. Where exposed, the timber frame appears in good condition.

4.4 West Elevation

4.4.1 The west elevation presents the high eaves side of the building and is clad with three tiers of treated plywood. The wall presents as plumb and in good alignment. At the north end on the northwest corner, vegetation in the form of a climbing plant is obscuring a portion of this end of the building, however where visible the condition appears reasonable. As before, the wall is constructed on a block plinth, however this is obscured generally by plywood boarding. The primary timber support posts can occasionally be observed between panels and these appear in good condition, anchored

to the concrete slab via embedded steel angle brackets. Where exposed the slab edge presents in good condition with occasional cracking associated with drying shrinkage though not considered to be detrimental to the performance as a whole.

4.5 Internal Observations

- 4.5.1 The structural format of the building comprises a series of mono pitched timber frames, 6 No. in total along the building which in turn support timber purlins that are providing the direct support to the current corrugated fibre cement roof sheeting. There are 5 No. purlins to each bay supporting the roof and these measure 50mm by 150mm and are spaced at approximately 1300mm centres. The purlins are supported directly on the principle rafters via joist hangers.
- 4.5.2 The rafter members are a composite of timbers comprising pairs of 25mm by 200mm deep and jointed with similar timber sections in between to provide a composite section that is approximately 70mm wide or thereabouts overall. Intermediate support to these rafters is obtained approximately within the centre span, located 3000mm from the west elevation. The intermediate posts are approximately 95mm by 95mm and are supported directly onto the concrete slab. The posts are embedded within the slab by an unknown amount, though are performing satisfactorily. Where the posts meet the principle rafters, a gusset structure is formed by adding a veneer of plywood to connect posts to rafters via 65mm wide timber bracing. This is commonly seen in structures of this nature.
- 4.5.3 At the high end west facing elevation, the principle rafter is supported on two posts and these measure 75mm wide by approximately 150mm deep. At the head of the posts, diagonal bracing is provided to connect the posts to the eaves beam which provide longitudinal stability under wind loading. These posts are embedded into the concrete and appear in good condition and are performing satisfactorily under the current load arrangement.
- 4.5.4 At the low eaves end, a diagonal strut connects the principle rafters to the principle support posts and these measure 35mm wide by 70mm deep. These are providing additional cross building restraint from lateral load from wind.

- 4.5.5 At the northeast end of the building the intermediate timber panels to the external walls are visible locally and the studs measure 35mm wide by 70mm deep and are spaced at 600mm centres. There are two tiers of timber noggins placed between studs. The studs are 2000mm high at this location.
- 4.5.6 Throughout the footprint of the building a concrete slab of unknown thickness is present. The slab has been constructed in several bays and where bays abut, it is possible to see the damp proof membrane penetrating above the joint line which is assumed to continue beneath the slab. There is evidence of construction joints across the slab and these remain tight, with negligible opening from construction. The slab presents as level throughout with occasional deviation between pours however, this is not expected to inhibit reuse. The slab currently supports vehicle loading from tractors and other agricultural equipment and therefore is considered more than capable of reuse for a residential context.

5.0 LIMITATIONS

- 5.1 The structural inspection is a specialist survey, whose purpose is to enquire into the structural stability of the building.
- 5.2 The work of a structural inspection consists of a visual inspection of all accessible parts of the building, assisted by a check for abnormal distortions where practicable. Reference may be made to local geological conditions, and to records of structural damage to other structures in the vicinity.
- 5.3 The limitations of structural inspections are similar to those of most other non-intrusive surveys. We are not permitted to dig trial holes, lift floor coverings or remove decorations. We will therefore remain unaware of hidden defects or unusual construction details. In most cases, these limitations are not important, because structural problems are usually evident on the surface (walls, ceilings, door openings) before they become severe. But it does mean that we cannot detect problems that are latent or concealed. We always recommend, regardless of the structural condition of the building, that the owners maintain cover for all insurable perils, as these are never 100% predictable.

- 5.4 Except where specifically noted otherwise, our advice is concerned solely with current structural performance, and we do not report on the condition of finishes, waterproofing, damp penetration or timbers.
- 5.5 We recommend carrying out structural maintenance as part of good housekeeping, the most important tasks being:
- Ensuring drains remain free flowing and watertight
 - Ensuring vegetation does not grow uncontrolled close to the building
 - Ensuring the building remains weatherproof
 - Repairing or replacing deteriorated materials
 - Taking professional advice on any proposed alterations or extensions
- 5.6 We can provide detailed advice on structural maintenance if requested. We are not able to detect the presence of asbestos materials. We can provide standard literature on the risks associated with asbestos, if requested. This report is for our client's personal use, and is confidential, non-assignable and carries no admission of liability to any third party.

6.0 CONCLUSION

- 6.2 We were asked to undertake a structural engineer's visual structural inspection of the existing barn at Christmas Tree Barn at Mill Lane, Weybread. The inspection was necessary to consider the structural form, overall condition and suitability for conversion to residential function.
- 6.3 The barn was found to be in generally good condition, with all external walls presenting as plumb and in good alignment. The mono pitched roof generally presented an even plane with minor dipping of the purlins towards the southern end of the roof plane.
- 6.4 The structure is supported on a concrete slab which presents as even and level and is currently performing satisfactorily for the present load arrangements. A test hole on the site was inspected which confirms that the underlying subsoil comprises sand and gravel material which is adequate for the expected loading from the converted building.

- 6.5 Whilst the roof elements are relatively modest and efficient, they are performing satisfactorily under the lightweight roof construction and therefore additional materials used in the conversion, such as insulation and finishes etc. should be as lightweight as possible to mirror the material currently supported.
- 6.6 The principle frames are supported intermediately via a timber post bearing on to the ground floor slab and at the top the post is stiffened at its connection with the principle rafter via plywood gusset. This arrangement or similar should remain in-situ to provide ongoing stability for the principle frames and a point of intermediate support to minimise the deflection of the roof structure. Therefore the structural posts will need to be incorporated into the proposed architectural layout of the conversion.
- 6.7 Whilst full architectural drawings have not been supplied, it is anticipated that the floor plan of the barn will be sub-divided into the various rooms associated with residential function and this will therefore provide the serendipitous effect of adding further stiffness to the structure both laterally and vertically which will assist in improving overall stability.
- 6.8 The current external walls are lightweight timber stud infill panels which currently do not contribute to the vertical load bearing arrangement of the structure, however do provide an enclosure to the structure and resistance to external wind pressures. This arrangement should be maintained during the conversion and additional loading from insulation and finishes is anticipated to be in the capacity of the structural panels.
- 6.9 There are existing door and window openings around the building and these are expected to be reused for the conversion.
- 6.10 In summary, we would therefore conclude that based upon the present structural configuration, condition and performance of the structure that it is capable of conversion to a single storey residential dwelling.

7.0 APPENDICES

Appendix A – Photographs



Photo 1 – South Gable End



Photo 2 – North Gable End



Photo 3 – West Elevation



Photo 4 – Interior – intermediate post support



Photo 5 – Gusset detail



Photo 6 – Principal rafter and purlins

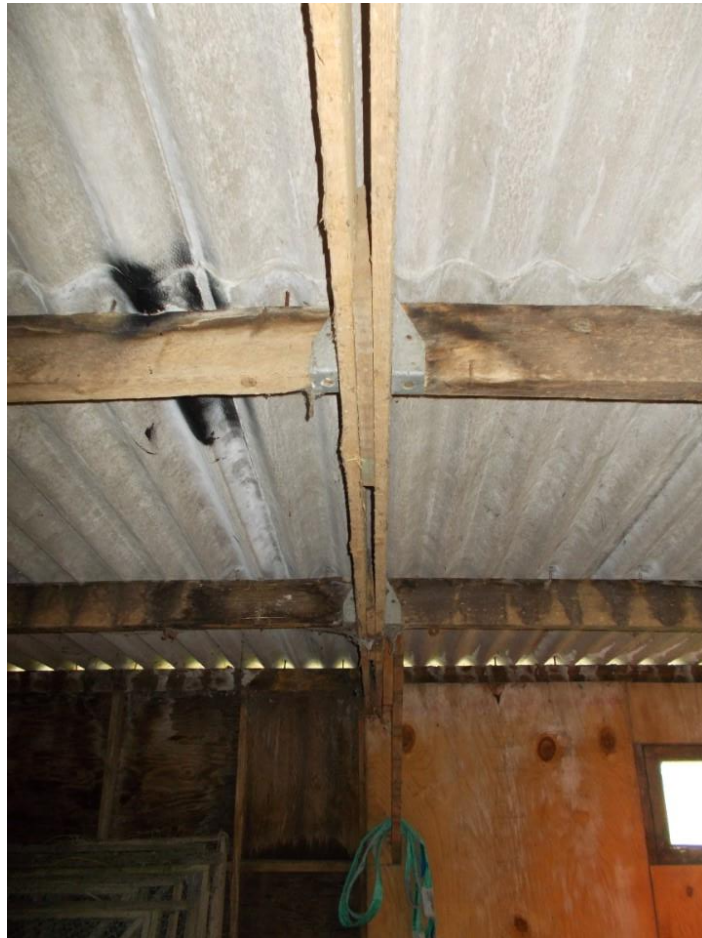


Photo 7 – Principal rafter detail



Photo 8 – Principal rafter, external post and wall panel detail