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CONSULTING ENGINEERS LTD

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**STRUCTURAL ASSESSMENT  
OF  
THE BARN AT  
2 HARTLEY WOOD  
CORNER COTTAGE  
HARTLEY, KENT**

**CLIENT:** BIRCHFIELD HOMES

**ARCHITECT:** BHD ARCHITECTS

**DATE:** SEPTEMBER 2020



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## **BARN at 2 HARTLEY WOOD**

### **1.0 BRIEF**

We have been requested by the Client to carry out a structural appraisal of the existing building so as to establish its potential for conversion into a domestic unit. This report is primarily intended for ancillary information, to be read in conjunction with the Planning Application and does not constitute a full summary for Building Regulation approval.

### **2.0 EXPERIENCE**

Trevor Cossey has over 40 years of experience as a structural engineer and has carried out structural assessments and surveys of both new and historic buildings throughout the South East. Throughout his career he has concentrated on work associated with building conversions and upgrades and brings a sympathetic approach to his work with older structures. Trevor's qualifications are as follows: BSC (Hons) C Eng. MStructE.

### **3.0 DESCRIPTION**

The building is a two-storey, timber-framed barn under a pitched, sheeted roof. The plan area is approximately 12.5m x 4.5m with an eaves height of 3.5m. The external walls are timber-clad and the roof sheeted. With reference to the geological map for the local area ground conditions should comprise clay with flints to depth.

### **4.0 FINDINGS**

For ease of reference each primary element of the structures will be considered in turn and salient points noted in relation to condition and possible need for repair.



#### 4.1 ROOF

The roof is of a conventional format comprising a mixture of 100mm x 50mm/100mm x 80mm rafters at 450-600mm centres spanning from ridge to eaves levels with intermediate purlin support. The rafters are generally in acceptable condition but in a number of locations additional rafters have been laid on to the existing roof to achieve a more uniform line to which the sheeting is attached. This arrangement is working efficiently but would benefit from some local reorganisation of the timbers (5-10%). At the mid-span of the rafters purlins are present supported by collars on an irregular grid. In any conversion works some upgrading would be required via the installation of a simple high-level ceiling line to strut the roof plains against each other. On grids 2, 3 and 4 the original oak cross beams at plate level have been cut out many years ago. Fortunately, new floor beams have been installed tying the front and rear elevations (see later comments).

The roof between grids 1-2 is a latter-day addition. The condition of the timber is generally commensurate with its age and would benefit from treatment works and 5-10% local repairs.

#### 4.2 FIRST FLOOR DECK

The first floor comprises 150mm x 63mm joists at 400mm centres spanning on to 250mm x 125mm oak cross beams on grids 2, 3 and 4. As mentioned previously the floor is a latter day installation resulting in the roof eaves tie beams being removed to achieve usable headroom. The main beams are effectively secured to the original columns but would benefit from additional metal strapping to ensure no further roof spread. From preliminary calculations the member sizes are adequate for domestic loading.

As for the roof timbers treatment would be beneficial and local repairs to the boarding and joists (5-10%).



#### 4.3 EXTERNAL WALLS

The external walls are of a standard timber frame construction with the majority being of oak studs, plates, mid-rail beams and top plate. In some areas the original timber has been replaced with softwood studs. On grids A and B main oak columns are present, grids 1-5 inclusive. The majority of the plates will require upgrading/repair and the softwood replaced with oak to match the original format. The external cladding is in good order requiring little attention.

#### 4.4 FOUNDATIONS

A number of trial holes have been excavated revealing shallow foundations commensurate with a building of this nature and age. Referring to the architect's plans for the conversion it is proposed that the ground floor level is lowered to achieve a greater headroom all as indicated on drawings 4015/PP-12. To achieve this requirement it will be necessary to underpin the existing external walls and link the new concrete with a slab to form a structurally viable watertight box which will safely re-support the superstructure. This work can be carried out by specialist contractors with no adverse effect the walls, roof, and floor above.

#### 5.0 **MEHTOD STATEMENT**

In any proposed conversion it is anticipated that a suitably experienced contractor who has prior experience of similar conversions is engaged. The method statement will be produced by the contractor but approved by all interested parties. The fundamental approach to a project of this nature is to ensure the temporary and long-term stability of the buildings while the work is underway. The need for temporary supports, suitable sequences of work, and consideration of the existing building elements is paramount. The project will be a team effort to achieve a successful outcome and the present involved parties are suitably qualified to achieve this end.



## 6.0 CONCLUSIONS AND RECOMMENDATIONS

As previously stated, the purpose of this report was to establish whether the existing building could be converted for domestic use and qualify such conclusions with details of general repair. From our observations we are of the opinion that the proposed conversion is a viable undertaking and that the building is of a permanent and substantial construction and not in need of major reconstruction. The building can remain standing as existing throughout the construction process. The drawings produced to date, including the existing and proposed layouts, can be considered as a logical and sympathetic use of a redundant farm building without involving any major or substantial construction works. As with any scheme of this nature certain elements of work will be required to meet the building regulation requirements generally as follows.

1. New ground floor concrete slab incorporating d.p.m. insulation and finishes.
2. Carry out any necessary upgrading works to foundations as previously discussed.
3. Treatment of all existing timber.
4. Overhaul of masonry below plate level.
5. Installation of d.p.c.
6. Introduction of insulation to walls and roof.
7. Local reordering of studs to external walls (5-10%).
8. Repair of wall plates (5-10%).
9. Rationalisation of roof timbers to achieve better support of roof sheets (5-10%).

**Trevor Cossey BSc (Hons) C Eng. MStructE**