ALAN BAXTER PARTNERSHIP LLP
CONSULTING STRUCTURAL ENGINEER

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RE: BARN 2, MINNIS FARM, OFF MINNIS WAY, WORTH, DEAL, KENT CT14 0DQ - STRUCTURAL REPORT FOLLOWING INSPECTION OF BUILDING

1) It is proposed to convert a former storage barn into residential accommodation. A site inspection was carried out on the 26th October 2022 to consider the structural suitability for conversion.

Description and Observations

2) The barn is located to the south east of Worth, accessed from Minnis Way. The barn has been most recently in use for storage agricultural machinery and hay and is one of a number of similar agricultural buildings in close proximity. The barn structure is a proprietary concrete frame manufactured and installed by Atcost, probably in the 1970-80's. All of the structural elements including purlins and gutters are of concrete, with steel angle ties and sheeting rails to the sides. The roof and side are clad with fibre cement profiled sheeting.

3) The barn comprises a pitch-roofed main barn of 4 bays with a full width lean-to to the south side and a single bay lean-to to the north east. Side cladding extends from ridge or eaves to approx. 1.8m above ground level to the south and east elevations and is open to eaves level to north and west elevations. The barn is open entirely to it's full height without inserted ceiling or mezzanines.

4) The ridge line of the duo-pitched roof runs east to west with the roof covering falling to north and south at approx. 25 degree pitch. The lean-to roofs both continue from the main roof slope at a slightly reduced pitch.

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IAN RICHARDS BSc CEng MIStructE, SIMON RAYNER BSc CEng MIStructE, Adrian Long BEng (Hons)
ASSOCIATES: David Davies IEng AMIStructE, Graham Spittle, James Folley
CONSULTANT: Michael Lewis
ALAN BAXTER PARTNERSHIP THE CLOCK BUILDING PYMPES COURT BUSBRIDGE ROAD LOOSE MAIDSTONE KENT ME15 0HZ
TELEPHONE: 01622 744263 FAX: 01622 749270
POOLE OFFICE: WESTONS POINT HOUSE WESTONS POINT BOATYARD TURKS LANE POOLE DORSET BH14 8EW
TELEPHONE: 01202 748712
EMAIL: mail@abpengineers.co.uk Website: www.abpengineers.co.uk
VAT REGISTRATION NO. 373 6951 20 LLP No. OC319497

5) The building measures approx. 18.0 long by 12.2m wide, internally, with the southern lean-to a further 9.5m wide. The northern single-bay lean-to also extending 9.5m. The main barn was measured as 5.4m to underside of eaves gutter and 7.7m to underside of ridge. Low eaves to the lean-to eaves was measured as 3.4m. The floor is broadly level with a slight fall to the south.

6) The barn floor was noted to be laid to a mix of compacted earth and chalk with some areas of concrete. The external areas are a mix of rough grass and some gravel surfacing, with a line of mature trees running to the west boundary, some 10-12m from the front of the barn. The trees included poplars and leylandii and other unidentified varieties. The land outside of the plot is laid to arable or grazing for horses.

7) No water supply was observed within or near to the barn, with rainwater downpipes from the gutters observed to be entering the ground, possibly connected to nearby soakaways.

8) The barn building is situated within a farm setting, close to other affiliated buildings, which while no longer in use, are being maintained with the grass and accessway well maintained. The site was found to be generally level with a slight fall to the south. The barn is some 160-180m south of The Street. Several residential buildings are located 120-150m to the north.

9) The British Geological Survey map sheet 290, site location TR 3393, 5609, covering the area shows the site to be underlain by Head Brickearth bordering/over Upper Chalk. Both of these formations are a good founding subsoil but head material can have a higher clay content, which can make the subsoil greatly affected by moisture changes due to tree root extraction. A moisture deficit and/or recovery can cause large changes in volume and hence movement of a building's foundations. Trial hole investigations of the building foundations will confirm their depth and the supporting subsoil beneath.

10) The building was found to be generally level and plumb with no indication of damage to concrete elements, settlement or movement observed.

Conclusions and Recommendations

11) We consider the barn to be in good condition and was found to be structurally robust and permanent. We consider that the building appears suitable for conversion to a residential property. However, as is always the case, some minor works will be required to convert the barn into a habitable building. An outline of the likely works and the reasons for them are given below.

12) Some works may be required to improve the structural capacity of the roof to support the additional weight of required insulation and other internal finishes. We do however note that the erection of internal walls or mezzanine floor will allow for such support without any significant works to the roof structure itself.

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13) The lack of an external plinth wall and perimeter foundation will require internal works to provide consistent support for the timber sole plate. Based on current information, a raft slab foundation with a downstand edge is considered to be most appropriate. As noted above, site investigation works will be required to confirm the subsoil profile, which combined with necessary laboratory testing, will allow the most suitable foundation system to be design and specified. We consider all internal walls and applied loading will be adequately supported by such an internal raft foundation.

14) Should there be a requirement for the internal ground floor level to be raised above existing levels due to flood protection requirements, suspended concrete or timber floors could be used.

15) External and internal walls and proposed internal structure should be connected to the existing barn frame to provide additional stiffness and bracing to it. Plywood sheathing could be added to the internal face of timber-framed walls to provide sufficient stability against racking of the structure.

16) It is believed that the above works to the barn will result in a building that will remain structurally secure and in use for the longer term.

Yours sincerely

[redacted]

JAMES FOLLEY
FOR ALAN BAXTER PARTNERSHIP

View on front of barn from north west

View on rear of barn from south east

View on front of barn from south west

View on bean showing concrete frame structure

View on lean-to to north side of barn showing structure

Detailed view on connection of post to portal rafter and lean-to rafter