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May 2023

STRUCTURAL ASSESSMENT

On

CONVERSION OF EXISTING OUTBUILDINGS

At

**THE WILLOWS
EYNHAM ROAD
CASSINGTON
OX29 4DF**

For

MR AND MRS HILL



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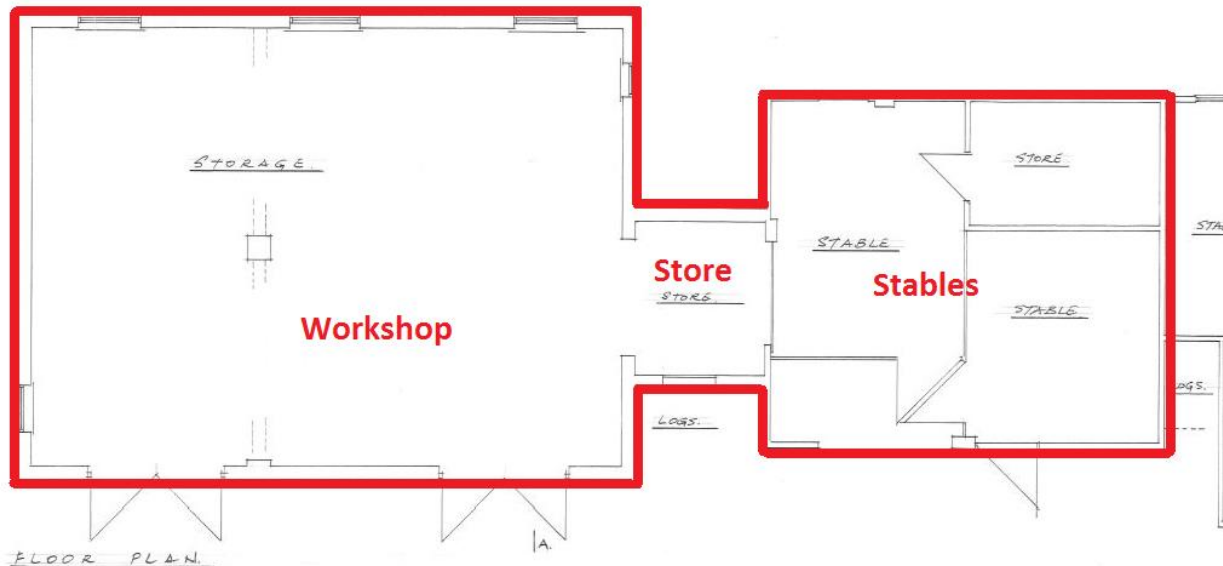
1.0 Instructions and Limitations

- 1.1** Instructions were received from you requesting a structural feasibility report on the proposed conversion of the existing outbuildings to a residential dwelling. The purpose of our survey is to inspect the buildings and provide an opinion on the suitability of the structures for conversion into the proposed uses.
- 1.2** Initially, our survey was to be visual only, without damage. Our report is limited to the inspection of visible elements of structure only. No inspections have been made of woodwork, damp proof membranes or other parts of the structure which were covered, unexposed or inaccessible and we are therefore unable to report that such part is free from defect.
- 1.3** This report is prepared for the information and use of Mr and Mrs Hill, and any liability of Ian Harban Consulting Engineers to any third party, whether in contract or in tort, is specifically excluded. Any third party finding themselves in possession of this report may not rely upon it without first obtaining the written authority of Ian Harban Consulting Engineers.
- 1.4** RHS refers to the right hand side of the building when viewed from the front.
- 1.5** LHS refers to the left hand side of the building when viewed from the front.

2.0 **Description and History**

- 2.1** Various single storey outbuildings are situated on the land of the Willows - an extended detached dwelling - on the outskirts of Cassington, north of the A40 road. The structures are located at the rear of the Willows, set back from the roads, on an area which is generally level.
- 2.2** The Workshop/Store and part of the Stables, as shown in Figure 1 below, are proposed to be converted into residential use.

Figure 1: Existing buildings proposed to be converted



- 2.3** In line with the Clause d) Paragraph 150 of the NPPF, the reuse of buildings is appropriate in the Green Belt provided that the buildings are permanent and substantial construction.
- 2.4** The Workshop and the Store were constructed in 1998, whereas the Stables date from the 1960s.
- 2.5** All three buildings are single storey and rectangular in shape, although different in size. They are attached to each other and have shallow mono-pitched roofs at various heights.
- 2.6** Photographs of the buildings and their surroundings are included in Appendix A.

3.0 **Inspection**

3.1 First inspection was made by V Kollo on 14 April 2023.

3.2 All areas were visited and the walls and roofs inspected from ground level externally.

4.0 Observations

4.1 Existing Structures

The existing structural layout of the buildings is shown in the figure below:

Figure 2: Existing structural layout



4.2 Stables

- 4.2.1** The Stable block is about 6.5m deep and 7.2m wide. The roof is low single pitch, eaves and ridge heights are 2.5m and 2.7m, respectively, providing for a pitch of approximately 2 degrees.
- 4.2.2** The corrugated sheet roof is supported on six rectangular 50x150mm deep timber purlins, which are in turn held in place by the walls and a front to back spanning steel beam in the middle of the building, splitting the span into two equal lengths. The steel beam is 280mm deep. There was no evidence of structural shortcomings observed in the roof.
- 4.2.3** Walls are formed with a single leaf of blockwork which is stiffened by block piers enhancing wall stability.
- 4.2.4** Elevations are generally plumb and exhibit no signs of significant movement or extensive damage which would be indicative of stability or foundation problems.
- 4.2.5** Small cracks were observed at the top RHS corner of the front elevation externally, and at this corner on the side wall internally. The cracks developed under a hole in the corrugated roof sheet and were likely caused by water ingress. The stepped cracks are less than 5mm wide and follow the horizontal and vertical line of the mortar joints between the blocks. Some repair works will be required to these walls locally but overall, the walls should be fully capable of retention with no visible areas of bulging.
- 4.2.6** Precast concrete lintels were used to bridge over window and door openings.

4.2.7 The floors are cast concrete and have been laid level. Although the inspection was somewhat inhibited by the rubber stable matting, this did not prevent to draw representative conclusions on the overall condition of the floor structure which appeared to be in a sound condition.

4.3 Store

4.3.1 The Store is about 2.8m deep and 2.5m wide. Eaves and ridge heights are 2.4m and 2.5m, respectively, providing for a roof pitch of approximately 2 degrees.

4.3.2 The insulated composite roof panels are supported on the external walls and a timber purlin at midspan, spanning side to side. The purlin is 75x150mm deep. There were no obvious signs of structural shortcomings observed in the roof.

4.3.3 Walls were measured on site and were found to be about 280mm thick overall. This suggest modern cavity construction which is confirmed to some extent by the stretcher bond for the concrete blockwork internally and externally. All walls are in good general order and capable of full retention with no structural failure observed.

4.3.4 The floor is cast concrete that has been laid level and appeared in a sound condition.

4.4 Workshop

4.4.1 The Workshop is about 8.5m deep and 11.5m wide and is formed in two separate sections, the narrower LHS part has a higher level roof with eaves and ridge heights at about 4.4m and 5.0m, respectively. The roof of the RHS unit is at a lower level with 2.8 and 3.3m, eaves and ridge levels, respectively. The roof pitch is approximately 3.4 degrees.

4.4.2 Steel twin beams span front to back between the two sections supporting the cavity wall above which in turn supports the raised roof. The beams are 178x102x19 UB sections resting on the external walls and on an internal blockwork pier at midspan. The pier is 440mm wide and 440mm long constructed of concrete blocks laid flat.

4.4.3 The composite roof panels are supported on 290mm deep cold formed Z purlins, which are in turn held in place by the walls and the above mentioned hot rolled steel beams.

4.4.4 Lintels above window and door openings are proprietary cavity wall lintels.

4.4.5 Walls are the same thickness and construction as the Store walls and therefore assumed to be cavity walls. There are no internal partitions present but the high-level cross wall separating the LHS and RHS sections provide sufficient lateral support to the long front and rear elevations.

4.4.6 All walls are generally plumb and in good order. There were no signs of significant bulging or structural failure which would be indicative of stability or foundation problems. Slight diagonal cracking was observed externally above the LHS door opening on the front elevation as a result of very slight structural movement. Repointing will be required to this area.

4.4.7 The floor is cast concrete and has been laid level. The inspection of the slab was limited slightly by a quantity of farm equipment, but overall, the floor structure appeared in a sound condition.

5.0 **Discussion**

- 5.1** The structures inspected are generally in good condition. No evidence of significant movement, deflection or distress were observed.
- 5.2** The insulated composite roof panels of the Store and Workshop can be retained or replaced like for like. This will not increase the existing loads. Converting the Stables to habitable use will involve some additional vertical loads on the roof structure from the addition of thermal insulation and ceiling. This, however, is considered to be moderate and unlikely to result in distress.
- 5.3** Redevelopment works are limited to the conversion of the existing buildings with no alterations to the buildings' geometry and footprint. Therefore, horizontal loading applied to the buildings from wind will not alter as a result of the proposals. At present, the walls, piers and roofs provide such lateral stability and there is no reason to believe that they would not successfully continue to perform that way.
- 5.4** Local repairs will be needed to the walls of the Stables and Workshop where slight cracking was observed in the blockwork, but overall, the walls are capable of full retention with no requirement to dismantle and rebuild.
- 5.5** The concrete ground floor slabs appeared to be in a sound condition. The additional loads on the floors, such as insulation, screed and floor finishes, will be compensated by the reduction in imposed loading within a residential setting.
- 5.6** There was no evidence of significant movement or distress to the structures, suggesting that the foundations are adequately constructed.

6.0 **Conclusions**

- 6.1** On the basis of our inspection, we are of the opinion that the buildings represent a viable proposition for conversion to residential use without the need for significant structural works.
- 6.2** The buildings are capable of functioning as a dwelling. The existing fabric of the buildings is generally intact and structurally sound, and suitable for conventional repairs in accordance with current building best practice.
- 6.3** Minor masonry repairs will be needed to the walls of the Stables and Workshop locally where slight cracking was observed in the blockwork. Overall, however, it can be concluded that the walls are capable of full retention with no requirement to dismantle and rebuild.
- 6.4** The roof structures are performing satisfactorily and are configured to provide sufficient support to the roof coverings. The addition of thermal insulation and ceiling in the Stables will not increase the loads substantially. Therefore, there is no reason to believe the existing roof structures should not continue to perform in an acceptable manner.
- 6.5** Due to the change of use, the imposed load on the floors will be reduced. Therefore, the existing ground floor slabs should be suitable to form a sound base for the new dwelling from which to raise partitions and install insulation and floor finishes appropriate to a domestic floor.
- 6.6** There was no evidence to suggest significant past foundation settlement. The existing foundations are therefore generally suitable to sustain the loadings currently imposed by the structures. The proposals to convert the buildings to habitable use will involve the addition of little appreciable additional loads and there is no reason to believe the existing foundations should not continue to perform in an acceptable manner.
- 6.7** In summary, the overall condition of the Stables, Store and Workshop together with their overall performance to date lead us to believe there is no substantive reason why they cannot successfully be converted to a residential dwelling without significant structural intervention other than what would be required to maintain the integrity of the structures in their current forms.
- 6.8** With this in mind, we consider the existing buildings to be of permanent and substantial construction, and in principle, structurally strong enough to sustain the loadings from a building operation reasonably necessary to facilitate their conversion to residential use.

APPENDIX A

Photographs



Photograph 1 Workshop Front elevation



Photograph 2 Workshop, Store, Stables Front elevation



Photograph 3 Workshop and Store – Rear and side elevations and roof



Photograph 4 Stable Block – Rear elevation and roof



Photograph 5 Stables – External cracking at top RHS corner



Photograph 6 Stables – External cracking and discontinuity of roof



Photograph 7 Stables – Cracking internally



Photograph 8 Stables – Precast concrete lintel over door



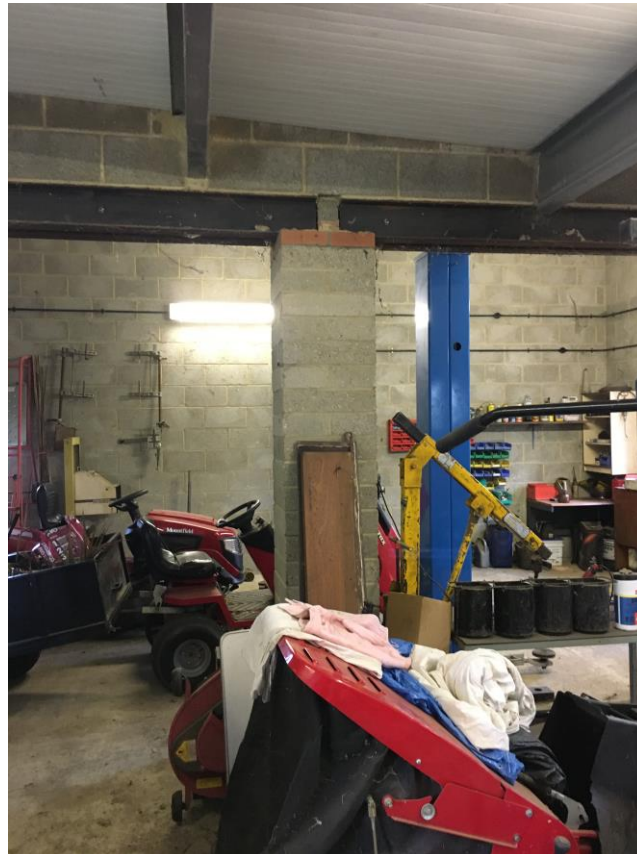
Photograph 9 Stables – Stiffening pier



Photograph 10 Stables – Steel beam supporting timber roof joists



Photograph 11 Store



Photograph 12 Workshop – Block pier



Photograph 13

Workshop – Z purlins and steel beams supported on block pier



Photograph 14 Workshop higher level roof



Photograph 15 Workshop - Blockwork inner leaf



Photograph 16 Workshop – Concrete floor