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Our Ref 24100/JL/JL

Date: 10 April 2024

Mrs Stavrou,

Re: Chestnut Farm Barn, Woodfield Lane, Hatfield

We visited the above property, at your request, on 5th March 2024 to undertake a structural appraisal with respect to the proposed conversion of the existing Barn into a residential dwelling.

Our inspection was visual only and no opening up works were undertaken.

Survey

The Barn was originally a pig shed and is now currently used for storage. Photograph 1 shows the front elevation.

The structure is formed of seven pairs of precast concrete portal frames at approximately 3m centres forming a double pitched roof with central valley. Columns are located in the external walls and on the line of the central valley. Photograph 2 shows one half of the double portal frame.

As can be seen in Photograph 2 the floor is a ground bearing concrete slab, it has some cracks which are a combination of construction joints and thermal.

The external walls are formed in infill blockwork between the precast portal frames, refer to Photographs 3 and 4.

In many areas the blockwork has separated from the precast concrete, the worst affected area is the rear elevation, as shown in Photograph 5.

As seen in Photograph 3 the roof is formed in a profiled sheet, this spans from the precast eaves beam up to the ridge, refer to Photograph 6, and is supported at third points of the span by precast concrete purlins, refer to Photograph 7.

The central columns and associated valley beams are shown in Photograph 8. This shows damage to the column from water penetration and is typical to all central columns. Reinforcing bar is evident and will require concrete repair.

The precast concrete elements appear in a structurally sound condition, some concrete repair works are required, with no evidence of significant movement.

No distress or deflection was noted to the eaves beams or purlins.

External elevations are blockwork, which apart from the separation from the frame in places appears sound. The

roof appears structurally sound with no significant deflections to the sheeting. Refer to Photographs 9 and 10.

Foundations were not visible at the time of our survey. It is evident that the blockwork walls have been added to the frame and it appears they are supported on strip foundations.

There are a number of mature trees relatively close to the walls however there was no evidence of any ground movement affecting the frame.

Proposals

It is proposed to form a single residential unit.

Entrance doors and windows are to be formed in existing openings in the walls, frames are to be replaced. Only one opening to the right hand side elevation is to be widened.

The existing roof cladding is to be removed and replaced with a profiled metal sheet. Insulation to the roof is to be applied internally.

The external walls are to be retained and will be internally insulated.

New internal walls will be of light weight studwork built off the existing slab. The existing slab is to be retained and have insulation applied to the upper surface.

Structural Adequacy

The footprint and size of the structure is not changing and there will be no large openings added.

The overall stability of the existing structure will therefore not be changed.

No members of the portal frames will be amended/removed. Where the extended window opening is required in the wall the opening will require a new lintel.

The rear elevation to the right hand side will require the blockwork wall replacing, where possible this will be built off the existing foundation, if not possible a new strip foundation will be constructed between the precast concrete columns.

Loadings to the internal floors will be reduced from the current storage loadings, estimated to be a 5kN/m² (Imposed Load), the new Imposed Load of 1.5kN/m² is required for Residential areas and insulation and finishes will be less than 0.5kN/m².

All new internal walls will be timber studwork and constructed off the existing slab. A general allowance of 1kN/m² is usually attributed to this form of construction.

The new total load of 3kN/m² is therefore less than the existing load.

The portal frames will have the existing profiled sheet removed and a profiled sheet replacement added, insulation will be fixed to the underside of the roof structure. Imposed Loads (Access, Wind and Snow) will remain the same and Dead Loads will be similar to the existing.

The internal insulation and finishes to be applied to the blockwork walls will have minimal impact on the loadings.

Due to the existing size and use of the Barn no additional foundations will be required.

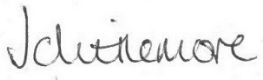
Conclusion

In conclusion we can confirm that the Barn is currently structurally sound and shows no sign of movement or distortion.

The Barn is structurally suitable for conversion into the residential units and there will be no alteration required or detriment caused to the existing structure.

We trust the report is clear, however if you have any queries please contact the office.

Yours sincerely,
HLS Structural Engineers Ltd



Julie Littlemore
MEng (Hons) BA (Hons) CEng MIStructE



Photograph 1 View on Barn from front.



Photograph 2 View on one half of double portal frame.



Photograph 3 Typical view on infill blockwork to external leaf.



Photograph 4 Typical view on infill blockwork to external leaf.



Photograph 5 View on rear elevation showing separation of infill blockwork and precast frame.



Photograph 6 View on precast concrete ridge beam.



Photograph 7 View on precast concrete purlin.



Photograph 8 View on central column/valley beam.



Photograph 9 View on left hand side external elevation.



Photograph 10 View on right hand side external elevation.