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DJC/TJL/6289

13 July 2020

Brooks Architects Ltd
16 Colonial House
Leiston
Suffolk
IP16 4JD

For the attention of Tim Hannon

Dear Sirs,

BARLEY GREEN FARM BARN – STRUCTURAL INSPECTION REPORT

1. BRIEF

Horizon Structures were appointed by Brooks Architects on your behalf to undertake a structural inspection of the above property with particular regard to converting it into domestic accommodation and reporting on any significant structural defects identified. We have therefore limited our inspection and report accordingly.

2. DATE OF INSPECTION

Tuesday 7th July 2020.

3. DESCRIPTION OF PROPERTY

The property is a substantial detached timber framed Barn with a first floor at either end and a full height void centrally. The property is constructed off a low height masonry wall before the historic timber barn springs off a plate. The indications on site revealed that approximately one-third of the left hand end of the structure appears to have been rebuilt with modern masonry being used for the stud wall and modern timbers being used in some areas throughout the structure. See Photograph 1.

The whole property is clad in weather boarding with a pitched cut timber principle truss roof overlaid in clay pantiles.

The property is situated centrally on the plot with a pond approximately 10m remote from the left gable. A substantial fir tree is located approximately 20m from the left gable and a series of semi-mature Silver Birch Trees are located approximately 12m from the right gable. An Apple Orchard is present to the rear.

The British Geological Survey shows that the property is founded on the Lowestoft formation consisting of Boulder Clay.

4. EXTERNAL INSPECTION

An inspection of the external weather boarding revealed that it is suffering from exposure and subsequent Beetle infestation throughout all elevations.

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Using a spirit level, it was possible to see that the property leans to the side and forwards. The front and rear elevations lean forward approximately 10-30mm at the left gable. Approximately plum centrally and approximately 30mm at the right gable. The left and right gables lean to the right approximately 30mm at the front elevation and between 100 & 75mm to the rear elevation. It was noted that the rear leaned in some areas varied front to rear e.g. the rear left-hand corner leans forward by approximately 50mm, whereas the front left-hand corner leans forward by approximately 10mm per metre. See Photographs 2 and 3.

It was noted that some of the rainwater down pipes discharge onto the ground adjacent to the base wall and this may lead to the softening of the soil or washout at a later date. Midway along the rear elevation, the low-level flint wall has disintegrated by what looks like a combination of vegetation and frost attack.

At each corner of the left gable, the underlying timber frame has been left exposed. These have suffered from weathering although no softening or rot appears to be present. See Photograph 4.

An inspection of the roof revealed that it dips suitable at approximately a third width of a roof towards the right-hand end. See Photograph 5.

5. INTERNAL INSPECTION

An inspection generally revealed that moisture has penetrated the building is allowing timbers to soften slightly and for Beetle infestation to progress. No area of significant rot were identified.

The inspection of the property generally reveals that very few bracing members were present within the structure allowing the property to rack in the two directions.

An inspection of the left ground floor room reveals that this has been formed with modern blockwork to the gable and the central internal walls. The room is subdivided by an open timber framed wall to support the first floor. The inspection revealed that the main timber frame elements along with a significant number of the principle timbers appear to be historic and supported off a modern fletton wall plate. The floor had been constructed from modern timbers with fibre board over. See Photograph 6.

An inspection within this area revealed no significant damage apart from two 0.5mm cracks beneath the gable window extending from the floor to the underside of the window. In addition to this, water penetration from above has led to isolated staining and damage to the timber.

An inspection of the first floor left room revealed that similar to below this was principally constructed from historic timbers however, a significant portion of the roof structure had been formed from new timbers apart from the first floor joints. The roof itself is a combination of principle trusses supporting purlin which in turn forms the rafters, however centrally the roof is voided with bracing timbers extending from the ridge down to the principle truss on either side. An inspection within this area revealed no significant damage apart from water penetration leading to isolated staining of the timber work and rotting to the floorboards.

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An inspection of the ground floor right room revealed a similar construction, however the underlying brickwork appears to be historic. The room has two relatively modern brick piers that support the first floor constructed from modern timbers.

An inspection of the room reveals no significant damage other than localised water penetration and very localised areas of rot.

An inspection of the first floor right room reveals that the roof slats has been constructed similar to the left room with principle trusses supporting purlins which in turn support the rafters. A full height void is present centrally with this location being supported off struts down onto principle trusses on either side.

The first truss from the right hand gable has been constructed with the principle rafter approximately 400mm to the left of it and the tying to the wall plate both front and rear appears to have slipped with between 25 and 50mm movement to the front, where as to the rear the tie has slipped approximately 200mm leading to movement of the wall plate that has caused the joint to shear inwards. See Photograph 7 & 8.

An inspection of the tie member reveals that it deflects to the right approximately 25 to 50mm due to the thrust on the struts up to the ridge line.

Water penetration through the roof has led to localised staining and isolating rot of the timber and floor.

6. LIMITATIONS CLAUSE

This report consists of a visual survey of the building and does not include any intrusive investigative work or testing in inaccessible areas and we are therefore unable to report that any such part of the building is free from defect.

7. CONCLUSIONS AND RECOMMENDATIONS

We consider that the evidence on site would indicate that the property is not suffering from any significant foundation movements such as subsidence or settlement.

The property has been left exposed and unmaintained for a substantial amount of time and consequently the moisture content of the timber structure is high allowing beetle infestation to progress. If this situation is allowed to continue the rot will progress through the structure. Generally, the property is in relatively good condition for a structure of this age and nature, however it has a tendency to rack left and right and rear to front because of the limited bracings internally.

We consider that the property is suitable for conversion into a domestic dwelling, providing that during the refurbishment works, the timber is treated, and additional bracings are included within the frame structure to prevent further movement.

In detail, the property is suffering from the following disuse:

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1. When the refurbishment works are undertaken a review of all the timber elements should be taken and where incidents of rot or significant beetle infestation, these should be replaced before treating the whole timber structure.
2. As mentioned above, additional timber bracing elements should be included within all the external and internal walls to stop the further racking of the structure.
3. The right internal truss should be reconstructed with a principle rafter over it and suitable tying into the wall plate.
4. The strutting to the ridge in the voided areas should be formalised to prevent sideways thrust on the tie members.
5. Areas of disintegrated masonry should be replaced using a sympathetic material.
6. All drain water goods should discharge to the drainage system to out fall away from the property.

We trust the above is self-explanatory, however, should you have any further queries please do not hesitate to contact the undersigned.

Yours faithfully,



David Cook
Civil and Structural Engineer
B.Eng C.Eng FICE MCGI
Horizon Structures Limited

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Photograph 1



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Photograph 2



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Photograph 3



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Photograph 4



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Photograph 5



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Photograph 6



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Photograph 7



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Photograph 8

