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10 November 2023



Vector Business Finance Limited  
6th Floor  
First Central 200  
2 Lakeside Drive  
London  
NW10 7FQ

Gyoury Self Partnership (St Albans)  
4b Parkway, Porters Wood  
St Albans, Hertfordshire AL3 6PA  
Telephone: 01727 853553  
www.gyouryself.co.uk

Dear Sir/Madam

**BARN AT NICOLL FARM, ALLUM LANE, ELSTREE**  
**SUMMARY REPORT ON STRUCTURAL REVIEW AND INSPECTION**

We confirm our structural review of the above Barn including a visual inspection on Thursday 17 August 2023. It is proposed that the existing structure is to be renovated for use as a four-bedroom residential unit.

**1.0 Appointment**

Gyoury Self Partnership are appointed by Vector Business Finance Ltd.

**2.0 Brief**

The brief was to visit the property to carry out a visual and non-intrusive structural inspection and appraisal of the Barn building and surrounds. Following the inspection to provide a written summary report on the condition of the structure, with pictures of critical items, in context with the intended renovation and conversion works.

**3.0 Inspections**

Inspections were made by Nicholas J Archer IEng IMIStructE, the Institution of Structural Engineers - Incorporated Member No 064224468, on Thursday 17 August 2023 in the period 09.00 to 11.50.

Conditions were dry and sunny thus permitting adequate inspection.

The building was unoccupied and generally empty, with only remnants of the recent cannabis production remaining.

**4.0 Reference Documents**

4.1 Appendix A to this report. Building plan with the individual areas numbered for reference purposes



Equity Partners: **Nicholas J Archer** IEng AMIStructE **Philip A Luck** BSc(Hons) CEng MICE  
Consultants: **Griffin Dixon** FRICS CEnv PEng FSPE **Mark Naumann** BEng(Hons) CEng MICE



- 4.2 Appendix B to this report. Pictures taken during the inspection on 17 August 2023
- 4.3 Appendix C to this report. Topographic Survey of the Barn.
- 4.4 Historic England Listing as follows:

TQ 19 NE ELSTREE ALLUM LANE (North side)  
 List Entry No 1103585  
 Elstree 7/155 Barn and Byre at 20.07.82  
 Nicoll Farm about 20m SW of House  
 (Formerly listed with Nicoll GV II Farmhouse as barn)

Barn with attached byre. C17, extended C19 and altered C20. Timber frame, weatherboarded. Tiled roofs. Barn: 4 bays with C19 extensions, 3 similar bays to W and brick to SE. Entrance to N and hipped threshing bay to S in 2nd bay from house. Oculus in E gable. Windows to W gable of lower timber extension which has a lean-to addition to front. C18 door hood set onto entrance on brick extension. Interior: clasped purlins, straight queen struts, intermediate collars. Curved and arched braces from wall posts to tie beams and to wall plates. Re-used timbers in 3 bay extension: clasped purlin collar beam roof. Slightly lower byre to N; 4 bays with additional hipped bay to N. Windows with round heads, Gothic glazing, and leaded lights and C18 flat hood set over door with pointed head all inserted facing house. Interior: clasped purlin collar beam roof, queen struts, arched braces.

- 4.5 The site is not within a Conservation Area.

## 5.0 General Description

- 5.1 The building is located on a generally north-south axis at Nicoll Farm, 34 Allum Lane, Elstree, Herts. WD6 3NP, at an elevation of approximately 120m ordnance datum – (Appendix B, picture B1, aerial view).
- 5.2 The building faces Allum Lane the B5378 on the crest of a hill, separated from the public highway by a brick wall.  
  
 Nicoll Farmhouse is also present on the site. The remainder of the plot is overgrown open land. Access is via a timber gate from Allum Lane immediately adjacent to the building. There is a further access onto the site to the east.
- 5.3 The site is in Flood Zone 1 with a very low risk of flooding from river, sea, or surface water and flooding from reservoirs is determined to be unlikely in this area.
- 5.4 The British Geological Survey indicates that the bedrock soils at the site comprise clay, silt, and sand. There is no available information as to the superficial soils.
- 5.5 The date of construction of the Barn is determined in the Listing as the 1600's and being extended in the 1800's, with alterations in the 1900's.

- 5.6 The building surrounds are mainly unsurfaced apart from the driveway off Allum Lane which is part hard paved.
- 5.7 As far as we could establish there is no formal foul or surface water drainage system. Where gutters, downpipes and other rainwater goods exist they are in poor condition.
- 5.8 There are self-seeded trees between the building and Allum Lane, picture B5.
- 5.9 The overall building is broadly L-shaped and is formed of 10 discrete areas, see Appendix A, with the individual areas numbered for reference purposes.
- 5.10 The main elevations mainly comprise timber horizontal square-edged weatherboard wall cladding directly fixed to the timber frame, pictures B1 – B8. There are various door, window, and other openings, bridged by timber lintels intrinsic with the frame, some of which are glazed.
- 5.11 Area 1, Barn 1, is approximately 15.6m x 6.4m and 4.2m to eaves, comprising an open plan area of a traditional timber framed structure of four bays running between timber framed gable ends, picture B13. There is an outshot between the annexes below.
- Annexes 1A and 1B to Barn 1 are brick-built add-ons with pitched roofs, incorporating hip ends, pictures B1, left, and B4.
- 5.12 Area 2, Barn 2, is approximately 8.6m x 4.2m and 2.6m to eaves and is also open plan and partially separated from Barn 1, pictures B23 – B32, with a lean-to add-on area 2A, pictures B26 & B33.
- 5.13 Areas 3, 4 and 5 form a wing to Barns 1 and 2, pictures B34, B35 and B36, B43, B44 - B50 and B57 and have an intermediate timber joisted first floor, part of which appears to have been retro-fitted, pictures B37, B38, B39, B40, B41, B42 and B51.
- 5.14 Area 6 is effectively a separate corridor to the rear of Areas 3, 4 and which looks to have been used for holding livestock and animal feed, pictures B52, B53, B54 and B55.
- 5.15 Areas 7, 8, 9 and 10, pictures B56 and B58 – B61 are relatively modern workshop and garage extensions that were of poor initial construction, are extensively run-down and hold no historical or heritage interest.

The proposal allows to remove these parts of the structure, albeit retaining the historic fabric that is at the interface and separating wall with area 5.

## 6.0 Commentary

### 6.1. General

The barn structures are best described as unique and bespoke timber frames conceived and fabricated by the carpenter, with the timber sizes and worked on a practical basis, using proportion, geometry, and availability to determine the individual components.

These structures are characteristic of a post and truss type, with principal rafters jointed into the tie beam which form the trusses which carry purlins, in turn supporting the rafters and roof covering, united with braced wall frames with common verticals to resist racking.

Connection and member to member jointing details were produced to act in compression, with peg detailing.

The superstructure as a whole springs from a timber cill beam, bearing on a brick plinth or near ground level.

Foundations are expected to be a shallow spread type, with a formation typically less than 500mm below the surface.

The species of timber used in the parts has not been confirmed but is assumed to be Oak.

The overall impression is of a severely dilapidated structure, which has suffered extensive movement with failure of individual members and joints in the superstructure at the same time bearing on the defective plinth and inadequate foundations.

There is appreciable distortion in the structure. The principals are not plumb, level, or square and there was rot and decay in many members, with the degeneration being at a level where there was substantial loss of section.

The building is not weathertight in respect of either the roof or the walls, with many holes, gaps, slipped tiles and missing segments of weatherboarding.

Infestation by boring insects, was evident in a lot of the timber members, with open flight holes, to a level that the members had been weakened. Specialist advice will be required to establish if treatment is possible, and the level of treatment required.

There are various temporary props insitu in Barn 1. Presently the timber frame is unable to adequately transmit the vertical and horizontal loads to the plinth and foundations, which are sub-standard in the majority.

We deem that there is a notable risk of structural failure and ultimately potential collapse in part or whole.

Significant works are required to secure the survival of the barn as extensive works are required to the brick plinth and the structural timber frame together with re-roofing and new external cladding.

## 6.2 Barn 1

The roof structure consists of common rafters, running from eaves to ridge and supported by purlins at the mid-point of each slope which carry between the principal trusses that are equally spaced along the length of the building.

The principal trusses incorporate a bottom chord, and which are supported on principal posts with knee braces at the intersection. The remainder of the external walls are formed with vertical timber staves spanning between the cill beam, a mid-height beam and eaves plates, cut between various diagonal braces which occur in most bays, pictures B9 – B16.

Note the builders' props set on rough stools, pictures B12, B13 and B14, and the old telegraph pole, picture B16, all acting as crude temporary supports, which are holding the structure in place.

There are several primary timber to timber joints that have pulled apart, with the movement and displacement measured at greater than 100mm.

The roof is covered with clay tiles on battens that carry between the rafters. There is no underfelt. There is significant unevenness and distortion in the slopes and ridge.

No underfelt or insulation is present. Some tiles have been replaced in the past and numerous others have slipped out of position or are missing.

The timber framed walls above the plinth are clad with traditional timber overlap horizontal weatherboarding, with a dark creosote style finish, which is in poor and weathered condition. There are notable loose and missing boards, holes, rot, poor joints, with sections having been previously replaced.

There are large poorly fitting hinged double-doors on the north elevation. There are other large doors in the south elevation of the outshot.

The plinth brickwork is in poor condition to the point where it has disintegrated in places, pictures B9 and B14. It is better elsewhere and locally, although the brickwork is eroded soft, damp, porous and dilapidated, with open joints and loose individual bricks, typically shown in pictures B10 and B11.

The plinth is not present at all in several lengths, where it has been replaced with rough, uneven, and stepped concrete underpinning that extends above floor level to higher than the natural plinth, covering the cill beam, pictures B12, B13, B15, B16 and B17. The latter picture shows the concrete deep-seated into the timber sections.

The floor is a mixture of flagstones, soil and other loose material bearing on the ground. The surface is uneven and mostly covered in pigeon droppings and other debris.

The annexes to Barn 1 are of solid brick construction each side of the outshot with brick arch lintels over the openings supporting timber framed roofs. The facing bricks are soft red in lime mortar and there are many areas of spalling and prominent erosion picture B4.

Localised movement and cracking were evident at various locations, with signs of past repair and rebuilding.

### 6.3 Barn 2

The structure and provenance of Barn 2 closely follows that of Barn 1, with rafters on purlins carrying to principal trusses and timber framed infill, Pictures B23, B24 and B25. Also pictures B27, B28, B29, B30, B31 and B32.

The loadbearing elements are in similar condition as described for Barn 1, although where inspection was possible most of the plinth brickwork has remained intact.

The floor was covered with significant amounts of rubbish meaning the construction could not be determined but is expected to be like that in Barn 1 and bearing on the ground.

As elsewhere and throughout the property, there is no formal damp course in the walls or floor.

The lean-to of Barn 2, picture B33, is a simple timber framed structure with a part rendered finish internally and with a vaulted pitched roof extending to a low eaves. There is blockwork infill at low level that has suffered movement.

### 6.4 Areas 3, 4 and 5

The structure is timber framed in a similar style to Barns 1 and 2 although the eaves is at a lower level and the plinth does not extend above floor level.

There are timber framed structural partitions at ground floor that separate the various areas some of which are open framed, picture B44 and others are clad, the cladding being in inferior condition, pictures B52 and B54.

The roof is covered with clay tiles on battens that carry between the rafters. There is significant unevenness and distortion in the slopes and ridge, with partial collapse, picture B3.

There is an intermediate floor above areas 3, 4 and 5 with internal access to the upper level via a timber staircase. Headroom in the upper level is prejudiced by truss chord members, pictures B37, B39 and B41.

The upper floor is timber joisted, part original timbers, pictures B42, B43 and B52, and part retro-fitted newer joists, pictures B44, B45 and B46. Note the distortion in the original joists, picture B42. Both areas revealed bounce and deflection when subject to walking loads.

The ground floor is of indeterminate construction and is patchy and uneven and covered in dirt and debris.

## 6.5 Area 6

The timber frame is part clad internally with horizontal and vertical boarding painted with distemper, all of which is in poor and unstable condition.

The floor is partly of cobbled brickwork which is assumed to be of historical interest albeit uneven and with extensive dirt and debris. The remainder is varying panels of concrete oversite, alongside different surface textures, with several steps, edges, and changes in level.

## 7.0 Further Investigations

We recommend that the following investigations should form part of the ongoing design process.

- Trial pits at selected locations to expose the foundations to the external walls.
- Trial pits to show the make-up of the ground floor.
- Survey and report by a timber and damp specialist, including recommendations so that a minimum 15-year guarantee can be obtained.
- Member by member timber survey and inspection to establish where full or partial replacement or strengthening is required.

## 8.0 Outline of the Works Required for Renovation to Residential Use

The proposal is to create four-bedroom residential unit with a kitchen, lounge, and dining-area in Barn 1 area 1, with plant, utility, and a study in areas 1A and 1B. Barn 2, area 2 will be bedroom 2, with area 2A being the dressing area and ensuite. Areas, 3, 4 and 5 will provide a snug and hall, cloakroom, and bedroom 2 at ground floor and bedrooms 3 and 4 at first floor. Area 6 will be the hallway and corridor linking the other parts.

In terms of the structural and fabric operations necessary to facilitate the renovation, subject to final design, the Conditions that may be attached to the planning permission, good practice and the requirements of the Building Regulations balanced against Conservation, we envisage the following:

- Preparatory and temporary support work, including scaffolding and bracing.

- Stripping of all roof and wall coverings and finishes from the timber frame. Note that removal of the weatherboard wall cladding will take away the diaphragmatic action that is provided by the cladding and contributes to the overall structural stability.
- Underpinning as required, - expected to be the majority of the walls - based on the outcome of trial pits and other design considerations.
- Removal of the old underpinning and rebuilding the entire brick plinth in sections, using reclaimed bricks where possible.
- Timber and damp treatment as recommended by specialists.
- Realignment of the timber frame using a tirfor mechanism, remaking the failed connections.
- Replace/strengthen the defective loadbearing elements of the timber frame.

There appear to be two options for bolstering the superstructure to achieve satisfactory integrity and stability:

- i) Assuming, in terms of load transfer to the ground and enabling overall stability, that the timber frame continues as the primary loadbearing structure, it would seem necessary to replace or strengthen each of the defective members on a piece-by-piece basis.

At this stage it would be reasonable to assume that between say 40% and 60% of the individual timber components will need to be replaced either in part using scarfing details or whole, or substantially strengthened.

- ii) Alternatively, on the basis that separate and independent structural support is provided, for example a steel frame or supplementary internal loadbearing walls, - perhaps of light gauge steel or loadbearing timber studwork on new foundations or slab thickenings, positioned inside the existing timberwork - with the existing frame becoming cosmetic and ornamental, albeit connected to the new supporting structure, it should be possible to mitigate the replacement and strengthening work.

In this case it would be reasonable to assume say 20% to 40% of the individual timber components will need to be replaced either in part or whole, or substantially strengthened.

- Brickwork cleaning, strengthening and repair, including localised rebuilding where displacement has occurred. The strengthening will comprise replacement of all fracture and spalled brick units with new, bed joint strengthening repairs to cracked mortar bed joints and repointing to a minimum depth of 25mm.
- Replacement of the existing ground floor with insulated ground bearing slab adopting appropriate threshold levels.
- Replacement or bolstering of the suspended timber first floor in Areas 3 and 4.



- Replacement roof covering and wall cladding, in materials sympathetic to the setting, including wall sheathing and insulation, with over-cladding to maintain the appearance.
- Provide new external windows and doors.
- Paint and decorate.
- New rainwater goods and underground surface water drainage connecting to adequate soakaways, located at least 5m from the building.
- Foul water drainage is subject to design, expected to connect to the public system or treatment plant.
- Upgrading of the surrounds and landscaping.

The above structural works will require planning, assessment, and appropriate sequencing to ensure stability is maintained.

## **9.0 Conclusion and Professional Opinion**

Based on our inspection this structure has reached the end of its serviceable life.

Subject to the further investigations and surveys it is our professional opinion, that the operations and the outcomes required will mean substantial rebuilding, strengthening and major remedial works to enable the building to be stabilised, preserved, and protected.

The original components remain albeit with significant distortion, misalignment, movement, loss of section, timber rot and decay and are not going to be functional in the longer term.

The levels of intervention required will need to be discussed and agreed with the conservationists and may be subject to planning conditions.

There will be no change in the general character of the building and the volumes of each area will remain. The property will be reduced by the removal of areas 7, 8, 9 and 10 and will not be otherwise extended.

We trust that our comments will be sufficient for your present purposes, please be in direct contact should any points require clarification.

Yours sincerely,



**NICHOLAS ARCHER**

Gyory Self Partnership (St Albans) LLP

E-mail: [nick.archer@gsp-stalbans.co.uk](mailto:nick.archer@gsp-stalbans.co.uk)

Notes to the above:

- A. This report is intended for your private and confidential use and that of associated legal advisers. It should not be reproduced in whole or in part or relied upon by third parties, for any use whatsoever, without our prior written authority.
- B. Our inspections were visual only without opening-up, intrusive investigations or any materials sampling or testing.
- C. We did not inspect any parts of the structure which were covered, unexposed or inaccessible and we are therefore unable to report that any such part of the property was free from defect.
- D. Our inspection and report has been conducted with the skill, care and diligence which may be reasonably expected of a consulting structural engineer carrying out this type of work.