SHIELDS WILSON
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STRUCTURAL AND CIVIL ENGINEERING

PRELIMINARY STRUCTURAL REPORT

UPON

AGRICULTURAL BARN

ADJACENT CHESNUT HOUSE, BROADGATE

SUTTON ST JAMES

PE12 0HD

PROJECT No: SW 22-230

DOCUMENT REF: SW 22-230-REP-01



G R MERCHANT LTD

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1. INTRODUCTION

Acting upon the instruction of G R Merchant Ltd., we attended the site during December 2021, to undertake visual inspections and basic ground investigations including inspecting the existing foundation detail.

The object of this report is to comment upon the current structural condition and viability for conversion to domestic accommodation. It confines itself to the Basic Structural Fabric and is not intended to comment upon non-structural items.

During the course of the survey and in preparation of this report no cladding, internal features or items were moved, therefore we cannot comment upon the condition of areas which were covered or inaccessible.

Comments relating to Ground Conditions are based upon investigations undertaken on site at the time and previous experience in the Fenland area, and publicly available British Geological Society records.

This report has been prepared for the named client above and should not be relied upon by any other parties, expect the client and their specialist third party advisors, without the express written permission of Shields Wilson Limited.

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2. PROPERTY LOCATION & DESCRIPTION

The barn building sits to the North West of Broadgate, Sutton St James, SPALDING, Lincs PE12 0HD. Approx. National grid reference TF 377 170.

The building is an agricultural barn which has been used for animal shelter and feed storage.

The barn complex is formed of 3 distinct structural forms. 2 no. barrel roofed steel framed and corrugated steel sheet clad and one no. timber frame and timber clad.

The structures are all approximately the same width varying from just under 4m wide to 4.3m wide.

The roof cladding mainly takes the form of corrugated single skin steel sheet, similar to a big six profile. These may well be original sheets as they closely follow the form of the frames and age and deterioration appear to match the framework.

There does not appear to have been a floor structure placed within the barns.

3. OBSERVATIONS

A visual inspection of the building was undertaken and our observations are described below.

The Location of the barn and its proposed form are illustrated on GR Merchant drawing 388/21, a copy of which is located within Appendix A.

There is a general photographic record of our survey contained in Appendix B.

3.1. Ground conditions

Publicly available British Geological Society maps and borehole records indicate the site to be underlain with Tidal flat deposits of Clay and Silt tidal flat deposits over the Clay Formations.

No site-specific ground investigations were undertaken, however from experience of numerous sites in this local area we anticipate the underlying ground conditions to be as described by the maps and consist of a medium dense sandy silt.

In our experience foundations taking the form of wide spread shallow strips and/or raft slab foundations would not be expected to experience settlements outside of normally acceptable limits.

From our observations on site and experience we do not anticipate the barn structures being founded onto a full foundation. It is likely the structural posts are set into a buried concrete surround.

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3.2. Structure

The style of structure with a lightweight steel angle framework curved at roof line to form the barrel roof can be seen forming a number of agricultural barns. They are lightweight structures intended as storage and out buildings.

It is typical of the style and period that the cladding is asbestos cement cladding. This is unlikely to be the original cladding. The asbestos sheets should be handled appropriately by correctly trained operatives in accordance with all asbestos related legislation.

It was noted that there are no rain water goods on the barn complex.

The single skin metal cladding is generally in poor condition with noticeable gaps in the sheeting joints and surface corrosion generally to most of the sheets.

Having analysed a number of structures of this style in the past we can say from experience that the frame structure will not be adequate to carry the required domestic loads, of cladding, services, ceiling and minimum roof imposed loads with the desired factors of safety required by current design codes.

In addition, a number of the timber posts exposed at foundation are showing significant signs of decay at ground level and just above.

As mentioned in the general description the barn has not been used for industrial or commercial purposes and as such has never had a ground floor structure installed.

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4. Proposed Structure Conversion

The proposed conversion will consist of the replacement of the roof and wall cladding, with similar new materials. The proposed material is a standing seam zinc cladding sheet.

The existing structural frame constructions are inadequate for the proposed loads, as described above. However, the proposed layout and arrangements can be configured in such a way to provide the load bearing capacity and the structural stability required for the proposed conversion to meet current design standards.

The new internal timber stud linings to form the external walls can be constructed as load bearing stud walls. These walls will also be sheathed and as such will provide significant racking to provide structural stability for the proposed dwelling.

The new internal walls can also be designed to be suitable timber frame walls spanning from ground to head utilising the racking capacity described above to provide overall stability and load bearing capacity if required. However given the limited widths of the structures it is highly likely that sufficient vertical and lateral capacity can be formed in the use of the external wall lines.

New timber purlin/rafter members will be required to provide additional vertical load bearing strength to the roof structures. However these can be additional to the existing framework leaving the original structures in place.

The new load bearing walls should be built up to the underside of the frame roof trusses and be packed tight, to ensure load transfer and new roof members will be supported on these lines as well. This will ensure roof loads are supported by the new structure and new foundations.

As the barn has no existing floor or suitable foundation detail it is recommended that a combined floor and foundation detail be installed by way of installing a structural raft slab foundation. This is a very common solution for Barn conversions where a new floor is required, and it is efficient to combine the foundation and slab solutions.

The raft slab should include a suitable edge beam detail which can encapsulate and support the existing main frame posts. Once the main frame posts are suitably support by a new foundation detail any members decaying at ground level and below can be cut out so that the good wood above cannot be affected in the future by spreading decay.

The raft slab foundation solution should include stiffening and thickening beams at any proposed load bearing internal wall line, any roof and stability loads picked up by these lines will then be suitably founded.

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5. CONCLUSIONS & RECCOMENDATIONS

Generally, the condition of the structure of two of the three barn buildings is average for a building of this type and age and one is in a poorer condition.

The proposed conversion layout and style can be detailed in such a way to provide methods for load bearing and stability and as such will ensure that the proposed conversion can accommodate domestic loads in accordance with the modern building regulations.

The deteriorated sections of below ground posts should be cut out, and supported onto a new foundation detail as described in section 4 of this report and this will ensure the longevity of the structure which is to remain.

By implementing the recommendations contained in the report above, the property should become suitable to provide domestic accommodation for years to come.

For and on behalf of **SHIELDS WILSON LIMITED**

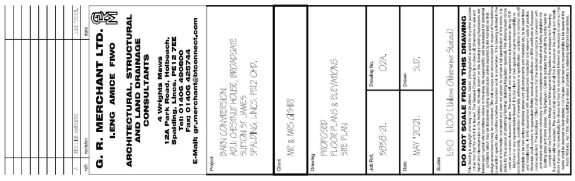
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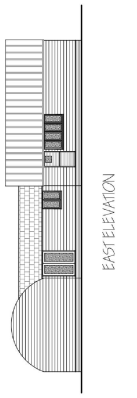
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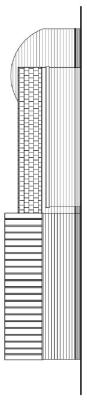
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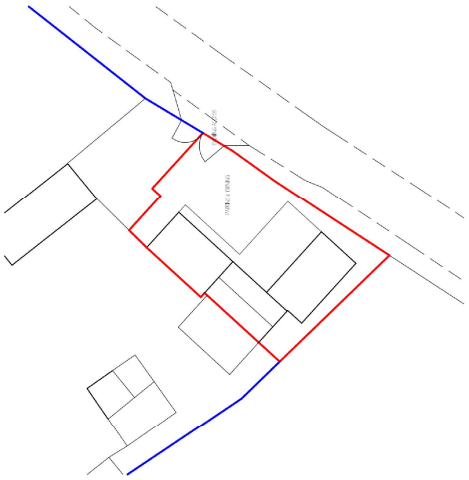
APPENDIX A

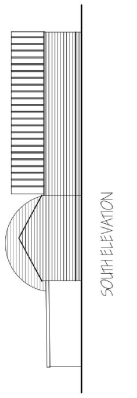
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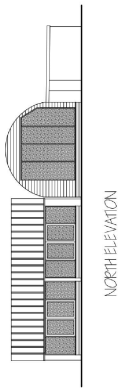














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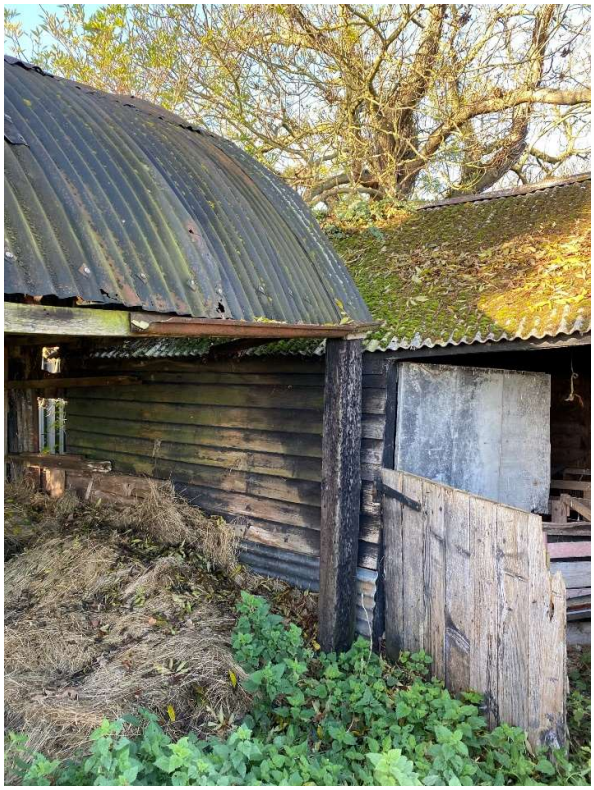
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