

PRELIMINARY STRUCTURAL REPORT

UPON

AGRICULTURAL BARN 2

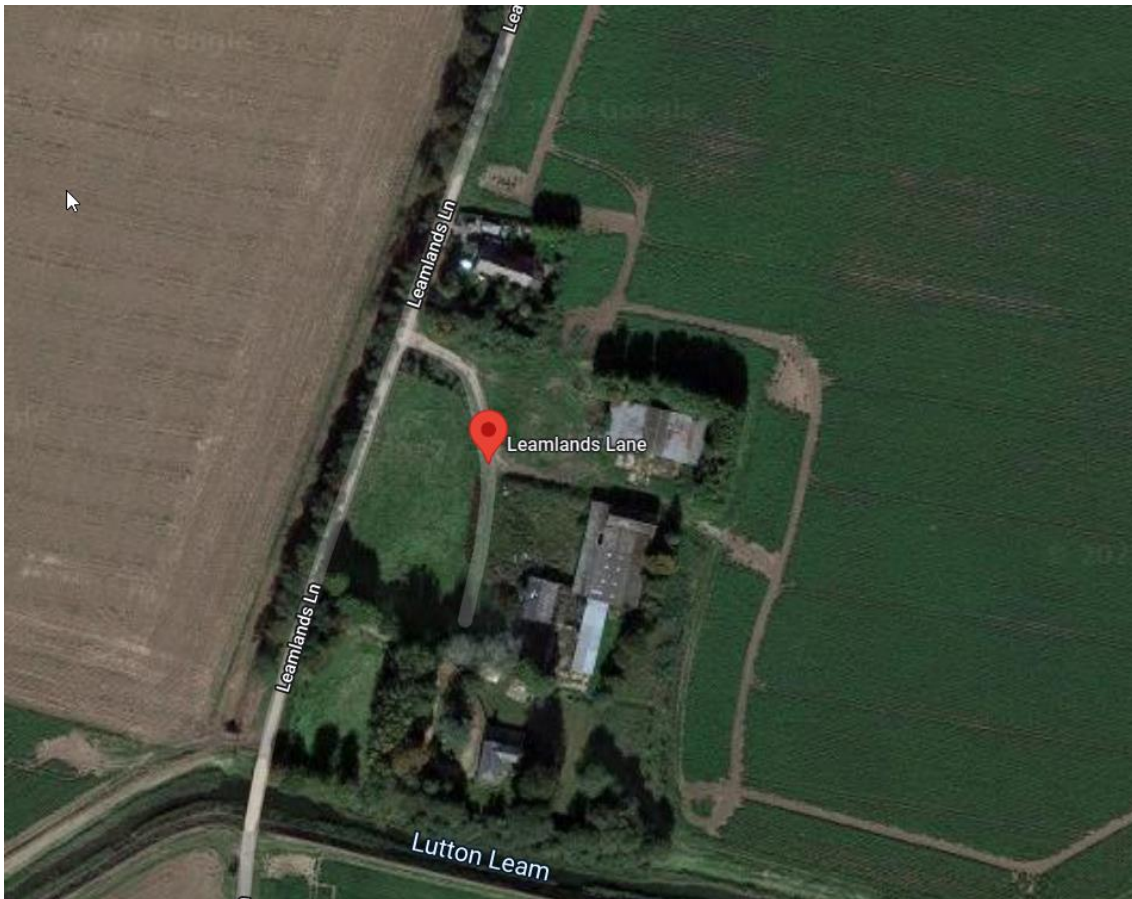
LEAMLANDS FARM, LEAMLANDS LANE

LUTTON MARSH, LINCS.

PE12 9NS

PROJECT No: SW 22-167

DOCUMENT REF: SW 22-167-REP-01



CONTENTS

1. INTRODUCTION	2
2. PROPERTY LOCATION & DESCRIPTION.....	3
3. OBSERVATIONS	4
3.1. Ground Conditions	4
3.2. Structure.....	5
4. Proposed Structure Conversion.....	6
5. CONCLUSIONS & RECCOMENDATIONS	7
APPENDIX A.....	8
APPENDIX B.....	11

1. INTRODUCTION

Acting upon the instruction of Mr S King., we attended the site in November 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, except the client and their specialist third party advisors, without the express written permission of Shields Wilson Limited.

2. PROPERTY LOCATION & DESCRIPTION

The site sits to the East of Leamlands Lane and the North of Lutton Leam. The barns sit to the North of the existing Dwelling, Leamlands Farm, Leamland Lane, Lutton Marsh PE12 9NS.

Site location plan, GR Merchant drawing 3775-21/01 is contained within Appendix A.



The building is an agricultural barn which has likely been used as a cattle barn during its history.

The timber structure of the barn takes the form of main frames consisting of timber pole columns and kingpost trusses at regular centres along the length of the building with purlins spanning between these truss frames. The 4 No. frames are spaced at between 4.5 - 5m.

To the east and West of the main central barn there are lean to structures also formed with Timber frame pole columns, with lean to rafters and purlins.

The width of the whole structure is approximately 34m, the central barn is 7m wide which the duo pitch kingpost trusses span clear over and the lean-to structures being 15m to the East and 12m to the West. The lean to structures are formed with loose rafter spanning between pole columns which are at 5m and 4m centres respectively on the line of main frames from the central barn.

The roof cladding takes the form of asbestos cement roof sheets. These are not likely to be original but do appear to be fixed off what are likely to be the original timber purlins.

The walls are clad using single skin metal corrugated cladding sheets fixed to timber rails spanning between the main frame posts.

The majority of the barn footprint does not have a floor slab. There is a central slab to the central barn portion and an area of slab to the front of the Western Lean-to.

3. OBSERVATIONS

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

The form of the barn is illustrated on GR Merchant drawing 3775-21/03, 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 specific site investigations were undertaken. However, in places the strata underlying any topsoil was exposed and it could be seen to be a soft silty material.

From our previous experience of Pole barns we are not anticipating the poles to have a foundation resembling a modern form. If any foundation is present it is likely to be in the form of a small concrete surround.

The natural soft silts are likely to provide relatively low bearing capacities but are anticipated to be reasonable for a shallow foundation wither in the form of wide strips or a raft slab.

Both styles of foundation founded onto this stratum would not be expected to experience settlements outside of normally acceptable limits

3.2. Structure

The style of structure can be seen forming a number of agricultural barns across the surrounding Fenland area. They are lightweight structures intended as storage buildings and for agricultural use.

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 should be noted that some of the rain water goods also appear to be of asbestos construction.

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 timber 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.

Generally the condition of the timber frame is good, with no visible degradation to most of the elements. There are isolated pole columns which have suffered deterioration at the base, possibly they have stood wet at periods.

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

In areas of the barns internally water was standing within the low lying parts of the ground.

4. Proposed Structure Conversion

The proposed conversion involves the replacement of the roof and wall cladding, with similar new materials.

The existing timber frame construction is 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 structural stability required for the proposed conversion to meet current design standards.

The new internal partition walls included on the Eastern lean to are located on the main frame lines, and as such they should be constructed as load bearing masonry walls and can provide load bearing capacity for the roof as well as lateral stability for the whole structure.

The new external walls to the central barn portion can be designed to accommodate the roof loads from the existing kingpost trusses which will remain as they are suitable and in good condition.

New or additional purlin members may be required to aid the existing members with the additional loads.

The new load bearing walls should be built up to the underside of the wall plates for the roof members and trusses and be packed tight, to ensure load transfer. This will ensure roof loads are supported by the new structure and new foundations.

The Western lean to section is proposed to be open plan and will require some additional light steelwork fanning to be introduced to provide additional support for the new loads presented by the domestic conversion and to offer stability to the proposed external walls of masonry construction. The proposed wall layout includes 3 large bi-fold doors and as such the piers central between them will not have the required self-stability without this additional framing.

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 will also be required as the proposed Floor level is required to be raised to satisfy Flood risk requirements.

The raft slab should include a suitable edge beam and internal beam details which can encapsulate and support the existing main frame posts. Once the main frame posts are suitably support by a new foundation detail any decaying post sections at ground level and below should 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 the proposed internal wall lines, which will be load bearing at the main frame positions, roof and stability loads picked up by these lines will then be suitably founded.

5. CONCLUSIONS & RECCOMENDATIONS

Generally, the condition of the structure is good for a building of this type and age.

The proposed conversion layout and style will 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.

Any deteriorated sections of timber 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.

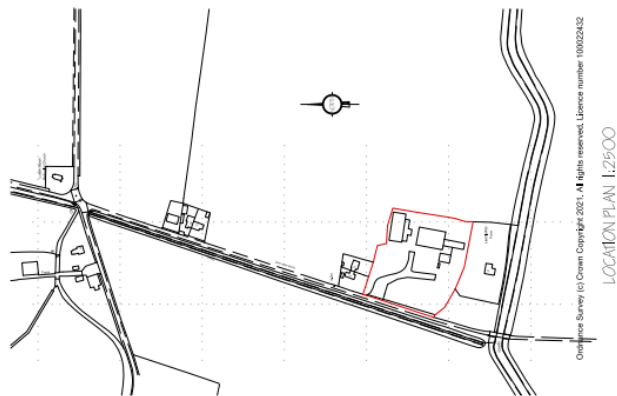
By implementing the recommendations contained in the report above, the property should provide suitable domestic accommodation for years to come.

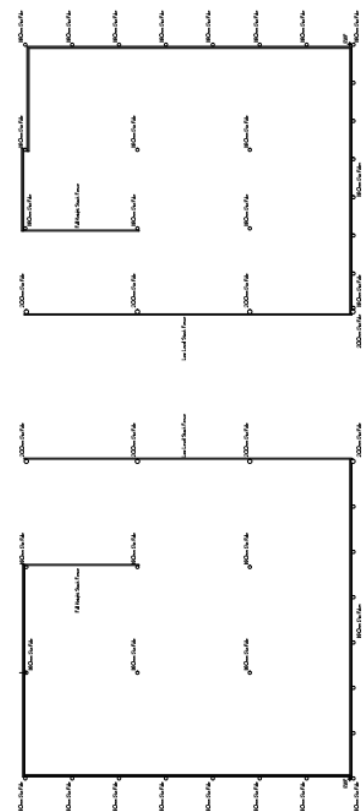
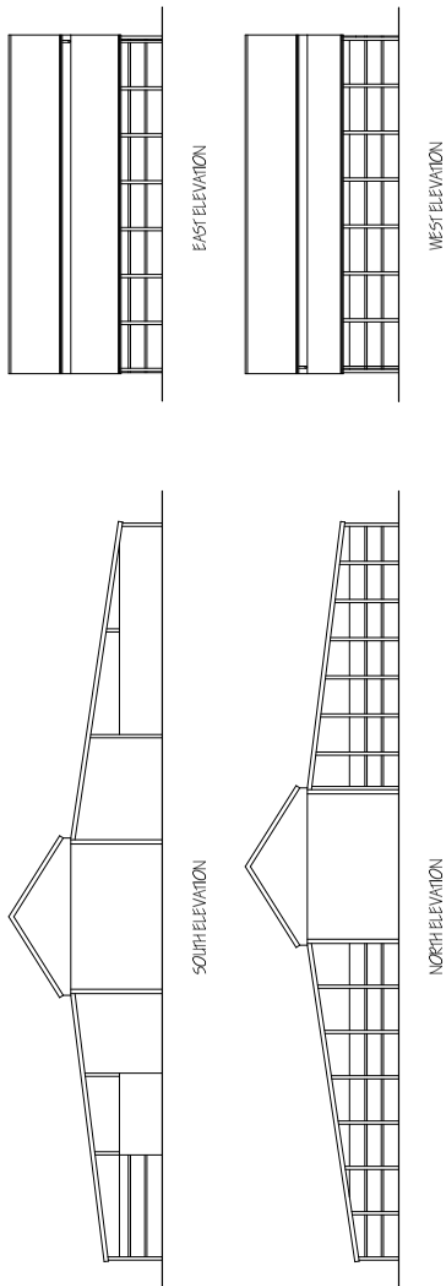
For and on behalf of **SHIELDS WILSON LIMITED**

A Wilson CEng MStructE

March 2022

APPENDIX A

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GROUND FLOOR PLAN

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APPENDIX B

