

PRELIMINARY STRUCTURAL REPORT

UPON

AGRICULTURAL BARNES

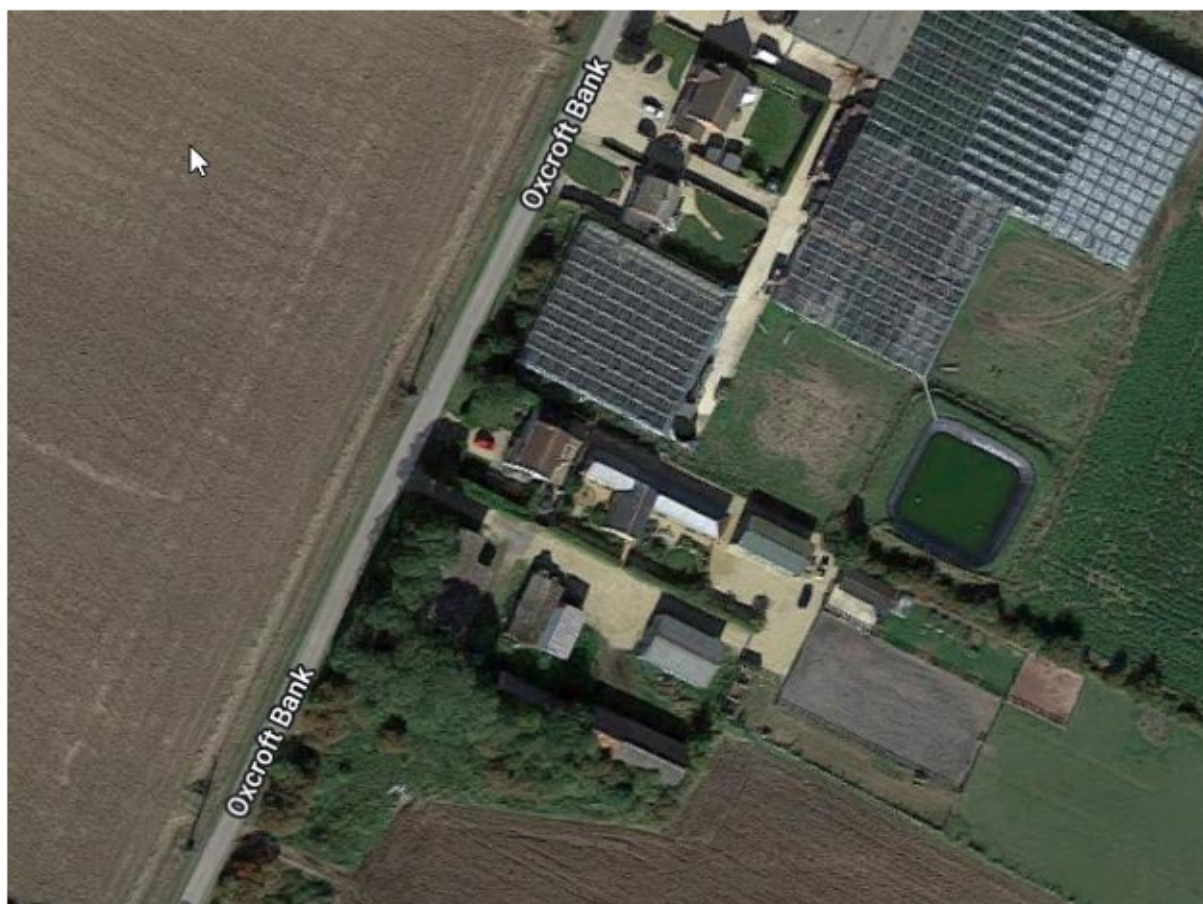
CARTERS FARM, OXCROFT BANK

SHEPEAU STOW, LINCS.

PE12 9NS

PROJECT No: SW 22-144

DOCUMENT REF: SW 22-144-REP-01



CONTENTS

1. INTRODUCTION	2
2. PROPERTY LOCATION & DESCRIPTION	3
3. OBSERVATIONS	4
3.1. Ground Conditions	4
3.2. Structure	4
4. Proposed Structure Conversion	6
5. CONCLUSIONS & RECCOMENDATIONS	8
APPENDIX A	9
APPENDIX B	12
APPENDIX C	22

1. INTRODUCTION

Acting upon the instruction of G R Merchant Ltd., we attended the site in February 2022, 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 our 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 Oxcroft Bank, Shepeau Stow, Lincolnshire. The barns sit to the South of the existing Dwelling and collection of agricultural structures known as Crters Farm Leamlands Farm, Leamland Lane, Lutton Marsh PE12 9NS.

Site location plan, GR Merchant drawing 3911-21/01 is contained within Appendix A.



The building is an agricultural barn. Portions of which have been used for Grain storage and equipment storage during their working life.

The timber structure of the barn is split into 3 distinct sections each with their own structural form. The arrangements of the forms are illustrated on GR Merchant drawing 3911-21/02 contained within Appendix A.

The Eastern portion of the barn is formed in a typical English Brothers style frame arrangement with a trussed rafter arrangement of Pole columns at approximately 4.5-5m c/c, often seen in the South Lincolnshire, North Cambridgeshire Fens area.

The Western portion sits lower the rest of the barn, eaves height sitting at approximately 2.5m above ground level.

It is formed with a timber structure with a trussed rafter and posts being utilised to support vertical roof loads to ground.

The walls take the form of a rudimentary timber grain walling with regular raking props to resist the retaining loads induced from loose grain storage.

The roof sheeting is a corrugates single skin metal roof sheet.

The Western and central portions of the barn have concrete ground bearing floor slabs in place, however there is no slab in the Eastern portion of the structure.

3. OBSERVATIONS

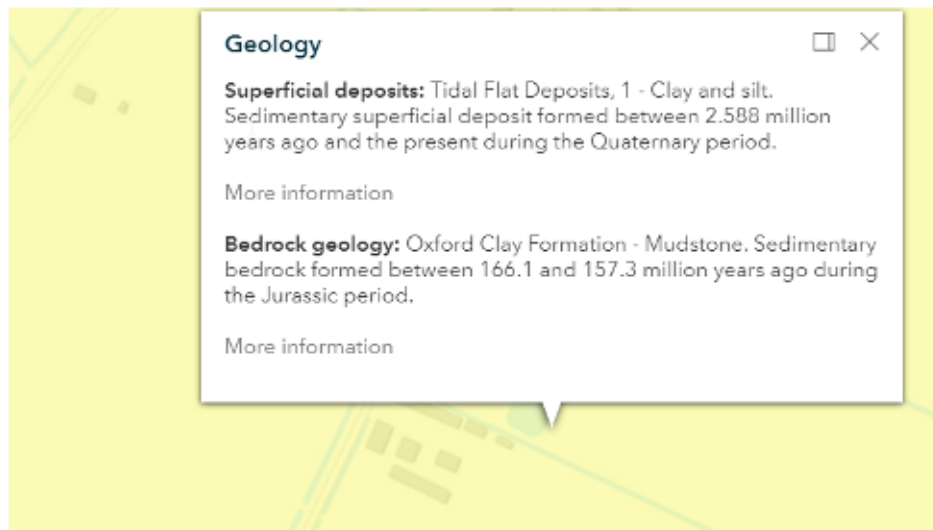
A visual inspection of the building was undertaken, our observations are described below.

The form of the barn is illustrated on GR Merchant drawing 3911-21/02, 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.

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 likely underlying ground conditions are natural soft silts and are likely to provide relatively low bearing capacities but are anticipated to be reasonable for a shallow foundation either 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.

The single skin metal roof 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 scissor truss style in the past we can say from experience that the timber frame structure of the Eastern portion of the barn 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.

The Trusses in the Western portion of the barn are propped by a central post and will likely carry the required loads with little strengthening/adaptation.

The central portion of the barn appears to be an infill and its structure will require some strengthening/adaptation to carry the required domestic loads to current standards.

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

The ground floor structure in the central and Western portions of the barn appears to be a relatively thin concrete yard slab, which has not been considered for permanent building weight loads to be supported. It is generally in average condition and from what was visible didn't appear to have suffered any significant cracking or differential settlement.

4. Proposed Structure Conversion

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

The proposed plan arrangement is shown on GR Merchant drawing 3911-21/03 contained in Appendix C.

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 external walls will be designed as load bearing where necessary and new internal partitions should be constructed in a load bearing stud designed as a racking panel or in load bearing masonry and will then provide load bearing capacity for the roof as well as lateral stability for the whole structure.

The roof structure of the central portion will require additional structural members in the form of purlins spanning from the newly created load bearing walls lines between forming the Eastern and Western portions of the barn.

New or additional purlin members may be required within the Eastern portion of the barn to aid the existing members with the additional loads. Adaptations to the existing trusses should be minimised by positioning rooms/corridors at first floor in locations where trusses can remain as intact as possible.

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

The Eastern Gable elevation is proposed to be semi open and significantly glazed. This is likely to require the introduction of some steel framing to assist the existing frame in supporting the bi-fold door loads and providing stability to the end frame line.

As the barn has no existing suitable foundation detail it is recommended that the existing floor be replaced (or built over dependent upon required levels) with 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 supported 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 main structural elements 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.

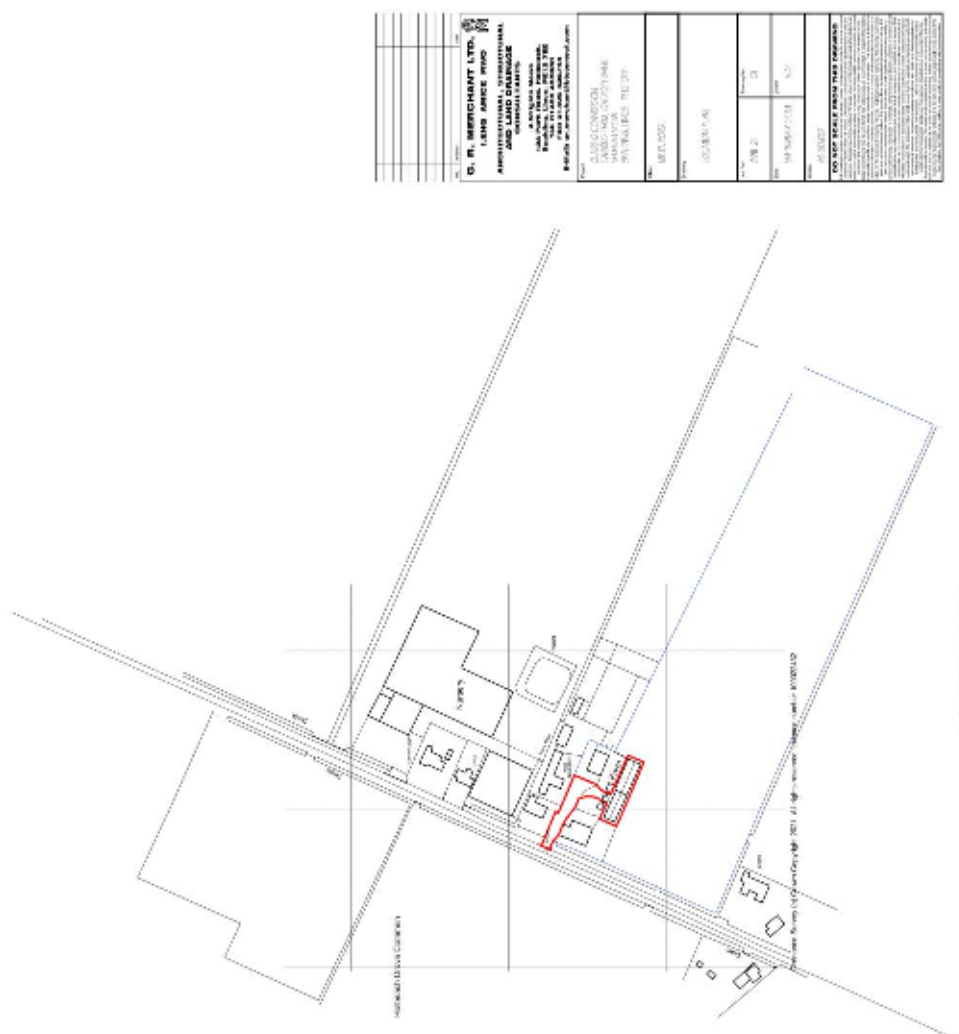
By implementing the recommendations contained in the report above, the property should provide suitable domestic accommodation for years to come.

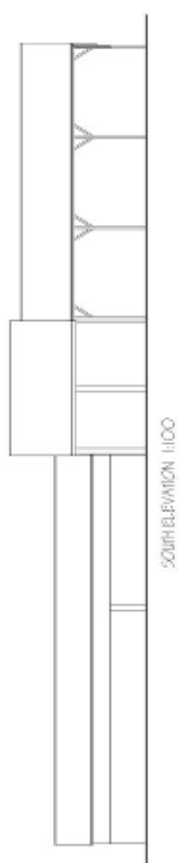
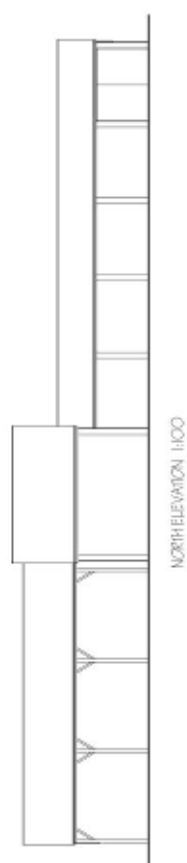
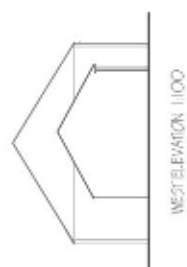
For and on behalf of **SHIELDS WILSON LIMITED**

A Wilson CEng MStructE

April 2022

APPENDIX A



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APPENDIX B



















APPENDIX C

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