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Black Barn
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Structural Survey Report

for
Proposed Barn Conversion

at
185 Avenue Farm Road
Sutton Bridge
Spalding

for
Mr. and Mrs. D. Grundy

Job reference: WECE-24-500

Issue date: March 2025

1.00. Client

1.01. Mr. and Mrs. D. Grundy

By Email

2.00. Brief

- 2.01. Instructions were received from our clients, to undertake a structural survey of the barns at 185 Farm Avenue Road, Sutton Bridge, Spalding.
- 2.02. The purpose of the survey was to assess the structural condition of the existing barns, the original ones assumed to have been constructed pre 1950's, with the intention of conversion to a residential dwelling. The barns were advised as being previously used for agricultural storage.
- 2.03. The survey was undertaken on 28th February 2025 with Bradley Whyatt from WE. Consulting Engineers in attendance.
- 2.04. This report has been prepared from a visual inspection conducted from ground level without the benefit of specialist access or investigative equipment; and it is therefore not possible to categorically state that no further problems or defects exist with other parts of the structure.
- 2.05. No monitoring, testing of structural materials or testing for soil contamination was conducted.
- 2.06. In accordance with our standard practice, this report has been prepared solely and exclusively for the client to which it is addressed, and no responsibility is accepted to any third party for the whole or any parts of its contents.
- 2.07. The recommendations in this report are based simply on the findings of the site visit. We highlight that, other conditions may occur elsewhere on the site of which we have no knowledge and therefore cannot accept any responsibility.

3.00. Location and Background

- 3.01. The subject barns are situated to the front and centre of the site off the northern side of Farm Avenue Road, approximately 2.75km north of the town and civil parish of Sutton Bridge, Lincolnshire.
- 3.02. This area is covered by South Holland District Council.
- 3.03. At the front of the site, outside the courtyard on the southern side and adjacent to Farm Avenue Road, is a grassed area. To the west of the barns lies 185 Farm Avenue Road. To the north, at the rear of the site, are old greenhouses and farm fields, while to the east are other agricultural buildings.
- 3.04. It is understood that the barns proposed for conversion have historically been used in their entirety for agricultural purposes.
- 3.05. Small trees, hedges, and shrubs are near the barn along the western side elevation.
- 3.06. The British Geological Survey map indicates that the underlying bedrock geology consists of Amptill Clay Formation – mudstone; overlain with superficial deposits of Tidal Flat – clay and silt.

4.00. Observations

- 4.01. Refer to Appendix A: Existing Barn Plan Layouts. For the purposes of this report, Stores 1, 2, 3, and 4 will be referred to as the 'original barns'. The remaining stores — namely Stores 5, 6, and 7 — are thought to be later historical extensions constructed at different times and will be referred to individually.
- 4.02. The topography at the site is typical of the area, relatively low-lying and flat.
- 4.03. The external hardstanding areas immediately around the barns are finished with either gravel, concrete or tarmac.
- 4.04. The original barns form an 'L'-shaped layout, with the east-west wing spanning approximately 21.25m and the north-south wing around 16.75m, both wings with an approximate width of 4.75m. The barns are predominantly single-storey; however, at the intersection of the wings, the structure is two-storey.
- 4.05. The complex of original barns comprises four stores:
- Store 1 which appears to have historically functioned as a stable block with a number of stable doors on the east elevation facing the courtyard.
 - Store 2 is the two-storey section of the complex—an enclosed masonry building featuring a timber first floor structure, with two access doors and a window.
 - Store 3 is a shelter structure with an open side facing the internal courtyard.
 - Store 4 is similarly a shelter, but with its open side oriented toward the fields to the north.

- 4.06. The original barns duo pitch gable end roofs comprise a traditional slate tile on a cut roof formed with common rafters at regular 300-450mm centres on purlins supported by timber king post roof trusses spaced at mid-span, third or quarter points in the case of the single storey stores. The two-storey building has a central truss which is propped from the first-floor structure with two queen posts set beneath each purlin position. The timber purlins are founded directly in the masonry gable end walls. We did not note any protection from moisture transfer from the masonry at gable ends or any roof plan bracing members.
- 4.07. The original barns ridge lines were observed to be relatively level and even considering the age of the buildings.
- 4.08. Rainwater goods were observed to have been provided on all side elevations of the original barns. Some lengths of guttering appeared to have been recently replaced, whilst other sections appeared to remain as the original. The eaves guttering on the south elevation of Store 3 facing the courtyard was noted to contain missing or damaged sections.
- 4.09. The external masonry loadbearing walls were generally observed to be 215 mm thick, constructed using brick units bonded with lime mortar in a Flemish Garden Wall bond pattern.
- 4.10. The original barns load bearing walls, considering their age, generally appeared to be in good structural condition with little signs of movement or settlement. We noted some weathering, particularly of the mortar joints at a few locations, and some small areas at corners containing damaged brick units
- 4.11. Concrete lintels were provided at the head of all doors and windows supporting masonry and roof structures over on the original barns. However, we comment that most contained vertical cracks at mid-span indicating these lintels have failed. At these locations, the timber header of the door frame appeared to be providing necessary support the structure over.
- 4.12. The large wooden double doors on the gable end of Store 1 are headed with a timber lintel which supports the timber clad and framed gable triangle above. The lintel appears to be performing satisfactorily.
- 4.13. The first-floor structure in Store 2 has been created with timber floor joists at approximately 450mm centres supported on two timber beams spanning north to south at third points, both propped at mid-span by timber posts at ground floor level. Timber stairs on the east side of the store provide access to the first-floor level. The timber structures appeared in reasonable structural condition. We comment that there was evidence of either current or historical insect infestation in some of the timber members viewed.
- 4.14. The shelter roof structure of Store 3 is supported by masonry walls along the three enclosed elevations—north, east, and west. On the open south-facing elevation, which faces the courtyard, vertical support to the roof trusses is provided by timber posts in lieu of masonry walls. These timber posts are founded on concrete piers raised approximately 0.70 m above ground level. The structural timber members appear to have performed to structural requirements to date.

- 4.15. The shelter roof structure of Store 4 is supported by masonry walls along the three enclosed elevations—east, south, and west. On the open south-facing elevation, which faces the fields at the rear of the property, vertical support to the roof truss is provided by timber eaves beam in lieu of masonry walls. The structural timber members appear to have performed to structural requirements to date.
- 4.16. Open sided Store 5, on the east side and front of the site, is a different and separate standalone structure thought to have been a more recent addition to the original barns. The building has a mono pitch roof is rectangular, approximately 6.50m x 12.00m on plan and 2.10m to the low eaves.
- 4.17. The roof to Store 5 comprises a profiled type of fibre-cement roof cladding with steel angle purlins at regular centres over five steel angle trusses, the roof slope is approximately 10 degrees. The trusses are supported on reinforced concrete walls along the east and south sides which enclose the building, whilst steel circular sections provide support on the open sided western elevation.
- 4.18. A small triangle of profiled type metal cladding on the southern end of Store 5 above the reinforced concrete wall is attached to the steel angle roof truss to enclose the structure. At the northern end, whilst Store 5 abuts the masonry of neighbouring Store 7 which encloses much of this elevation, the high-level triangle is unclad and open.
- 4.19. The structural components of Store 5 appear to have performed satisfactorily to date. However, we noted evidence of surface corrosion to the exposed steelwork and some areas of spalled concrete revealing reinforcement at some locations of the reinforced concrete walls.
- 4.20. Rainwater goods have been provided along the low eaves of Store 5. However, they were considered non-functioning and in need of repair.
- 4.21. Store 6 is a small timber framed rectangular, approximately 6.00m x 3.00m on plan and 2.70m to low eaves, lean-to structure off the north side of Store 2. Again, this structure is considered a more recent addition.
- 4.22. The roof to Store 6 comprises a profiled type of fibre-cement roof cladding with timber purlins at regular centres over timber trusses, the roof slope is approximately 4 degrees. The trusses are supported by the wall of Store 2 on the south side and timber beams and posts along the north elevation. The building is clad with a profiled type metal cladding which encloses the building on north and east elevations. The west elevation is open to eaves with high level timber cladding in the triangle above eaves.
- 4.23. The structural components of Store 6 appear to have performed satisfactorily to date.
- 4.24. Rainwater goods have been provided along the low eaves of Store 6. However, they were considered non-functioning and in need of repair.
- 4.25. Store 7 is a small timber framed rectangular, approximately 5.00m x 4.75m on plan and 2.10m to low eaves, mono pitch roof structure off the east end of Store 4. The roof falls towards the northern end of abutting Store 5. Again, this structure considered a more recent addition.

- 4.26. The roof to Store 7 comprises a profiled type of fibre-cement roof cladding with timber purlins at regular centres over timber rafters, the roof slope is approximately 4 degrees. The rafters are supported by the wall of Store 4 on the west side and timber posts sited directly beneath along the east elevation. The building is clad with a profiled type metal cladding which encloses the building on the east elevation. The north elevation is open.
- 4.27. The structural timber components of Store 7 appear to have performed satisfactorily to date.
- 4.28. Rainwater goods do not appear to have been provided to Store 7.
- 4.29. The ground floor of Store 1 and 2 was observed to be concrete which appeared to be in reasonable structural condition with no evidence of significant cracks or settlement. We noted the formed gutter and sloping surfaces in Store 1, evidence of its assumed historical stable use. There were no concrete slabs to any of the shelter structures of Stores 3, 4, 5, 6 or 7.

5.00 Conclusions and Recommendations

- 5.01. We consider that the structural condition of the Barns at 185 Farm Avenue Road, in particular the original brick-built structures which are intended for habitable purposes, is good.
- 5.02. Most of the roof structure (rafters, purlins, and trusses) appear to be currently performing satisfactorily. In converting the barn for domestic use there are likely to be additional loads by adding insulation and roofs. As such all existing roof structures should be confirmed suitable, strengthened, or new roof timbers installed appropriately, all designed by a suitably qualified person.
- 5.03. Should it be confirmed appropriate to retain existing timber members based in their size and spacing, the condition of the members should be confirmed in serviceable condition while undertaking works on the roof structure when the members are clearly visible all around. Any members confirmed to be adversely affected by insect infestation or rot should be treated or replaced as necessary. Any timber member bearing into the existing solid masonry walls should be protected from moisture transfer from the wall.
- 5.04. The addition of roof plan bracing, or ceiling diaphragms, would benefit the existing barns structural elements by providing an effective means of transferring roof level lateral loads to shear walls and adding strength and stability to the existing masonry envelope walls.
- 5.05. Any repairs to the masonry walls bonded with lime mortar should be undertaken using traditional methods. Any historical repairs, if applicable - locations to be confirmed on site, undertaken using ordinary portland cement-based mortar should be removed and replaced with lime mortar as required.
- 5.06. Any minor cracks in masonry walls should be repaired with proprietary crack stitching kits by Helifix, or similar approved. All cracked or overly weathered masonry units are to be replaced, and mortar joints repointed. All locations to be confirmed on site following close inspection.

- 5.07. The existing above ground drainage goods were observed to be in a variety of conditions around the barns. At the time of the survey, we were not provided with survey information for the below ground drainage and as such cannot comment on its present condition. If it is proposed to use the existing underground system, we suggest getting a survey undertaken to confirm the pipes are suitably sized and serviceable for the proposed development or confirmed otherwise. As a minimum we would expect all guttering to be free from debris, fixed to an appropriate fall to correctly connected and installed downpipes, which in turn should be suitably connected to the underground drainage network to transfer surface water a safe distance away from any building foundations in accordance with modern standards and regulations to soakaways or similar as necessary.
- 5.08. When undertaking the conversion works, proprietary lintels (pre-cast concrete or steel), or appropriately sized timber sections where no masonry is to be supported over, should be installed to manufacturers or designers' specifications over all door or window openings.
- 5.09. Foundations to all load bearing structures have not been surveyed as part of this report and should be confirmed suitable when undertaking the design of the proposed conversion by a suitably qualified person.
- 5.10. Any steelwork with surface corrosion will need to be prepared appropriately and repainted to guarantee its condition for the foreseeable future. Some patch repairs to the steel members may be required following close inspection during the preparation for painting.
- 5.11. Any reinforced concrete with exposed reinforcement will need to be prepared appropriately and repaired with concrete to guarantee its condition for the foreseeable future.
- 5.12. Other than building with lime mortar there were no other damp proofing measures observed. Specialist advice should be sought to confirm this is adequate when considering the barns for domestic conversion.
- 5.13. To summarise, provided civil and structural design, construction, repair, and maintenance works are all undertaken in accordance with modern codes of practice and regulations; and following the advice and recommendations in this report, there is no structural reason why the existing barns at 185 Farm Avenue Road cannot be retained and converted into a habitable domestic property with traditional barn characteristics that will be structurally sound for many years to come.

Report prepared by

B. Whyatt

B. Whyatt BSc (Hons)

for and on behalf of WE. Consulting Engineers

Appendix A: Existing Barn Plan Layouts

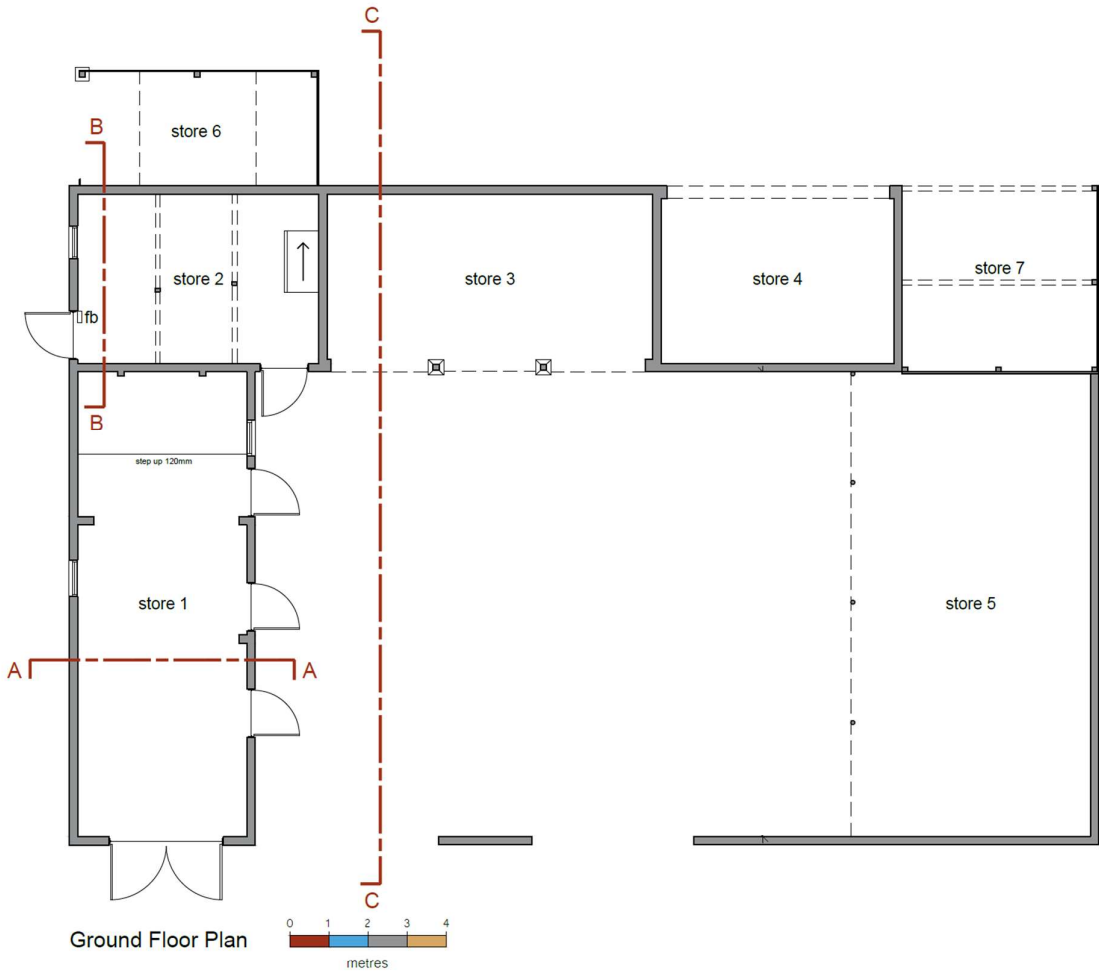
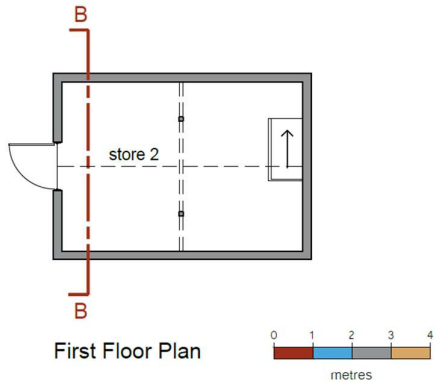


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Appendix B: Site Photos



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Photo 1. Store 1 front south gable elevation



Photo 2. Store 1 west wide elevation – southern end



Photo 3. Store 2 west side elevation – northern end



Photo 4. Store 2 west gable elevation



Photo 5. Store 6 north side elevation. Also Store 2 at first floor level.



Photo 6. Store 4 north side elevation



Photo 7. Store 5 east rear elevation and Store 7 end elevation



Photo 8. Store 5 south side elevation



Photo 9. Courtyard Stores 1 and 2 side elevations



Photo 10. Courtyard Stores 3 and 4 side elevations



Photo 10. Courtyard Store 5 open side elevation



Photo 11. Store 1 cracked lintel from outside



Photo 12. Store 1 cracked lintel from inside



Photo 13. Store 2 lintel with minimal end bearing on RHS



Photo 14. Store 1 king post roof truss



Photo 15. Store 2 king post roof truss



Photo 16. Store 3 king post roof truss



Photo 17. Store 4 king post roof truss



Photo 18. Store 3 timber post supporting eaves beam



Photo 19. Store 3 timber post base detail

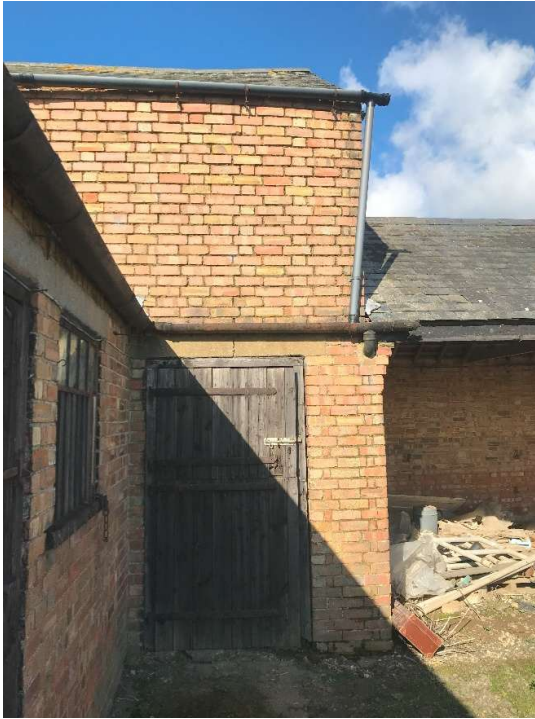


Photo 20. Store 2 stormwater goods



Photo 21. Store 5 east side elevation stormwater goods



Photo 22. Store 5 north end stormwater goods

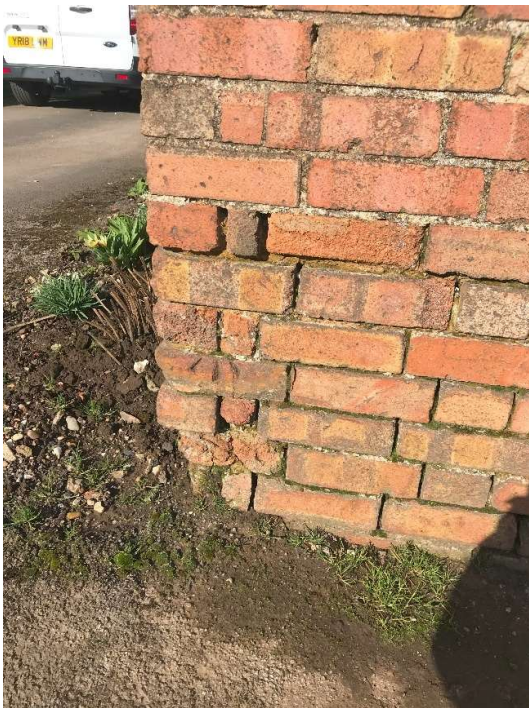


Photo 23. Weathered masonry



Photo 24. Store 5 load bearing RC wall with exposed reinforcement



Photo 25. Store 2 concrete floor slab