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Consulting Civil and Structural Engineers

Outbuildings, Church Farm, Lower Seagry

Structural Appraisal

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Quality Assurance

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Prepared	Checked	Approved	Date
NL	PB	PB	11 December 2023

1.0 Introduction

1.1.1 Mann Williams have been appointed by Heather Waddington to provide a structural appraisal report on two outbuildings at Church Farm, Lower Seagry. The purpose of the report is to comment on the structural condition, discuss the reasons for any defects noted and make recommendations for remedial works. This report will also comment on the proposed conversion of the buildings to habitable use.

1.1.2 This report is based on survey work carried out on 9th February 2023. Opening up works were not carried out; observations were made from ground floor level externally and floor level internally. Limited access was possible via ladders to eaves level.

1.1.3 The outbuildings consist of two single storey buildings of approximate footprint 11m by 9m and 21m by 6m joined on their side elevations. For the purposes of this report, the west building is noted as building A and the east building, as building B. Building A is 3.5m height to eaves level; building B is 2.1m. Both buildings are mainly of concrete blockwork construction; the roof structure to Building A is timber, Building B has a steel roof structure. Both roofs have what appears to be corrugated concrete cladding. The buildings are not listed and are believed to be approximately 60 years old.

1.1.4 For reference purposes, the survey plans are included in Appendix A to this report.

1.1.5 For the proposed alterations and additions to the two buildings refer to MBA Architecture drawings 650-P-01C and 650-P-02E.

1.1.6 This report has been updated following refusal of a previous scheme *Notification for Prior Approval Under Class Q for the change of use from 1 No. agricultural building to 1 No. residential dwelling (Class C3) as defined in the Town and Country Planning (Use Classes) Order 1987 (as amended) to include operational development, under application reference: PL/2023/06516.*

This update has been prepared in support of the revised proposals, which seek to respond to and mitigate the previous reasons for refusal.

In structural terms the key revised proposals are the reduction in the number and size of proposed external window and door openings, and the change of roof covering material. Neither change changes alters our assessment findings.

2.0 Structural Observations – Building A

2.1.1 Building A has a duo-pitch roof, clad in (assumed) concrete corrugated sheeting. Externally the roof lines look to be reasonably true, suggesting that the roof structure is performing satisfactorily.



2.1.2 Internally the roof structure is seen to consist of three bays, formed by timber trusses spanning north-south, supporting timber purlins at approximately 1.1m centres. The trusses appear to be structurally sound, and performing satisfactorily. The purlin also appears to be sound, although a slight deflection is present.





2.1.3 On the north elevation the trusses are supported on blockwork piers, formed as part of a 140mm thickness concrete blockwork wall. On the south elevation the trusses are supported on steel columns, 6” by 3”. The columns appear to be performing satisfactorily; generally there is light corrosion evident on the visible steel faces, although more significant corrosion and delamination is evident at low level.





2.1.4 The gable ends are formed in 140mm concrete blockwork; on the south elevation 140mm blockwork is constructed as infill between the steel columns. The walls generally appear to be performing satisfactorily in that they appear to be plumb and free from significant cracking. This also suggests that the building is adequately founded.





3.0 Structural Observations – Building B

3.1.1 Building B has a duo-pitch roof, clad in (assumed) concrete corrugated sheeting. Externally the roof lines look to be true, suggesting that the roof structure is performing satisfactorily.



3.1.2 Internally the roof structure is seen to consist of six bays, formed by a central spine wall with two steel trusses either side. The steel trusses support two lines of purlin on each pitch and an additional row over the eaves line.



3.1.3 The steel trusses are formed with welded lightweight steel circular hollow sections; the trusses appear to be performing satisfactorily; although light corrosion is evident this does not appear to have developed excessively. Similarly, the steel purlins (angle sections) are lightly corroded; the sections are quite slender but appear to be performing satisfactorily, albeit with slight deflection evident.



3.1.4 On the south elevation the trusses are supported on steel circular hollow section columns with concrete surrounds at the base. The columns appear to be sound, with only light corrosion, and the concrete base surrounds appear to be providing good protection to the vulnerable low level steelwork.

3.1.5 On the north elevation the trusses are supported on concrete blockwork piers to a 140mm thickness concrete blockwork elevation. The piers have a very slight cracking evident at the head; the reason for this is not immediately clear, but could be related to the very localised nature of the north elevation restraint at the truss positions.



3.1.6 The north elevation itself has a very light cracking evident in places. It is assumed that in part this is due to the fact that the relatively long elevation has no joints over its length. It would normally be expected to provide joists at approximately 6m centres. The overall condition of the blockwork suggests that the building is well founded, with no significant cracking noted, and walls appear to be plumb.



4.0 Proposed Alterations

4.1.1 MBA Architectures drawings 650-P-01C and 650-P-02E show the proposed alterations to Buildings A and B.

4.1.2 For both buildings the roof cladding is shown as trapezoidal section metal sheeting, the weight of which is likely to be slightly lighter than the roofing material currently cladding the roof structure. This means that the only proposed increases in the loading carried by the roof structure are relatively minor; insulation and ceiling.

4.1.3 A partial footprint mezzanine floor is proposed for the west side of Building A. The ground floor wall configuration under the mezzanine offers support options for the floor, meaning that the additional loading to the existing walls and foundations can be kept to an acceptable minimum by distributing loading between new and existing elements.

4.1.4 The south elevation of Building B is currently open. The Architects proposals show a combination of glazing and masonry; both will require a new foundation.

4.1.5 Building A is proposed to have a render finish, a nominal increase in wall and foundation loading which is considered to be acceptable without strengthening.

5.0 Discussion

5.1.1 Both buildings appear to be performing satisfactorily structurally at present; the roof lines appear to be true, and walls appear to be reasonably plumb. This suggests that the buildings are adequately founded, and that sufficient resistance to lateral wind loading is present.

5.1.2 Minor structural defects are present in both buildings. The steel columns to Building A have sufficient corrosion at their bases to warrant remedial works, relatively simply carried out via steel plating. The minor cracking to the north elevation of Building B doesn't necessarily require remedial works, but consideration could be given to introducing movement joints if the building is to be converted to habitable use and the control of cracking becomes more desirable.

5.1.3 In structural terms there is no apparent reason why the buildings shouldn't be converted to habitable use. As part of the conversion the roof coverings will be replaced; it is assumed that the existing cladding is performing a 'diaphragm' or 'plate' action, providing overall stability to the buildings. New cladding will need to be detailed in such a way as to replicate this action.

5.1.4 As agricultural buildings it could be expected that lateral wall displacements under high wind loading would be higher than would normally be acceptable for sensitive domestic wall and ceiling finishes. Indicative initial analysis suggests that the existing wall structures would not meet current Codes of Practice, but a coherent structural action is present and years of exposure to lateral loading does not appear to have had an adverse structural effect. For this reason, conversion is considered to be acceptable, and finishes can be chosen with these displacements in mind. A degree of additional stiffness will be gained by the proposed additional cross walls in both buildings, and by the insertion of a mezzanine within Building A.

5.1.5 Initial analysis of the timber roof trusses to Building A suggests that there is sufficient capacity for higher loading (ceilings, insulation) with only minor strengthening to the king post connections. The purlins will require slight strengthening for higher loading, but this can be carried out simply via fixing additional timber alongside the existing.

5.1.6 Similarly, the purlins to Building B will require strengthening for higher loads, again by providing additional sections alongside the existing. The trusses to Building B appear to be adequate under existing loading; appraisal for higher loadings will be dependent on establishing steel thickness, but initial analysis suggests that the trusses are capable of carrying slightly higher loading if required without modification.

5.1.7 Care will need to be taken at the interface between the new foundation on the south side of Buildings B and the existing foundations either end. There is the potential for differential movement at these points; an investigation of the existing foundations will be carried out to inform the design of this interface.

6.0 Summary

6.1.1 Both building structures appear to be performing satisfactorily at present; the roof structures appear to be adequate and the structural condition of the walls suggests both adequate founding conditions and adequate resistance to lateral loading.

6.1.2 Minor structural defects are present, but these can be remediated relatively simply, via steel plating to the Building A steel column bases, and remedial works where minor blockwork cracking is evident.

6.1.3 In structural terms conversion to habitable use appears to be acceptable, provided any re-cladding replicates the ‘plate’ action the existing corrugated roof cladding appears to be providing.

6.1.4 Although the proposed conversion to habitable use involves the provision of further internal walls careful selection of internal finishes is advisable as expected displacements under high lateral loading may be more akin to agricultural buildings than to purpose-designed domestic buildings.

6.1.5 The proposed addition of cross walls within each building, and a mezzanine in Building A, provides an opportunity to increase the overall building stiffness.

6.1.6 Further loading is proposed at roof level in the form of ceilings and insulation; initial analysis suggests that the timber roof trusses to Building A may require a minor king post connection upgrade, but some sufficient capacity is likely to be present in the Building B steel trusses (subject to further investigation). Both buildings will require a slight strengthening of the roof purlins should higher loadings be proposed by providing new purlins alongside the existing.

6.1.7 Where new foundations are required, care will need to be taken at the interface between new and existing to avoid excessive differential movement. The design will be informed by an investigation of the existing founding conditions.

Appendix 1 – Survey Plans



Abbreviations

fl	= floor level	dh	= door head
cl	= ceiling level	dc	= door cill
fcl	= false ceiling level	hh	= head height
u/s	= underside of	ch	= cill height
u/sb	= underside of beam	sh	= strike height
csu	= ceiling slopes up	sph	= spring height
mh	= manhole cover	ah	= apex height

Elevation Locations

Key

Beam
Ceiling
Cupboard/Worktop
Door
Duct/Boxing
Joists/Trusses
Level
Manhole
Overhead
Section
Services
Step/Stairs/Ramps
Wall
Window

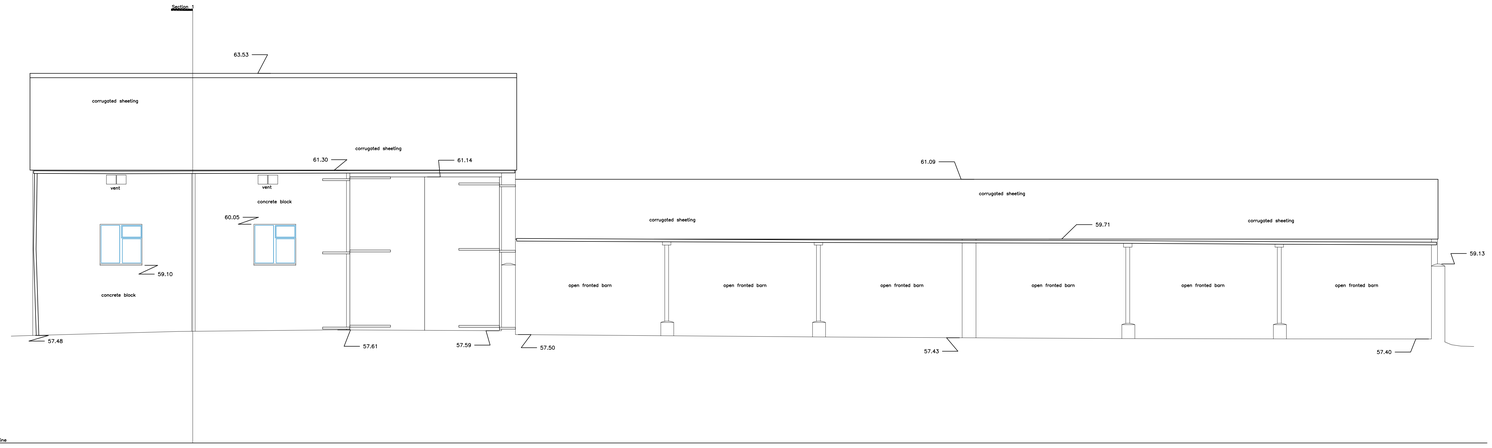
SWS
SouthWestSurveys
Tel: 01454 501683
Mobile: 07595946495
www.southwestsurveys.co.uk
info@southwestsurveys.co.uk
28 Rudgeway Park
Rudgeway
Bristol
South Glos
BS35 3RU

Drawing Title:
Ground floor plan

Project Name:
Church Farm
Lower Seagry, SN15 5EP

Client:
Heather Waddington
Agent:
MBA Architecture

Site Level Datum: OSDN Height	Grid Orientation: OSGB36
Date: 09th February 2023	Scale: 1:50 @ A1
Surveyed By: NW / Drawn By: NW	Sheet ID: SWS042236gf / Rev: rev



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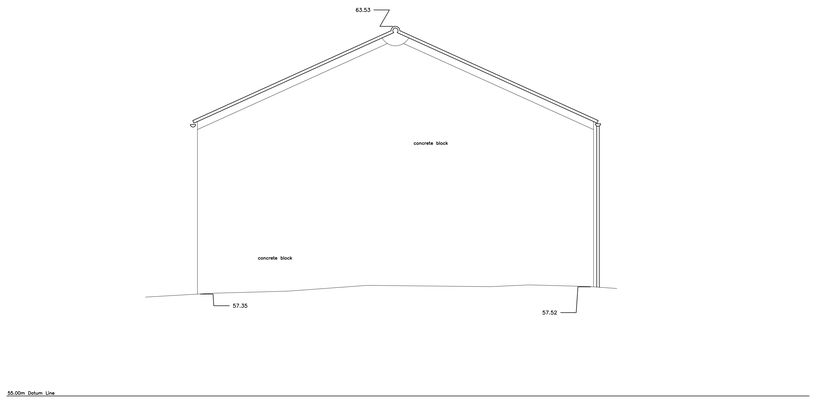

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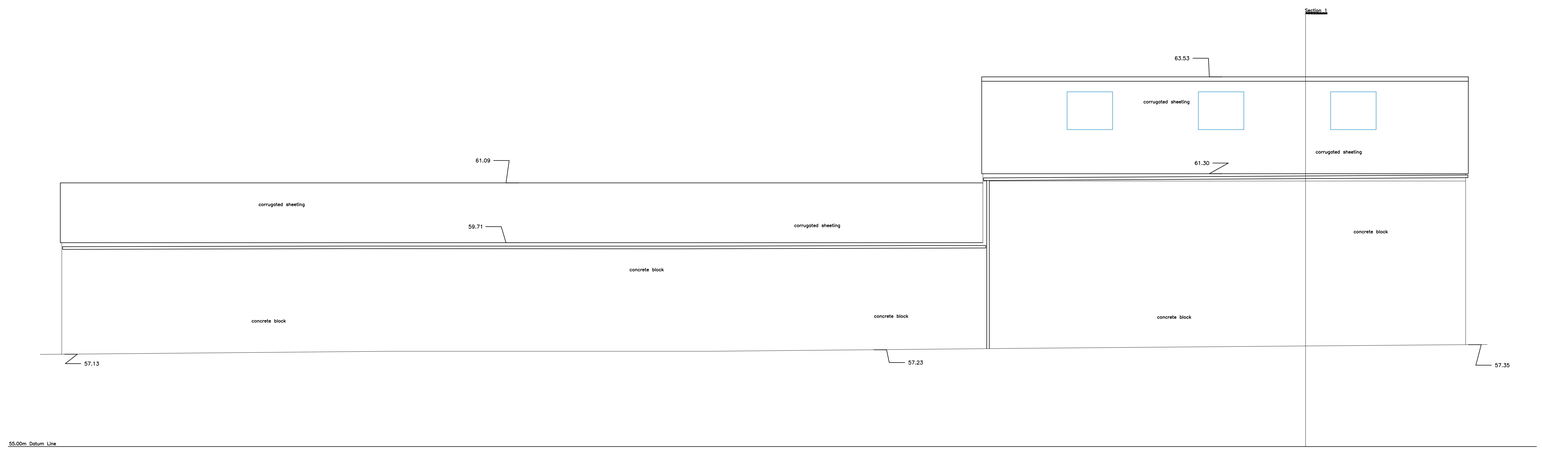

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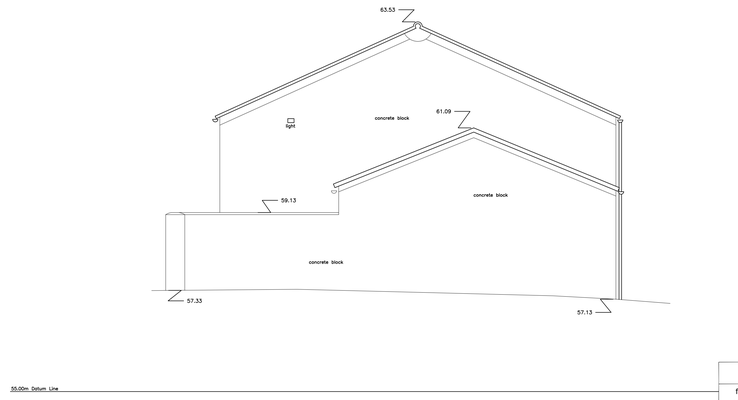


EAST ELEVATION

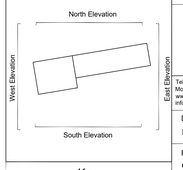
0 1m 2m 3m 4m 5m 6m 7m 8m 9m 10m

Scale 1 : 50

Abbreviations

fl =	floor level	dh =	door head
cl =	ceiling level	dc =	door cill
fcl =	false ceiling level	hh =	head height
u/s =	underside of	ch =	cill height
u/sb =	underside of beam	sh =	strike height
csu =	ceiling slopes up	sph =	spring height
mh =	manhole cover	ah =	apex height

Elevation Locations



Key

Beam
Ceiling
Cupboard/Worktop
Door
Duct/Boxing
Joists/Trusses
Level 00.00
Manhole
Overhead
Section
Services
Step/Stairs/Ramps
Wall
Window

SWS
SouthWestSurveys
Tel: 01454 501683
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www.southwestsurveys.co.uk
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28 Rudgeway Park
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BS35 3RU

Drawing Title:
Elevations

Project Name:
Church Farm
Lower Seagry, SN15 5EP

Client:
Heather Waddington
Agent:
MBA Architecture

Site Level Datum	Grid Orientation
OSN Height	OSGB36

Date:	Scale:
09th February 2023	1:50 @ A0

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