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Structural Appraisal
Lawndowns Bungalow
Grampound Road
For

Ms T. Davey

Job no 21:8121



1.0 Introduction:

1.1 Brief:

Derek Gray & Associates have been asked to inspect and prepare a structural appraisal of the walls of the building on the site.

1.2 Scope and limitations of report:

The scope of this report is restricted to an appraisal and opinion of the building's general structural suitability.

Only those structural elements that may particularly affect the stability of the property have been noted, with the proviso that they were reasonably accessible and visible at the time of the inspection. Although we have taken all reasonable skill and care in the preparation of this report it should be noted that no guarantee can be given that the property will be free from future defects or those noted be free from increased deterioration.

This document is not considered to be a full structural survey

1.3 Method of Inspection

No specialist investigations or opening up works have been undertaken this appraisal being a visual assessment of the structural elements. No opinion can be given, or responsibility taken, for any part of the structure hidden by fixtures, finishes or otherwise inaccessible, at the time of the survey. Such unexposed parts may contain problems and special arrangements would need to be made for those areas to be investigated. See full terms and conditions at the end of this report

Where applicable, BRE Digest 366, Structural Appraisal of Existing Buildings for Change of Use and The Institute of Structural Engineers publication Appraisal of Existing Structures have been used as the basis of the report

2.0 The Building: Overview

A redundant agricultural building situated adjacent to Lawndowns Bungalow, Grampound Road close to an unclassified road.

The building is constructed from single skin blockwork with a lightweight corrugated sheet monopitch roof.

The long axis of the building runs from north to south, the ground falls gently from the northern end by about 0.5 m along the length of the building.

2.1 Description of Building.

The building is approximately 27 metres long x 9 m metres wide formed in three equal sections. The property is constructed on a sloping site with the higher ground to the north; as a consequence a small step has been formed in the ground floor slab at the junction between each section/

The roof does not follow the stepped arrangement resulting in increased internal height for each successive section.

Full height openings, half the width of each section, are placed on the western elevation of each section, at the higher (northern) end. The sections are divided with full height masonry walls.

3.0 Walls:

Constructed from concrete blockwork which has been neatly pointed resulting in walls which would have a neat appearance if cleaned. The blockwork is 20 courses high at the upper eaves at the southern, lower end, this resulting in a wall 4.5 m high. The rear wall is reduced to 2.9 m high.

A timber capping beam is placed on the top of the western wall, this acts as a lintel over the three door openings, no windows are provided in the units.

The ground slopes along the length of the building, this results in a wall 3.6 m high on the long eastern face at the southern end, reducing by 225 mm at each cross wall.

All the walls are constructed in 140 mm blockwork with piers 440 wide placed centrally in each section.

The walls are in good condition and were well constructed.

3.1 Alterations and addition to the walls

The three main openings on the west elevation are no longer required. It is intended to block up these openings with new cavity walling constructed with a blockwork outer face and timber frame lining.

Three large door openings will be cut in the eastern wall together with two smaller windows.

3.2 Calculations for new walling

Dead load from roof allow	0.75 kN/sq.m x 1.5 m	1.13 kN/m
Live load from roof	0.60 kN/sq.m x 1.5 m	0.90 kN/m

Wind loads

$$V = 46 \text{ m.s}$$

Height of walls < 5 m

$$S_2 = 0.74$$

$$W_k = 0.613 \times (46 \times 0.74)^{0.5} / 1000 = 0.71 \text{ kN/sq.m}$$

Design of stud walling at 4.5 m high

Design of Timber Frame Studs to BS5268:Part 2

Geometry

Height of studs	4.50 metres
Thickness of stud	140 mm
Width of stud	38 mm
Spacing of studs	400 mm
Radius of gyration, i	40.415 mm

Materials

	Timber grade	24
	E min	7200 N/sq.mm
	E mean	10800 N/sq.mm
Table 9	σ_c	7.9 N/sq.mm
Table 9	σ_m	7.5 N/sq.mm

Table 17	k3	1.25	
Table 22	λ (Le/i)	111.346	
	E design	10800	N/sq.mm
Appdx C	part eq'n	0.801	
	k12	0.296	
	Loads		
BS6399	Wind loads	0.740	kN/sq.m
	Wind moment	0.749	kN-m/stud
	Axial loads	2.230	kN/m
		0.892	kN/stud
	k7	1.087	
Cl.13.1	k8	1.100	
	$\sigma_{m,a, }$	6.036	N/sq.mm
	$\sigma_{m,adm, }$	11.214	N/sq.mm
	$\sigma_{c,a, }$	0.168	N/sq.mm
	$\sigma_{c,adm, }$	3.218	N/sq.mm
	σ_e	5.732	N/sq.mm
Cl 15.6	Combined Stress	0.597	

Provide 140 x 38 studs at 400 centres

These studs will bring both the strength of the wall and the insulation up to current standard.
 Lintels to be designed as part of the construction phase works.

3.3 Photographs of the walls



Northern end of western elevation



Entry doors in western elevation



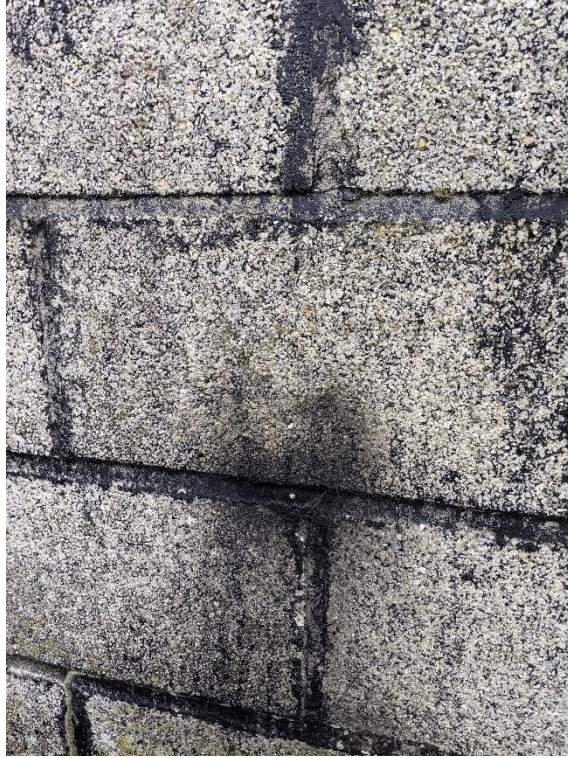
Northern end of eastern elevation



Northern elevation



Various internal views of walls



Blockwork

4.0 Roof

Currently consisting of corrugated steel sheeting supported on seven rows of continuous timber purlins supported on a central beam spanning between the piers.

It is assumed that this roof would be replaced during any conversion of the building.

4.1 New roof

Proposals call for a replacement roof using insulated plastic coated sheeting, this to be supported on purlins spanning between cross walls.

Longest span = 4.75 metres.

Loading from this roof will have approximately the same value as the existing roof and will not adversely affect the strength of the walls

5.0 Floors

The walls have been constructed directly off a concrete ground bearing slab laid with a single block course stepped at each dividing wall. It would be safe to assume that this slab is at least 150 mm thick, thickened at the edge to 225. Foundations were not inspected as the outside area is a concrete hard-standing.

6.0 Conclusion

The walls of the building are in good condition. Bearing in mind the height and thickness of the walls together with the site exposure it is apparent that the walls are of adequate size for the current use.

However, the walls are reaching the limit of their lateral load capacity as they stand.

The proposed conversion provide either external insulation to the walls supported by a timber frame which can be arranged in such a manner that the walls will not have additional loading from the roof and which will increase the overall strength of the structure.

7.0 Terms and Conditions of Report

Statutory Requirements

Enquiries with local or statutory authorities have not been carried out. Although attention may be drawn to any apparent breach or statutory requirement relative to the building or site, the absence of any such comment does not imply compliance with any such requirement.

Contamination

Although contamination is a high profile issue in Cornwall the property and site have not been tested for any form of contamination or pollution. However, such matters are an important consideration and could adversely affect the future value of both property, site, and prospects for future development. Specific environmental audits can be arranged with appropriate specialists in this field.

Mundic Test

The testing for Mundic Block is a specialist undertaking requiring laboratory procedures and has not been carried out as part of this report.

Non Structural Timber

Non - structural timber, such as window and door joinery, skirting boards and soffits etc have not been inspected.

Trees and Shrubs.

Trees and shrubs in close proximity to buildings could be capable of causing future structural problems such as subsidence. No large plants were found close to the building at the time of the survey although there may have been trees and shrubs in the vicinity in the past.

Methane & Radon

Testing for, or enquiry about possible methane presence from geological or organic sources, or the presence of Radon Gas have not been carried out as part of this structural assessment

Building Faults

No inspection for building faults such as defects in rainwater systems, drains, roof coverings or rising damp have been carried out as part of this survey.

Copyright

This report is copyright of Derek Gray & Associates and is intended for the sole use of the client, his professional advisors and the Local Authority Planning Department. The contents of the report should not be relied upon by any other party without the written consent of this practice.

Derek Gray
Chartered Structural Engineer
Derek Gray & Associates
29th November 2023

