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STRUCTURAL ENGINEERS REPORT

5-7 HIGH STREET

BEMBRIDGE

ISLE OF WIGHT

Client: Bembridge Parish Council
5 Foreland Road
Bembridge
Isle of Wight
PO35 5XN

Engineer: Patterson Reeves & Partners
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Tel : 01983 550539

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Designing For Your Needs



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CONTENTS

1.0 BRIEF

2.0 SUMMARY

3.0 INTRODUCTION

4.0 GEOLOGY OF THE AREA

5.0 OBSERVATIONS

6.0 DISCUSSION

7.0 RECOMMENDATIONS

APPENDIX A

PHOTOGRAPHS

1.0 BRIEF

- 1.1 Patterson Reeves & Partners were appointed by Bembridge Parish Council to undertake a structural inspection of 5-7 High Street Bembridge to assess the building for general structural condition and report back with the findings.
- 1.2 A visual inspection of the property was carried out by Chartered Structural Engineer Chris Jenner CEng MStructE on Thursday 20th March 2014. Photographs of the building have been included to assist with clarifying the observations described within this report. The weather conditions were dry at the time of the inspection.
- 1.3 Please note that the site survey did not include inspection of those parts of the structure which are inaccessible, and we are therefore unable to report that the structure is free from defect.
- 1.4 We can give no guarantee whatsoever against the presence of rot, disease, beetle infestation or other defects in the timber of the property.
- 1.5 No responsibility is accepted to any other third party for the whole or part of the contents of this report, which is exclusively for the use of Bembridge Parish Council.

2.0 SUMMARY

- 2.1 The cavity wall ties at ground floor level have corroded causing damage to the external masonry skin. The existing corroded ties should be isolated and new ties should be installed. Areas of cracked or damage brickwork should be rebuilt.
- 2.2 New lintels should be installed over ground floor openings where the existing brickwork arch lintels have been damaged or to facilitate rebuilding areas of damaged brickwork. New lintels will be required should existing load bearing window frames be replaced with lightweight window frames.
- 2.3 The masonry infill panels in the upper front gable wall (visible from within the loft space) should be tied to the surrounding timber frame.
- 2.4 Internal cracks visible in concrete beams and to the underside of the first floor slab should be investigated further and repaired using specialist concrete repair materials and techniques.
- 2.5 The roof has moved in an outward direction at eaves level, indicating roof spread. This movement is considered to be historic and not becoming progressively worse, however the area should be investigated further by removing finishes to determine the construction/condition of the structural elements and strengthened as necessary.

3.0 INTRODUCTION

- 3.1 All references to the orientation of the building are made whilst observing the property from the front. When describing the building elements all directions are given facing the elements.
- 3.2 The property is a detached two storey building, which was constructed using traditional building materials, comprising ground floor brickwork cavity walls possibly changing to solid brickwork rendered walls at first floor level. The first floor comprises of a reinforced concrete slab, which spans between internal reinforced concrete down-stand beams and concrete or masonry columns. Tudor style timber inserts have been incorporated into the first floor elevations and a bay window has been constructed onto the front of the building.
- 3.3 The roof construction comprises a steeply sloping timber roof with a tiled roof covering. Timber feature trusses with steel ties have been constructed at regular intervals and provide support to the timber rafters and purlins.
- 3.4 An external concrete staircase has been constructed onto the left side of the property, which provides access to a first floor self-contained office.
- 3.5 The internal ground floor comprises a retail shop to the front and public conveniences to the rear.
- 3.6 The property has been built onto a generally level site.
- 3.7 Recent structural repair work has been carried out to repair the ends of the reinforced concrete beam over the shop front.

4.0 GEOLOGY OF THE AREA

- 4.1 The 1:50,000 geology survey map of the Isle of Wight indicates that the site overlies Marine Gravel.
- 4.2 These soils are not normally adequate for supporting low rise buildings on traditional foundations.

5.0 OBSERVATIONS

- 5.1 The brickwork arch lintel above the front right elevation window opening has been damaged by the installation of new service cables/pipes and a section of brickwork leans in an outward direction. (See photograph 4).
- 5.2 The outer brickwork ground floor wall adjacent to the entrance into the ladies toilet is bowing and an area of the brickwork is loose. (See photograph 5).
- 5.3 The rear ground floor brickwork piers between window openings have cracked and exposed corroded steel wall ties are visible. (See photograph 6 and 7).
- 5.4 Ground floor timber window frames provide support to the brickwork outer skin. (See photograph 8).
- 5.5 The roof appears to have moved in an outward direction on the left elevation and a gap has appeared between the external wall and timber soffit board at eaves level. (See photograph 9).
- 5.6 The front gable wall comprises a timber frame with 100mm thick brickwork infill panels in between the timber posts. It would appear that the infill panels are not tied to the timber frame and a gap has appeared between the infill panel and timber post. (See photograph 12).
- 5.7 Cracks are visible in the underside of the concrete floor slab and in the concrete beams within the gents toilet. (See photographs 13 and 14).
- 5.8 There is a horizontal crack located in the front left corner of the ground floor shop. (See photograph 15).

6.0 DISCUSSION

- 6.1 The steel cavity wall ties at ground floor level have corroded. When corrosion develops in steel ties they can expand and fail causing instability, bulging, cracking and damage to walls. This corrosion could be caused by dampness penetrating into the cavity or possibly due to high levels of calcium chloride in the mortar mix.
- 6.2 The roof line has moved in an outward direction at eaves level on the right elevation. If the roof timbers have deteriorated, are weak, have been poorly designed or if they are not triangulated or fixed to ceiling joists they can move in an outward direction at their support position, particularly if the support is an unrestrained masonry wall. No recent damage was noted, which indicates that the movement is historic and not becoming progressively worse.
- 6.3 Cracks are visible in the concrete beams and to the underside of the concrete floor slab, particularly in the Gents toilet. It is likely that the steel reinforcement bars have corroded, expanded and caused the concrete to crack.
- 6.4 It is possible that the internal crack noted to the front corner of the shop has been caused by wall tie failure or was caused by the deterioration of the reinforced concrete beam located over the shop front, which has now been repaired.
- 6.5 The timber frame structure on the front elevation will expand and contract due to changes in temperature or moisture. This movement has allowed gaps to appear between the posts and masonry infill panels. These slender panels appear to be unrestrained at their junctions with the surrounding structure and are in a potentially unstable condition.

7.0 RECOMMENDATIONS

- 7.1 The existing corroded cavity wall ties should be isolated and new ties should be installed as soon as possible to prevent further structural damage. Areas of cracked or damaged brickwork should be rebuilt.
- 7.2 New lintels should be installed over ground floor openings where the existing brickwork arch lintels have been damaged or to facilitate rebuilding areas of damaged brickwork caused by corroded wall ties. New lintels will be required should existing load bearing window frames be replaced with lightweight window frames.
- 7.3 The masonry infill panels in the upper front gable wall (visible from within the loft space) should be tied to the surrounding timber frame.
- 7.4 The extent of the internal cracks visible in concrete beams and to the underside of the first floor slab should be investigated by removing areas of damaged concrete and repaired using specialist concrete repair materials and techniques to prevent further structural damage.
- 7.5 The movement noted to the roof structure should be investigated further by removing finishes to determine the existing construction/condition of the structural elements. It is likely that the movement is historic and no further work will be recommended, however should defects be found they should be repaired and the structure strengthened as necessary.

For and on behalf of Patterson Reeves & Partners Ltd

C Jenner CEng MStructE

28th March 2014

APPENDIX A

PHOTOGRAPHS