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April 2018

STRUCTURAL APPRAISAL
OF
'YORK HOUSE'
KING STREET, ROBIN HOOD'S BAY
FOR
MR & MRS J WHITELEY

NYMNPA

09/07/2018

Prepared by

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The **Institution**
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**STRUCTURAL APPRAISAL
OF
'YORK HOUSE'
ROBIN HOOD'S BAY
FOR
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1.0 BRIEF:-

This report has been prepared on the instruction of Mr J Whiteley

Our client, Mr Whiteley, is the owner of the above property. An architectural survey by others has expressed concern regarding some structural items and recommended that a structural engineer's report be obtained.

The object of this report, therefore, is:-

- To assess the extent of any visible damage
- If possible, to advise on the probable cause of any damage.
- To advise appropriate remedial measures or further action.

This report is a structural appraisal of the current status of the building and is NOT a full specification for carrying out any remedial works.

We have not inspected the woodwork or other parts of the structure which are covered, unexposed or inaccessible and we are, therefore, unable to report that any such part of the property is free from defect.

Dimensions noted in this report are rough visual estimates for identification purposes only. No actual measurements have been taken at the site.

2.0 INTRODUCTION:-

The property is a terraced cottage situated in the heart of the old village of Robin Hood's bay, Whitby North Yorkshire.

The age of the property is not known, but we anticipate that it is well in excess of 100 years.

Current owners purchased the property during 2017 and are using the cottage as a holiday home.

2.1 Date of Visit:-

The property was visited for the purpose of this report on the 18th April 2018.

2.2 Weather:-

The weather was mild and dry. There have been some significant periods of wet and windy weather recently. The last 12 months have been quite wet locally.

2.3 Topography:-

The site is situated just above the main sea-walls at the bottom of the village.

Land slopes steeply down towards both the north and east.

Historically the cliffs at Robin Hood's Bay suffered from slippage due to sea erosion. In the 1970s the Local Authority carried out extensive sea defence works to protect the historic village properties.

There is not any significant vegetation adjacent to the building; it is surrounded by paved yards, surfaced road, paths etc.

We would describe the site as being extremely exposed to inclement weather from the North Sea.

2.4 Geology:-

At this stage no subsoil investigations have been carried out.

3.0 GENERAL:-

3.1 Type of Building:-

The property appears to be a detached 2 storey dwelling, but a cellar and a bedroom at attic level effectively provide 4 floors of accommodation.

Walls are typically solid construction, typically approx. 200mm thick. Some external surfaces have been rendered and some have been painted white.

The pitched roof has an 'A-frame' profile.

3.2 Overall Stability:-

Overall stability is provided by the external masonry walls. Due to the slender nature of these walls there will also be some lateral stability benefit taken from the various lightweight internal partitions.

3.3 Alterations:-

It is almost inevitable that a property of such an age as this one will have been altered on a variety of occasions in the past.

In this case we understand that the rear of the cottage may have been a victim of land slippage in the early 1900s. Later (date unknown) the rear section was

re-built. The Local Authority have also constructed extensive sea defence walls just below this particular property.

Our own observations suggest that the main roof may have been raised.

4.0 OBSERVATIONS:-

Damage assessment has where possible been made in accordance with Building Research Establishment digest No.251 (BRE 251), "Assessment of damage to low-rise buildings". The digest has six categories '0' (negligible) to '5' (very severe).

4.1 External:-

4.1.1 Front (South) Elevation

This elevation faces South (away from the sea) and has some shelter from adjacent buildings. The main wall is approximately 7m long x 12m high. There is a cellar flat below street level.

At ground floor level there is a door and bay window. At first floor there are two modest windows and at attic level a single modest window.

As far as we are able to assess from a simple visual inspection the main elevation appears to be approximately 200mm thick solid, coursed sandstone construction. Generally, the sandstone appears quite weathered.

Recent re-pointing suggests there is a diagonal line of weakness to the left of the main windows. Because the pointing is recent, we can not advise if the past movement is on-going. There were other factors noted later that would suggest to us that the roof could have been raised a long time ago. We will be recommending installing a number of stainless steel masonry crack repairs bars across this area.

To the left of the bay window and directly above, there has been a significant amount of heavy re-pointing. It suggests there has been some movement of the lintel over the bay window. Usually, these are timber and suffer some deterioration with age. On this occasion we have not identified the actual material of the lintel as it is covered. Recent re-leading of the bay-window will probably have benefitted the present status quo.

Recent re-pointing suggests there has been some cracking between the attic window and the right-hand side first floor window. The client advises that some crack repair bars have recently been installed. From our external observations, we feel that this area may benefit from some additional bars, say 3 no. immediately to the left of recent re-pointing.

There is a vertical crack below the bay window. This could be due to general deterioration of lintels with age and damp. We will be recommending installing 2 no. crack repair bars.

Generally, the modest bulges and undulations did not cause us very serious concern. While we feel there has been (and probably still is) past movement, we feel that movement is generally quite gradual and not necessarily cause for alarm.

The main body of loading from the masonry on this elevation is being directed down onto the lintel over the bay window. This has clearly deflected in the past and resulted in movement above, visible at 1st and 2nd floor levels. It is common for there to be two lintels, an outer stone one and an inner timber lintel. In this case due to the slender nature of the external wall there may be only one lintel.

For the present we will be recommending adding some crack repair bars around the bay window. In the long term it will probably be advisable to replace the lintel.

Below ground floor level to the side of the entrance door a significant amount of load is being directed onto a timber lintel over the cellar door below.

In accordance with BRE 251 and noting the slender nature of the external wall, damage on this elevation could be classified as 'severe' however, in the context of a historic cottage that has stood for a very long time we feel that a more appropriate classification would be category 3 (moderate) for which the digest remarks "*...these cracks require some opening up and can be patched by a mason. ...Repointing of external brickwork and possibly a small amount of brickwork to be replaced...*".

4.1.2 Side (East) Elevation

This elevation steps down along its length towards the Sea Wall. There is a street light and a t.v. aerial bolted to the face. All masonry on this elevation has been painted white (we assume to reduce horizontal damp penetration from inclement weather).

The left (higher) side is probably the main original building. At eaves level brickwork suggests to us that the roof may have been raised a long time ago. There are just two small openings for windows on this elevation. Centrally there may be indications that a former window has been blocked up.

The lintel for the lower window does not appear to extend onto a support at one side. We will be recommending 2 no. crack repair bars. Textures below the paintwork suggest a number of possible past alterations (e.g. altered windows).

The lower right-hand section may have been re-built in the mid 1900s. There may have been an old vertical crack in the centre of the lower section.

Current observations did not indicate to us evidence of significant ongoing movement to cause us serious concern.

In accordance with BRE 251 we would classify the visible evidence of damage on this elevation as category 3 (moderate).

4.1.3 Rear (North) Elevation

Generally, this elevation faces the sea and is very exposed to inclement weather. Masonry has been rendered and/or painted white, which we assume is to reduce horizontal damp penetration.

On the upper (original?) section the window effectively spans the full width of the roof at lintel level. Internal inspection indicated to us that this upper level wall was very thin and may not necessarily be masonry construction. We did not record evidence of significant recent movement to cause us serious concern.

Noting the minimal evidence of recent movement we would classify recent damage as category 2 (slight) for which the digest remarks "*...some external pointing required to ensure weathertightness. Doors and windows may stick slightly....*".

4.1.4 Side (West) Elevation

Not accessible.

4.2 Internal:-

The cellar area was not inspected.

4.2.1 Ground floor

Generally, walls appear to be lined. External walls appear to be quite thin construction. Where identifiable, approximately 200mm thick solid sandstone.

Kitchen:

Minor localised damp patches to ceiling.

Hall:

Walls lined.

Bed:

Possible evidence of damp around the bay window. While some may be due to horizontal penetration, it is also likely some damp is due to condensation.

Shower Room:

We felt ventilation to this room could be improved.

The kitchen area at the rear was probably added on to the main original cottage after issues regarding land slippage were resolved.

Generally, decorations and linings to the walls appeared quite old and did not indicate to us evidence of significant ongoing movement to cause us serious concern. The thin, solid external walls are, however, slender and will be prone to horizontal damp penetration and condensation.

4.2.2 First floor

Joists generally span across the width of the building. Floors felt uneven, but we did not feel this was unusual bearing in mind the age and past history of the property.

The lounge section is to the rear over the new portion of the building. There were not really any significant piers at the opening between the old and newer construction, i.e. the original rear wall of the property has effectively been removed a long time ago. All walls appear to be lined.

Ceiling and wall decorations appear to be of reasonable age and did not suggest to us evidence of ongoing movement to cause us serious concern.

Internal partitions appear to be light studwork. Some of these partitions will provide propping to the joists above. Due to the slender nature of the external walls, we would advise that all internal partitions (throughout the property) should be regarded as structural, irrespective of their apparent light construction.

4.2.3 Attic level

This space appears to be fully open plan. The ceiling appears to be a raised collar roof. The base of the rafters (eaves) is approximately 1200mm above floor level. There is not roof space access. This type of roof construction is usually prone to lateral spread at eaves level.

In the front corner of the room there was evidence of approximately 10mm of horizontal movement at eaves level (tapered vertical crack at wall junction). Decorations suggested that this movement had occurred slowly over a long period of time. There is some minor hairline cracking along the edges of the horizontal ceiling (junction with sloping ceiling). There appeared to be a slight bow to the ceiling.

We have not verified the actual roof construction, but our view is that it is probably quite flimsy. There is some minor localised damp staining on the timber linings to the external walls.

Because the movement appears to be quite modest and has probably occurred over a long period of time, we do not feel the movement should cause immediate alarm. It would however, be advisable to plan for improvements to be included with any ongoing maintenance plans.

Usually our preferred remedy for this type of roof is to add a steel beam directly under the ridge line. In this case we anticipate that there could be some practical problems with this solution; the front wall is quite slender and care will be required in order to provide beam support; the rear wall is also quite slender and may comprise light studwork rather than masonry (to be verified). There are windows at both ends that may restrict options for supporting the load from the ridge beams (e.g. posts?).

It may be possible to design a steel framework of light posts and short beams that could fit within or close to the existing linings but this will require further investigation.

Alternatively, modest improvements could be achieved by lining the sloping ceiling with plywood sheeting and strapping to the verge of the gable walls.

The width of the window on the rear elevation and also the possible light construction of the rear wall may influence options available to strengthen the roof.

All proposals need to be subject to further investigation.

5.0 CONCLUSIONS:-

The property is clearly very old and will have suffered from a variety of movement and general deterioration over a long period of time. We understand from the client that the rear section of the property may have been victim of land slippage during the early 1900s. We feel that for a property of this age and location a certain amount of mild undulations etc. are to be expected.

Internal linings to the external walls have significantly restricted general inspection and assessment of these items.

Brickwork at high level on the side elevation suggests to us that the roof may have been raised a long time ago.

External joinery such as fascias etc. is in poor condition.

A number of defective lintels and sills have also been identified by others.

External walls are quite slender (thin solid construction) and will be prone to damp from a variety of sources, i.e. rising, horizontal penetration and condensation. Due to the slender nature of the external walls, we would advise that ALL internal partitions should be regarded as structural. Generally, joists

span across the width of the building, leaving the front and rear elevations with minimal lateral restraint.

Front and rear walls are very slender and appear to lack suitable lateral restraint (ie floors span parallel to these walls).

Front Elevation: Crack patterns suggest that the main evidence of movement on this elevation is due to a deteriorating (or inadequate) lintel over the ground floor bay window.

A-frame style roofs are prone to lateral spread at the eaves. The main house roof may be particularly flimsy.

This type of property will require regular maintenance due to its age and the particular exposed location. A general maintenance plan should also include for general improvements over time. Initial priorities should be lintel to bay window, lintels & sills generally and the roof.

6.0 **RECOMMENDATIONS:-**

These recommendations should be read in conjunction with items noted in survey assessment by others. These recommendations should be considered in addition to those expressed by others.

Urgent matters are defects considered by RAA Ltd to represent actual or developing threat to structural stability of part or all of the building.

Significant matters are those which, while not necessarily posing an immediate threat to the fabric of the building or personal safety, could if left unattended for any significant time progress to an urgent matter.

6.1 Urgent matters

Taking into account the age and past history of the building we feel that structural issues recorded may be regarded as 'significant' rather than 'urgent'.

6.2 Significant matters

Repair/strengthen various evidence of cracking (see attached sketch):

Cut out horizontal bed in masonry 50 mm deep. Apply approx 10mm bead of epoxy resin to back of saw-cut. Fix 6 mm diameter stainless steel 'helifix' resin anchor bars 1000mm long or similar approved. Apply second bead of resin to cover helical bar. Repoint with gauged mortar to match existing.

Provisionally allow for 14no. stainless steel bars:

- Front elevation: Left side 5 no.
- Front Bay window – Left side 4 no.
- Front first floor level 3 no.
- Side (East) over lower window 2 no.

Final details may vary slightly depending on materials found on site

Inspect and possibly replace lintel to bay window.

Roof: Strip roof and investigate.

We would suggest that further inspection (exposure) of the lintel to the bay window and roof would benefit from further Structural Engineer inspections.

6.3 General & maintenance issues

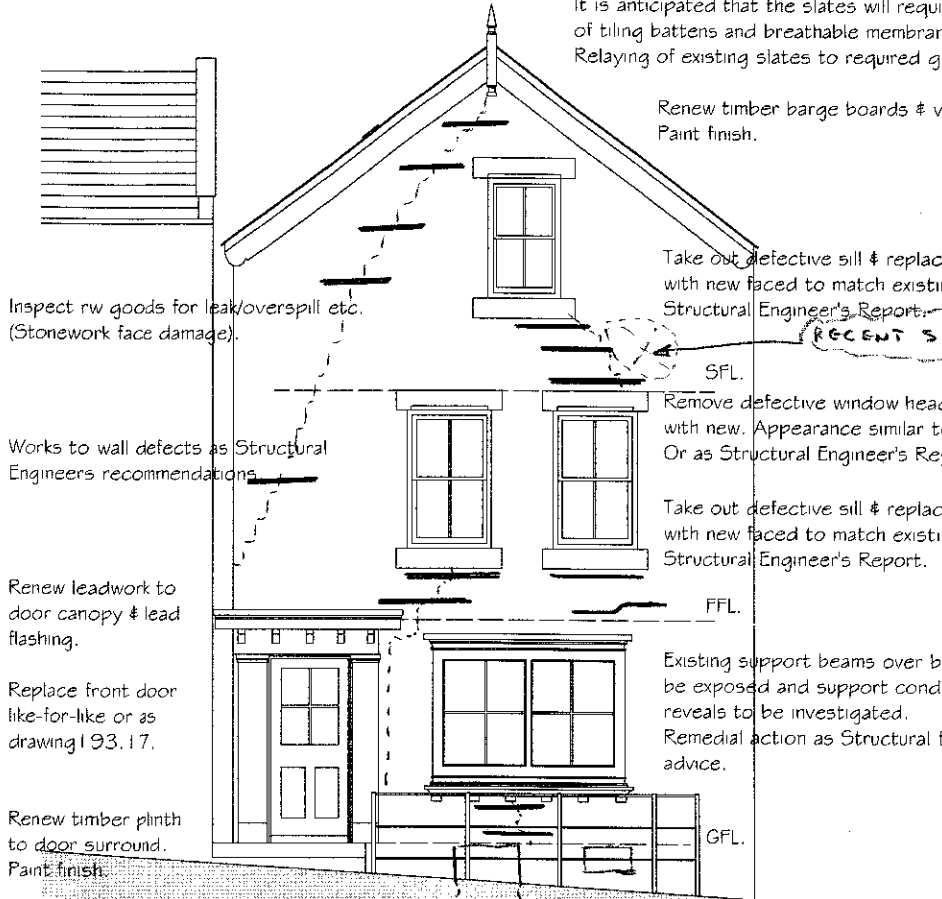
Replace external joinery e.g. fascias etc.

Signed for
Richard Agar Associates Limited

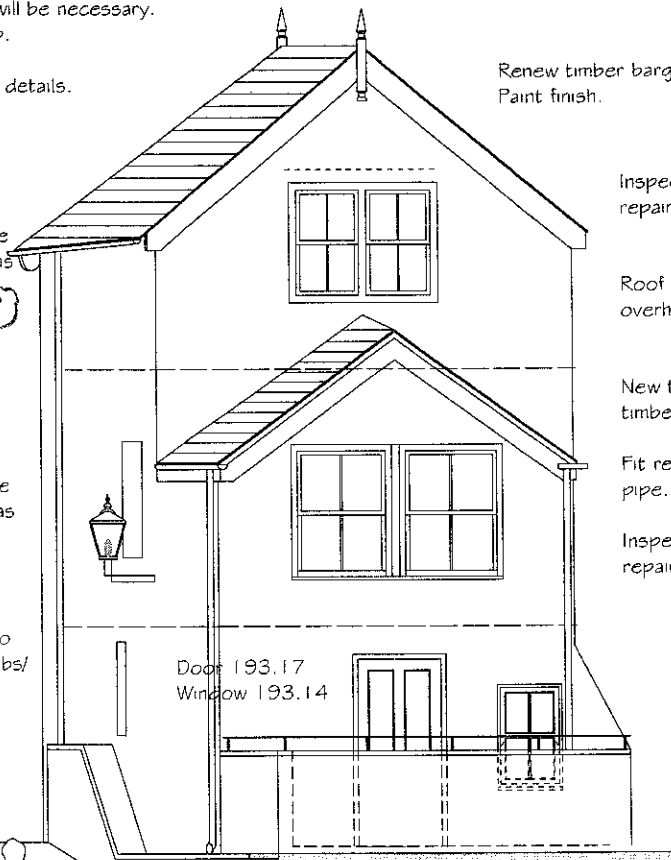
Eur Ing RICHARD AGAR
BSc(Hons) MSc CEng MIStructE MICE MCS MCIArb
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Director.

Extractor fan duct from new Shower Room to terminate at proprietary slate vent. Black colour.

Main roof of house to be inspected by specialist roofing contractor. Areas of uneven slating, patching, broken & missing slates, & yawning, give the impression that a complete overhaul may be required. It is anticipated that the slates will require removal and the replacement of tiling battens and breathable membrane underlay will be necessary. Relaying of existing slates to required gauge and lap.



Structural: Settlement has clearly occurred in the front wall of the building generally emanating from the head of the bay window and rising up the entire facade. There is evidence that work has been carried out in the past however there are obvious problems which remain to be addressed. A Structural Engineer's report is being prepared.



Free standing wall to Terrace to be taken down & rebuilt as notes on plan. Stone capping & iron railing for black paint finish as detail on plan.

Proposed:
ALTERATIONS to
YORK HOUSE
KING STREET
ROBIN HOODS BAY

Drawing:
EXISTING
ELEVATIONS I

Drawing No. 193/03
Date: DECEMBER 2017
Scale: 1/50

MICHAEL MILLER
BA(Hons) ARCH. CLAT
Architectural Consultant.



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S O U T H E L E V A T I O N

N O R T H E L E V A T I O N

SKETCH SHOWING SUGGESTED
LOCATION OF CRACK REPAIR BARS

3.452 - SK.01