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j c consultancy ltd
consulting structural & civil engineers

Our Ref : JC/14/03/1764-LR1

Date : 11th February 2015

Mr & Mrs J Delaney
Bresby House
Quadring Eaudyke
Lincolnshire.
PE11 4QB

Dear Mr & Mrs Delaney

RE:- STRUCTURAL ENGINEERING SERVICES TO;-
EXSITING GABLE WALL, BRESBY HOUSE.

Further to our visit to your property in March 2014, more recently last week, and together with various discussions with your agent / architect, Mr Robert Lowe, we would like to comment as follows;-

You have asked us to inspect and comment upon an existing gable wall to your property, as you are in the process of submitting a Listed Building Application for various works to the house. The gable wall appears to be suffering from structural movement, and you have asked for our comments with respect to its stability and potential repair. This report should be read in conjunction with the attached photographs.

The wall is a solid masonry construction which forms the gable wall of a rear projection. The gable contains a centrally located chimney breast at ground and first floor levels, and has a projecting chimney stack at the ridge. At first floor level, there is a window located to the right hand side, and a pair of existing tie bars with 'S' pattress plates are present at the verge.

Internally, the room at ground floor is utilised as the Kitchen, and accommodates a feature fireplace on the gable wall. The upper storey is currently attic space, however it is your intentions to convert this to an En-Suite Bathroom as part of your planned works. Within the attic room, adjacent to the gable, there is a disused stair void to the right hand side of the centrally located chimney stack (below the window), and a small cupboard to the left hand side.

When viewed externally, the wall can be seen to be in a poor condition. There has been significant lateral (outward bowing) movement to the upper right hand side of the gable around the window opening. This has resulted in vertical fractures occurring which appear to follow the line of the chimney stack towards the lower level of the gable. When comparing photographs taken in March 2014 to those taken recently, it does appear that there may have been movement over the period. There has been previous alterations and repairs to the gable adjacent to the window as a small panel of more recent brick units are present. The lower section of the gable is in a reasonable condition with little in the form of significant bulges or fractures present.

The extent of the movement observed externally is not reflective within the internal finishes at first floor level. Within the Attic room, there is little evidence of significant movement.

Vertical movement of the gable wall (i.e settlement or subsidence) does not appear to have occurred to any extent that causes concern.

Contd….

Directors
J L Hicks BEng(Hons) MSc.
J C Ellington BSc. CEng MIStructE FRSA MInstD

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The Institution of Structural Engineers

The cause of the movement is likely to be a combination of a general lack of restraint to the upper gable wall, together with the deterioration of the masonry units around the chimney flue.

Due to the presence of the window opening, and the stair void behind, the upper right-hand section of the gable wall panel is laterally unrestrained. This lack of 'tie-ing' restraint causes the outward bulge when the wall is subjected to loading of its own self weight. Above the window, a tie and pattress plate is present. Whilst this restrains the masonry at verge level, it also creates quite a stiff point, which when combined with an unrestrained panel below, does exacerbate the movement locally within the wall, and as such the bulging effect becomes more pronounced.

It is likely that the left hand side of the gable wall has not suffered such degree of movement as without the stair-void behind, and without the window present, the wall panel is much more robust and is laterally tied at first level.

In addition to lack of restraint, the brick units between the flue and the outside face are likely to be relatively brittle as they will have been subjected to gases from the fire over a long period of time. This is a common occurrence in this type of arrangement, and it is a likely catalyst of the vertical fracture that can now be seen.

As bulging visible on the outside is not particularly reflective on the internal finishes, it has to be considered, and it is highly likely, that the outer leaf masonry has become debonded and bulged away from the inner leaf masonry, which remains reasonably plumb. For this to occur, masonry units that span across the width of the walls, known as headers, may have snapped under stress, which then releases the outer leaf and develops the bulge.

In respect to repairs, it is difficult to confirm the exact requirement until works commence on site as the full extent of the defect is often hidden from view within the thickness of the wall.
Whilst we always attempt to retain as much original fabric as possible, without any demolition, this can only be done where suitable strapping and tie-ing can be achieved. This is not always possible and undoubtedly on a wall that is displaying the extent of bulging and distortion observed, a small amount of careful demolition and rebuild will be required.

At this stage, in respect to informing the Local Authority as to the probable extent of repairs as part of your submission we recommend the following.

Option 1 – Conservative Scenario (depending on consideration following commencement of works)

If it can be demonstrated that the outer leaf has debonded from the inner leaf, and that the masonry units behind the chimney stack are not excessively brittle, we would recommend that the outer leaf is carefully propped at high level, and a small localised area of demolition and rebuild is carried out around the window, as illustrated on attached Sketch SK01.The existing window and lintel will need to be removed, and reinstated as part of the works. The rebuilt leaf can be tied back to the remaining inner leaf masonry using remedial screw in wall ties. Additional strapping and pattress plates should be installed at first floor level, and remaining fractures on the wall should be stitched using the Helifix system. (more info at www.helifix.co.uk)
It may be possible to carry out this work without taking down and re-building the chimney stack, however the safety of operatives may result in this being unavoidable.

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Option 2. – Worst Case Scenario. (depending on consideration following commencement of works)

If it transpires that the inner leaf has laterally moved with the outer leaf, and the masonry units behind the chimney stack are excessively brittle, a more extensive demolition and rebuild of the upper gable is likely, as illustrated on attached Sketch SK02. Again the existing window and lintel will need to be removed, and reinstated as part of the works. As the rebuilt wall progresses, additional strapping and ties should be installed at first floor level, and remaining fractures on the wall should be stitched using the Helifix system. (more info at www.helifix.co.uk). The existing ties and pattress plates at verge level should be reinstated.
It is envisaged, this work will involve the careful taking down and re-building the chimney stack

We trust this commentary and highlighted options are satisfactory for your current requirements, and will form part of your discussions with the Local Authority during your submissions. However if you do have any queries, please do not hesitate to contact us. Once you are in a position to commence the works, please feel free to contact us so that we can attend site and liaise with your builders, architect and the Conservation officers as to the most sensible approach to repair.

Yours faithfully
For JC Consultancy Limited

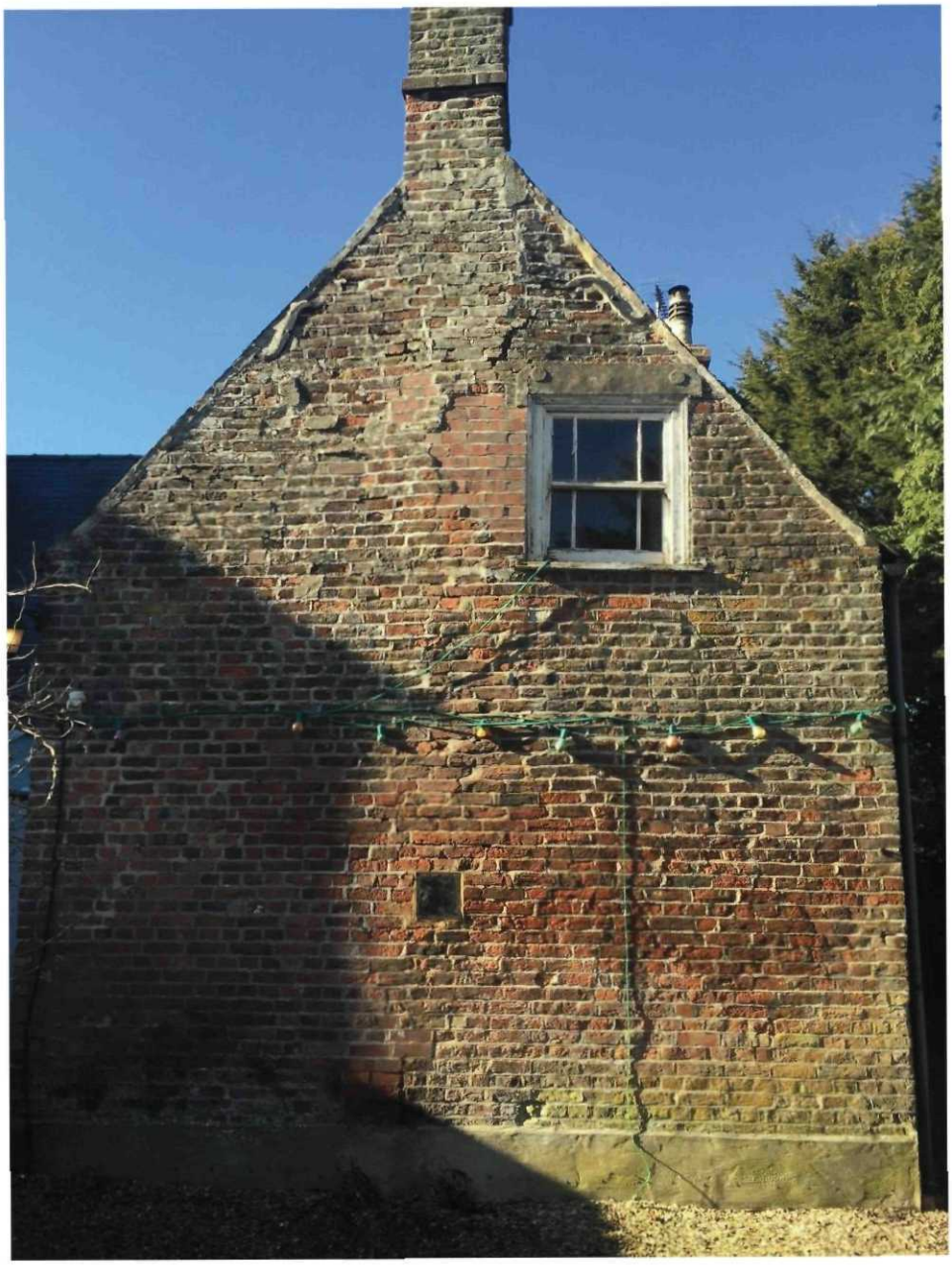
Jamie Hicks.
Director

Photographs and Sketches over.

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Photograph 1 – Gable Wall



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Photograph 2 – Upper Gable Wall



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Sketches

j c consultancy LTD consulting structural & civil engineers DETAIL SHEET	CONTRACT / PROJECT Bresby House Quadring Eaudyke Spalding Lincolnshire PE11 4QB	JOB No. JC/14/03/1764 PAGE SK01 DATE Oct 2014 BY JLH CHKD JCE

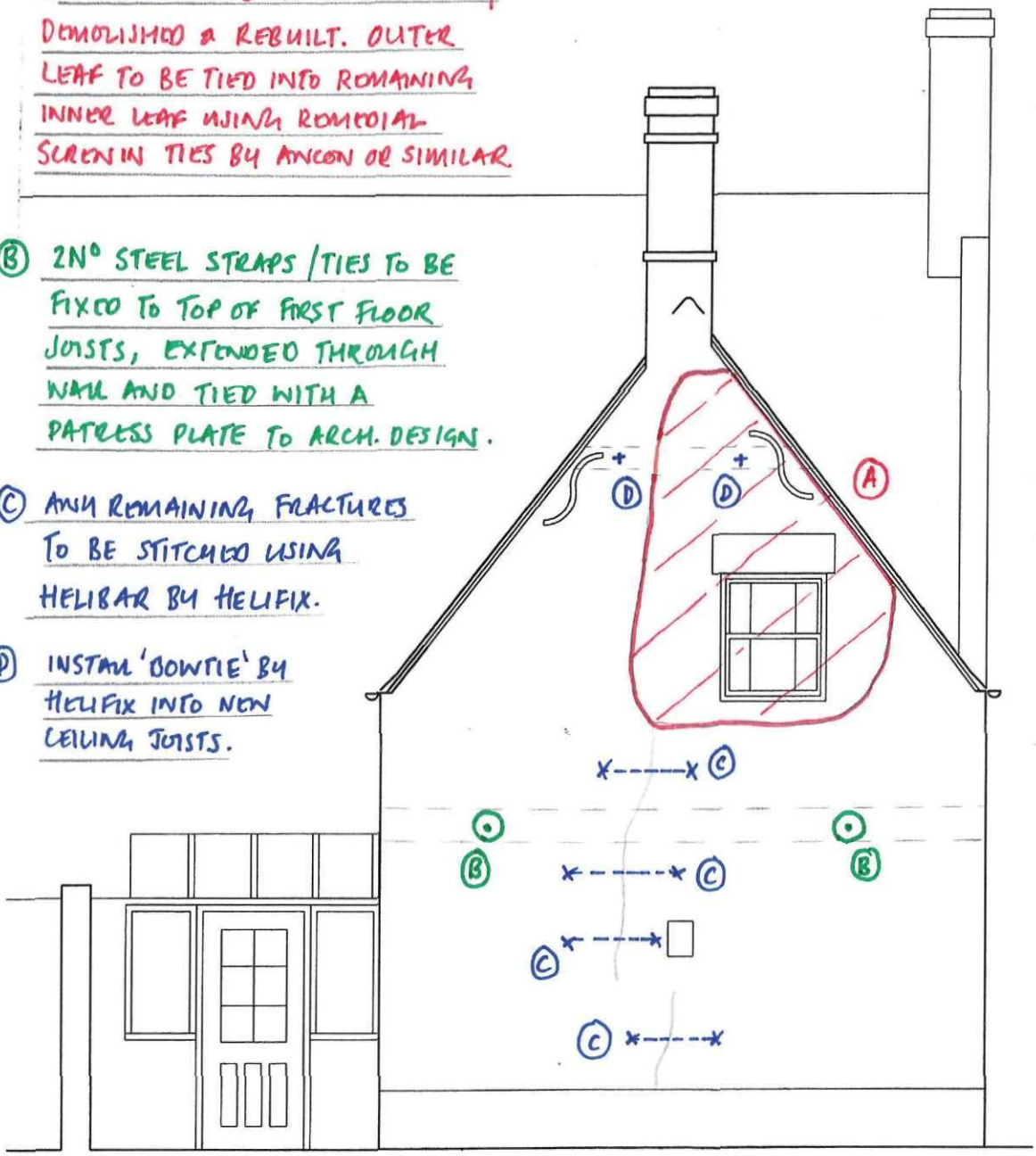
OPTION 1 - POTENTIAL REPAIR

(A) OUTER LEAF OF APPROXIMATE AREA SHOWN HATCHED TO BE CAREFULLY DEMOLISHED & REBUILT. OUTER LEAF TO BE TIED INTO REMAINING INNER LEAF USING REMEDIAL SCREW IN TIES BY ANCON OR SIMILAR.

(B) 2N° STEEL STRAPS / TIES TO BE FIXED TO TOP OF FIRST FLOOR JOISTS, EXTENDED THROUGH WALL AND TIED WITH A PATRESS PLATE TO ARCH. DESIGN.

(C) ANY REMAINING FRACTURES TO BE STITCHED USING HELIBAR BY HELIFIX.

(D) INSTALL 'BOWTIE' BY HELIFIX INTO NEW CEILING JOISTS.



Kitchen Gable

NOTE:- IT IS ASSUMED THAT THE MAJORITY OF DEMOLISHED MASONRY UNITS CAN BE USED IN RE-BUILD, SUPPLIMENTED WITH SALVAGED UNITS AS REQUIRED.

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j c consultancy LTD consulting structural & civil engineers DETAIL SHEET	CONTRACT / PROJECT Bresby House Quadring Eaudyke Spalding Lincolnshire PE11 4QB	JOB No. JC/14/03/1764 PAGE SK 02 DATE Oct 2014 BY JLH CHKD JCE

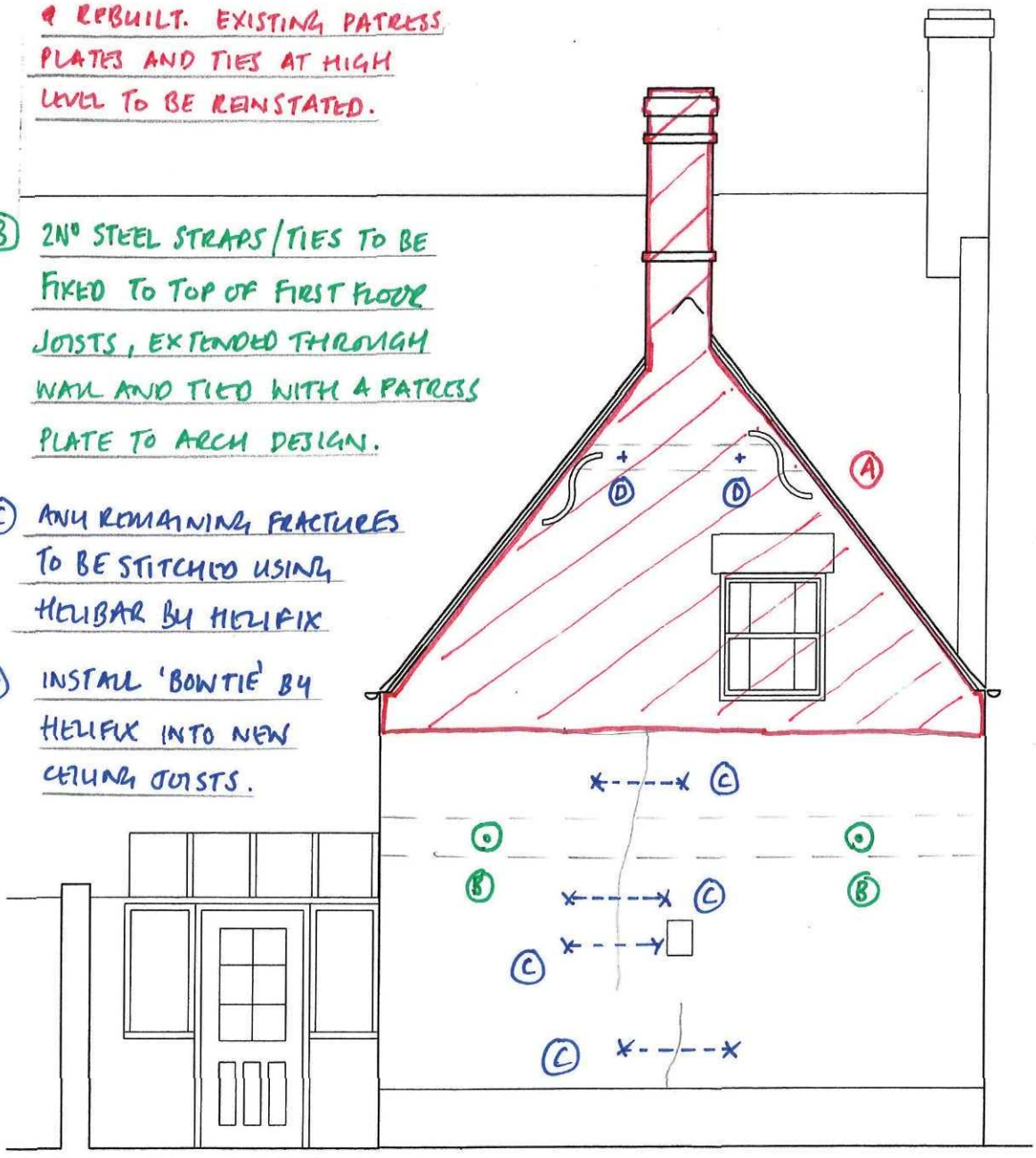
OPTION 2 - POTENTIAL REPAIR

(A) UPPER GABLEWALL & CHIMNEY TO BE CAREFULLY DEMOLISHED & REBUILT. EXISTING PATRESS PLATES AND TIES AT HIGH LEVEL TO BE REINSTATED.

(B) 2Nº STEEL STRAPS/TIES TO BE FIXED TO TOP OF FIRST FLOOR JOISTS, EXTENDED THROUGH WALL AND TIED WITH A PATRESS PLATE TO ARCH DESIGN.

(C) ANY REMAINING FRACTURES TO BE STITCHED USING HELIBAR BY HELIFIX

(D) INSTALL 'BOWTIE' BY HELIFIX INTO NEW CEILING JOISTS.



Kitchen Gable

NOTE - IT IS ASSUMED THAT THE MAJORITY OF DEMOLISHED MASONRY UNITS CAN BE USED IN REBUILD, SUPPLIMENTED WITH SALVAGED UNITS AS REQUIRED.

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Seymour, Sarah

From: Customer Services SHDC <info@sholland.gov.uk>
Sent: 02 March 2015 11:41
To: _planningadvice
Subject: FW: Planning Application ref PP-04016449 - Bresby House, Quadring Eaudyke
Attachments: 1764 engineer's report on gable BRESBY HO.pdf

From: Robert Lowe Chartered Architect [mailto:lowearchitect@gmail.com]
Sent: 28 February 2015 22:40
To: Customer Services SHDC; Joe Delaney
Subject: Planning Application ref PP-04016449 - Bresby House, Quadring Eaudyke

f.o.a Planning Department

Sir,
A Listed Building application has been made today via the Planning Portal [ref. no. PP-04016449].
Unfortunately the structural engineer's report exceeded the maximum size allowed by the Portal.
The report is attached for inclusion in the application.

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Regards,
Rob Lowe

Robert Lowe Chartered Architect
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lowearchitect@gmail.com