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STRUCTURAL APPRAISAL OF THE EXISTING BUILDING INCORPORATED INTO THE REDEVELOPMENT AT

43 BELSIZE LANE, LONDON, NW3 5AU

Name of Client: PKS Architects

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1.0 INTRODUCTION

1.1 This report has been commissioned to investigate and establish the method of existing masonry retention being incorporated into a proposed redevelopment of 43 Belsize Lane, London.

1.2 The following statement is taken from London Borough of Camden Planning Approval Notice dated 14 September 2012.

Condition 12. Prior to commencement of demolition a structural Method Statement for the works of demolition shall be submitted to and approved in writing by the Council. The statement shall include details of the method of securing the retention and protection of all walls, floors and roof structures shown to be retained on the demolition drawings hereby approved. No works of demolition shall be carried out other than in accordance with the approved Method Statement.

1.3 This report sets out to explore and report on how condition 12 may be achieved and how implementation of necessary steps may be incorporated into the overall schedule of works necessary for construction of the scheme. Prior to preparation of this report the property was first visited on Tuesday 13 November 2012 at which time a transient visual appraisal was undertaken. The property was subsequently revisited on Wednesday 12 December 2012 in the company of a contractor and, at which time, a more detailed inspection was undertaken.

1.4 At the time of the first appraisal, the weather was dry and calm with seasonally average temperatures. The subsequent visit was undertaken in temperatures at or around freezing.

1.5 Reference to PKS Architects' drawings 150-00, 01, 03 and 05, proposed demolition ground floor, proposed demolition first floor and proposed demolition roof plan indicate the areas of existing structure scheduled to be retained, as referred to in Condition 12.

1.6 For discussion purposes, the front elevation facing Belsize Lane has been considered to be the north west elevation.

2.0 DESCRIPTION OF PROPERTY

2.1 Reference to PKS Architects' drawings 010/00, 01 and 05, B1, 020/01, 02, 050/01, 02 and 03 entitled proposed ground floor, proposed first floor, proposed roof plan and proposed lower ground floor together with sections AA, BB and elevation drawings, all indicate the proposed redevelopment of 43 Belsize Lane. These drawings indicate existing structure incorporated into the redevelopment.

2.2 The existing building originally formed stabling or coach house with loft/accommodation over as part of the demise of the main property No.20 Belsize Park.

2.3 External walls to the building are generally 215mm thick solid brickwork built in a lime mortar, with some areas being painted render and some wall areas being painted brickwork.

3.0 OBSERVATIONS

3.1 North West Elevation of Two Storey Structure

The north west elevation was situated immediately against the back edge of the public footway alongside Belsize Lane.

The upper portions of the first floor wall contains one first floor window and an upstand masonry parapet was seen to lean to varying degrees. This wall was checked for verticality and the results appear on 870612/001 and 002 in Appendix A.

A historic tie bar end is located at the south west end of this elevation at first floor level. This bar was seen to be located immediately below the first floor and extended right through the property to a similar metal plate on the south east elevation. (See Photographs 1 and 2)

The brick coursing was seen to have a nominal slope down towards the south west.

3.2 North West Elevation of Freestanding Yard Wall

The freestanding boundary wall is situated immediately against the back edge of the public footway along Belsize Lane.

This wall was seen to be concave with the middle section having bulged towards the south east. This wall was checked for verticality and the results appear on 870612/001 and 002 in Appendix A.

The bed joints to this wall were seen to slope down nominally towards the north east.

The whole wall shows clear evidence of decay and deterioration of, not only the bricks but also the mortar. (See Photograph 3.)

3.3 South West Elevation of Two Storey Building

This elevation contained two large door openings and one personnel door together with two windows at first floor level.

A part vertical, part inclined fracture was seen ascending from the top north west corner of the north west door opening which had evidence of former render repairs in its length.

A section of render was removed midway up this crack line. This revealed extensive cracking in the brickwork, measured as circa 50mm horizontal movement and circa 12mm vertical movement. (See Photograph 4).

A diagonal crack which included significant evidence of former repairs was seen ascending from the top south east corner of the north west door opening up to about roof level.

A short vertical fine to 1.5mm wide crack was noted ascending from the top north west corner of the central door opening.

A fine diagonal crack was noted ascending to the south east from about the mid span of the south east door opening at ground floor level.

This whole elevation is rendered but with clear evidence of patches of render being of different ages, showing through the painted finish.

The whole elevation shows evidence of decay and deterioration due to rising and penetrating damp resulting in spalling and erosion of surface finishes.

3.4 **Internal Elevations**

An internal inspection of the north west and south west elevations indicated bricks and joints to be eroded with surface spalling with clear evidence of penetrating and rising damp.

3.5 **First Floor**

The first floor construction was noted as being 50 x 175 timber joists at 400mm centres spanning parallel to Belsize Lane. This floor had a lath and plaster soffit beneath which was a newer false ceiling comprising plasterboard on battens. The upper surface was timber boarding.

3.6 **Foundations**

A trial pit was excavated at the north west end of the south west elevation.

This trial pit revealed brickwork extending no more than 250mm below finished ground level, bearing on to a matrix of broken brick and lime mortar with no clearly identifiable interface to virgin ground. The below ground brickwork was significantly displaced in places. (See Photograph 3)

3.7 **Building Services**

The south west elevation had a number of incoming and outgoing services attached to the wall and which passed into the ground immediately adjacent to this elevation.

4.0 **DISCUSSIONS**

4.1 The purpose of the appraisal report is to consider ways in which the requirements detailed in Condition 12 may be implemented.

4.2 Reference to the proposed general arrangement drawings indicates a full size basement beneath, not only the footprint of the existing structure, but also extending out to other areas of the site.

4.3 To excavate and form a new underground accommodation area beneath the existing structure will involve the introduction of temporary works sufficient to support the weight of the existing structure and for these supports to extend down to a level beneath the proposed basement floor level in order that excavations can proceed without in any way compromising the structural integrity of the temporary works to the existing masonry.

4.4 This appraisal report has been commissioned to consider and report on the practical aspects of introducing a temporary structure capable of supporting the existing masonry. What must also be considered is how the temporary works would need to be adapted to take account of the significant distortions, decay and the deteriorated state of the structure being considered.

Fractures noted in the existing masonry indicated that not only has there been a history of movement in the form of previous repairs, but re-cracking is taken to be evidence of current progressive movement.

4.5 From the plumb survey results, it is evident that the existing walls lean to varying degrees.

The degree of lean is such that without some form of supplementary support, the wall could be expected to fall over. The centre of gravity is in many places outside the middle third, thus generating tension which, in brickwork such as this, cannot be developed.

The propping of the wall is considered to currently be provided by the building roof, floor and return walls, areas of which are scheduled for removal.

4.6 Temporary works therefore would need to address not only the vertical support requirements, but to also consider and cater for bending moments induced by out of plumb masonry and prevent the risk of sections of wall collapsing in an uncontrolled manner as a consequence of partial demolition and the need to protect site workforce, neighbouring properties and members of the public walking and driving immediately adjacent to the structure in question.

4.7 Examination on site revealed brickwork which is in particularly poor condition. The wall above ground is fractured in numerous places. Removal of render revealed cracking 50mm wide with numerous repairs. The integrity of the wall in these areas is significantly reduced and, at worst, non-existent.

The brickwork below ground was similarly in a poor condition, having loose and missing bricks, substantially eroded joints and offering no evidence of a uniform horizontal line as a potential support line.

4.8 The design and specification of temporary works capable of meeting the diverse and exacting requirements could be expected to require either the support structure itself or protective measures associated with the support structure to encroach into the public footway and carriageway immediately adjacent to the walls in question.

This is a busy and congested area and it is understood that the footway has a significant amount of underground services. These services would require protection at all stages of the works both from impact from above, movement of the ground within which they are supported and any excavations associated with the introduction of temporary works.

4.9 The following specific structural factors can be expected to influence the decision process and sequenced operations detailed in the construction phase programme.

a) <u>Technical considerations for the introduction of temporary works</u>
Any temporary works, due to their complexity would extend significantly beyond the area of the walls to be supported in order that the structure can cater for over-turning moments due to out of plumb, wind load etc.

b) Temporary works shall be required to extend to a level lower than the proposed basement excavations in order that the excavations can be undertaken without in any way jeopardising the stability and integrity of the temporary structure.

c) These retained walls cannot perform any useful function in the new structure in terms either of their thermal performance, moisture penetrating resistance or ability to support any structure including their own self weight due to the out of plumb.

d) For a scheme to be developed capable of holding the section of brickwork in position throughout the redevelopment, it would be necessary to determine how the masonry is subsequently supported and attached to the new structure. The soft lime mortar is not sympathetic to localised fixing and any new support/attachment arrangements would need to take account of the fractured, our of plumb condition of the existing masonry.

4.10 The presence of an existing tie bar end in the north west elevation indicates measures taken to address historic movement. It is therefore likely that measures taken to retain the existing masonry would need also to consider what effect partial removal of the existing structure would have on the effectiveness of this tie bar and the likelihood is that additional temporary works would be necessary to replicate the existing tying effect of the tie bar to ensure that any benefit currently being provided by the tie bar is maintained and the stability of the existing masonry is not compromised as a result of the partial demolition.

4.11 Because of the considerable difficulties of retaining specific areas of masonry, due largely to its very dilapidated condition, consideration has been given here to temporary removal and faithful reconstruction of those areas detailed as being retained. This approach would have a number of significant benefits, namely:-

(a) It would allow the brickwork to be rebuilt vertical.
(b) Brickwork can be built off a new quantified and dedicated foundation.
(c) Brickwork can be carefully dismantled in a regulated manner largely removing risks of accidental collapse.
(d) The reconstructed areas of brickwork would have restored integrity and can be secured to the new structure in a quantifiable and discreet manner.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 This appraisal report has been prepared to consider and comment on the proposed retention of parts of the existing structure.

The existing structural components scheduled to be retained are in a very dilapidated condition. They have been weakened by decay in the form of spalling bricks, eroded joints,

fractures and distortions, all of which have resulted in these various components being in a very poor condition and having unpredictable characteristics.

Partial demolition, necessary to undertake the works, can be expected to further destabilise these components.

5.2 The proximity of the masonry, particularly the sections immediately alongside the public footway and carriageway, but also elsewhere, need to be considered in terms of overall safety of the workforce on site, members of the public close to the site and neighbours, this is covered by condition 4 of the Planning Consent.

5.3 Any temporary works necessary to hold in position the existing sections of masonry would by necessity be extensive and involved. These temporary works would need to extend down to new basement floor level before the basement is excavated and in a manner which would facilitate subsequent excavation of the basement. These temporary works would need to address potential overturning moments due to eccentric loading from the distorted brickwork as well as wind loads and other loads normally associated with façade retention.

5.4 The temporary works would also need to take into account existing loads from existing tie bars and ensure that sufficient temporary structure is introduced to replicate any loads prior to partial demolition of the existing structure.

5.5 With regard to the existing condition of the fabric of the building and its lack of structural integrity it is clear that a secondary level of structural support would be required to maintain the building. The building has, in fact, expended its practical life due to lack of foundations, neglect and age.

However, it must be emphasised that notwithstanding the assessment of the status of the existing structure, major works could de-stabilise the brickwork and lead to some areas of failure.

5.6 Therefore having viewed the structure and considered all the implications of temporarily supporting and integrating the sections of masonry into the new development, we are of the opinion that the alternative option of faithfully reproducing the sections of brickwork following construction of the basement section of the proposed redevelopment should be proposed. To do so would wholly remove the very real concerns the dilapidated state of the structure poses in respect of the health and safety of the workforce on site, properties bounding the site and members of the public in the proximity of the site but would produce an end result which faithfully recreated the appearance of the present structure.

6.0 GENERAL EXCLUSIONS

6.1 This report does not constitute a full survey of the property, insomuch as all items such as plumbing, electrical goods, damp and timber infestations have been omitted, or commented upon only in general terms, as they are not relevant to this particular report, which has been prepared with the principal concern to the overall stability of the structure and its integration into the proposed development.

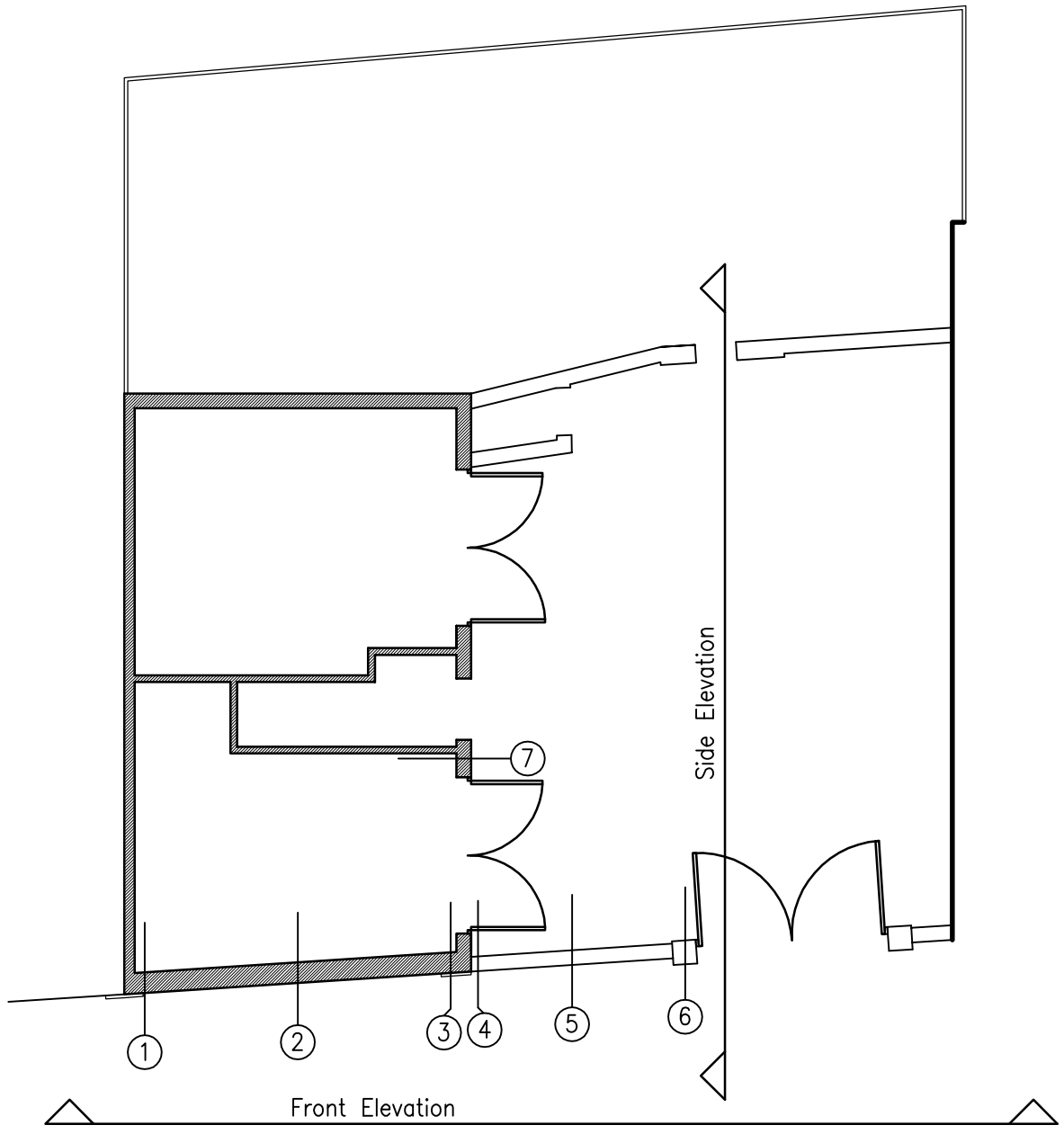
6.2 The advices and recommendations we have given are based on inspections described in this assessment.

6.3 This report has been prepared for the sole use of PKS Architects and their client and may not be used by other parties without the written consent of vkhp-consulting.

Paul S Boorman
IEng AMIStructE AMICE
Associate Director

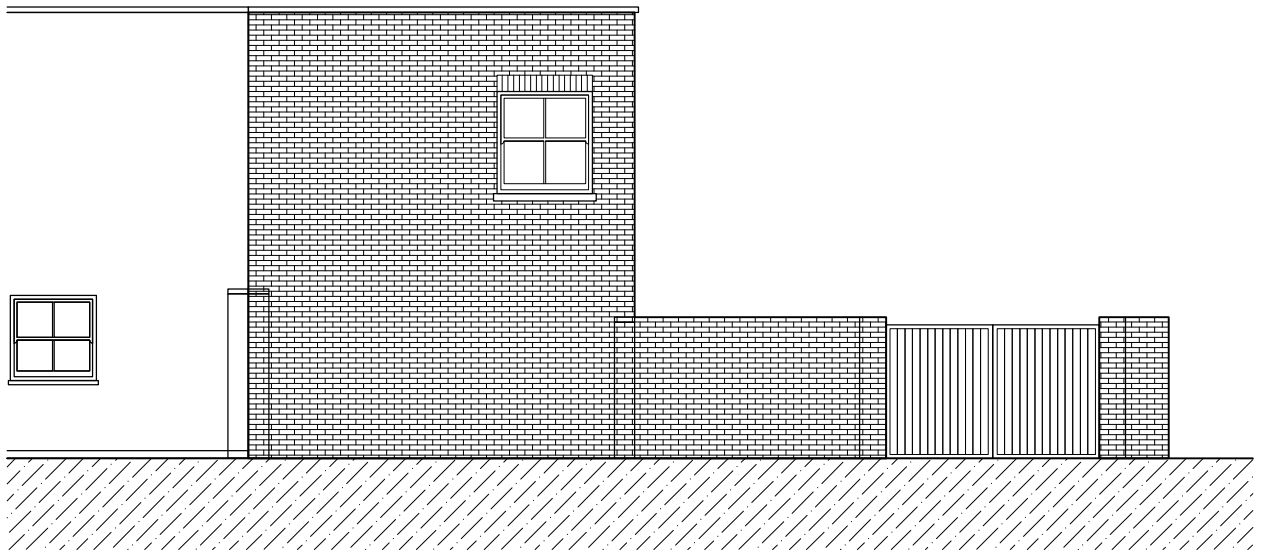
APPENDIX A

DRAWING 870612/001 PLUMB SURVEY SETTING OUT
DRAWING 870612/002 PLUMB SURVEY SECTIONS

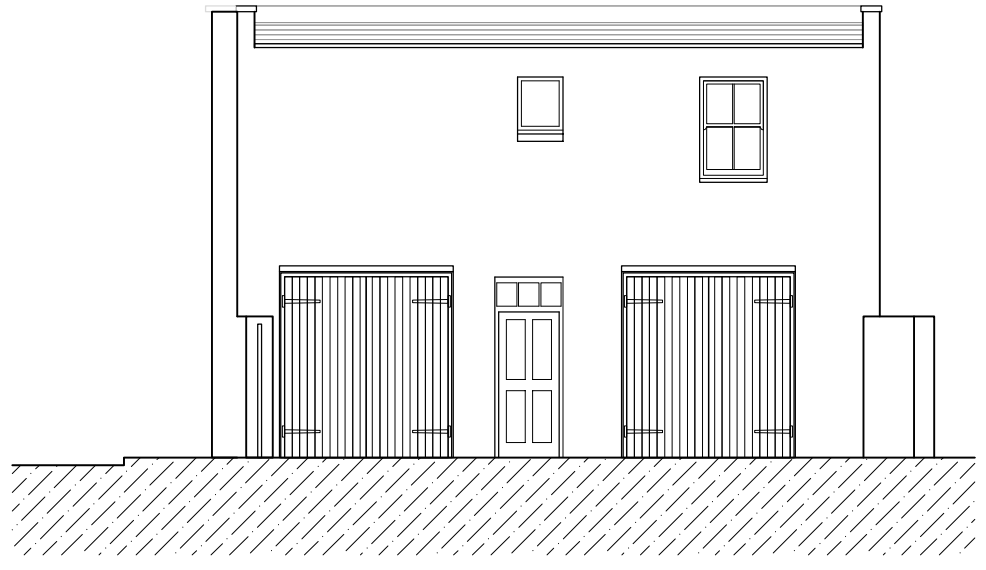


Plan Showing Location Of Plumb Survey

For details of plumb sections see drawing 870612 / 002



Front Elevation From Road



Side Elevation From Courtyard

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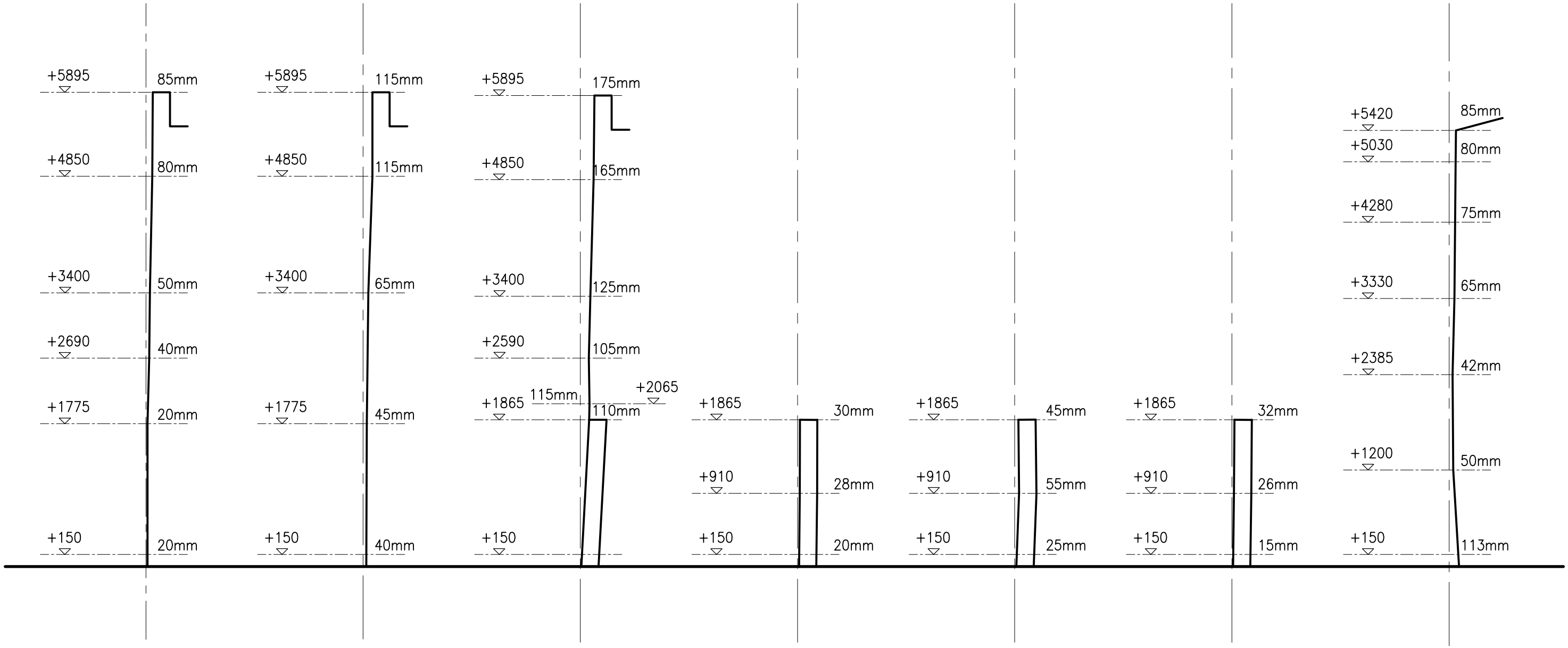
PROJECT
43 Belsize Lane
London NW3

TITLE
Plumb Survey - Location Plan

Rev	Revision note	Date
-	-	-

Date	Scale	DRG No	REV
Dec 2012	1:100 @ A3	870612 / 001	



For location of plumb sections see drawing 870612 / 001

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PROJECT
43 Belsize Lane
London NW3

TITLE
Plumb Survey - Sections

Rev	Revision note	Date
-	-	-

Date: Dec 2012
Scale: 1:100 @ A3
DRG No: 870612 / 002
REV:

APPENDIX B

PHOTOGRAPHS

PHOTOGRAPH 1
Tie bar end, North West end

PHOTOGRAPH 2
Tie bar end, South East end

PHOTOGRAPH 3
Dilapidated brickwork

PHOTOGRAPH 4
Masonry fracturing

PHOTOGRAPH 5
Displaced dilapidated brickwork