

6 Cambridge Gate, NW1



Construction Method Statement

May 2014

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1.0 Introduction

Constructure Ltd were appointed in March 2014 for structural advice on the proposed refurbishment of an apartment at 6 Cambridge Gate. This report has been produced to accompany the planning application and listed building consent submissions by Kerr Parker Associates Limited, describing the scope and nature of the structural works. It details the outline approach that will be taken to safeguard the integrity of adjacent buildings, highways and services.

2.0 The Site

The property at 6 Cambridge Gate is a Victorian Grade II listed building, thought to have been built between 1875 and 1877. It is a mid-terraced building in a symmetrical terrace of 10 houses in French Renaissance style, overlooking Regent's Park. There are 2 storey mews houses to the rear which are also part of the site. The main house consists of 5 storeys plus a mansard roof. The house is of traditional load bearing masonry construction with timber floors and a pitched, tiled mansard roof to its front half and flat roofs to its rear half. The existing building fills the entire site and comprises lower ground floor, a front light well with the building extending all the way to the rear wall of the site. An open courtyard lies immediately to the rear of the main body of the house, adjacent to a 2 storey linking building between the main house and the mews house.

The house is currently divided into flats and the flat in question occupies lower ground floor, ground floor and the main staircase up to third floor where there is a small rear roof terrace.

Access to the flat is gained by a bridging slab spanning over the front light well to the main entrance at ground floor and at lower ground floor via steps down into the front light well. In addition, there is level access to the rear of the flat via the mews which is at lower ground floor level.

2.1 Previous Structural Work

From a review of the available information, it is apparent that during the building has been extensively remodelled and refurbished, notably in the mid 1990s when the whole terrace was refurbished and much of the original historic fabric rebuilt. The current floors are thought to date from this time as are many of the internal partitions.

The original timber floors were likely to have been of double floor construction with floor joists of varying sizes and ceiling joists spanning across the building onto large timber beams or binders spanning from the front wall to the central spine wall. Much of this structure is thought to have been removed and replaced.

2.2 Local Geology

From the geological maps, the underlying soil is seen to be a narrow band of Langley Silt which forms a boundary between the much larger London Clay and Lynch Hill Gravel deposits. London Clay is the predominate soil type in the Camden area although gravels are found closer to the Thames.

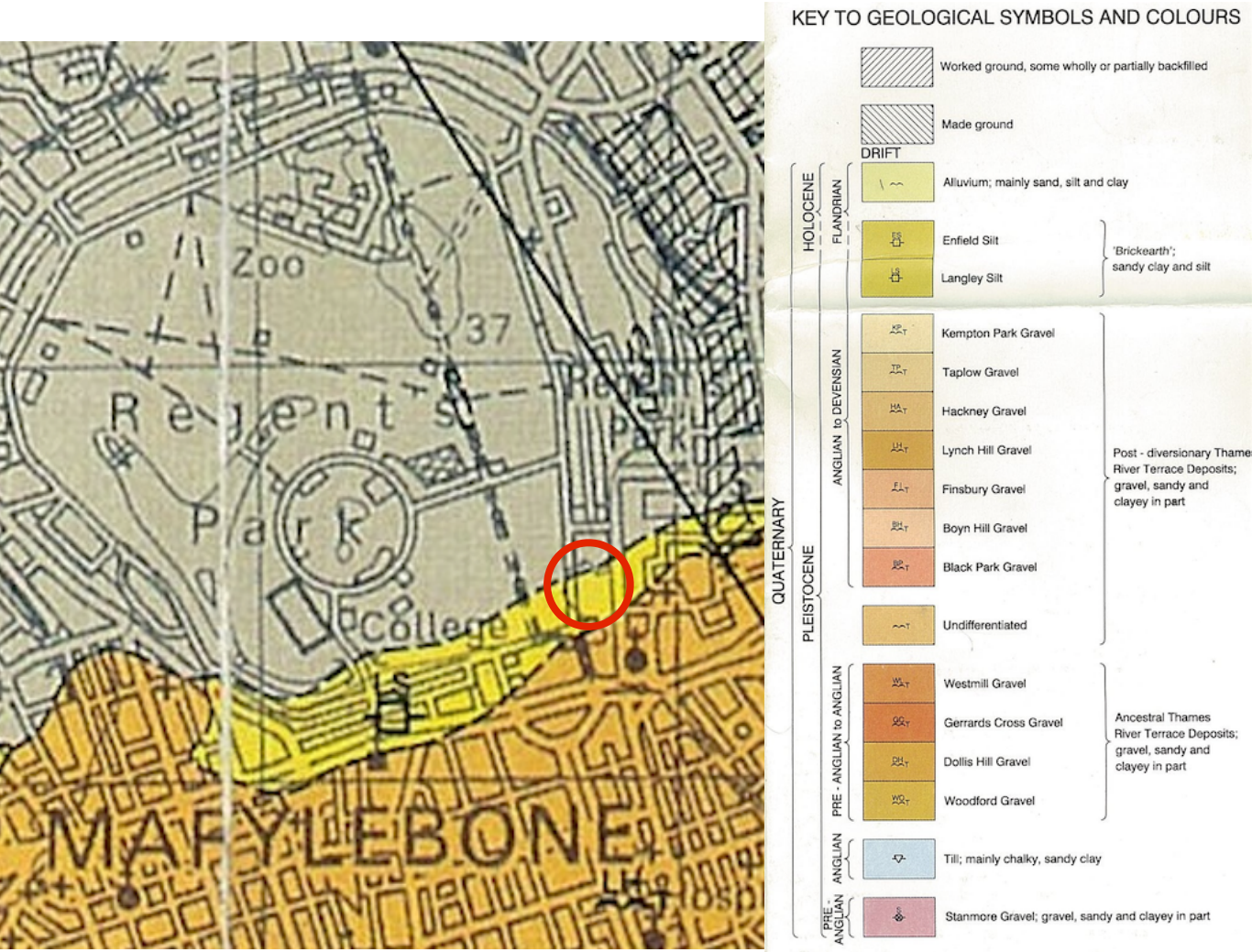


Figure 1 - Local geology map

2.3 Local Boreholes

A study of local borehole records for the site and its surrounding area shows the soil to be predominantly clays to 40m below ground level with where is becomes sandy before encountering chalk at 52m below ground level.

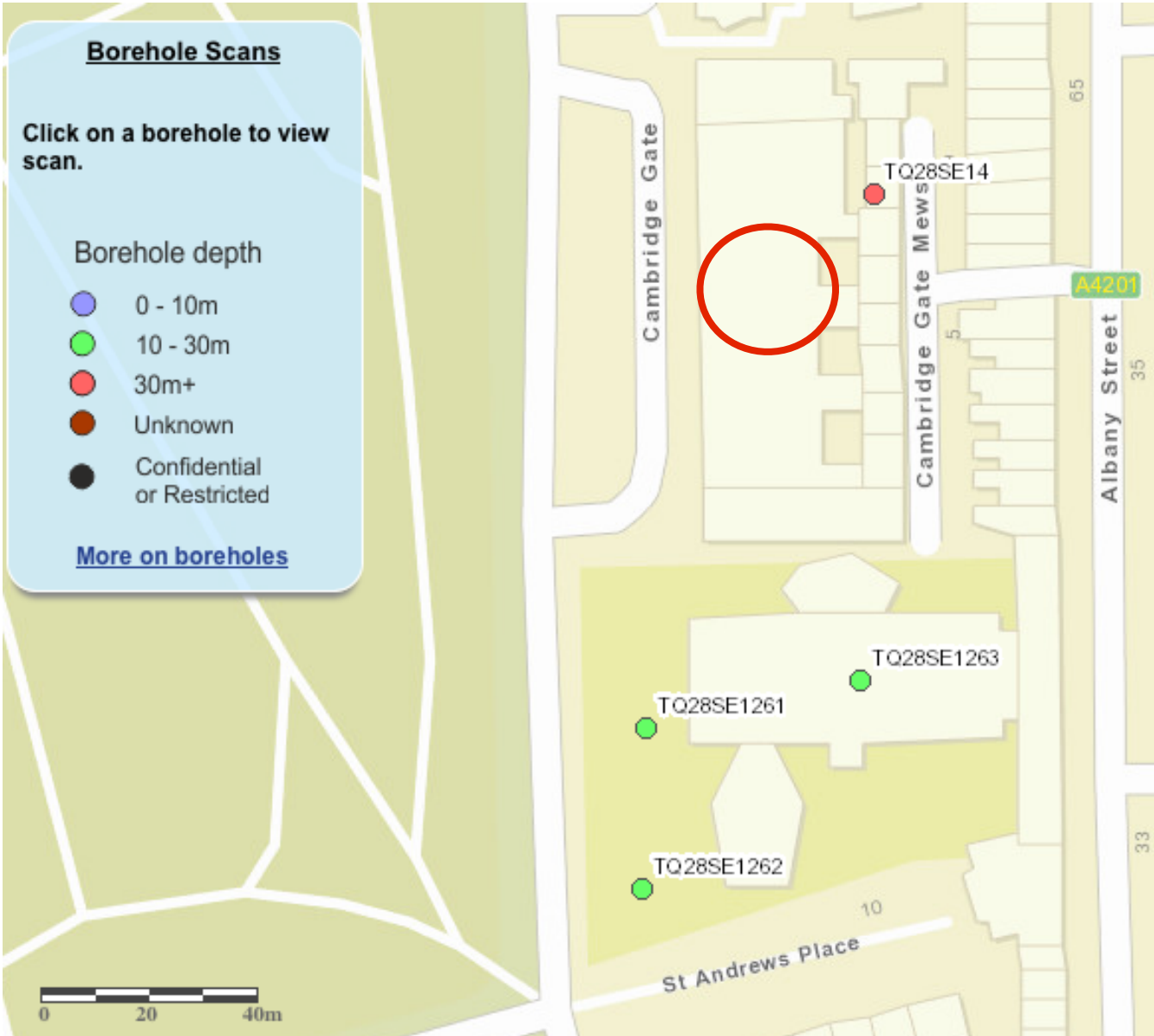


Figure 2 - Local BGS borehole records

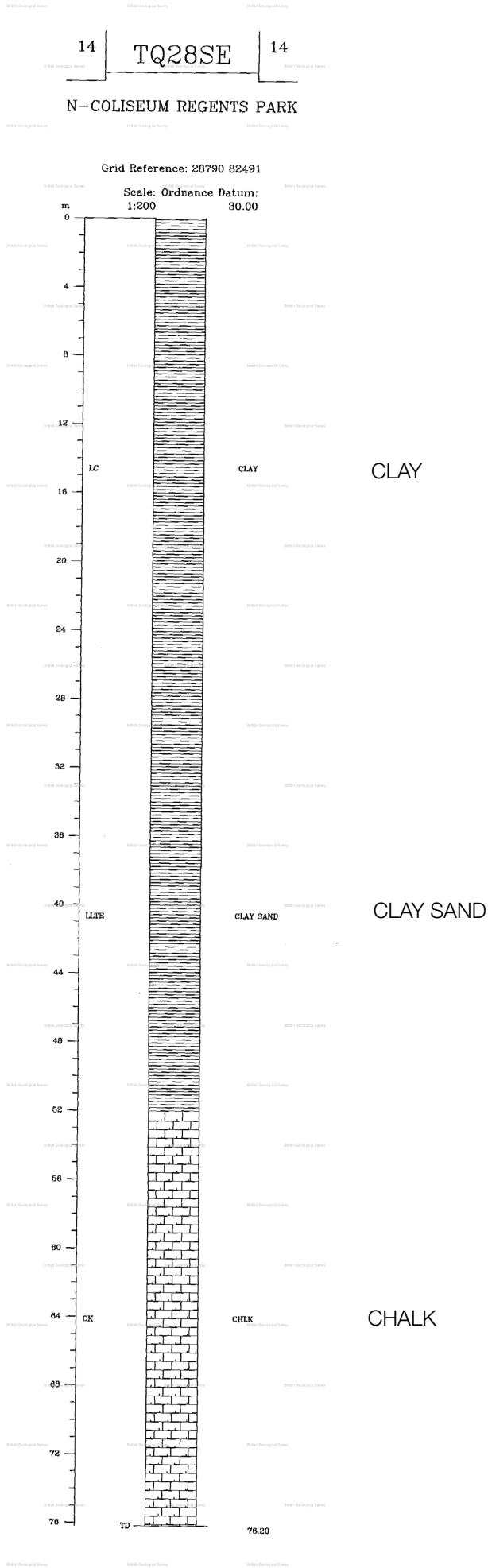


Figure 3 - BGS borehole log “TQ28SE14”

2.4 Flood Risk

From the extract of the Environment Agency's Flood Risk map in figure 4, it can be seen that the site lies within Flood Zone 1. Therefore no Flood Risk Assessment or Hydrological Reports are required to be provided as part of this application.

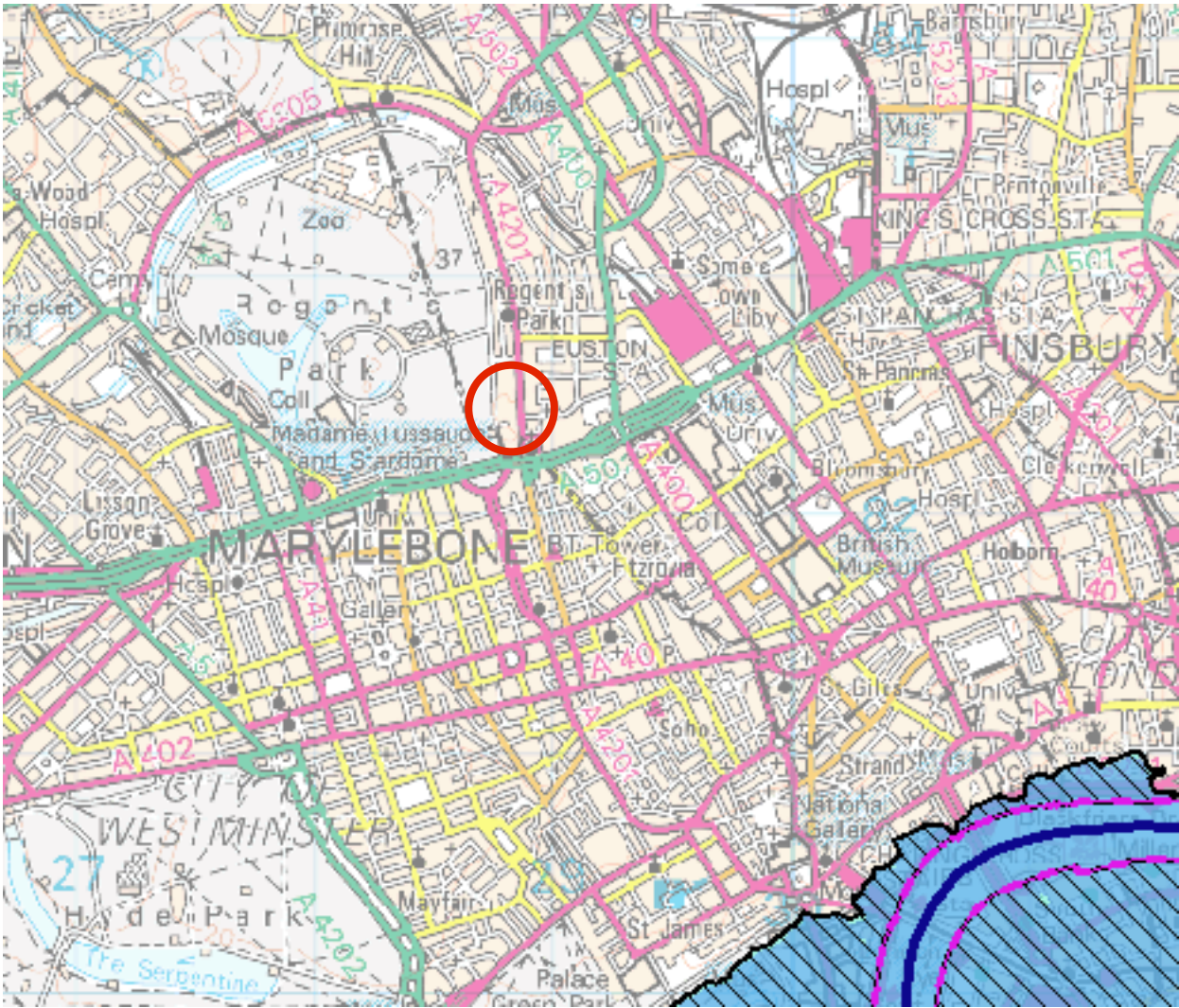


Figure 4 - Environment Agency Flood Risk Map showing site

2.5 Existing Utilities and Underground Services

Existing services including sewers and drainage runs will be identified prior to commencing the works. It is likely that new below ground drainage routes will be needed. These can be laid in trenches through the existing lower ground floor slab.

3.0 Investigation Works

3.1 Site investigation

It has not yet been possible to gain access for site investigation purposes but this will be done at the first available opportunity. Due to the building's Listed status, site investigation works will be limited and carefully planned to avoid damaging the remaining historic fabric of the building. Externally, trial pits will be dug by hand in the rear courtyard to expose and measure the existing foundations before begin backfilled. Internally, floorboards will be carefully lifted to enable timber joist depths and spacings to be measured before replacing the boards. It is planned to establish whether walls are of masonry or timber construction by non-invasive methods. This will be sufficient for initial design purposes and the information will be used to confirm assumptions currently made about the composition and structural arrangement of the existing building.

3.1.1 Contamination testing

Contamination testing will be carried out during the site investigation works, and the results of these tests will be recorded in the interpretative report.

3.1.2 Groundwater

Groundwater is not expected to be encountered in the trial pits.

4.0 Description of Works

It is proposed to remove many of the modern internal partitions at lower ground floor level and enclose the rear courtyard area with a new glazed roof above. Several of the main load bearing walls are to have large openings formed or existing openings widened.

At ground floor the alterations are generally less intrusive apart from the major item which is the removal of a circular column adjacent the stairs.

No structural alterations are proposed within the stair well from ground floor up to third floor where a small new platform is to be created as an extension of the landing. The external wall opening is to be made wider and a new glazed enclosure is to be built onto the rear roof terrace.

During the site works, it may become apparent that the bearing of some of the floors onto their supporting walls has slipped beyond what would normally be an acceptable amount and some remedial works may be required. This is likely to comprise steel straps screwed to the existing joists and inserted into the walls by removing a brick and replacing it over the end of the strap which will be bent up behind the brick.

5.0 Listed Building Status

The fact that the building is Grade II listed has influenced the structural designs and construction methods proposed. New structure will only be provided where absolutely necessary to maintain the structural integrity of the building. Materials and construction methods will be sympathetic to the historic fabric where possible. Reclaimed bricks and lime mortar will be specified for wall repairs. Where new joists are needed to stiffen floors which are to bear additional load, they will be inserted from above by lifting floorboards rather than from below to avoid damaging the existing ceilings.

New bearings onto existing masonry will adopt a suitably low allowable compressive stress to avoid damaging the existing bricks.

In general, the approach taken to the design is to provide additional structure alongside existing structure rather than to replace the original. This preserves the original materials in their current state.

The proposed works will not be detrimental to the historic fabric of the building and will not significantly alter existing load paths or adversely affect its structural performance.

Any historic structure found to be damaged or otherwise compromised will be repaired with appropriate traditional materials and techniques but repairs will be ‘honest’ and not try to hide their presence.

6.0 Detailed Proposals and Design Considerations

6.1 Construction

Prior to any works commencing on site, party wall awards will need to be agreed, and monitoring points on adjoining buildings may be required. If this is the case, a monitoring regime for these will be agreed with the adjoining owners, with trigger levels defined within the structural specifications, to be monitored during the works. Monitoring will be carried out by an independent party with results circulated to all stakeholders.

6.1.1 Heave Protection

As the proposals to not involve excavating or lowering slabs, heave is not a design concern.

6.2 Lower Ground Floor

Modern partitions are being removed throughout to allow reconfiguring of the internal space. The front wall is being left unchanged. The load bearing cross wall adjacent the stairs is being entirely removed and replaced with a structural steel box frame which will spread the load from above into the existing foundations below with minimal disturbance to the structure and maintain the current load path. The box frame will have moment connections at its corners, designed to provide racking stiffness to replicate the current lateral stability arrangement without detrimental effects to the existing building.

Other load bearing walls have doorways infilled and moved to other locations where precast concrete lintels will be provided, side by side to match the thickness of the walls.

When installing steelwork into openings wider than 3m, folding wedges or other means will be specified to pre-load the frames before being dry-packed.

The front chimney breast is being removed and a steel beam will be provided in the floor above to support the brickwork remaining.

The existing floor slab is being left intact apart from trenches cut for new drainage.

The opening into the rear courtyard is being made wider and a new box frame will be provided.

The other 2 exterior walls into the courtyard, to the side and rear, are also being opened up to a large degree with steel box frames provided to provide vertical and lateral support.

The mews house to the rear will have approximately half of its main central wall removed and new internal partitions built but the stairs remain unchanged. The existing garage doors are to be replaced with a new wall.

6.3 Ground Floor

The column adjacent the stairs is to be removed and this will require a steel box frame to support the structure above. The posts of the box frame will be placed into recesses cut into the walls. Consideration will be given to the use of flat jacks to pre-load the steel frame before the column is removed. This assessment will be made when a full load take-down calculation has been carried out.

To the rear of the main house the part glazed side wall to the breakfast room is being removed and replaced with a fully glazed wall with double doors opening out onto a new structural glass roof covering the courtyard below.

The rear wall of the mews house is being largely removed, leaving a central brick pier and brick nibs at each side. This wall will be replaced with a steel box frame on one side to maintain lateral stability of the structure and a simple beam over the opening on the other side.

The internal walls of the mews are being left intact at ground floor with one of the doorways begin infilled and a new doorway being formed adjacent.

6.4 Upper floors

No changes are proposed to the stair well at first or second floors.

At third floor, an extension to the stair landing will be created with a new steel beam, suspended from the roof above by a high level beam, crossing the stair well but avoiding the roof light which is to remain. There will be a steel hanger from the high level beam to support the lower steel which frames the new portion of timber floor.

The existing glazed enclosure onto the roof terrace is to be removed and the opening into it is to be widened, requiring a steel beam above, spanning between the reduced, retained brickwork nibs. A new glazed enclosure is to be built on the terrace.

6.5 Highways

The house fronts onto Cambridge Gate and Cambridge Mews to the rear but no alterations are proposed which will have any impact on the Highway.

6.6 Party Wall Matters

The proposed development fall within the scope of the Party Wall Act 1996. Procedures under the Act will be dealt with in full by the Employer’s Party Wall Surveyor. The Party Wall Surveyor will prepare and serve necessary notices under the provisions of the Act and agree Party Wall Awards in the event of disputes. The Contractor will be required to provide the Party Wall Surveyor with appropriate drawings, Method Statements and other relevant information covering the works that are notifiable under the Act. The resolution of matters under the Act and provision of the Party Wall Awards will protect the interests of all Building Owners.

The scheme for 6 Cambridge Gate will be developed so as not to preclude or inhibit similar, or indeed any, works on the adjoining properties. The Surveyors will verify this as part of the process under the Act.

6.7 Design Codes

The following design codes will be followed during the detailed design stage:

The Building Regulations 2010 - Approved Document A

BS 648 - Weights of building materials

BS 5950:1 - Structural use of steelwork in building

BS 5268 - Structural use of timber

BS 5628-1:2005 - Code of practise for the use of masonry

BS 6399:1 - Loadings for buildings (Dead and imposed loads)

BS 6399:2 - Loadings for buildings (Wind loads)

BS 8000:Section 2.2:1990 - Workmanship on building sites

BS 8004 - Foundations

BS 8110:1 - Structural use of Concrete

7.0 Outline Construction sequence

The full and final construction sequence will be provided by the contractor’s temporary works designer but below is an indicative outline sequence to demonstrate the intention to protect the existing building.

- Secure site, erect hoardings, establish welfare facilities and signage as appropriate.
- Prop from lower ground floor to underside of first floor.
- Carry out demolition of wall at first location.
- Install steel box frame, install flat jacks if required, then ram in dry-pack mortar to the underside of the existing structure and any voids at the sides of the steel frame.
- Allow time for dry-pack to cure.
- Begin demolition at next location.
- Install steel frame as above, repeating until installation is complete.
- Cut trenches in lower ground floor and lay new drainage before reinstating slab.
- Remove temporary propping.

8.0 Temporary Works

Temporary works design and coordination must be carried out by a suitably qualified and experienced specialist and full design details (drawings and calculations) must be submitted to the engineer for comment. This specialist will be appointed by the Contractor who will be responsible for the design, erection and maintenance of all temporary works to ensure the stability of the existing structure, excavations and adjacent structures at all times.

The sequence of propping, demolition and steelwork installation must be agreed and carefully followed to avoid destabilising any of the existing walls or other structures in the vicinity.

Monitoring points are to be installed to agreed areas, which will allow any movement during the works to be assessed for compliance against maximum allowable, and trigger levels within the structural specification.

9.0 Potential Impact upon Adjoining Properties and Local Environment

The use of temporary propping and the proposed structural systems reduce the amount of potential movement and so minimise the effects on adjacent structures to ensure that the work will not be problematic.

Along with this, the appointed Contractor shall undertake the works using good practice in accordance with the structural design, following all the agreed methods of construction and required temporary works. In practice some minor settlement is possible, but this will not be permitted to be worse than ‘Category 2, aesthetic’ as described in BRE Digest 251: Assessment of damage in low-rise buildings.

The design of the works will consider the environmental forces as well as the response of the structural elements as their collective whole, and will be carefully designed to have the the required stiffnesses to remain within acceptable deflection constraints. The coordination of sequencing, and the checking of compliance of temporary works will minimise potential for movement. The minimal movement that does occur will be defined by accepted limits, which would be considered as being accommodated within the elasticity of the superstructures.

This overall approach considers all of the potential risks, and ensures that the implementation of the proposed works will not affect the structural integrity of this property, neighbouring structures, roadways and public utilities.

9.2 Drainage

As there is no change of use proposed, there will be no significant increased discharge into the existing drainage and sewerage systems. Surface water will not be altered as there will be no additional hard surfaces formed.

10.0 Monitoring

It is proposed that the structural stability of the flats above and buildings on each side is safeguarded by a system of movement monitoring. The Contractor shall appoint a specialist survey company to accurately measure the positions of the front and rear walls of numbers 5, 6 and 7 and establish monitoring positions (targets). Targets will also be located on the inside of the party walls.

The external facades and Party Walls will be monitored near lower ground, first floor and roof level. The targets shall be firmly attached to allow 3D location measurement for the duration of the work, to a continuous and uninterrupted accuracy of +/- 1mm. Suitable remote reference bases unaffected by the works will be adopted.

Two series of baseline readings shall be taken before the work begins then readings shall be taken shortly after the start of demolition then at weekly intervals during the construction until structural completion and removal of propping after which point the frequency will be reduced to monthly then a final reading 6 months after completion.

All measurements will be plotted graphically, clearly indicating any movements over time. Results shall be submitted and circulated to all relevant parties including the appointed Party Wall Surveyors within 24 hours of being measured.

Trigger levels are to be as set out below. In the event of a ‘red’ value being reached the Contractor must immediately stop, make safe the works, notify the Party Wall Surveyors and only recommence when agreed by the appointed Surveyors.

Trigger Levels for movement:

Vertical movement of Party Walls (including garden walls):

Amber +/- 5mm	All parties notified
Red +/- 10mm	Work stopped and reviewed

Lateral movement of Party Walls (including garden walls):

Amber +/- 4mm	All parties notified
Red +/- 6mm	Work stopped and reviewed

Lateral or vertical movement of facades:

Amber +/- 5mm	All parties notified
Red +/- 10mm	Work stopped and reviewed

11.0 Summary

The proposed alterations and refurbishment will not have any significant detrimental effect on the historic fabric of the building, nor shall they alter the current load paths apart where a load bearing walls are being removed and steel box frames are being installed. Overall stability is maintained by the current systems which will continue to be effective.

Structural repairs will be carried out using traditional materials and techniques where possible. No attempt will be made to conceal or hide their presence.

During demolition and construction, lateral and vertical stability of the building will be maintained by temporarily propping, such that no significant adverse movement is expected.

Environmental impacts have been assessed, and the response to likely geotechnical and hydrological aspects has been considered. The proposals are deemed to not have any adverse impact in this respect but will be reviewed once the site investigation has been carried out.

Once the works are complete, the building will continue to perform structurally and remain robust and secure without detriment to itself and its historic fabric, adjoining or adjacent buildings, or the highways.