JAMPEL DAVISON & BELL
CONSULTING ENGINEERS

Project Title
76 Lawn Road
London NW3

Report Title
Structural
Method Statement

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R11438-MS1

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1 INTRODUCTION

Jampel Davison & Bell Ltd has been appointed by Amy Gunning and Richard Lipsitz to provide structural engineering services for the proposed project at 76 Lawn Road.

The project entails partial demolition of the existing building and reconstruction above a new basement. The proposed building incorporates extensions to the rear, internal alterations and a loft conversion.

This statement has been prepared by a Chartered Engineer. It sets out details of the engineering design and sequence of construction in order to assist in achieving an appropriate standard of construction and to inform the detailed Basement Impact Assessment undertaken by Geological & Environmental Associates (GEA), geotechnical consultants.

Jampel Davison & Bell have acted as Consulting Structural Engineers on many successful basement projects in the London area.

2 ADJOINING BUILDINGS

2.1 77 Lawn Road

No.77 has been substantially rebuilt above a single storey basement. Construction works commenced in the summer of 2018 and the basement was completed on October 2018.

The superstructure of the newly constructed building has a timber and steel roof and a timber first floor supported on loadbearing masonry walls. The substructure consists of a ground bearing reinforced concrete basement raft supporting columns that in turn support a reinforced concrete ground floor slab.

The basement excavation was supported by either a contiguous piled wall or reinforced traditional underpinning to retained external elevations. A contiguous piled wall was used to support the excavation along the 77/76 boundary for the entire length of the 77 basement.

2.2 75 Lawn Road

No.75 is of similar construction to 76.

The owner of no.75 has applied for planning permission for a similar redevelopment project that includes the construction of a single storey basement. The planning stage engineering drawings by HRW Consulting Engineers indicate a similar design intend for the basement construction utilising underpinned retained elevations, contiguous piled walls and a reinforced concrete box in the ground.

This statement and accompanying structural proposals allow for the redevelopment of no 76 irrespective of whether 75 is retained or redeveloped.

3 THE EXISTING BUILDING

The existing building is a two storey semi-detached house constructed circa 1930's. It is of traditional construction with a pitched tiled roof, timber first floor and loadbearing masonry walls; the external elevations are in fairfaced brickwork to the front and sides of the building and rendered at the rear – they are generally 330mm thick on the ground floor reducing to 225mm on the first.

The rear section of the main building appears to have been extended. The single storey garage to the side of the main building and abutting no.75 also appears to be a later addition.

The property is built on a site that slopes from the rear to the front. The level difference between the rear garden and the pavement to Lawn Road is of the of the order of 1.9 metres.

The building has suffered damage due to foundation / ground movements and currently contains widespread cracking. The cracking generally increases in width with height and there are several cracks in walls of the order of 10mm. The foundation and ground movements have been more severe towards the rear of the house.

A structural appraisal of the cracking and ground movements was undertaken by Alan Baxter Consulting Engineers in 2018/2019 and a report provided in April 2019; the appraisal was supported by a ground investigation report by Ground Engineering Ltd dated March 2019, a below ground drain survey and monitoring. The appraisal indicates some historical cracking with significant cracking becoming evident about three years prior to the date of the report and worsening in the summer of 2018. The report identified the likely contributing causes to be

- Variations in ground moisture in the shrinkable London clay caused by seasonal changes and exacerbated by the roots from large trees close to the building.
- Water leakage of a collapsed drain causing softening of the clay.
- Ground movements associated with the construction of the basement to 77 Lawn Road.

The severity and the widespread extent of the damage warrant wholesale underpinning of the building in order to restore and safeguard its structural integrity. The construction of the basement should achieve this.

4 SITE INVESTIGATION

4.1 Trial Holes

The trial holes excavated by Ground Engineering Ltd show foundations consisting of stepped brick corbels on concrete varying in depth between 0.75m and 1.35m below external ground level founded onto the outcrop of the clay. The concrete varied in thickness between 0.3m and 0.85m and was noted to be of variable composition with reference to brick/aggregate concrete.

4.2 Borehole Investigation

The site specific ground investigations undertaken by GEA in October 2019 included a number of boreholes that proved the layer of made ground overlaying the London Clay.

The boreholes, as to be expected in London Clay, did not highlight a ground water issue.

5 DETAILS OF ENGINEERING PROPOSALS

A primary objective of the design has been to specify the construction of the basement in a manner that should minimise ground movements and potential impact on adjoining properties. The proposed structural solution is shown on the following Jampel Davison & Bell drawings:-

R11438/101 General Arrangement Basement
R11438/102 General Arrangement Ground Floor
R11438/103 General Arrangement First Floor
R11438/104 General Arrangement Second Floor
R11438/105 General Arrangement Roof
R11438/200 Section & Details Sheet 1
R11438/201 Section & Details Sheet 2

The calculated foundation loadings have been provided on drawing R11538/L1

5.1 Retention and Underpinning of Existing Walls

The following factors have influenced the decision concerning the retention of existing walls

- The Architectural merit of external elevations and requirements of the proposed layout.
- The effect on robustness to the retained part of the building in the temporary condition during construction.
- The degree of existing damage caused to the building by the ground/foundation movements that have occurred - see section 3 above.

Prior to commencing demolition, the contractor will be required to repair the damage to the existing walls and to install adequate temporary works in order to maintain vertical and lateral support to the retained walls and to safeguard the building during all construction stages.

Crack repair of walls would involve the installation of stainless steel Helibars and injecting the cracks with grout with provision made for re-pointing the mortar joints.

Underpinning of the retained walls is to be undertaken in traditional hit and miss fashion in accordance with the specification and would be reinforced to support the ground pressures during construction; in the permanent state the underpinning is to be buttressed by a reinforced concrete wall that would be propped at the top by the ground floor slab.

5.2 Basement Construction

The building is to be supported on a ground bearing reinforced concrete raft designed to support the building above, to provide secure lateral support and fixity to the perimeter earth retaining structures and to resist potential upwards pressures due to ground heave and ground water. The front retaining wall would also be installed in underpinning fashion in view of the tree in the front garden.

Temporary support of the excavation at the side and rear of the building, where there is no underpinning, is to be provided by a 350mm diameter contiguous piled wall.

The underpinning and the contiguous piled wall are to be propped so as to maintain lateral stability during all construction stages.

6 CONSTRUCTION METHOD STATEMENT AND SEQUENCE OF WORKS

This section of the report is to be read in conjunction with the following drawings relating to the temporary works:

R11428/TW1 Underpinning Sequence
R11438/TW2 Lateral Support of Underpinning and Contiguous Piled Wall
R11438/TW3 Support of Retained Superstructure – Plans
R11438/TW4 Support of Retained Superstructure - Sections

Stage I – Repair brick walls that are to be retained

- Cracking in brickwork to be repaired with stainless steel Helibars set into 40mm deep slots in horizontal mortar joints and set in Helibond grout. Helibars to be spaced at 300mm vertical centres and to extend 500mm beyond the cracking.

Stage II – Underpinning of existing side elevations & of no 75 party wall

- Construct reinforced concrete underpin in traditional hit and miss fashion in accordance with the specification and drawings.
- All excavations to be provided with temporary support by planking and strutting.
- Reveals of openings and building corners to be supported on sacrificial props.
- Following construction of each section of underpin, the working space is to be backfilled with soil, thoroughly compacted in layers with a power rammer in order to maintain temporary lateral stability.

Stage III – Construction of front RC retaining wall and underpinning of front elevation

- Construct the reinforced concrete retaining wall in sections in similar fashion in accordance with the specification and drawings.
- The front elevation is to be concurrently supported on braced temporary propping supported off the base of the reinforced concrete wall
- Each excavation section is to be provided with temporary support by planking and strutting that is to be retained until such time as the retaining wall is supported by the waling and struts.

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Stage IV – Temporary Support of Superstructure and Demolition

- Install temporary steel framing to support the retained parts of the existing roof and first floor and to provide lateral restraint to the retained walls.
- Install temporary works to support the walls to the front section of the building.
- Install safety deck beneath all walls supported on needles to catch any falling debris.
- Install monitoring.
- Carry out demolition of the relevant parts of the building.

Stage V – Install Contiguous Piled Wall

- Install the contiguous piled wall and cast capping beam. Piles to be augered using a mini rig such as a Klemm 702.
- Cast RC capping beam

Stage VI– Basement Excavation and Construction

- Excavate to below the upper waling, install and prop in order to provide lateral support to the underpinning and contiguous piled wall
- Excavate to the level of the lower waling, install waling and prop
- Complete excavation and install 100mm concrete sub-base in accordance with the specification.
- Construct RC basement raft and wall kickers.
- Wait 5 days and remove lower waling and struts.
- Construct RC perimeter walls up to level of the upper waling. Wail 7 days, restrain top of cast RC wall with inclined struts down to the basement raft and remove lower waling and props.
- Complete construction of RC walls and cast ground floor slab.
- Wait 7 days following casting of ground floor slab and remove inclined wall struts.

7 TEMPORARY WORKS

7.1 In order to see that the intent of the structural design and the Basement Impact Assessment are correctly interpreted, the contactor will be required to submit all finalised temporary works proposals for review prior to commencing excavation. The contractor is to take responsibility for the design of the temporary works and submit detailed proposals and method statements.

The earth retaining structures walls are to be provided with temporary lateral support by way of waling, props and bracing.
The retained parts of the roof and first floor are to be provided with temporary support where necessary. Additional ties are to be installed to the roof rafters to ensure roof stability.

The stability of retained walls affected by the demolitions is to be maintained by way of temporary supports and bracing.

7.2 Dewatering Strategy

Groundwater was not encountered during the ground investigation and is not expected to be an issue. Small amounts of perched water may be encountered within the made ground.

All excavations are to be kept clear of water if necessary by ways of simple submersible pumps.

8 GROUND STABILITY

8.1 The proposed structural design and method of construction of the basement has been developed with a view to ensuring structural safety and constructed to a good standard of workmanship in accordance with the specification and this document, the works should be completed without adverse impact on the structural stability of the property and of neighbouring properties.

8.2 The basement raft will be designed to withstand any uplift due to hydrostatic pressures by utilising the dead weight of the building above and the earth retaining structures/underpinning.

9 PARTY WALL MATTERS

9.1 The scope of the works falls within the Party Wall Act 1996. Procedures under the Act will be dealt with by the client's Party Wall Surveyor. The Party Wall Surveyor will prepare and serve necessary Notices under the provision of the Acts and agree Party Wall Awards in the event of disputes.

The Contractor will be required to provide the Party Wall Surveyor with the appropriate drawings, method statements and all other relevant information covering the works notifiable under the Act. The resolution of the matters under the Act and provision of Party Wall Awards will protect the interests of all owners.

9.2 Monitoring

It is proposed that the structural stability of the surrounding/adjacent properties is safeguarded by a system of movement monitoring.

The Contractor shall monitor the position and movements of the elevations of the adjacent properties around the perimeter of the proposed excavation. The monitoring shall be undertaken by a specialist survey company. The monitoring system will have at least the following characteristics:

1) The existing boundary walls are to be monitored near ground level and near parapet level, at intervals not exceeding 3m centres.

2) Monitoring points (targets) shall be firmly attached, to allow 3D position measurement, for the duration of the work, to a continuous and uninterrupted accuracy of -/+ 1mm (other than the precise level monitoring in item 3 below). A suitable remote reference base/datum unaffected by the works will be adopted; one located at least 50m from the site.

3) Precise Level Monitoring of low level targets to the boundary walls shall be undertaken to an accuracy of -/+ 0.5mm

4) Points / targets shall be measured for 3D positioning on, at not less than the following intervals:

   - Before any works commence
   - Weekly during the period of basement excavation/construction
   - Monthly during the course of the remainder of the works.

4) All measurements shall be plotted graphically, to clearly indicate the fluctuation of movement with time. The survey company shall submit the monitoring results to the Engineer and to the Adjoining Owners Party Wall Surveyors/Engineer within 24 hours of measurement, graphically and numerically.

5) The following trigger levels for movement are proposed for agreement. In the event of a trigger value being reached the Contractor will immediately stop any work that might cause further movement, assess the situation and propose alternative methods for proceeding, with definitive further movement limits for those later steps
   Amber +/-6mm All parties notified.
   Red +/-10mm Works reviewed

10 CONCLUSION

The proposed basement at 76 Lawn Road has been designed to robust structural principles and widely used and known methods of construction.

The Basement Impact Assessments by GEA have shown that with a good standard of workmanship and quality control the potential risk of damage to adjacent structures should not exceed category 1 (very slight) and therefore within acceptable limits.

The hydrogeological report and ground movement assessments demonstrate that the structural integrity of the neighbouring properties should not be compromised by the proposals.

Structural Method Statement Prepared by

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