16A LYNDHURST GARDENS GARDENS, NW3

REPORT: STRUCTURE

CONSULTANT: MICHAEL CHESTER & PARTNERS

VABEL

MICHAEL CHESTER & PARTNERS Consulting Civil and Structural Engineers
8 Hale Lane London NW7 3NX tel 020 8959 9119 fax 020 8959 9662 mail@michaelchester.co.uk

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16A LYNDHURST GARDENS, LONDON NW3

STRUCTURAL REPORT TO ACCOMPANY PLANNING APPLICATION

1.0 Project Information

1.1 The site is located half way along Lyndhurst Gardens, London NW3, just to the south of Wedderburn Road and Belsize Court. The proposals involve the demolition of the existing house followed by the construction of a new four storey building with a full basement and a partial sub-basement. The existing building to the south of the site has a basement, the existing building to the north doesn't.

1.2 Michael Chester & Partners have been appointed by Lyndhurst Gardens LLP to carry out an appraisal of the structural and slope stability aspects of the Basement Impact Assessment (BIA) in line with Camden Planning Guidance CPG4 "Basements and Lightwells".

1.3 Revision B of this report accompanied a previous application for Planning Consent. The current revision has been updated to reflect the site investigation that has now been carried out, a report on anticipated ground movements prepared by specialist Geotechnical Engineers, Geotechnical Consulting Group, and new floor layouts that have been proposed by Lyndhurst Gardens LLP.

2.0 Questions arising from CPG4 BIA Slope Stability Screening Flowchart

Q1: Does the existing site include slopes, natural or man-made, greater than 7 degrees (approximately 1 in 8)?

Yes. The site is on a slope that runs downhill largely from north to south between about 1 in 5 to 1 in 6. The existing gardens are terraced making them relatively level.

Q2: Will the proposed re-profiling of the landscaping at site change slopes at the property boundary level to more than 7 degrees (approximately 1 in 8)?

No. Proposed levels around the new building are to remain largely as existing.

Q3: Does the development neighbour land, including railway cuttings and the like, with a slope greater than 7 degrees (approximately 1 in 8)?

Yes. See Q1.

Q4: Is the site within a wider hillside setting in which the general slope is greater than 7 degrees (approximately 1 in 8)?

No. The general lie of the land is about 1:10.

Q5: Is the London Clay the shallowest strata on the site?

British Geological Survey sheet 256 shows the main subsoil to be London Clay but on the edge of the Claygate Beds approximately 50m to the north, the latter being silt and fine grained sands interbedded with very silty clays, possibly water-bearing. A trial pit investigation has shown that there is up to 2m of clayey, silty, rubbley Made Ground over the London Clay. The London Clay have been proven to 15m depth by 3No boreholes; geological information referenced by Geotechnical Consulting Group (GCG) indicates that the Clay is actually up to 100m thick in this area.

Q6: Will any trees be felled as part of the proposed development and/or are any works proposed within any tree protection zones where trees are to be retained?

Yes. A few small trees are to be removed as part of the development but the effects of this on adjacent buildings are not considered significant in structural terms. The new basement is close to 4No existing trees which are to be retained. See the Arboricultural report for advice on this.

Q7: Is there a history of seasonal shrinkage-swell subsidence in the local area, and/or evidence of such effects on the site?

As Q5, the site is underlain by London Clay, as is a very large part of North London. London Clay is a highly plastic material readily susceptible to volume changes as a result of changes in its moisture content. There were, however, no obvious signs that the existing building was suffering or had been suffering from the effects of this.

Q8: Is the site within 100m of a watercourse or a potential spring line?

The available information indicates that there is no water course within 100m of the site though it is possible that a spring line exists at the interface of the Claygate Beds and the London Clay between 40 to 150m north-west of the site. See Basement Impact Assessment for Groundwater and Surface Water for further information on this.

Q9: Is the site within an area of previously worked ground?

There is a layer of up to about 2m of Made Ground over the London Clay which is thought, based on historical maps of the area, to be a material brought in to terrace the gardens.

Q10: Is the site within an aquifer? If so, will the proposed basement extend beneath the water table such that dewatering may be required during construction?

No, the site is not within an aquifer. Some minor dewatering may, however, be required for short periods from time to time during construction to deal with water trapped within the top soils and/Made Ground that bound the site.

Q11: Is the site within 50m of the Hampstead Heath ponds?

No.

Q12: Is the site within 5m of a highway or pedestrian right of way?

No. The proposed basement is approximately 20m from the closest highway and public right of way.

Q13: Will the proposed basement significantly increase the differential depth of foundations relative to the neighbouring properties?

Yes. However, the proposed building is a detached house and no underpinning of adjoining properties is currently proposed.

Q14: Is the site over (or within the exclusion zone of) any tunnels, eg railway lines.

No. The Thameslink Train line run by First Capital Collect does run in a tunnel just adjacent and to the north of the site but the new basement has been located such that it is outside the 5m exclusion zone. Network Rail has confirmed that there is approximately 25m of cover to the crown of the tunnel.

3.0 Slope stability "scoping"

3.1 Conceptual ground model – The site is generally level north/south running from about 76.5m OD at the west end, through 76.4m OD in the middle to about 75.8m OD at the east end. The top surface of the London Clay is currently thought to run generally from north to south at about 75.4m OD at the northern boundary of the site and at about 74.5m OD on the southern boundary.

3.2 A site investigation has been carried out, along with laboratory testing to ascertain moisture content, Atterburg limits and SPT values for pile design. The site investigation confirms the assumptions made above in paragraph 3.1.

4.0 Basement Impact Assessment

4.1 In structural terms the main impact of the development is with the excavation for the basements. The subbasement is located in the middle of the site with excavations approximately 7.5m deep relative to the garden of the No 18 and some 5.5m away from this building. The excavation for the swimming pool will be about 8.5m deep relative to No 18 but it is approximately 8.0m distant. Because of the lie of the land, however, the excavation for the pool to the south will be about 5.5m deep relative to No 16 and it is 5m distant.

4.2 The ground movements resulting from the excavations have been assessed by Geotechnical Consulting Group and their report accompanies ours. In summary, vertical movements to both 16 & 18 Lyndhurst Gardens are anticipated to be between 3 to 4mm linearly over distances of 18 to 20m, causing "an imperceptible tilt and no structural damage". Worst case horizontal movements are expected to be in the order of 6mm over about 20m, giving a horizontal strain of about 0.03% and indicating that damage will fall in the "negligible" or "very slight" categories of the BRE classification put forward by Burland. In practice it is considered likely that any damage would manifest itself in the extensions to the rear and sides of No's 16 & 18 Lyndhurst Gardens at the junctions with the main buildings rather than in the main buildings themselves.

4.3 Early deflections in the retaining walls after the initial excavation contribute the largest component to the total anticipated ground movements and is also the component most likely to cause damage to nearby structures. Contiguous piling is proposed around the entire perimeter of the site and, internally, around the subbasement and swimming pool, with a top down form of construction both to limit the degree of shoring that would otherwise be required to adequately prop the piles and, more importantly, to mitigate the risks of settlement occurring in the adjacent sites. Such methods fall within the CIRIA definition of a "high stiffness" retaining wall.

5.0 Other related considerations

5.1 The building work is taking place very close to First Capital Connect's Thameslink tunnel. Early enquiries have indicated that Network Rail would be happy in principle for the development to proceed but close liaison with them is essential. Geotechnical Consulting Group has prepared a Tunnel Movement Prediction Report and this indicates short and long term movements at tunnel level in the order of 2mm. In terms of stress levels at the crown of the tunnel, there is a short term reduction of 11kN/m^2 reducing to 8kN/m^2 in the long term after the building has been constructed. Condition surveys before, after and during the works may need to be prepared.

5.2 We would recommend monitoring the buildings adjacent to the site before, after and during the excavation work so that any movements can be properly appraised and any adverse structural effects dealt with in a timely manner.

6.0 Summary

6.1 It is proposed to demolish the existing bungalow at 16A Lyndhurst Gardens and construct a new building with a slightly larger footprint and with up to two levels of basement. Investigations show that the subsoils are approximately 2m of Made Ground over London Clay. The First Capital Connect Thameslink Tunnel runs just to the north of the site at approximately 25m depth.

6.2 The basement will be excavated using a top down form of construction to ensure that the retaining walls satisfy the "high stiffness" definition recommended by CIRIA. Assessments of both the horizontal and vertical ground movements have been carried out by specialist Geotechnical Engineers and indicate the likely level of damage to the adjacent existing buildings to be in the "negligible" or "very slight" categories put forward by Burland *et al*.

6.3 With regards the Network Rail tunnel, an assessment carried out by specialist Geotechnical Engineers indicates short and long term movements at tunnel level in the order of 2mm and a short term reduction in vertical stress at the crown of the tunnel of 11kN/m^2 reducing to 8kN/m^2 in the long term after the building has been constructed.

6.4 We would recommend that the adjacent buildings be monitored as part of the works and that full condition surveys be carried out.