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85 AVENUE ROAD

PROPOSED RECONSTRUCTION OVER BASEMENT

STRUCTURAL ENGINEERING PLANNING REPORT

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Preamble

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Terms of Reference

MBP are appointed by Wolff Architects, acting on behalf of Mr Glen Breadon to prepare a report to outline appropriate methods for the construction of a basement as part of the redevelopment of No 85 Avenue Road, Camden. The principal purpose of this report is to address the concerns of the Planning Authority with respect to the practicality of executing the works and to the effect of the development on adjoining properties.

This report relates to proposals shown on Wolff Architects' drawings 0808-PR-200 to 210 as revised and issued to 5 August 2009. These incorporate amendments made in response to preliminary structural commentary by MBP on the proposals.

Introduction

No 85 Avenue Road is a wide detached property comprising an existing ground floor, first floor and accommodation at second floor within the mansarded roof. There is a cellar under a small part of the service wing extending forward from the main building façade. The current proposal is to demolish the existing house and replace it with a new building, incorporating a single basement under and beyond the entire enlarged footprint of the house. The basement will accommodate garaging, a swimming pool, staff quarters and other leisure facilities as well as plant to service these facilities and the remainder of the house.

This report outlines the structural form proposed for this installation; the constraints on methodology; the anticipated impact on adjoining properties; and recommended solutions to address the various constraints.

The proposed approach is based on MBP's experience of designing and overseeing construction of a number of similar basement installations beneath and adjacent to existing buildings in confined situations. Certain aspects of the design proposals may be refined or modified during development of the scheme, whilst ensuring that the principal requirements for stability of the surrounding ground and avoidance of unacceptable movements or other distress to existing structures are adhered to.

The Site

The overall depth of the site is approximately 60m and the width 22m. There are mature horse chestnut trees in the pavement outside the front garden and lime trees just inside the front boundary. There is also a mature sycamore in the rear garden of the adjoining property (No 83). An arboriculturalist's report on these trees is to be prepared, but it is understood that the proposed construction is very unlikely to have any adverse effect upon them.

From Geological Survey maps and knowledge of the area, it is anticipated that the site is underlain by London Clay beneath a shallow layer of Made Ground. Apart from slight perched water, there is a very low likelihood of ground water being encountered within the depth of construction. A full site investigation will be carried out prior to detailed design of the development to confirm these assumptions and to inform the design process.

Existing Buildings

The existing building is of brick and tile hanging elevations under a tiled roof. Construction is assumed to be of load-bearing masonry with timber floors. The ground floor level is raised above ground level by almost 1m.

The main front façade lies some 24m back from the front boundary with a service wing extending forward to within about 11m. The rear façade is about 8m beyond the main front wall, 32m from the front boundary.

It is anticipated that the existing structure will be found to have shallow foundations within the London Clay at a depth of around 1 to 1.5m. Preliminary inspection gave no indication of any damaging deflection of the structure.

No 83 Avenue Road is a similar large detached property, the main part of which is set some 5 or 6m from the site boundary but with a single storey garage and extension linking this with the boundary wall. There is a narrow pedestrian access on No 85's side of the wall but a gap of only about 1m at the narrowest point. It is not known whether this property has a basement and design and construction proposals will be based on the conservative assumption that it does not.

Number 87 Avenue Road is a similar large detached property, the main part of which is set some 3m from the site boundary. There does not appear to be any significant building within this zone. The main part of the existing building of No 85 extends to this boundary. It is not known whether this property has a basement and design and construction proposals will be based on the conservative assumption that it does not.

Proposed Development

The new building is to be deeper than the existing with the main front façade proposed to lie about 15m from the front boundary, the central section extending some 2m forward of this line. The rear façade of the house will be approximately coincident with that of the existing building. Garaging is to be in the basement with a ramp extending to within about 7m of the front boundary. The line of the flank walls above ground is proposed to be as the existing, that is about 1m from the south boundary and right up to the northern boundary.

The basement is planned to extend almost the full width of the superstructure but forward to the line of the top of the vehicle ramp and beyond the main rear façade by about 10m, resulting in overall plan dimensions of some 34m by 20m. General basement floor level will be about 3.75m below ground floor level (approximately 2.75 below existing ground level at the front of the site). Local deepening will be provided to accommodate the pool, associated plant and provision for drainage sumps etc.

The plan form and overall scope of the development are such that retention of any part of the existing superstructure is considered impractical.

Factors Affecting Design and Construction

The new construction, including the basement, abuts the northern boundary over part of its length and extends to within a metre of the southern boundary. The basement wall construction will need to be designed to resist lateral ground pressures and limit vertical and horizontal ground movement such that the neighbouring properties and installations are not significantly adversely affected. Particular attention will be required at the southern boundary where the adjoining property's single storey wing immediately abuts the boundary.

Whilst there are no works to a Party Wall, 3 metre and/or 6 metre notices under the Act will need to be served as appropriate.

It is considered unlikely that there is significant free ground water within the excavation depth. However, provision will need to be made to collect and dispose of any water that does enter the excavation and to provide adequate water-proofing to the completed basement.

The excavation of the basement may result in some net unloading of the London Clay and there is likely to be some heave as a result. Although the construction duration will allow a significant proportion of this movement to occur before the works are completed, it is to be expected that a small amount of long-term uplift could occur to some extent. Owing to the relationship between the development and adjacent buildings, this is not anticipated to have any effect on those structures.

Access to the site is relatively straightforward. However, measures to protect the roots of established trees to the front of the site may influence the selection of plant to be used and hence the construction methodology.

General Construction Process.

There is insufficient space on the site to allow excavation without temporary support. Temporary retaining walls will be constructed using steel sheet piles or contiguous reinforced concrete piles. Selection will be made on economic and practical construction grounds. For the shallower parts of the basement, cantilevered walls may be used to simplify excavation, albeit at the expense of additional sacrificial material in the wall construction. Where the excavation depth is greater to accommodate the pool and associated plant, longer piles will be installed and propping at the top or at an intermediate level will be adopted to keep deflections within acceptable levels.

Excavation will take place within the temporary walls, materials being placed by the excavation plant directly into road transport vehicles for disposal. Where propping is required, it will be

installed as soon as excavation reaches the appropriate level and suitably wedged or jacked to minimise movement. Ground and wall movements will be monitored throughout the excavation process to ensure that the temporary support is acting as designed.

Internal sides of the deeper excavation for the pool and plant will not require major temporary retaining walls. The construction methodology will be determined by the Contractor but may include propped trench sheeting or open cut within battered sides.

Sequence of Excavation and Construction

The sequence of excavation is largely a matter for the contractor to propose and relates to the decisions made about the amount and nature of propping. The design team will define permissible limits of deflection of retaining walls and adjacent structures and require a detailed method statement and monitoring programme to be submitted for approval prior to start of any construction works.

Low level drainage runs will generally be provided for within the basement level or cast into the base slab to avoid the need for local trench excavation etc below the general cut level. The overall base slab geometry will be kept as simple as possible to aid speed of construction and reliability of water-proofing.

The base slab and permanent retaining walls will be of reinforced concrete, the mix containing a proprietary admixture to improve the watertightness of the construction. The permanent walls will be propped by a reinforced concrete ground floor slab which will be cast integrally with the walls before removal of any required temporary works propping.

Watertight Construction

As indicated above, the risk of significant inflow of free water into the excavation or the completed basement is considered to be low. Minor inflows during excavation will be managed by directing them to sumps and pumping the water away or by locally sealing the piled wall. The ground conditions and the distance from other structures mean that there is no risk of damage to those buildings from any slight variations in the ground water conditions.

However, it will be necessary to prevent seepages and water vapour transmission into the completed structure. It is proposed to use a proprietary waterproofing additive to the reinforced concrete in conjunction with compatible hydrophilic water bars in construction joints to achieve the required internal environment. The final design and detailing of such systems is carried out by specialist suppliers who also provide a construction monitoring service to ensure the proper application of the materials.

The structural waterproofing will be supplemented by an internal proprietary cavity drainage membrane system, any free water entering the system being disposed of into the general surface water discharge system via pumped sumps. Infiltration volumes are expected to be very low.

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Heave and Settlement

The removal of load from the London Clay stratum will result in both immediate and longer term swelling of the ground. The duration of the construction process will mean that the magnitude of this movement after completion of the project will be relatively small. The remoteness from existing buildings will prevent any consequential movement being experienced by adjoining properties.

The basement box will be stiff enough to prevent differential vertical displacement between the area beneath the superstructure and that extending beyond its perimeter.

Downward movement of the ground alongside the excavation and in neighbouring gardens will be limited to a few millimetres by the controlled propping of the piled wall. Typical vertical movements close to a controlled excavation are of the order of 0.15-0.20% of the excavated depth – 4 to 8mm in this case. Such movements are considered insignificant away from existing buildings and unlikely to cause significant damage even to immediately adjacent structures. Particular care will be taken to minimise wall deflection at the south flank of the new building where neighbouring property is closest.

Summary and Conclusions

The limited depth of the basement to the proposed development and the separation of the new structure from its neighbours mean that its construction, using current good practice for properly supported excavations, will have no deleterious effect on such properties.

Detailed specifications will be prepared and method statements procured to ensure that good practice is followed and that adequate supervision and monitoring is provided throughout the works.

The thicknesses and junctions of structural elements shown on Wolff Architects' drawings are indicative and approximate only. Minor variation may be required during design development to suit the performance requirements and preferred construction methodology.

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