elliottwood

8 Lindfield Gardens

London, NW3 6PU

Structural Engineering Report and Subterranean Construction Method Statement

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Non-Technical Summary

EWP has worked on a number of projects in the area and are aware of both the underlying soil and of the groundwater; the basement has been designed with this in mind. From our experience, the basement will have no adverse effect on the local hydrogeology. The attached site specific site investigation, ground water impact assessment and basement impact assessment provides further evidence of this.

If the works noted above are properly undertaken by suitably qualified contractors, these works will pose no significant threat to the structural stability of the building or the adjoining properties. A damage assessment report is attached which provides further evidence of this.

All reports have led to the same conclusion: the extension of the existing lower ground floor will not have any significant adverse effect on the property, neighbouring properties, groundwater, surface water or slope stability.

1.0 Introduction

1.1 Elliott Wood Partnership LLP is a firm of consulting structural engineers approximately 80 strong operating from their head office in South West London. Residential developments of all scales have been central to the workload of the practice with many in the Greater London area. In particular Elliott Wood Partnership LLP have been producing designs for basements to both existing and new buildings. To date this numbers approximately 500 sites many of which have been in the London Borough of Camden. Our general understanding of the development of London, its geology and unique features together with direct experience on many sites puts us in a strong position to advise clients on works to their buildings and in particular the design and construction of their basement.

1.2 Elliott Wood Partnership LLP were appointed by the building's owner to advise on the structural implications of the proposed refurbishment works and the extension of the existing basement under the footprint of the building. The following report has been prepared to ensure that the property and neighbouring properties are safeguarded during the works. It includes information on the site, the proposed alterations, their impact on the site and adjoining buildings and how the works will be constructed. This report follows the guidance given in the Camden Planning Guidance on Basements and lightwells CPG4. This assessment has been prepared in accordance with the guidance given in CPG4, DP23 and DP27. The Basement Impact assessment has been carried out, by persons holding the required qualifications relevant to each stage.

1.3 A site investigation has been completed at the property comprising of four trial pits and two augered boreholes. No opening up works have been undertaken to confirm the building's structure.

1.4 A detailed set of drawings showing the existing site, building and proposed works has been provided by Canaway Fleming Architects.

2.0 Description of Existing Building and Site Conditions

2.1 No. 8 Lindfield Gardens is a detached house on the north eastern side of Lindfield Gardens. The property was constructed in the 19th Century.

2.2 The building is not listed however it is in the Redington Frognal Conservation Area in the London Borough of Camden.

2.3 The existing building is a four storey residential property including a lower ground floor level. The building is currently separated into flats with a communal corridor and stairwell. This report deals with the alterations to the ground floor flat only including a new basement excavated adjacent to the rear and side wall of the building. Flat A is the front lower ground floor flat.

2.4 The existing building is approximately square on plan with the lower ground floor level under the front of the property. There is a single storey side extension which houses the garage at lower ground floor level. The property shares a garden boundary wall with no. 6 and no.10 Lindfield Gardens to the south east and north west respectively.

2.5 We have assumed that the existing building is traditionally constructed with timber floors supported on load bearing masonry internal and external walls. The roof is a traditional pitched timber roof and is currently being used for habitable space.

2.6 The overall stability of the building is provided by the cellular layout of the masonry walls and diaphragm action of the timber floors at each level.

2.7 The results of our desk study can be summarised as follows;

- The building appears to be in the vicinity of some of the minor tributaries of the Westbourne river (reference Lost Rivers of London, Nicholas Barton).
- The site is located within Flood Zone 1 as shown on the latest Environment Agency Flood Maps, which indicates that the property is at low risk from flooding (reference; www.environment-agency.gov.uk).
- The site does not appear to be in the vicinity of any London Underground Ltd infrastructure (reference; www.google.co.uk/maps).
- There is no record of any historical bomb damage to the property (reference, The LCC London Bomb Damage Maps 1939-1945, LTS).

2.8 Geological maps show that the site is situated within an area underlain by London Clay. A site investigation consisting of four trial pits and three augered boreholes was completed by Site Analytical Services in March 2013 and March 2014. The site investigation showed that the site is underlain by approximately 1.2 metre of made ground with Weathered London Clay formation to depth. Ground water monitoring was completed on three occasions and showed the ground water level to be approximately 7 metres below the ground level of borehole 1. This is consistent with our knowledge from other basement projects we have completed in this area.

2.9 The above report has been supplemented by a further report from Site Analytical Services Ltd dated April 2014 which considers the effect of the proposals on the looocal slope stability. It also includes a damage assessment report.

3.0 Observations

3.1 Generally the building appears to be in a reasonable condition for its age and type. It is generally robust and appears reasonably well constructed.

3.2 The building generally appears to have been fairly well maintained. There are no obvious visible signs of significant movement or settlement to either this property or the directly adjoining buildings.

3.3 There are a number of trees located around the periphery of the building. Notably there are two silver birch, one grapple plum, one small palm and a horse chestnut in the rear garden. There are also two trees in the front garden. The palm tree and grapple plum tree are to be removed as part of the basement construction.

3.4 The site slopes at approximately 1 in 8 from a high point at the back of the rear garden to the lowest point closest to Lindfield Gardens road.

4.0 Proposed Alterations

4.1 The proposed works involve the construction of a new rear extension across the full width of the rear of the property at upper ground floor level and the general re-planning at upper ground floor level.

4.2 The proposed works include the extension of the existing lower ground floor level along the side of the property adjacent to the boundary wall with no. 10 Lindfield Gardens and across the back of the property.

4.3 The basement will be constructed using L-shaped reinforced concrete underpins cast in an underpinning sequence around the perimeter of the proposed basement. The new ground floor over the basement will be replaced with a reinforced concrete slab with profile metal decking supported on steel beams. The basement slab will also be a reinforced concrete slab to provide a prop to the underpins in the permanent case and resist any lateral ground loads.

4.4 The rear wall of the garage is to be demolished and the new basement slab is to be cast at the same level as the existing garage slab.

4.5 The basement floor has been designed as a suspended slab on a Cordek Cellcore deck. This will allow for heave from the removal of overburden from the London Clay and will prevent high uplift forces being transferred to the new or existing structure.

4.6 The new foundations to the basement will by their nature be such tha they are below the zone of heave/shrinkage zone of the clay adjacent to the existing trees and consequently the trees will not impact on the proposed works. If anything, this will provide a more robust foundation system for the building in this area.

5.0 Proposed Below Ground Drainage

5.1 It is proposed that the existing drainage connection to the public combined sewer in Lindfield Gardens is retained and re-used. This will be subject to its location and condition, which will be confirmed by CCTV survey. The sewer records have been included in the Appendix.

5.2 Due to the slope of the site the proposed basement level is likely to be higher than the level of the existing public sewer connection as such the foul effluent generated at basement level is likely to be drained via gravity to the main private drainage system.

5.3 The current proposals are to construct a new basement down the side of the property which will be terraced over the top. This is currently in an area of hard and soft landscaping. Therefore there is likely to be only a slight increase in hardstanding. The attached surface water flow and flooding scoping report discusses this in more detail.

5.4 The site is located in Flood Zone 1 as shown on the latest Environment Flood maps, and as the site area is less than 1 hectare, a Flood Risk Assessment in accordance with the NPPF is not normally required. Thames Water have confirmed that there have been no reported incidents of sewers flooding in the area as a result of surcharging public sewers.

5.5 The basic waterproofing strategy is informed by the existing building and ground conditions. Ground water is not likely to be encountered however it has been considered in the design and waterproofing of the basement. It is proposed that the concrete underpins and slab will act as the primary barrier to possible water ingress. An internal drained cavity system will be installed to complete the system creating a Category 3 Basement as defined in BS 8102.

5.6 The cavity drain system will include a cavity drain sump to collect any water which will then be pumped to the main private drainage system.

5.7 The existing below ground drainage located at this property will be CCTV surveyed to verify locations, depths and sizes. The proposals do show an increase in impermeable area which will require a positive connection to the below ground drainage system as the ground conditions do not allow for infiltration. The increase in impermeable area will be in the order of 110m2 which will generate an increase in discharge of approximately 1.6l/s for the 50mm/hr storm event. This increase is considered too small to be able to flow control as any orifice would be too small and suffer from blockage.

The existing drainage system will be analysed once survey information is obtained to verify if the existing pipe network can take this additional inflow. If it appears that the existing system is insufficient, either the pipe work will be modified to allow additional capacity or a new connection will be made to the offsite sewer.

It is important to note that SUDS are proposed with the inclusion of some sections of green roof. Green roofs are recognised to provide overall discharge reduction and may allow for a reduction to the peak rate of discharge. The green roof system is to be selected at a later time at which point the full benefits of the system will be determined.

6.0 Party Wall Matters

6.1 The proposed works development falls within the scope of the Party Walls 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 notable under the Act. The resolution of matters under the Act and provisions of the Party Wall Awards will protect the interests of all owners.

6.2 The designs for 8 Lindfield Gardens will be developed so as not to preclude or inhibit similar, or indeed any, works on the adjoining properties. This will be verified by the Surveyors as part of the process under the Act.

7.0 Hydrogeological Statement Summary

7.1 From the published data and site investigation completed, groundwater was accounted at approximately 7.0 metres below ground level. This is consistent with our knowledge from basement projects we have completed in this area.

7.2 As the formation level of the proposed works is approximately 3.5 metres below upper ground floor level, groundwater is unlikely to be encountered. The groundwater will flow beneath and around the existing building.

7.3 Arup's Subterranean Development Scoping Study (para 5.1), June 2008, notes that the impact of subterranean development on groundwater flows is negligible as groundwater flows will find an alternative route if blocked by a subterranean structure.

8.0 Conclusions

8.1 It is assumed that the above measures and sequence of works are taken into account in the eventual design and construction of the proposed works.

8.2 Detailed method statements and calculations for the enabling and temporary works will need to be prepared by the Contractor for comment by all relevant parties including party wall surveyors and their engineers. Elliott Wood Partnership will need to ensure that adequate supervision and monitoring is provided throughout the works particularly during the excavation and demolition stages. A specification and indication of monitoring requirements is attached

8.3 To this end, EWP will have an on-going role during the works on site to monitor that the works are being carried out generally in accordance with our design and specification. This role will typically involve weekly site visits at the beginning of the project and fortnightly thereafter. A written site report is provided to the design team, Contractor and Party Wall Surveyor.

8.4 The updated groundwater Assessment is attached which confirms that there are no cumulative affects due to groundwater.

Subterranean Construction Method Statement

9.0 Subterranean Construction Method Statement

Some of the issues that affect the sequence of works on this project are:
The stability of the existing building;
The stability of adjacent building;
Forming sensible access onto the site to minimise disruption to the neighbouring residents; and
Providing a safe working environment.

The proposed works involve the extension of the existing basement down the side and back of the property. The basement is to have a number of new lightwells to the rear of the property. A new full width rear extension is going to be constructed at ground floor level.

The undertaking of such projects to existing buildings is specialist work and EWP will be involved in the selection of an appropriate Contractor who will need the relevant expertise and experience for this type of project.

Noise & Vibration

The Contractor shall undertake the works in such a way as to minimise noise, dust and vibration when working close to adjoining buildings in order to protect the amenities of the nearby occupiers.

The breaking out of existing structure shall be carried out by saw cutting where possible to minimise vibration to the adjacent properties and associated construction noise. All demolition and excavation work will be undertaken in a carefully controlled sequence, taking into account the requirement to minimise vibration and noise.

9.1 Stage 1: Site Set-Up

Erect a fully enclosed painted plywood site hoarding along the front boundary wall, this should not impede on the neighbouring properties.

The services within the site should be identified and isolated as necessary. All below ground obstructions should also be removed to allow the works to progress.

9.2 Stage 2: Enabling Works

The principles for the removal of spoil shall be agreed. Given the scope of the works it is likely that conveyors will be used to move the spoil from within the building to a holding skip located in the front garden/driveway. Grab lorries will be used to remove the material from the skip.

Tree Protection methods to be agreed and installed to all retained trees.

9.3 Stage 3: Demolitions and Internal Soft Strip

Complete soft strip of internal finishes within the building including the installation of any temporary works to improve the robustness of the building during the works.

9.4 Stage 4: Underpinning to Building

The existing garden paving will need to be removed in the location of the new basement.

Dig trial underpins for inspection by Elliott Wood Partnership to check how well the existing soil is cemented and in particular its ability to “stand up” whilst the individual underpin is completed. Given our experience on nearby projects we would expect that localised trench sheeting and props will need to be installed within the underpin shaft.

The underpin works will be completed to the perimeter of the proposed basement including the Party Garden Wall between no. 8 and 10 Lindfield Gardens. The underpins will be reinforced concrete L-shaped underpins excavated as a shaft, in a maximum of 1metre lengths. The shaft will be fully propped with trench sheeting and acrow props. The reinforcement will be tied in the underpin with the toe cast first followed by the stem. The underpins will be left to cure for 3 days and then dry-packed to the underside of the wall over with 3:1 sharp sand to cement drypack well rammed in. The exact sequence of the underpinning will be advised by the Contractor as it will relate to their sequence of construction.

The temporary propping to the central bund will remain in place and removed as part of the bulk excavation. This method of construction will be used to limit any horizontal ground movement associated with the construction of the underpins and limits the risk of the underpinning works on the neighbouring buildings and the remaining building over the works.

9.5 Stage 5: Bulk Excavation and Temporary Propping

Complete the bulk excavation re-installing temporary propping to the underpinning across the width of the basement as required. The temporary propping will remain in place until the basement and lower ground floor structures are in place and have cured sufficiently.

The retaining walls to the rear lightwell will be designed as vertical cantilevers but will require temporary propping until the basement slab has been completed.

9.6 Stage 6: Cast the Basement Slab

Cast the basement slab including any underground drainage. Once this has cured it will provide a prop to the bottom of the underpins. As such the lower level of propping to the underpins can be removed.

9.7 Stage 7: Construct Ground Floor Steelwork and Slab

Install the steelwork at lower ground floor level and construct the ground floor slab. Once the slab has cured it will provide a permanent continuous prop to the top of the underpins. As such the upper level of propping to the underpins can be removed.

9.8 Stage 8: Superstructure Works

The superstructure works can be commenced following the completion of the substructure works. This will include the installation of temporary needles propped through to the basement slab to allow for the rear wall of the property to be removed. Steel picture frames will be installed to maintain the lateral stability.

Appendices