PRICE&MYERS

REPORT

Athlone House

Basement Impact Assessment

Contents

Appendices

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16756

1 Introduction

This Basement Impact Assessment (BIA)has been produced in response to the guidance for basement and lightwell construction adopted by the London Borough of Camden (LBC) to accompany the Planning submission for the works at Athlone House.

The information contained within this BIA has been produced to cover the information required within a BIA as set out by Camden Planning Guidance - Basements and Lightwells (CPG4) including Camden Development Policies DP27 - Basements and Lightwells in respect of the proposals at Athlone House, for the creation of a residential basement at the property. For the purposes of this report "the site" is defined as the extent of the proposed basement at Athlone House.

The purpose of this Basement Impact Assessment document is to outline the key points for the method of safe excavation and construction of a basement at Athlone House. It also sets out how the neighbouring area will be protected as well as the local environment and amenity.

The topics covered within the appendices of this report are; a geotechnical and hydrological report by GEA, which makes specific reference to the proposed works and LBC basement planning policy, a Flood Risk Assessment, Price and Myers structural and underground drainage scheme drawings, previous examples of similar work which Price and Myers have undertaken. The nominated building contractor will liaise with London Borough of Camden and the local residents to ensure that the principles outlined are established in detail prior to the commencement of construction.

Section 4 of this report and the accompanying drawings best describe the proposed work to Athlone House. As Structural engineers we are experienced in designing such basements and have extensive knowledge with regards to the type of ground conditions found around Hampstead Lane. Appendix F shows related examples of our work within the London Borough of Camden and central London.

Scoping of Issues

Section 3 of the GEA report, dated October 2012 in Appendix A, outlines the screening stage to see the effect of the basement on the surrounding area. Where the screening chart has revealed potential impact on the surrounding area Section 9 of the GEA report has investigated these areas in more detail.

2 Surveys and Ground Conditions

There have been numerous site investigations and reports carried out on the site within the last 10 years including Geotechnical, Hydrological and Environmental reports. These include a comprehensive investigation and report carried out by LBH Wembley in June 2002, a follow up report in September 2003 where they returned to site to measure and report on the ground water and a further Hydrological assessment on December 2010. RPS Health, Safety and Environment undertook a Desk Study Assessment of the Ground water at Athlone House in May 2004 and Price and Myers wrote a report summarising the above mentioned reports in February 2010. These are included in Appendix B.

For this report we will concentrate on the October 2012 GEA report, as it is the most recent and specifically addresses the current proposals with reference to the Camden planning policies. It should be noted that all of site investigation reports are generally in agreement.

In October 2012, GEA undertook a geotechnical and hydrological investigation comprising of three boreholes and 5 trial pits. Their report attached in Appendix A outlines their findings and specifically addresses the items outlined in the Camden planning policies for Basements and Lightwells. This report specifically addresses all of the questions in the Screening Chart and provides detailed responses for areas where the Screening indicated that further investigation was required. This can been seen in section 3 and 4 of Appendix A.

A brief summary of the geotechnical findings is; the site has a thin layer of made ground, approximately 0.4m within the surrounding lawn and between 0.8m and 1.8m close to the existing house to 0.8m deep, underlain by firm, becoming stiff Claygate Member of the London Clay Formation. The London Clay was proved to a depth of 20m where the boreholes were terminated.

The contamination test results indicated slightly elevated concentrations of arsenic and chromium within the near surface soils. Historic use of pesticides or naturally occurring arsenic, are the likely causes of these concentrations and as such it has been advised that no remedial measures are required.

A summary of the hydrology of the site is below, the LBH Wembley and GEA reports give a detailed assessment of the site.

The site lies outside the designated Environment Agency source protection zones, the only catchment area available is the higher ground of Highgate Hill, which rises by a further 15m or so to the East. The ground water at the site contributes to the surface water streams and ponds that are to be found lower down the slopes of Hampstead Heath.

The GEA bore hole logs encountered small amounts of ground water seepage at depths of 100.95 mOD and 99.86 mOD which is well below our proposed basement level.

The borehole logs showing the ground conditions and water strikes are shown on our drawings 16756 / 100 and 101 in Appendix D. These drawings show the relationship between the soil and water strikes with our proposed basement structure.

3 Existing and Neighbouring Structures

The existing building is of brick and timber joist constructions built c. 1871. It is currently in a poor condition mainly due to water ingress and a lack of maintenances. There is no obvious signs of heave related movement although the general poor condition makes it difficult to distinguish between areas of disrepair.

To the north of the site are a couple of modest two storey houses and to the East a number of relatively new apartments. All of the neighbouring structures and roads are in excess of 40m from the proposed construction.

4 Proposals

Introduction

The site is approximately 4 hectares in size with an existing building built c.1871 located on the top of a slope. The site is generally at the peak of a hill with falls down to the East and rising up Hampstead Lane. The existing building is set within landscaped grounds.

The land abuts Hampstead Lane to the North, a new residential construction to the East and Hampstead Heath to the West and South.

The proposal is to construct a new residential single dwelling house consisting of 4 storeys (including basement and ground) with an approximately central tower consisting of an additional storey. The proposed footprint of the new building is approximately 36m x 28m in a similar location as the existing building.

Our drawings in Appendix D best show the proposed substructure and super structure.

Substructure

Foundations in general

The London Clay will provide a suitable bearing stratum for the support of the proposed building. The sub-structure is expected to take the form of a raft slab foundation approximately 600mm thick which will evenly distribute the load onto the Clay. The loads from the new building onto the clay will be within the 150 kN/m^2 allowable bearing pressure stated in the GEA report.

Basement construction

An approximately 4 metre deep basement is required below part of the footprint of the building. This will be achieved by 300mm thick RC retaining walls, which will cantilever from the raft slab in the temporary state (until the ground floor slab is installed) and act as a propped cantilever after the installation of the ground floor slab.

The perimeter of the building does not have any obstructions close by, therefore we anticipate the basement to be achieved by battering the soil face back to ensure its temporary stability. A temporary batter gradient of 1:1 would seem reasonable. The basement would then be constructed within the open excavation.

Water Proofing

We would expect the basement to meet either Grade 3 or 4 water tightness, in accordance with BS8007. Grade 3 implies full water and vapour tightness within the useable space. Grade 4 takes this to a higher level of environmental control appropriate for storage purposes.

Our favoured approach to such basements is the use of a drained cavity construction. This is a system of drainage blankets, slots and sumps used to control and discharge any leakage through the retaining structure. As a practice we have no faith in the effectiveness of any form of external tanking system unless completed in open excavations with full working access and quality control eg. asphalt tanking with protective finishes. For an additional level of comfort we may consider using waterproofed concrete in addition to a drained cavity.

Superstructure

The superstructure will be a reinforced concrete frame. The approximately 9m x 9m column grid effectively precludes traditional flat slab construction. As such a waffle slab construction with band beams between columns will be adopted. Post tensioned flat slab construction will also be considered. The perimeter walls will consist of insitu reinforced concrete with holes cast in for windows and doors. Constructing these perimeter walls out of insitu concrete is not entirely required for structural reasons. Concrete columns with blockwork infill walls could also be used, however solid concrete allow for an easier fixing for the stone cladding and also less joints in the stone. The use of concrete walls could also have construction programme benefits.

The domed and pitched roofs are likely to be constructed from steel beams and timber rafters.

Overall stability will be provided through diaphragm action in the slab distributing the lateral load onto the perimeter walls.

Temporary Works

There will be very little unusual temporary works requirements for this project. The majority of the temporary works revolve around the creation of the basement. As mentioned previously the large site area will allow for a traditional battered excavation, and work within the open excavation. Temporary sump pumps may be required to remove any water within the excavation.

5 Site Drainage and Ground Water

Site Drainage

"Hardstanding and roof areas currently occupy approximately 0.31 Ha of the site area. The proposed development is not expected to add any impermeable areas on site and therefore will not increase the run-off rate.

In accordance with Environment Agency guidelines, the Building Regulations and Water Authorities advice, the preferred means of surface water drainage for any new development is into a suitable soakaway or infiltration drainage system. Sustainable Drainage Systems (SUDS) can reduce the impact of urbanisation on watercourse flows, ensure the protection and enhancement of water quality and encourage recharge of groundwater in a manner that mimics nature. However, the ground investigation report shows that infiltration is not feasible in this area. Therefore, attenuation to the public sewers is the only available option for this development as there are no watercourses within a reasonable distance from the site. Detailed information about where the

existing site currently drains was not available at the time that this report was prepared. However it is believed that either surface water runs freely at the adjacent soft landscape areas, or there are existing connections to the public sewers located in Hampstead Lane. Further investigation is required to assess if there are any existing connections to the public sewers and their condition.

The London Plan (dated 2009) requires new developments to attenuate surface water to the public sewers to Greenfield run-off rate. The Greenfield run-off rate from the hardstanding and roof areas is approximately 1.5 l/sec in the 1 in 100 year storm event as calculated with the FEH software. R&D technical Report W5-074/A/TR1 Rev.C re-issued in June 2007 states that *"A practicable minimum limit on the discharge rate from a flow attenuation device is often a comprise between attenuating to a satisfactorily low flow rate while keeping the risk of blockage to an acceptable level. It is suggested that this is 5 l/sec using an appropriate vortex flow control device or other technically acceptable flow control device".* Therefore, surface water from the site must be attenuated to 5 l/sec. This flow rate is also in line with Code for Sustainable Homes that requires surface water attenuation to existing rates for developments that increase the flow rates and volumes to the public sewers.

The run-off rate that the existing development generates in the 100-year storm event, was estimated based on the modified rational method:

Q_{100} = 2.78 x A x i (where A is the catchment area in Ha and i is the rainfall intensity in mm/hour as estimated from the WinDes software).

Q_{100} = 2.78 x 0.31 x 107 = 92.2 l/sec.

Preliminary calculations showed that the drainage system must be able to temporarily store 150m^3 of surface water in the 1 in 100 year + 30% storm event. Attenuation can be achieved through Sustainable Drainage Systems (SUDS) such as ponds and/or attenuation tanks. The preferred means of surface water attenuation is through a pond. These components can be used to store rainwater but also enhance the aesthetics and amenity value of the site. Therefore it is proposed to temporary store surface water through a pond before discharging to the public sewers with a control rate. If site restrictions prove that this is not feasible then alternative means of surface water attenuation will be considered (i.e. attenuation tanks).

Foul water will drain to the public sewers located at Hampstead Lane. It is thought that there is an existing connection serving the current house. The drainage design should aim to provide gravity systems where possible. The sewer records show that the ground floor and above floors will be able to drain by gravity. The basement drainage design must also aim to reduce pumping where possible. Therefore further investigation is required to assess whether the existing connection to the foul sewer can be reused and what is the invert level of it.

Groundwater

The GEA report indicates that the water table is below our proposed basement level. The proposal is to dig the basement in an open cut excavation and backfill around concrete retaining wall with free draining granular fill. At the base of the granular back fill will be a sub-soil drain. This land drain will have two functions; to ensure that if any ground water does encounter the proposed basement it will simply flow around the perimeter of the basement and have little affect on the upstream or downstream water, it will also relieve the retaining wall of any potential water pressures. This approach is in agreement with the recommendations within the hydrological reports.

The full hydrological reports from GEA, LBH Wembley, RPS Health, Safety and Environment are included in the appendices..

6 Construction Methodology

Site Logistics, Hoarding and Security

The Site Set-up drawing indicates the likely areas for the site cabins, entrance security, delivery road, loading area / spoil handling area and tower crane. It also indicates the location of the hoarding, which will visually shield the neighbouring housing from the construction site.

To minimise the affect of the construction to the neighbouring properties the contractor will be required to register with the 'Considerate Contractor Scheme'. This scheme regulates and monitors a number of aspects of the construction site including noise, cleanliness/presentation of the site, working hours, deliveries, waste etc. The contractor will also be required to regularly clean the windows of the neighbouring buildings throughout the construction period.

Health & Safety

We consider the following issues will require further consideration in order to mitigate or eliminate inherent significant risks:

- The demolition of the existing building will have to be undertaken to ensure adequate temporary stability is always maintained. A detailed method statement will have to be provided by the contractor and strictly adhered to.
- A detailed survey of the existing services will have to be undertaken. All existing services will need to be terminated prior to any demolition.
- The basement excavation will need to be undertaken whilst ensuring adequate slope stability. A temporary batter of 1:1 would seem sensible however small amount of surface level fill and topsoil may require and more shallow batter.
- Delivery and handling of large or heavy structural elements (eg. steel beams and reinforcement bars) has been considered from the outset. Wherever possible off-site fabrication will be utilised to ensure large items are crane-lifted. In addition reinforcement can be detailed to provide smaller bars at more regular centres, which will help reduce the weight of hand-lifted elements.

7 Conclusions

A design analysis has been undertaken of the various aspects of construction and how these may affect the local amenity and neighbouring properties with regard temporary and permanent stability and the ground and surface water regime.
Soil investigation and associated studies have demonstrated that the development will not have an adverse effect on the local ground and surface water regime.

Appendix A

Site Investigation Report

Appendix B

Previous Site Investigations

Appendix C

Flood Risk Assessment

Appendix D

Proposed Drawings

Appendix E

Site Setup Plan

Appendix F

Example Past Projects

21 Wilton Street	Complete overhaul of a listed house in Belgravia, including pool, gym, media room etc. within a new basement.
17 Phillimore Gardens	Refurbishing a listed house and constructing a new basement with swimming pool under the garden and part of the house.
44 Grove End Road	Extensive refurbishment of a listed building plus construction of a basement swimming pool and car park.
7 Wilton Crescent	Rebuilding a mews house to include double storey basement with swimming pool plus renovation and rooftop extension of listed house.
15 Thurloe Square	Refurbishment of a listed house and construction of a basement extension.
7 St James Square	Construction of a two-storey basement with swimming pool under a grade 2 listed house designed by Lutyens.
2 Alma Terrace	Construction of a basement under the full footprint of the house and garden. The house above remains occupied and the work is done using a tunnelling method.
12a-14 Cheyne Row	Construction of a new basement under a central courtyard of a collection of houses.
44 Markham Square	Refurbishment and extension of a house including new basement.
15 Addison Crescent	Construction of a deep basement with swimming pool under an existing house.
40 St Petersburg Place	Alterations to house and mews house featuring new basement.
23a Earls Court Square	A basement extension under the house to include a gym and 20m lap pool.
22 Frognal Way	Retaining a listed 1970's modernist house and constructing a new basement with swimming pool under the house and garden.
4 Frognal Way	Refurbishment of an existing house including an extension and new basement with swimming pool.
20 Rutland Mews South	Construction of a new basement under an existing house.