Fitzjohn’s Avenue, NW3

Prepared for the London Borough of Camden

Basement Impact Assessment

A detailed planning application, submitted on behalf of PegasusLife to provide specialist living accommodation for older people

PegasusLife

Contents

1.0 INTRODUCTION

1.1 Symmetrys Limited has been engaged by Pegasus Life to carry out a basement impact assessment for the proposed double storey basement of the development at 79 Fitzjohns Avenue, London. The basement is proposed below specialist accommodation for older people development, to create space for plant rooms and car parking. This report will only concentrate on the proposed basement works.

Photo 1: Front elevation

1.2 Our structural arrangement drawings and this report will be included within our client's planning application. Our documents are not intended for, and should not be relied upon by, any third party for any other purpose.

1.3 General arrangement drawings for the proposed development were provided to us by Sergison Bates architects.

1.4 <u>Reference documents</u>

The following documents have been used as guidance to complete this Basement Impact Assessment.

1, *Camden Planning Guidance: Basements and Lightwells.*
2, *Camden geological, hydrogeological and hydrological study – Guidance for subterranean development.*
3, *North London Strategic Flood Risk Assessment – Mouchel*

2. EXISTING CONDITION

2.1. The site is located in Hampstead, in the London borough of Camden. It is bounded by Fitzjohns Avenue to the East and Prince Arthur Road to the South, as shown in Figure 1.

2.2 The site is currently occupied by a multi storey residential building with a single storey basement, built in the 1970s or 1980s, known as Arthur West House. Please see photos 1 and 2. The areas of the building adjacent to the roads are five storeys tall, with a single basement beneath the block onto Fitzjohns Avenue. Behind these taller areas the building reduces to one and two storeys covering the remainder of the site. The existing building is brick clad and is assumed to be concrete framed. The basement is assumed internal foundations are assumed to be piled, although this can only be confirmed by intrusive investigation.

Photo 2:Aeriel view of existing site

All existing buildings on the site will be removed entirely. Existing foundations will also be removed where practicable, although piled foundations will only be broken down to below the proposed basement formation level. No detailed investigation has been carried out on the existing structure due to its planned demolition. Similarly, no monitoring of the existing building has or will take place.

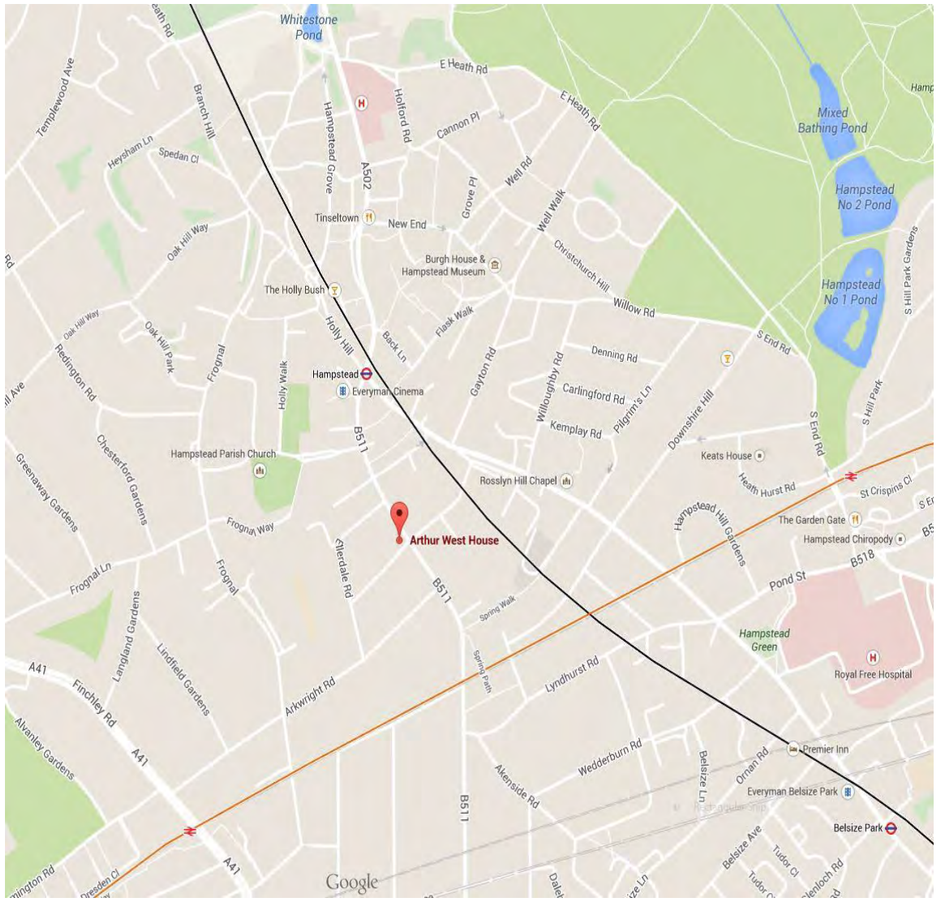

Figure 1: Site location and local transport

3.0 GEOLOGICAL, HYDROGEOLOGICAL AND HYDROLOGICAL STUDY

This section of the Basement Impact Assessment has been undertaken by CGL. Their report can be found in appendix C.

3.1 Site Investigation

A site specific ground investigation and interpretative report has been undertaken by Ian Farmer Associates and their findings and recommendations are described in their report dated November 2014 (ref 52247A) included here in appendix D. All works and the report were supervised and authorised by a Chartered Geologist, Deborah Ashton BSc (Hons) MSc Cgeol FGS. Ground water levels were monitored over a number of visits.

3.2 The ground conditions are fully described in the geotechnical site investigation report but can be are summarised as follows:

Borehole 1:

Ground level to 1.8m	Made ground
1.8m – 4.8m	Sandy clay
4.8m – 10.3m	Clay interbedded with sand
10.3m – 11m	Clay

Groundwater encountered at 8.2m at its highest

Borehole 2:

Ground level to 1.7m	Made ground
1.7m – 8.5m	Sand
8.5m – 20m	Sandy clay

Groundwater encountered at 8.1m at its highest

Borehole 3:

Ground level to 1.3m	Made ground
1.3m – 2.9m	Sandy clay
2.9m – 4.2m	Sand
4.2m - 11m	Clay interbedded with sand

Groundwater encountered at 7.7m at its highest

Borehole 4:

Ground level to 1.6m	Made ground
1.6m – 4.8m	Clay
4.8m – 6m	Sand
6m - 12m	Clay interbedded with sand

Groundwater encountered at 10.6m at its highest

Borehole 5:

Ground level to 1.7m	Made ground
1.7m – 2.5m	Sand
2.5m – 6.2m	Clay
6.2m – 14.2m	Sand
14.2m – 20m	Clay

Groundwater encountered at 10.6m at its highest

3.3 Flooding

The full Flood Risk assessment report is contained in appendix E. A summary of its fundings is given below.

Despite the relatively low distance to the Hampstead ponds, the whole of the London Borough of Camden lies in flood risk Zone 1, which would mean a site specific Flood risk assessment is not required, but this has been carried out. The risk of flooding at the site is significantly low, zone 1 is defined as having 1 in 1000 annual probability of river or sea flooding in any given year. On this basis, no further assessment is therefore necessary although a more detailed analysis is contained in the report.

The risk of water run-off from the proposed development affecting neighbouring properties is insignificant. Similarly, available sources indicate the risks of flooding for water courses and ground water are also insignificant. Historical records also show the risk flooding due to rain water or water backing up from off-site drainage is also low. Despite these low levels of risk of flooding, the report recommends adopting storage or re-use of roof run-off and the inclusion of SUDs in the drainage design where practicable.

4.0 DESIGN PROPOSALS

4.1 The proposal for the site is to remove the existing building entirely then construct a new development of specialist accommodation for older people. This will comprise of two buildings joined by communal areas at ground floor. The building to the eastern end of the site, onto Fitzjohns Avenue, will be nine storeys, including a two storey basement. The building to western end, onto Prince Arthur Road, will be six storeys with a lower ground partially recessed into the surrounding landscaping but not with a basement.

The new building will be framed in in situ reinforced concrete, adopting flat slab construction supported on columns and lift shafts distributed throughout the floor plate. Lateral stability wil be provided by a series of reinforced concrete shear walls cantilevering from the foundations. Cladding will be brickwork and glazing over the full height of the elevations. The retaining wall at the perimeter of the basement will be a contiguous piled retaining wall adopting bored cast in situ reinforced concrete piles. These perimeter piles will also provide vertical support to the perimeter columns. Internal columns and lift shafts will similarly be supported on bored cast in situ reinforced concrete piles. The lower most basement slab will be suspended, spanning from the perimeter piled retaining walls to the internal piles.

4.2 Below Ground works

The first stage of works will demolish the existing building, including it's substructure. Any existing piles will be broken down to below the proposed formation level. Installation of the new piled retaining walls to the eastern building and the internal gravity piles will then commence. Once the perimeter piles are installed, the bulk excavation will follow on, adopting the temporary supports described in section 5.1.

Once excavation is complete and internal buried services and piles caps have been installed then the basement slab will be installed. This will be supported at the perimeter by the retaining wall by dowels grouted into the piles and internally on the pile caps. With the removal of the overburden pressure of the ground up to the existing level, the ground at the proposed formation level will heave. Performance characteristics of the ground will be derived from the geotechnical site investigation report, contained in appendix A; these will inform advice from a geotechnical specialist on the probable magnitude of that heave and associated forces. The basement slab will be underlain by a comperssible mat which will be designed to crush under heave pressures, and sized to accommodate the recommendations of the geotechnical specialist. This will eliminate the application of the heave forces to the basement slab.

The ground water levels given in the geotechnical site investigation report are typically around 8-10m below the existing ground level and therefore around 2m above the proposed lower basement level. The basement slab and retaining walls will be designed to resist groundwater levels at 1m below external ground level, which ensures an adequate safety margin above actual current groundwater levels.

In the permanent condition the floor slabs of the basement, upper basement and ground floor will act a props to the perimeter retaining walls. Once these slabs are installed and fully connected to the retaining walls and internal vertical elements then the temporary propping will be removed.

Considerations of the magnitude of heave or vertical and horizontal settlement of the proposed building and their influence on neighbouring structures are discussed in the Ground Movement report contained in appendix C.

The introduction of a new basement to the site could affect local groundwater regimes. This effect has been analysed by specialist hydrogeologists and is discussed in the Hydrogeological report contained in appendix C.

4.3 Waterproofing

As described, groundwater levels will be above the basement slab. Inhabited areas of the basement will therefore be designed to BS8102, where guidance is given for the waterproofing of basement structures according to their use. With this in mind the use of tanked, integral and/or drained methods of waterproofing will have to be considered. The probable approach will be proprietary watertight concrete for all reinforced concrete elements below ground level, with a proprietary drained cavity system to the inner face of the perimeter structure. Advice will be sought from tanking specialist for these matters.

5.0 TEMPORARY WORKS

5.1 The method of construction adopted minimises the need for temporary works in the form of propping. However, propping during the bulk excavation will be required. Please see appendix A for the proposed structural plans and expected construction sequence.

The temporary works will be minimised by installing the perimeter retaining piles at the beginning of the new construction works. The contiguous piled retaining wall to the perimeter of the east block will then be installed. Internal gravity piles will also be installed, including sacrificial piles for temporary support of the retaining walls. Once piling is complete then the bulk excavation will begin. As excavations progress downward, the piled retaining wall will be temporarily propped at Ground floor level and at the first level of basement. These props will be strutted against either the return walls or the internal piles designed specifically for that purpose. Propping forces on those temporary piles will be minimised where possible by balancing with props from opposing elevations. Once the floor slabs at basement, upper basement and ground floor are installed and fully connected to the retaining walls and internal vertical elements then the temporary propping will be removed.

The appointed contractor will be responsible for all temporary supports and for the stability of the structure during the works. To ensure that Symmetrys design intent is correctly interpreted by the contactor, they will be required to submit all temporary works proposals to the appointed structural engineers for review a minimum of ten working days prior to commencing excavation.

5.2 Dewatering Strategy:

Widely used methods for dewatering are described below. The appointed principal contractor must submit a detailed dewatering strategy to Symmetrys for comment 14 days prior to commencing works on site. This will be informed by the recommendations of the hydrogeological preort contained in appendix C.

Local Dewatering- simple sump method
All excavations shall be kept clear of water by submersible pump. Should large quantities of water be encountered, this will be pumped into the existing drainage system using a larger sump pump via a sediment settling tank. Long period of pumping will be avoided and regular inspections of the work area to ensure de-watering is carried out only when necessary,

Jetted Sumps
This method achieves the same objective as the simple sump methods of dewatering but will minimise the soil movement associates with this and other open sump methods. A borehole is formed in the subsoil by jetting a metal tube into the ground by means of pressurised water, to depth within the maximum suction lift of the extract pump. The metal tube is withdrawn to leave a void for placing a disposable well point and plastic suction pipe. The area surrounding the pipe is filled with course sand to function as a filtering media.

Other dewatering
Strategies such as grouting and ground freezing are likely to be impractical for a project of this size. However, this is to the discretion of the main contractor.

6.0 GROUND STABILITY AND STABILITY OF NEIGHBOURING STRUCTURES

6.1 Due to the robust engineering principles and construction method applied, the extent of movement is unlikely to be significant. We can confirm that the proposed structural design and method of construction of the basement has been developed with a view to ensuring structural safety, and that if constructed in accordance with this document the works will be able to be completed without any adverse impact on the structural stability of the neighbouring properties, other adjacent structures, adjoining land and gardens or the adjoining Public Highway.

6.2 The reinforced concrete structure will be designed to accommodate surcharges from the neighbouring property, public highway and ground pressures. The structure will have adequate stiffness to ensure that the lateral deflections do not exceed the appropriate limits recommended by British Standards Codes of Practice in order to ensure that potential ground movements be kept to acceptable limits.

6.3 The structures will be designed to withstand any uplift due to hydrostatic pressures as well as being designed to transfer vertical loads into the ground safely.

6.4 Figure 1 shows the positions of the Northern and the Overground lines. These are a significant distance away, with the closest line being 130m away. Due to this significant distance no consultation with the London Underground Asset Protection team will be undertaken.

6.5 Ground stability and the stability of neighbouring structures is further discussed in the report by CGL in appendix C.

7.0 PARTY WALL MATTERS

7.1 The scope of 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 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.

7.2 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 basement excavation perimeter, and the elevations of the adjacent properties adjacent to 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: monitoring positions (Targets) will be established within the proposed excavation and on the adjacent structures themselves.

1) The perimeter temporary/permanent works will be monitored at ground level, at intervals not exceeding 3-4m centres, measured from the Targets installed on the first level on the underpin retaining wall.

2) The existing facades will be monitored near ground level and at roof level, at intervals not exceeding 3m centres.

3) 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. A suitable remote reference base/datum unaffected by the works will be adopted, one located at least 50m from the site.

4) Points/targets shall be measured for 3D positioning. Before any works commence a base reading will be taken, then further measurement will be taken weekly during the period of

basement excavation/construction and monthly during the course of the remainder of the works. A final reading is to be undertaken 6 months after the completion of all construction works.

5) 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 (Symmetrys Ltd) and to the Adjoining Owners Party Wall Surveyors/Engineer within 24 hours of measurement, graphically and numerically.

6) 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.

7) Trigger movement limits are proposed as follows:

A) Facades Horizontal movement/Facades Vertical movement

Amber	+/-10mm	All parties notified.
Red	+/-15mm	Works reviewed

B) The garden walls and excavation

Amber	+/-10mm	All parties notified.
Red	+/-15mm	Works reviewed

8.0 DRAINAGE

8.1 Any existing below ground drainage within the perimeter of the site will be removed entirely during the demolition works. The new development will adopt new drainage systems for foul and surface water, both of which will discharge into the existing combined mains sewers beneath Ftizjohns Avenue and Prince Arthur Road. Any changes to discharge volumes created by the new development will be submitted for approval of Thames Water and London Borough of Camden.

8.2 Surface water drainage from above ground will run below external ground levels from the building perimeter to the site perimeter. Above ground foul drainage will run across the ground floor soffit then below ground from the building to the site perimeter. Foul drainage from upper and lower basements and discharge from the cavity drains will be drained to a submersible package sewage station situated below the basement slab which will then be pumped via a rising drain to the nearest available inspection chamber on the gravity drainage system. At the site perimeter, surface and foul drainage will combine before entering the existing combined main sewer.

8.3 There will be appropriate drainage installed to the hard and soft landscaping (hard and soft) on the site. Permeable surfaces will be adopted where possible to minimise an changes to existing regimes.

9.0 CONSTRUCTION

The proposed basement development will be managed and constructed by a competent Contractor with the appropriate experience and expertise in basement construction and working on restricted sites.

The Property is located within a residential area. The Contractor will employ appropriate methods of construction in order to minimise noise and nuisance to neighbours as far as reasonably practicable. The Contractor shall obtain the necessary licences and approvals for the noise notices from the relevant authority.

9.1 Demolition

Demolition can be an extensive source of noise pollution to the immediate and surrounding area; hence all demolition works will be undertaken in accordance with the following standards/documents:

Considerate Constructors Scheme standards
ICE Demolition Protocol
GLA's best practice guidance document The Control of Dust and Emissions from Construction and Demolition.

9.2 Sustainable Construction

As the basement construction will involve significant amounts of concrete, cement replacement alternatives should be considered. Cement replacements can used to replace up to 40% of the cement in concrete mix. These replacements are typically waste products from energy production industry such as PFA (pulverised fuel ash) and GBFS (granulated blast furnace slag). By adopting them waste products from the energy production industry are recycled and not sent to landfill sites. Furthermore this also reduces the amount of cement that needs to be mined. Concrete should be bought from a local supplier to further reduce the carbon footprint of transport.

There is a significant amount of reinforced concrete on the project for which steel reinforcement bars will be required. By specifying reinforcement from a UK supplier it ensures that the rebar is made from 100% recycled steel. Any structural steelwork should be sourced from a British manufacturer to ensure that rolled sections are made from at least 60% recycled steel. Sourcing the steel from a local supplier will further reduce the transport carbon footprint.

The use of timber as a structural element is to be maximised as timber production actively negates greenhouse gas production. Furthermore all timber is to be FSC certified insuring that the timber is produced from a sustainable source.

10.0 SUMMARY

10.1 The appointed engineer will review all temporary works, contractors' method statements and calculations for these works, prior to works starting. The permanent works will also be submitted to Building Control and the necessary Party Wall Surveyors for approval prior to the works commencing on site.

10.2 The proposed basement at 79 Fitzjohns Avenue has been designed with robust structural principals and methods of construction that are widely used and known. This will ensure the integrity of this building, neighbouring structures and roadways is not compromised during its construction.

This assumed Method Statement and Structural report has been completed by Symmetrys Limited and checked by Christopher Atkins CEng MIStructE who is the Managing Director of Symmetrys Limited.

R.C.T

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