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142 Hampstead Road  
London  
NW1 2PS

Programme of Ground  
Investigation

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project no: 210147  
revision: P1  
status: Information

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## Site Location and Access

This document is to be read in conjunction with drawing 210142/SI/01

- 1.0 The site is located at 142 Hampstead Road, London, NW1 2PS
- 2.0 The site can be accessed by vehicles from Hampstead Road.
- 3.0 A BP petrol station currently occupies the site. Vacant possession of the site will be achieved on 19<sup>th</sup> December 2011. The intrusive investigations are programmed to commence 3<sup>rd</sup> January 2012.
- 4.0 To arrange access to carry out the investigation please contact Elliottwood Partnership.

## Description and History of the Site

- 1.0 The current site is occupied by a petrol station that will be demolished to make way for the new development (Ref: 2010/4683/P). There are large underground petrol storage tanks (as shown on the attached drawing) underneath the station that will likely be removed as part of the development. The existing surface of the petrol station is impermeable consisting of pavers and concrete. Due to the use of the site as a petrol station, it is possible that the ground is contaminated.
- 2.0 Network Rail infrastructure for Euston Station is located to the east of the site. An existing retaining wall exists along the boundary with the railway lines being approximately 5-6m below the site. This retaining wall appears to be of solid brickwork construction, however, further information regarding the geometry and construction is unknown at this time. The new building is proposed to be approximately 3m from the retaining wall.
- 3.0 The Northern Line tunnel runs adjacent to the site on the west side within Hampstead Road. It is located approximately 10m away from the west side of the proposed building with the crown approximately 25m below ground level. The deep boreholes for the investigation have been located at least 15m away from the closest tunnel.
- 4.0 An existing EDF conduit runs across the northern end of the site in a north-easterly direction. This conduit is routed through a raised gantry over the railways and runs underground through the site. The exact location of the conduit within the site has been determined with ground penetrating radar with the surveyed location indicated on the drawings.

## Proposed Development

- 1.0 The proposed development is to build one new residential building 11 stories high at the northern half and 6 stories high at the southern half as part of the wider scheme. The ground floor comprises of main entrance lobbies, plant space, storage, and a small retail unit. A soft landscaped area is proposed between the building and the east boundary retaining wall which will incorporate play areas for children and areas of new planting and soft landscaping.
- 2.0 The building will be founded on deep bored piled foundations, assumed to be 600 diameter continuous flight auger (CFA) with an assumed pile capacity of 1500kN. This is due to the high loading from the building above as well as the close proximity of the retaining wall on the east side of the site. Piles will enable the building loads to be transferred into the ground such that additional vertical and lateral loads are not imposed on the existing retaining wall.



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- 3.0 The piles are proposed to be supporting reinforced concrete pile caps or piled raft at ground floor level.
  - 4.0 The ground floor is proposed as a 300 thick suspended slab with a void below the slab to maintain vibration isolation from the ground. The slab is supported typically at the column positions with vibration isolation bearings below. The slab is stepped to accommodate the varying floor levels. The resulting void below the slab varies between 300-500mm which should accommodate any below slab services such as drainage routes or electrical ducts.
  - 5.0 The frame will be typically formed of 250mm thick reinforced concrete flat slab construction supported by reinforced concrete columns and walls. Due to the irregular shape of the building there is no regular grid pattern to the arrangement of the supporting elements. The majority of columns will be positioned at the edges of the building and will typically be 200mm thick to fit within the walls of the façade to minimise their impact on the unit layouts. Any internal columns are to be positioned within partitions.
  - 6.0 A transfer structure is required at the north end of the building at second floor level to provide a double height open entrance area for the private residence as well as avoid the EDF conduit at ground floor level. The span of the transfer structure is up to 12m and is a 1200mm deep flat RC transfer slab.

## Geology

- 1.0 Geological records of the site and our understanding of ground conditions in the area indicate that the ground conditions are likely to consist of London Clay. The extent of made ground is unknown.
- 2.0 Groundwater levels are also unknown at this time though not very likely to be high considering that the adjacent Euston railways are approximately 5-6m below the site level.

## Desk Study

- 1.0 A desk study report is required as part of the ground investigation report.
- 2.0 A site visit should be undertaken as part of the initial Desk Study to make an appraisal of the site, to determine the accessibility of the proposed investigation locations, and to identify potential sources of contamination.

## Site Investigation

- 1.0 The main investigation is to consist of 2No. deep boreholes (minimum 30m deep – fully cased), 3No. window samplers (6m deep), 3 No. hand-dug trial pits, 4 No. probe locations (10m deep) and 6 No. CBR tests as noted on the drawing No. SI/01. Provisional investigation locations are shown on the drawing SI/01.
- 2.0 An unknown object is located at the north end of the site (as indicated on the attached Network Rail drawing). An allowance for GPR survey and 4No. additional trial pits shall be made to determine the nature/geometry of this object. A CAD drawing shall be produced with the exact location indicated.
- 3.0 Groundwater and gas monitoring standpipes shall be undertaken at the 3No. WS locations as shown on the drawing. The standpipes are to be checked on a monthly basis on 4No. subsequent visits. After the third return visit, Elliottwood should be contacted to discuss the need for an extended period of groundwater monitoring.
- 4.0 The probes should be located 2.0m away from the existing retaining wall. The purpose of these is to determine the extent of the retaining wall foundations and provide a general description of the ground encountered along this boundary. If an obstruction (such as an existing foundation) is encountered then the next location should be moved another 500mm away from the retaining wall.



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- 5.0 Trial pits (3 No.) are to be undertaken to determine the cover, depth, position and geometry of existing EDF cable ducting. Trial pits are to be hand dug only with great care taken to avoid damage to the existing EDF cable. Additional trial pits at the north end of the site shall also be assumed to be hand dug to avoid potential damage to the unknown object.
  - 6.0 A sufficient number of soil and groundwater samples should be taken to enable a full suite of contamination testing deemed sufficient based on the findings of the desk study and as required to develop a remediation strategy should one be deemed necessary.
  - 7.0 The actual locations of the investigations should be accurately recorded and included in the report.
  - 8.0 All boreholes, window samplers and trial pits are to be backfilled and well compacted with excavation material arising. The additional cost of full surface reinstatement should be included within the tender should this be required.
  - 9.0 The works should stop immediately should any archaeological artefacts be encountered and must not re-commence until instructed by the Client.

### Access for Additional Surveys

- 1.0 Manned vibration measurement surveys are to be undertaken (by others) within the 2No. deep boreholes to measure vibration levels at the proposed pile toe level.
- 2.0 Casing has been noted as required to maintain the stability of the borehole and prevent collapse onto the instrumentation canister.
- 3.0 Access to the boreholes shall be maintained until the vibration survey has been undertaken.

### Specification

- 1.0 The following documents will apply unless otherwise agreed:
  - BS5930 "Code of Practice for Site Investigations"; British Standards Institute, 1999.
  - Specification for Ground Investigation, published by Thomas Telford Services Ltd in 1993.
  - BS ISO 10381-1 "Soil quality – Sampling – Part 1: Guidance on the sampling programmes"; British Standard Institute, 2002.
  - BS 6068-6.11: 1993 Water quality – Part 6: Sampling Section 6.11; Guidance on sampling of groundwater.
  - BS 1377 "Methods of test for soils for Engineering purposes"; British Standards Institute, 1990
  - BS 10175 "Code of Practice for Potentially Contaminated Sites"; British Standards Institute, 2001

### Buried Services

- 1.0 The Contractor is to satisfy themselves as to the location and extent of all existing services on site before commencing work. Repairs to damaged services remain the responsibility of the Contractor.
- 2.0 Use CAT scan and hand digging to determine presence of shallow services at all investigation locations.



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## Testing

### 1.0 The following tests are required:-

- Appropriate in-situ testing at each layer of differing soils and at regular intervals in the boreholes/window samplers to determine the soil properties and characteristics. Note: Mackintosh probe tests are not permitted.
- Details of groundwater strikes and levels of groundwater at completion. Gas and groundwater levels in the 3No. window samplers are to be monitored in standpipes. An allowance should be made for revisiting the site monthly for the following four months to monitor gas and groundwater levels.
- Laboratory tests on retrieved samples sufficient to make recommendations regarding the design of foundations. Consolidation testing of undisturbed samples to determine settlement characteristics.
- Sulphate content of the ground and any groundwater encountered (not water used for drilling purposes).
- Sufficient testing to establish the degree of desiccation of the ground.
- Contamination testing for CLEA contaminants and sufficient contamination testing to enable material excavated for the new foundations to be identified for disposal purposes (i.e. WAC testing) and to develop the remediation strategy should one be deemed necessary.
- Further contamination testing for ICRCCL / CRL contaminants should be included if evidence is encountered on site that would give cause for concern.
- CBR tests to enable the design of hard standing areas on the site. Location of tests to be in the vicinity shown on the drawing.
- Any further testing to meet the requirements noted in Reporting.

## Reporting

- 1.0 An initial desk study report is required and should be commenced and provided as soon as possible after appointment.
- 2.0 A factual and interpretive report is required containing all borehole, window samplers, probe, and trial pit logs, initial readings from the standpipes and test results with interpretative comments on the following:
  - Allowable end bearing and shaft friction values for piled foundations along with indicative pile depth/capacity for 600 diameter piles with a minimum length of 25m. The type of pile appropriate should be noted along with the assumed factor of safety.
  - Approximate total and differential foundation settlements with a discussion on the potential differential settlement between the 11 storey northern half and the 6 storey southern half.
  - The length of pile required to achieve the currently assumed pile capacity of 1500kN. The effect of sleeving the upper 5-6m the piles shall be included in the pile options.
  - Results of investigation of the unknown object along with GPR results and surveyed position.
  - Comments should also include the soil volume change from potential desiccation.



- o The sulphate effects of the soil and/or groundwater along with the suitable DS and ACEC sulphate design classification for the design of the concrete.
- o Reference should be made to any contamination testing carried out and recommendations made for appropriate action to be taken (if necessary) including remediation recommendations and the classification for disposal of excavated materials.
- o Recommendations for gas protection, if any.
- o Comments of suitability of excavated material as backfill.
- o Recommendations with respect to the design of hard standing areas.
- o Special or unusual conditions revealed during the investigation.
- o Elastic soil coefficient of the piles to aide in the computational modelling of the piled raft. Assume 600 diameter piles with a minimum length of 25m and an assumed pile capacity of 1500kN. The coefficient units are to be in kN/m and are required to examine the effect of settlement in the piles under the whole building loads. Coefficients should be stated for both vertical and horizontal directions.

4.0 One PDF copy and three hard copies of the final report are required.

## Method Statements and Risk Assessments

- 1.0 The Contractor shall provide method statements and risk assessment for all site operations for approval by Network Rail or other interested parties. This information would be required well in advance of the intrusive investigation.

## Appointment and Insurance

- 1.0 The Contractor shall comply with the terms and conditions in the attached appointment document. Payment provisions noted in the attached template are to be confirmed by the Client.
- 2.0 The Contractor shall maintain a policy of professional indemnity insurance with a limit not less than £5,000,000 (five million pounds). A copy of the certificate is to be included with the tender submission. Further details are contained in the attached appointment document.

## Protection and Safety

- 1.0 The Contractor shall comply at all times with the requirements of the Health and Safety at Work Act, etc. 1974, including Health and Safety Executive approved Codes of Practice and Guidance notes.
- 2.0 The Contractor shall ensure that the stability of all excavations and adjoining premises is maintained at all times. The Contractor is to design, install and maintain all necessary temporary works and programme the works accordingly.
- 3.0 The Contractor shall ensure that he carries the requisite insurance for carrying out the work, indemnifying against any expenses, etc. arising out of negligence, omission or default.