REMEDIATION PROPOSALS REPORT

Athlone House
Hampstead Lane
Highgate
London N6

Client: Virtus Real Estate

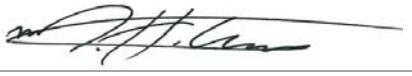
J16075A

July 2017




GEA Geotechnical & Environmental Associates

Document Control

Project title	Athlone House, Hampstead Lane, Highgate N6 4RU	**Project ref**	J16075A
Report prepared by			
	Matthew Legg BEng FGS		
Report checked and approved for issue by			
	Steve Branch BSc MSc CGeol FGS FRGS MIEnvSc		
1	Final	10 July 2017	

This report has been issued by the GEA office indicated below. Any enquiries regarding the report should be directed to the office indicated or to Steve Branch in our Herts office.

☑ Hertfordshire tel 01727 824666mail@gea-ltd.co.uk

☐ Nottinghamshire tel 01509 674888midlands@gea-ltd.co.uk

CONTENTS

1.0 INTRODUCTION

Geotechnical and Environmental Associates (GEA) has been commissioned by Virtus Real Estate, to formulate remediation proposals for the development of this site at Athlone House, Hampstead Lane, N6 4RU. The site has been the subject of a desk study and a number of phases of investigation with the following reports being produced:

- *Report on Ground Water for Athlone House* - LBH Wembley (report ref LBH2921(a), dated September 2003);
- *A Groundwater Assessment Report* - RPS Health, Safety and Environment (report ref: FLC1578.002L, dated May 2004);
- *Desk Study and Basement Impact Assessment* – GEA (report ref J12224 report issue 4, dated July 2014);
- *Ground Investigation and Basement Impact Assessment Report* – GEA (report ref J16075 report issue 2, dated June 2016); and
- *Supplementary Ground Investigation Report* – GEA (report ref J16075 report issue 3, dated June 2017).

The above reports contain data that is pertinent to the remediation of this site and should be read in conjunction with this report.

1.1 Proposed Development

Planning permission has been granted for the refurbishment and extension of the existing detached property, which will include the construction of a single storey rear extension that will house an indoor swimming pool within a single level basement. In addition to the works to the main house, permission has also been granted for the refurbishment and extension of two outbuildings along the northern boundary, in addition to a 2000 m^2 outhouse in the northwestern corner of the site and the conversion of a natural pond into a natural water swimming pond. This report is specific to the proposed development.

The permission has been granted with the following conditions relating to ground contamination:

Condition 21a
At least 28 days before development commences a written programme of ground investigation for the presence of soil and groundwater contamination and landfill gas shall be submitted to and approved by the local planning authority in writing

Condition 21b
Following the approval of detailed in Condition 21a, an investigation shall be carried out in accordance with the approval programme and the results and a scheme of remediation measures, if necessary, shall be submitted to and approved by the local planning authority in writing.

Condition 21c
The remediation measures shall be implemented strictly in accordance with the approved scheme and a written report detailing the remediation shall be submitted to and approved by the local planning authority in writing prior to occupation.

The details of the additional ground investigation were submitted to the Contaminated Land Office at the local planning authority and were approved, in order to satisfy Condition 21a; email correspondence is included in the appendix. The supplementary ground investigation

report along with this remediation proposals report are being submitted in order to discharge Condition 21b.

A proposed site layout plan is included in the appendix, whilst a cross-section through the new basement and swimming pool is shown below, along with an indicative image of the proposed natural water swimming pond.

1.2 Summary of Previous Findings

The previous desk study indicated that at the time of the earliest map studied, dated 1870, the site was occupied by Fitzroy House and its associated grounds. By 1896, Fitzroy House had been replaced with what appears to be the existing manor house, although at that time it was known as Caen Wood Towers. The map dated 1896 also shows a large pond in the

northwestern corner of the site. By 1935, the house had been extended northwards and a rectangular feature constructed within the grounds to the west, which on later maps is annotated as a tennis court. The site remained unchanged until between 1953 and 1964, when a large rectangular building was constructed adjacent to the eastern elevation of the original manor house. It is on the map dated 1964 that the site is first referred to as Athlone House and is stated as forming part of the Middlesex Hospital. The site remained unchanged until between 2006 and 2012, when the large rectangular building to the east was demolished, along with the northern extension to the existing building. No on-site or off-site sources of contamination were identified by the desk study or site walkover.

The previous investigation confirmed the expected ground conditions in that below a generally moderate thickness of made ground over the Claygate Member of the London Clay Formation, which was proved to the maximum depth investigated. In areas close to the house, the made ground was found to extend to depths of between 0.80 m and 1.80 m, whilst in the lawn areas surrounding the house, it extended to a maximum depth of 0.40 m. It generally comprised brown clayey silt with rootlets, gravel, brick, concrete, coal and timber fragments.

The Claygate Member generally comprised an initial horizon of firm becoming stiff medium to high strength brown and orange-brown mottled grey silty very sandy clay, with pockets of clayey fine sand and sandy silt, to depths of 6.00 m and 7.30 m. This initial layer was underlain by stiff brownish grey silty sandy clay with partings and pockets of pale grey silt to depths of 7.30 m and 9.00 m, over stiff high strength dark grey silty clay to clayey silt to depths of 12.00 m and 15.00 m. This was in turn underlain by very stiff high strength to very high strength dark grey silty, locally sandy, clay with traces of selenite, which was proved to the maximum depth investigated, of 20.00 m.

During drilling of the boreholes, groundwater was encountered at depths of 12.10 m and 12.50 m, corresponding to levels of between 101.43 m OD and 99.75 m OD. Subsequent monitoring of the standpipes installed in boreholes during several phases over a number of years has measured groundwater at depths of between 9.02 m and 10.21 m (104.42 m OD to 101.99 m OD).

The made ground has been found to be generally free from significant contamination. However, a sample recovered from the base of the pond in the northwestern corner of the site was found to contain elevated concentrations of lead, sulphide, benzo(a)pyrene and TPH. The proportions of the various carbon chain lengths suggest that the hydrocarbon contamination represents a heavy heating oil and it is possible that the other elevated contaminants originate from the same source, through the combustion or partial combustion of some form of hydrocarbon fuel. The pond is a natural pond originating from a spring that forms the source of one of the tributaries to the River Fleet, one of London's "lost rivers" and is therefore a sensitive receptor. Whilst the exact source of the contamination is unknown, it is thought that various surface water drains feed into the pond, so it is possible that the contamination is from some form of relic spillage that has washed down the existing drainage routes and into the pond.

All tanks have been removed from the main building on site and therefore no potential ongoing sources of hydrocarbon contamination were identified.

2.0 CONTAMINATION RISK ASSESSMENT

One of the requirements of the Environment Act (1995) is that local authorities carry out inspections of their area with a view to identifying sites that may be contaminated. When assessing whether a site is contaminated the local authority will attempt to establish the presence of a 'pollution linkage'. A pollution linkage requires there to be a source of contamination, a sensitive receptor that can be adversely affected by the contamination and a pathway via which contamination can reach the target.

SOURCE	RECEPTOR	PATHWAY	COMMENTS
Measured contamination within pond sediments and water	end users	ingestion of contaminated water and direct skin contact	the contaminated pond sediment will need to be removed and disposed of off-site to prevent ongoing contamination of the pond water. The existing pond water will also need to be removed and the new freshwater to tested to confirm the absence of contamination
	site workers during construction	ingestion of contaminated soil and pond water or dust, skin contact, inhalation	appropriate protective equipment and working practices required during ground work.
	neighbouring sites	groundwater	the treatment of the pond water and the removal of existing pond sediment will prevent further potential of the contamination migrating downstream to the Hampstead Ponds and other off-site sensitive receptors

The pollution linkages that require further consideration are discussed in more detail below.

2.1 End Users and Neighbouring Sites

In order to protect future end users of the proposed natural swimming pond, the existing pond sediment will need to be removed from site and disposed of a suitably licenced disposal site. Any existing water that is pumped from the pond will also need to be disposed of to a licenced waste management facility. Prior to the removal of the water, samples will be tested to establish background concentrations and to provide chemical analyses for waste disposal purposes.

It is understood that proposed natural swimming pond will be lined, potentially with a concrete liner, which will prevent any residual contamination from effecting future natural surface water within the pond. However, once the pond has refilled, further groundwater samples will be recovered and tested to ensure that all concentrations are within current guideline values.

2.2 Site Workers

Site workers should be made aware of the potential presence of contamination in the made ground and a programme of working should be identified to protect workers handling any soil. The method of site working should be in accordance with guidelines set out by HSE[1] and CIRIA[2] and the requirements of the Local Authority EHO.

1 HSE (1992) HS(G)66 *Protection of workers and the general public during the development of contaminated land* HMSO

2 CIRIA (1996) *A guide for safe working on contaminated sites* Report 132, Construction Industry Research and Information Association

3.0 REMEDIATION PROPOSALS

On the basis of the above, the following remediation should be undertaken in the soft landscaped garden areas:

1. Prior to commencing work on the natural swimming pond, samples of the existing water will be recovered and tested for background contaminant concentrations.

2. The existing water will be pumped out and disposed of to a suitably licenced facility and waste disposal certificates retained to be included in the remediation completion report.

3. The existing pond sediment will be excavated and disposed of to a suitably licenced waste disposal site and the waste disposal certificates retained to be included in the remediation completion report.

4. Following excavation, formation level will be inspected by a suitably qualified engineer to ensure all previous pond sediment has been removed, with photographs and observations provided in the remediation completion report.

5. Once the pond works have been completed and the water level established, further samples of the water will be recovered and sent for confirmatory analysis.

6. During the work a watching brief will be maintained in accordance with the discovery strategy included in the appendix, which sets out the procedure to be followed on site should contamination that was not previously identified, be encountered during the fieldwork. Any further investigation, test results and changes to the remediation strategy will be reported to Local Authority.

10. On completion of all of the above, a remediation completion report will be produced and submitted to the Local Authority for evaluation, including all of the above information.

APPENDIX

Proposed site plan

Discovery Strategy

Drainage Strategy

Foul Drainage

Private gravity system discharging inlet Thames Water foul sewer.

Surface Water Drainage

Gravity system discharging into tanked cellular storage sized to accommodate 1 in 100 year storm with 30% allowance for climate change. Attenuated green field runoff rate discharge into existing pond controlled by Hydrobrake or similar device.

SURVEY INFORMATION

Greenhatch Group - 01332 830044
DRG NUMBER: 22929_01_P — DATE RECEIVED: 21/04/2016

ARCHITECT SITE PLAN INFORMATION

SHH Architects - 020 8600 4171
DRG NUMBER: (817)020_PL01 & 021_PL01 — DATE RECEIVED: 10/05/2016

NOTES

1. All dimensions and levels are in metres unless otherwise noted
2. This drawing is to be read in conjunction with the relevant Architect's/Engineer's drawings, specifications and CDM documentation
3. This drawings has been produced electronically and may have been photo reduced or enlarged when copied. Work to figured dimensions only (DO NOT SCALE). All dimensions to be checked on site. Any errors or omissions to be reported to the engineer immediately.
4. This drawing contains coloured lines / information that may not be clear if reproduced in black and white.
5. Digital copies of this plan can only be considered accurate if supplied directly by Infrastruct CS Ltd.

Construction Note

It is essential that new drainage associated with the development is laid from the outfall(s) into the site. This is essential to avoid unforeseen obstructions where encountered (such as services). If the drainage is laid from the site out to the outfall it can result in significant abortive works to relay and overcome such obstructions.

Drainage Key

Sewers

- Foul water drain (private/non adoptable)
- Surface water drain (private/non adoptable)
- Foul water sewer (Adoptable)
- Surface water sewer (Adoptable)
- Highway drain (Adoptable)
- Foul rising main
- Existing highway drain
- Existing foul water drain (private/non adopted)
- Existing surface water drain (private/non adopted)
- Existing foul water sewer (Adopted)
- Existing surface water sewer (Adopted)
- Existing combined water sewer (Adopted)
- Redundant sewer

Chamber Key

FW	SW	
mac	mac	Mini access chamber (mac) - 300mmØ *
		PPIC - 475mmØ *
		P.C.C. units/brick *
DM	DM	Adoptable demarcation manhole within 1m of boundary *
		Manhole Depth 1.25 to 1.5m * Depth 1.55 to 3.0m *

* General note
(Refer to standard details & long sections for chamber sizes. Size may need to increase dependant on number of incoming pipes/size of incoming pipes)

RE	Surface water rodding eye
F1	Manhole reference number
	Rain water down pipe (roddable access)
	Soil vent pipe/soil stack
yg	Yard gully (150m - 200mmØ trapped)
RG	Road gully (trapped) C250
fg	Floor gully (trapped)
	Linear drainage channel
	Cellular storage (refer to drawing for sizes)
	Headwall
	Retaining wall
FFL XX.XX	Finished Floor Level (FFL)
	Tanked Permeable paving
	Shallow Swale
	Tree root protection zone (RPZ)
	Tree root membrane
	Impermeable barrier to stop lateral movement of water
	Baffle to prevent rapid through flow of water through permeable paving

Rev	Drawn by	Chk'd by	Comments	Date
P01	ATD	DJ	Initial issue	19/05/16

DRAWING TITLE
Drainage Strategy Plan
Ground Floor

PROJECT
Athlone House
Hampstead Lane
London

DESIGNED BY	DRAFTED BY	APPROVED BY
DJ	ATD	**

DATE: 19/05/2016 — STATUS: PRELIMINARY

SCALE: 1:500 @ A1 — scale bar @ 1:500 (0m, 12.5m, 25.0m)

CLIENT
Mr Mikhail Fridman

Infrastruct CS Ltd

JOB NUMBER	DRAWING NUMBER	REVISION
ICS-2129	01	P01

K:\ICS Jobs\2100 Jobs\2129 - Athlone House (HKW)\01 - Drawings\01 Civil\02 - 2129_Ground Floor.dwg

Geotechnical & Environmental Associates
Widbury Barn
Widbury Hill
Ware
SG12 7QE

Discovery Strategy

Site	Athlone House, Hampstead Lane, Highgate N6 4RU
Client	Virtus Real Estate
Engineer	Engineers HRW

Job Number J16075A

Sheet 1 / 1

DISCOVERY STRATEGY - CONSTRUCTION PHASE CONTAMINATED MATERIALS

SITE: Athlone House, Hampstead Lane, Highgate, London N6

Introduction

This site is to be redeveloped through the refurbishment of the existing manor house and a number of existing outbuildings, in addition to the construction of a new summer house and natural swimming pond The main contractor is yet to be appointed, with the work being carried out on behalf of Virtus Real Estate.

Elevated levels of lead, sulpahte and petroleum hydrocarbons (TPHhave been encountered in the sediments to the natural pond in the northwestern corner of the site and a Condition of Planning requires that remediation is carried out in order to protect sensitive receptors. Part of the Condition of Planning requires a Discovery Strategy to be in place during the construction phase, the purpose of which is to define the procedures to be followed on site in the event that previously unidentified contamination or suspicous objects are discovered. It is intended to be understood and followed by all on-site workers and for all new site workers to be made aware of the procedure.

How to identify potential contaminated material

- Looks oily and had an oily hydrocarbon odour
- Solvent type of odour
- Man made materials in fill such as paint cans, car parts, glass fragments
- Contains fragments of white asbestos sheeting
- Sand bags, and / or subsurface concrete structures

(these are examples only and is not be any means a full list. If any doubt, ask)

Procedure

On discovery of any suspicious material during the redevelopment, the following procdedure should be followed:

- Site personnel to immediately inform the site manager and should not investigate it themselves.
- The site manager should make a desicion on whether the material is potentially contaminated and will inform GEA, with the area of work cordoned off and work ceased in the vicinity.
- GEA will then attend site to sample material for laboratory testing and will attempt to quantify the volume. The London Borough of Camden will then be informed of the discovery and will be forwarded laboratory data and remedial strategy for their approval in the event that the material is to be classified as contaminated.
- The discovery should be documented by the site manager including date of discovered, a plan detailing the position of the contamination and site photographs.
- Following the completion of the remediation and the development, a remediation completion report will be sent to the London Borough of Camden for their approval.

Geotechnical & Environmental Associates (GEA)
is an engineer-led and client-focused independent specialist providing a complete range of geotechnical and contaminated land investigation, analytical and consultancy services to the property and construction industries.

We have offices at

Widbury Barn
Widbury Hill
Ware
Hertfordshire
SG12 7QE
tel 01727 824666
mail@gea-ltd.co.uk

Church Farm
Gotham Road
Kingston on Soar
Notts
NG11 0DE
tel 01509 674888
midlands@gea-ltd.co.uk

Enquiries can also be made on-line at

www.gea-ltd.co.uk

where information can be found on all of the services that we offer.