9-13 Grape Street, London, WC2H 8ED

Basement Impact Assessment

June 2016

FAIRHURST consulting engineers gga

CONTROL SHEET

CLIENT: Paragon

PROJECT TITLE: 9-13 Grape Street, London, WC2H

REPORT TITLE: Basement Impact Assessment

PROJECT REFERENCE: 112380

DOCUMENT NUMBER: 001

Issue & Approval Schedule	ISSUE 1 DRAFT	Name	Signature	Date
	Prepared by	Andrew Smith		15/06/2016
	Checked by	Heather Bourne		15/06/2016
	Approved by	Phil Brown		15/06/2016

Revision Record	Rev.	Date	Status	Description	Signature	
	2				By	
					Checked	
					Approved	
	3				By	
					Checked	
					Approved	

This document has been prepared in accordance with procedure OP/P02 of the *FairhurstGGA Quality and Environmental Management System*

CONTENTS

1.0 NON TECHNICAL SUMMARY 1
2.0 INTRODUCTION 2
3.0 BASELINE CONDITIONS 4
4.0 SCOPING PHASE 11
5.0 CONCLUSIONS 13

FIGURES

Figure 1. Site Location Plan
Figure 2. Surrounding Buildings and Land Uses
Figure 3. Trial Pit Location Plan
Figure 4. Location of site relative to the 'Lost Rivers' of London (Barton, 1992)
Figure 5. Risk of Flooding from Surface Water

APPENDICIES

Appendix A. Trial Pit Photographs
Appendix B. Responses from Transport For London and DTZ (Post Office Tunnels)

1.0 NON TECHNICAL SUMMARY

Project Objectives	At the request of the London Borough of Camden a Basement Impact Assessment has been carried out at 9-13 Grape Street, London in support of a planning application for a proposed new development which includes lowering the north western section of the basement to match the south eastern section at approximately 21.10mOD. A small 1m x 1m sized lift pit is also proposed to 0.94m below basement level to approximately 20.16mOD.
Geology/ Hydrogeology	The BGS map of the area (Sheet 256) indicates that the site is underlain by the Lynch Hill River Terrace Gravel with the London Clay Formation at depth. According to Environment Agency Flood maps the site lies within Flood Zone 1, which is defined as areas where flooding from rivers and the sea is very unlikely, with less than a 0.1 per cent (1 in 1000) chance of such flooding occurring each year. Based on the results of the site walkover combined with a study of OS mapping there are no watercourses or surface water features within 100m of the site. The Lynch Hill River Terrace Gravel is designated as a Secondary (A) Aquifer whilst the Bedrock geology underlying the site (London Clay Formation) has been classified as Unproductive Strata; rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow.
Conclusions and Recommendations	It is concluded that the proposed development is unlikely to result in any specific land or slope stability issues, groundwater or surface water issues. If seasonal groundwater is encountered during construction, the contractor should make provisions to control this through conventional sump pump methods. The exact location, depth and geometry of the existing royal mail tunnels below the site should be confirmed at a detailed design stage.

2.0 INTRODUCTION

The purpose of this assessment is to consider the effects of a proposed basement extension on the local hydrology, geology and hydrogeology at 9-13 Grape Street, London, WC2H 8ED.

The site comprises a five storey commercial building (including a basement level) and is located on the north east side of Grape Street, with the rear backing onto West Central Street. The building is currently unoccupied.

The current basement steps down from approximately 21.52mOD within the north western section of the site to 21.10mOD within the south eastern section. Proposals for the site include lowering the north western section of the basement to match the south eastern section at approximately 21.10mOD. A small 1m x 1m sized lift pit is also proposed to 0.94m below basement level to approximately 20.16mOD.

The information contained within this BIA has been produced specifically to meet the requirements set out by Camden Planning Guidance – Basements and Lightwells (CPG4) (July 2015) in order to assist London Borough of Camden with their decision making process.

2.1 Data Sources

This section provides the baseline data used to complete the BIA in relation to the proposed development. Reference information used for this purpose is outlined below:

(i) Ordnance Survey Maps

Historical Ordnance Survey plans were were reviewed on www.oldmaps.co.uk for information pertaining to the historical land use and changes to the site.

(ii) Published Geological and Environmental Information

- British Geological Survey – 1:50,000 Geological Sheet 256, North London (Solid & Drift), 1990;
- British Geological Survey borehole scans (available: http://mapapps.bgs.ac.uk/geologyofbritain/home.html).
- Environment Agency Internet database (www.environment-agency.gov.uk);
- Barton N (1992) The Lost Rivers of London. Historical Publications Ltd, London;
- Regional Climates of the British Isles edited by Dennis Wheeler and Julian Mayes. Routledge 1997. 343 pp. ISBN 0-415-13931-7
- Site reconnaissance survey completed by Fairhurst (June 2016);
- CIRIA C580 Embedded retaining walls – guidance for economic design (2003)
- New Oxford Street. The Post Building. Ground Movements and Central Line Tunnel Capacity Calculations. Arup. 26th June 2015. Reference REP/GEO/05. Available Online on Camden Planning Portal.

(iii) London Borough of Camden

- London Borough of Camden (LBC) Planning Guidance (CPG4) – Basements and Lightwells (July 2015).
- LBC (Nov 2010). Camden geological, hydrogeological and hydrological study. Guidance for subterranean development (produced by Arup Consulting).
- London Borough of Camden. Strategic Flood Risk Assessment July 2014. URS.
- River Basin Management Plan (RBMP). Thames River Basin District (2009);
- New Oxford Street Limited. The Post Building. Ground Movements and Central Line Carrying Capacity Calculations. Arup. 2015. Available online on Camden Planning Website.

(iv) Drawings

- Robert Partington and Partners Architect drawings

(v) Additional Websites

- http://www.ucl.ac.uk/bloomsbury-project/streets/vine_street.htm

2.2 Guidance, Frameworks and BIA Approach

The proposed basement is located in the London Borough of Camden (LBC) and as such will be required to be developed in accordance with the guidance and policies outlined in the Camden Planning Guidance. Basements and Lightwells (CPG 4) (July 2015).

The BIA approach follows current planning procedure for basements and lightwells adopted by LBC and comprises the following elements:

- Screening;
- Scoping;
- Impact Assessment;
- Review

On the basis of the screening process it has been deemed unnecessary to carry out the impact assessment and review stages.

2.4 Qualifications

The qualifications required by LBC are fulfilled as documented in Table 1 below. All assessors meet the qualification requirements of the Council guidance.

Table 1 – Qualification Summary

Subject	Qualifications Required by CPG4	Relevant person(s) in Fairhurst
Surface flow and flooding	A hydrologist or a Civil Engineer specialising in flood risk management and surface water drainage, with either: The 'CEng' (Chartered Engineer) qualification from the Engineering Council The CWEM (Chartered Water and Environmental Manager) qualification from the Chartered Institution of Water and Environmental Management	Mr Jon Lau BEng MSc CEng MIStructE Mr Andrew Smith BSc(Hons) FGS MCIWEM
Subterranean (groundwater flow)	A hydrogeologist with the 'CGeol' (Chartered Geologist) qualification from the Geological Society of London	Mr Phil Brown BSc (Hons) FGS CGeol
Land Stability	A Civil Engineer with the 'CEng (Chartered Engineer) qualification from the Engineering Council	Mr Jon Lau BEng MSc CEng MIStructE

3.0 BASELINE CONDITIONS

3.1 Site Description

The site is located on the north east side of Grape Street, with the rear backing onto West Central Street as detailed on Figure 1.

The site comprises a five storey commercial building (including a basement level), built around 1900 and constructed with red brick and terracotta. The building is currently empty having previously been used as offices and a gym.

The site is located in the Bloomsbury Ward of London Borough of Camden and is in the Bloomsbury Conservation Area. The buildings located on the development site are not listed, but are included on the local list for Camden as unlisted buildings of merit that make a positive contribution to the character of the conservation area.

The predominant character of Grape Street is commercial in nature, however the upper floors and mansion blocks are largely the preserve of residential uses. To the south of the application site and on the opposite side of Grape Street, the building sits adjacent to elaborately decorated grade II listed buildings, most notably the Shaftesbury Theatre. The buildings surrounding the site are shown in detail on Figure 2.

The site is located on slightly sloping ground to the south west at angles of 2-3°. The basement level of the building accommodates this slope stepping down from approximately 21.52mOD within the north western section to 21.10mOD within the south eastern section. The wider general area also slopes to the south towards the River Thames.

3.2 Site History

A brief summary of the site history using publically available historical map information is described below. It should be noted that this report does not purport to be a full Phase One Risk Assessment and should not be treated as such.

Grape Street is detailed on the earliest available Ordnance Survey Map of the area dated 1851 although it is labelled as Vine Street. Unnamed buildings are detailed on both sides of Vine Street and from internet sources (http://www.ucl.ac.uk/bloomsbury-project/streets/vine_street.htm), it is apparent a large distillery (Bloomsbury Distillery) was present on the site in this time which was established on Vine Street in circa 1838. A soap company also had premises at no. 7 Vine Street in the 1860s. The surrounding area is also well developed with Oxford Street detailed to the north and the A40 Broad Street to the south.

By 1895 the distillery on the site is formally labelled and is detailed covering most of the land immediately to the east of Vine Street. Land further to the east is shown as being undeveloped land. The street is shown to have reduced in size with the construction of Shaftsbury Avenue to the north. It was renamed Grape Street in 1905 (Camden History Society, Streets of St Giles, 2000)

By 1910 the distillery is shown have been redeveloped and the existing buildings 9-13 Grape Street are detailed on the site. By 1916 Shaftsbury Theatre (labelled Princes Theatre) is detailed to the south west of the site.

By 1952 large buildings are shown to have been constructed in the vacant land to the east of the site and a garage is labelled 20m south west of the site. By 1968 these buildings are shown to have been demolished and the existing local access road leading from West Central Street and the underground car park are now detailed in this area.

No further significant change is evident.

3.3 Geology

British Geological Survey (BGS) Data

The BGS map of the area (Sheet 256) indicates that the site is underlain by the Lynch Hill River Terrace Gravel with the London Clay Formation at depth.

The BGS's online records indicate there are four historical boreholes located 10m to 20m east of the site (BGS References TQ38SW/799A, B, C and D). Unfortunately the borehole logs are largely illegible although from the borehole legends, a surface cover of Made Ground overlying Lynch Hill River Terrace Gravel with the London Clay Formation at depth can be identified.

From a search of LBC online planning portal, a project-specific ground investigation comprising one 50m deep borehole was carried out by Concept Engineering Consultants Ltd between October and November 2013 at 21-23 New Oxford Street, WC1A (The Post Building), 125m north east of the site. The results of this borehole are reported in an Arup Report entitled 'Ground Movements and Central Line Carrying Capacity Calculations' dated June 2015 and the results are summarised below (note: only depths to Ordnance Datum are described in the report).

Table 2. Summary of Nearby Ground Investigation (Arup 2015) (125m NW of site)

Stratum	Level to top of Stratum (mOD)	Thickness (m)
Made Ground	+24.0	3.5
River Terrace Deposits	+20.50	2.0
London Clay	+18.0	21
Lambeth Group	-3.0	16.5
Thanet Sand	-19.5	6.5
Chalk	-26.0	Proven to 0.2m

Groundwater is noted within the River Terrace Deposits between 18.0mOD and 20.50mOD and described as being perched on the London Clay Formation below.

3.4 Ground Investigation

General

As part of the enabling works for the development, a limited intrusive ground investigation was designed to allow a representative assessment of the current ground conditions beneath the site and nature of the existing building foundations

The ground investigation works were completed by specialist building contractors and comprised of 10 No hand excavated trial pits (TP1 to 10) to depths of up to 1.19m bgl to establish the depth and construction of the existing foundations of the existing building and determine the founding stratum.

An Exploratory Hole Plan is provided within this report as Figure 3 which is provided within Appendix A of this report whilst photographs of the trial pit excavations are included in Appendix A.

Ground Conditions

The trial pits revealed ground conditions that were generally consistent with the geological records and known history of the area and comprised Made Ground up to 0.74m in thickness followed by Lynch Hill River Terrace Gravel below.

These ground conditions are summarised below and in the following Table 1.

The levels of the boreholes and trial pits have been approximated using current topographical survey information.

Made Ground

The Made Ground extended to depths of between 0.15 and 0.74m bgl in Trial Pits 1, 4, 5, 6, 7, 8, 9 and 10 (20.55 to 21.26mOD) and to the full depth of excavation of 0.40m bgl in Trial Pit 2 (21.19mOD) and 0.30m bgl in Trial Pit 3 (21.26mOD). The soils general comprise a surface layer of concrete up to 0.30m in thickness overlying brick and concrete rubble.

In locations Trial Pit 2 and 3 large drains were encountered during the excavations causing the early termination of the pits.

Lynch Hill River Terrace Gravel

The underlying Lynch Hill River Terrace Gravel comprised silty very gravelly sand. These soils extended down to the full depths of investigation of between 0.40m to 1.19m bgl in Trial Pits 1 and 4 to 10 (20.1 to 20.90mOD)

Table 3: Summary of Ground Conditions Encountered

Lithology	Depth to top of Lithology		Thickness	Exploratory Holes Encountered
	mbgl	mOD		
Made Ground*	GL	21.09 to 21.59	0.10 to 0.74	All
Lynch Hill River Terrace Gravel**	0.15 to 0.74	20.55 to 21.26	0.06 to 0.80	TP3 to 10

* The base of Made Ground was not proven at positions TP2 and TP3

** The base of River Terrace Gravel was not proven at positions TP1 and 4 to 10

Groundwater

Groundwater was not encountered during the excavation of the trial pits and the soils remained essentially dry throughout.

3.4 Hydrology and Drainage

3.4.1 Rainfall and Runoff

According to Mayes and Wheeler (1997) rainfall in the local area averages around 610mm and significantly less than the national average of around 900mm.

Evapotranspiration is typically 450 mm/yr resulting in about 160 mm per year as 'hydrologically effective' rainfall which is available to infiltrate into the ground or runoff as surface water flow.

With reference to Barton (1992) and Figure 4 to this report the site is not within 100m of any of the old river systems.

The area located immediately around the site is highly developed with more than 80% of the surface covered with hardstanding. Most of the rainfall in the area will run-off hard surface areas and be collected by the local sewer network.

3.4.2 Flood Risk

<u>River or Tidal flooding</u>

According to Environment Agency Flood maps the site lies within Flood Zone 1, which is defined as areas where flooding from rivers and the sea is very unlikely, with less than a 0.1

per cent (1 in 1000) chance of such flooding occurring each year. The EA's website also shows that this area does not fall within an area at risk of flooding from reservoirs.

Based on the results of the site walkover combined with a study of OS mapping there are no watercourses or surface water features within 100m of the site.

Surface Water Flooding

According to CPG4 (2015) No 9-13 Grape Street did not flood during either the 1975 or the 2002 flood events. Modelling of surface water flooding has been undertaken by the Environment Agency and a copy for the site area is reproduced as Figure 5 to this report. The site is shown as having a 'Very Low' risk of flooding; the lowest category for the national background level of risk.

Sewer Flooding

With reference to Camden's Strategic Flood Risk Assessment (2014) the property lies outside of an area at risk of internal and external sewer flooding.

3.5 Hydrogeology

The Environment Agency Groundwater Protection Policy uses aquifer designations that are consistent with the Water Framework Directive. These designations reflect the importance of aquifers in terms of groundwater as a resource (drinking water supply) and also their role in supporting surface water flows and wetland ecosystems.

Reference to the data sources detailed in section 2.1 indicates that the site is underlain by the Lynch Hill River Terrace Gravel, which is designated as a Secondary (A) Aquifer.

The Bedrock geology underlying the site (London Clay Formation) has been classified as Unproductive Strata; rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow.

Other hydrogeological data obtained from the data sources detailed in Section 2.1 includes:

- The underlying soil classification of the site is of high leaching potential;
- There are no source protection zones within 500m of the site;
- There are no surface water abstraction licenses within 2km of the site;
- There are no water wells within 250m of the site;
- The anticipated groundwater level below the site is likely to be within the River Terrace Deposits below the maximum depth of excavation at 20.10mOD perched on the London Clay Formation below.

3.6 Proposed Development

Proposals for the site include the erection of a roof extension and change of use from office and photographic studios, gymnasium and gallery to office (Class B1) use. As part of these works, the existing north western section of the basement will be lowered by 0.20m to 0.40m to a level of approximately 21.10mOD whilst a small 1m x 1m sized lift pit is also proposed to 0.94m below basement level to approximately 20.16mOD.

3.7 Planning Summary

From the site walkover and a review of the LBC planning portal for Grape Street (1950 to present), it is apparent that the following buildings have basements already exist along the road: No's 9-13 (the site), No 7, No 15, No 16 and No's 2-18. To the east of the site there is a large multistorey car park which contains a double storey basement.

Apart from the site, there have been no recent planning applications with reference to proposed basement excavations along Grape Street within the last 5 years.

3.8 Results of Basement Impact Assessment Screening

A screening process has been undertaken in accordance with the most recent guidance from Camden Council (CPG 4, 2015) and the findings are described below.

Subterranean (Groundwater) flow

Question	Response	Details
1a. Is the site located directly above an aquifer.	Yes	The site is underlain by the Lynch Hill River Terrace Gravel, which is designated as a Secondary (A) Aquifer; permeable layers capable of supporting water supplies at a local rather than strategic scale and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.
1b. Will the proposed basement extend beneath the water table surface.	No	Reference to the trial pits excavated at the site indicates that groundwater is unlikely to be encountered during the maximum excavation to 20.10mOD.
2. Is the site within 100m of a watercourse, well (used / disused) or potential spring line.	No	There are no surface water features within 100m of the site. According to publications regarding Lost Rivers of London (Barton, 1992), the site is not within 100m of a former river or watercourse.
3. Is the site within the catchment of the pond chains on Hampstead Heath?	No	The site is over 5km south east from these features
4. Will the proposed basement development result in a change in the proportion of hard surfaced / paved areas.	No	As the site is already largely hard landscaped, the scheme will not result in a change in the proportion of hard surfaced / paved areas
5. As part of site drainage, will more surface water (e.g. rainfall and run-off) than at present be discharged to the ground (e.g. via soakaways and/or SUDS).	No	Soakaways are not considered appropriate to the site due to nature of the development and therefore no surface water will be discharged to ground as part of the site drainage.
6. Is the lowest point of the proposed excavation (allowing for any drainage and foundation space under the basement floor) close to, or lower than, the mean water level in any local pond or spring line.	No	There are no surface water features within 100m of the site. According to publications regarding Lost Rivers of London (Barton, 1992), the site is not within 100m of a former river or watercourse. Excavations at the site have indicated the groundwater is below the maximum basement dig of 20.16mOD.

Slope stability

Question	Response	Details
1. Does the existing site include slopes, natural or man-made greater than 7 degrees (approximately 1 in 8).	No	The site is located on sloping ground to the south west but this is at angles of less than 3°. The existing level basement level steps down to the south west to account for this slope
2. Will the proposed re-profiling of landscaping at the site change slopes at the property boundary to more than 7 degrees (approximately 1 in 8).	No	Re-profiling of landscaping at the site is not proposed
3. Does the development neighbour land, including railway cuttings and the like, with a slope greater than 7 degrees (approximately 1 in 8).	No	In the surrounding area there is a slight slope in topographic gradient to the south west but this equates to around a 2-3˚ slope angle.
4. Is the site within a wider hillside setting in which the general slope is greater than 7 degrees (approximately 1 in 8).	No	There is a general slope to the south towards the River Thames but this is less than 7 degrees.
5. Is the London Clay the shallowest strata at the site.	No	The British Geology Survey (BGS) map of the area (Sheet 256) indicates that the site is underlain by the Lynch Hill River Terrace Gravel with the London Clay Formation at depth.
6. Will any trees be felled as part of the development and/or are any works proposed within any tree protection zones where trees	No	No trees will be felled as part of the development.

are to be retained.		
7. Is there a history of seasonal shrink-swell subsidence in the local area and/or evidence of such effects at the site.	Yes	The London Clay Formation which underlies the Lynch Hill River Terrace Gravel below the site is prone to shrinking and swelling.
8. Is the site within 100m of a watercourse or a potential spring line.	No	There are no surface water features within 100m of the site. According to publications regarding Lost Rivers of London (Barton, 1992), the site is not within 100m of a former river or watercourse.
9. Is the site within an area of previously worked ground.	No	According to information from the BGS the site is not in the vicinity of any recorded areas of worked ground
10. Is the site within an aquifer. If so, will the proposed basement extend beneath the water table such that dewatering may be required during construction.	No	The site is underlain by the Lynch Hill River Terrace Gravel, which is designated as a Secondary (A) Aquifer. However from the trial excavations carried out at the site, the basement will not extend beneath the water table.
11. Is the site within 50m of the Hampstead Heath Ponds	No	The site is over 5km from these features
12. Is the site within 5m of a highway or pedestrian right of way.	Yes	The site is within 5m of Grape Street
13. Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties.	No	The basement at the site will be increased by only 0.30m. This will not significantly increase the differential depth of foundations relative to neighbouring properties at No.7 and No. 15 which also contain basements to approximately this level.
14. Is the site over (or within the exclusion zone of) any tunnels, e.g. railway lines.	Yes	Transport for London has confirmed that they do not have any tunnels below the site (Appendix B). However, the site is located above the Post Office Railway Tunnels (See Appendix B) which are indicated to be present at depths of 9m below existing basement level (12mOD) according to a nearby investigation by Arup (June 2015).

Surface Water and Flooding

Question	Response	Details
1. Is the site within the catchment of the ponds chains on Hampstead Heath	No	With reference to the Camden Geological, Hydrogeological and Hydrological Study, the site is not within the catchment of the pond chains on Hampstead, nor the Golder's Hill Chain
2. As part of the proposed site drainage, will surface water flows (e.g. volume of rainfall and peak run-off) be materially changed from the existing route.	No	On completion of the development, the surface water flows will be routed similarly to the existing condition, with rainwater run-off collected in a surface water drainage system and discharged to a combined sewer. Any groundwater flows will not be impeded by the basement.
3. Will the proposed basement development result in a change in the proportion of hard surfaced / paved external areas.	No	The scheme will not result in an increase in impermeable areas on the site
4. Will the proposed basement result in changes to the profile of the inflows (instantaneous and long-term) of surface water being received by adjacent properties or downstream watercourses.	No	All surface water for the site will be contained within the site boundaries and collected as described above; hence there will be no change from the development on the quantity or quality of surface water being received by adjoining sites.
5. Will the proposed basement result in changes to the quality of surface water being received by adjacent properties or downstream watercourses.	No	All surface water for the site will be contained within the site boundaries and collected as described above; hence there will be no change from the development on the quantity or quality of surface water being received by adjoining sites.
6. Is the site in an area identified to have surface water flood risk according to either the Local Flood Risk Management Strategy or the Strategic Flood Risk Assessment or is it at risk from flooding, for example because	No	According to modelling by the Environment Agency, there is a 'Very Low' risk of surface water flooding (the lowest category for the national background level of risk) for No's 9-13 and the surrounding area. There are no surface water features within 100m of the site which could create a flood risk for the

the proposed basement is below the static water level of nearby surface water feature.		proposed basement. According to CPG4 (2015) Grape Street did not flood during either the 1975 or the 2002 flood events. With reference to Camden's Strategic Flood Risk Assessment (2014) the property lies outside of an area at risk of internal and external sewer flooding.

3.9 Non-Technical Summary of Chapter 3.0

The site is located on the north east side of Grape Street, with the rear backing onto West Central Street as detailed on Figure 1.

The site comprises a five storey commercial building (including a basement level), built around 1900 and constructed with red brick and terracotta. The building is current empty having previously been used as offices and a gym.

Proposals for the site include the erection of a roof extension and change of use from office and photographic studios, gymnasium and gallery to office (Class B1) use. As part of these works, the north western section of the existing basement will be lowered by between 0.20m to 0.40m to a level of approximately 21.10mOD. A small 1m x 1m sized lift pit is also proposed to 0.94m below basement level (20.16mOD).

The site is underlain by the Lynch Hill River Terrace Gravel, which is designated as a Secondary (A) Aquifer. The Bedrock geology underlying the site (London Clay Formation) has been classified as Unproductive Strata; rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow.

According to Environment Agency Flood maps the site lies within Flood Zone 1, which is defined as areas where flooding from rivers and the sea is very unlikely, with less than a 0.1 per cent (1 in 1000) chance of such flooding occurring each year.

The scheme will not result in an increase in impermeable areas.

The following have been identified as being the potential issues which will be carried forward to the Scoping Phase in this report:

Subterranean Groundwater Flow

- Is the site located directly above an aquifer.

Slope Stability

- Is there a history of seasonal shrink-swell subsidence in the local area and/or evidence of such effects at the site.
- Is the site within 5m of a highway or pedestrian right of way.
- Is the site over (or within the exclusion zone of) any tunnels, e.g. railway lines.

4.0 SCOPING PHASE

This purpose of the scoping phase is to assess potential impacts for each of the issues identified in the screening process and provide recommendations/actions.

Where no remaining actions exist from the screening stage, the Impact Assessment and Review stages as detailed in Section 2.3 are not deemed necessary.

Subterranean (Groundwater Flow)

Screening Question		Response	Action(s)
1a	Is the site located directly above an aquifer.	As identified in the initial screening stage, the basement will be excavated into the Lynch Hill River Terrace Gravel which is designated as a Secondary A Aquifer. Using the results of the trial excavations dug at the site groundwater is not indicated to be encountered during the basement excavations and therefore there will be no restriction of groundwater flows (perched groundwater or below groundwater table) below the site. If seasonal groundwater is encountered during construction, the contractor should make provisions to control this through conventional sump pump methods. No change to the existing drainage arrangements is proposed and therefore existing rates of rainfall infiltration and groundwater recharge will remain unchanged. It is therefore considered that no further action is required.	No further assessment required

Slope Stability

Screening Question		Response	Action(s)
7	Is there a history of seasonal shrink-swell subsidence in the local area and/or evidence of such effects at the site?	The London Clay Formation, which is susceptible to shrink/swell is located at the site below the Lynch Hill River Terrace Gravel and is usually recorded as having a high susceptibility to shrinkage and swelling. However from the results of the trial excavations, the basement will not be excavated into these soils and therefore the risk from shrink-swell subsidence is seen as being very low.	No further assessment required
12	Is the site within 5m of a highway or a pedestrian right of way?	The proposed basement is not to be extended below Grape Street and therefore it is suggested that the impact on this access road is likely to be minimal. Temporary works to address potential instability are to be incorporated into detailed design and construction sequence. There is nothing unusual in the proposed development that would give rise to any concerns with regard to the stability of public highways.	No further assessment required
14	Is the site over (or within the exclusion zone of) any tunnels, e.g. railway lines.	Transport for London has confirmed that they do not have any tunnels below the site (Appendix B). However, the site is located above the Post Office Railway Tunnels (See Appendix B) which are indicated to be present at depths of 9m below existing basement level (12mOD) according to a nearby investigation by Arup (June 2015). Due to the shallow excavations (up to 0.94m below basement level or 20.16mOD), there will be at least 8m between the full depth of excavation and the level of anticipated crown of the tunnel. As no piling or deeper excavation work is proposed, movement to the tunnel is therefore seen as being unlikely. The exact location, depth and geometry of the existing royal mail tunnels should be confirmed at a detailed design stage.	No further assessment required

4.1 Non-Technical Summary of Chapter 4.0

Based on the scoping phase it is not considered that the proposed basement would result in any detrimental changes to 9-13 Grape Street or the buildings located in the vicinity of the property.

On the basis of these findings, no further site investigation is recommended as necessary for the site.

5.0 CONCLUSIONS

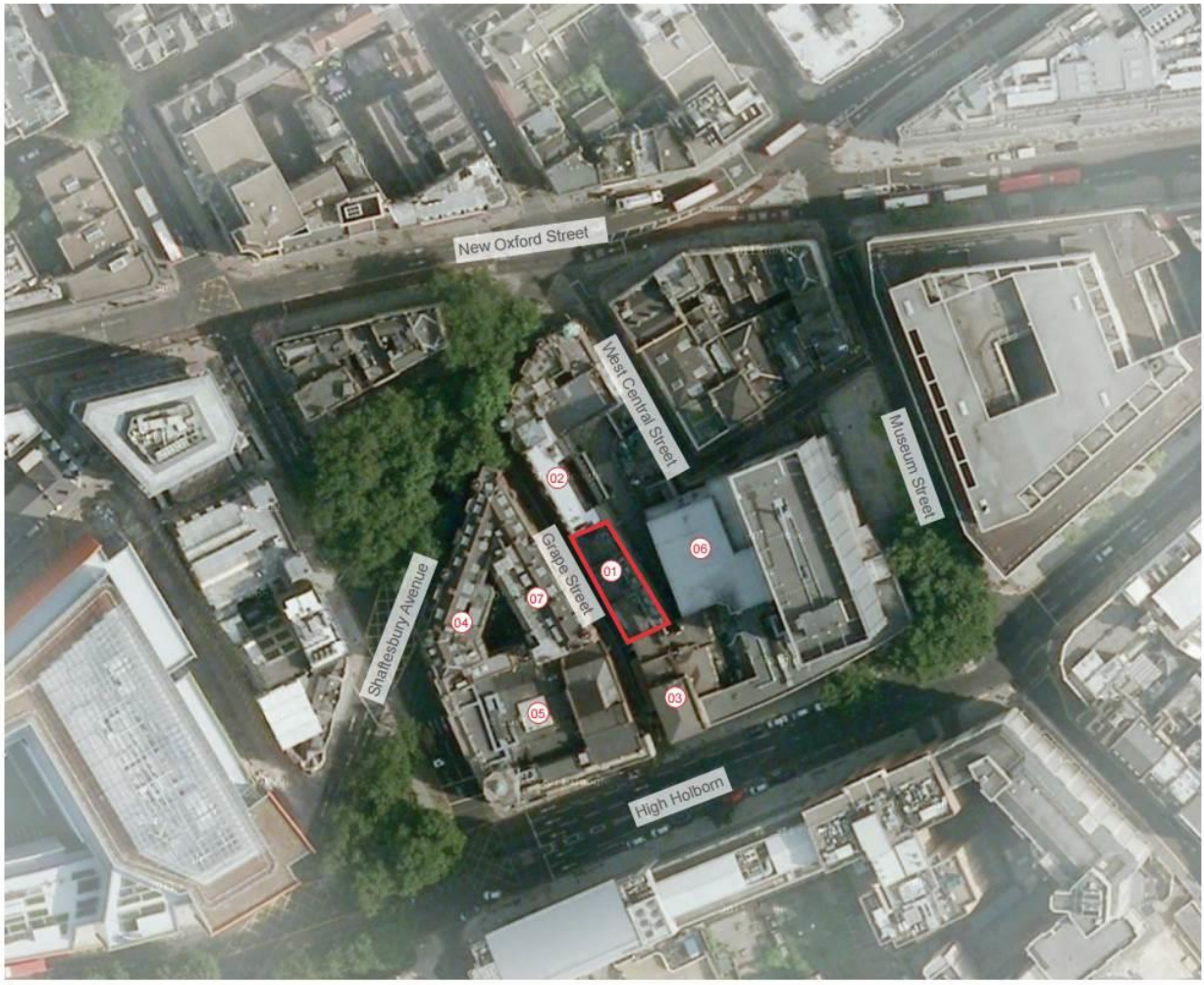
A Basement Impact Assessment has been carried out following the information and guidance published by the London Borough of Camden. Information has been used to assess potential impacts identified by the screening process. It is concluded that the proposed development is unlikely to result in any specific land or slope stability issues, groundwater or surface water issues.

If seasonal groundwater is encountered during construction, the contractor should make provisions to control this through conventional sump pump methods.

The exact location, depth and geometry of the existing royal mail tunnels below the site should be confirmed at a detailed design stage.

Figure 1 – Site Location Plan

Figure 2 – Surrounding Buildings and Land Uses



Application Site at 9-11 Grape Street, highlighted in red

01	9-11 Grape Street
02	Queen Alexandra Mansions
03	The Cuban Embassy
04	Sovereign House
05	The Shaftesbury Theatre
06	Multistorey Car Park
07	Kind Edward Mansions

Figure 3 – Trial Pit Location Plan

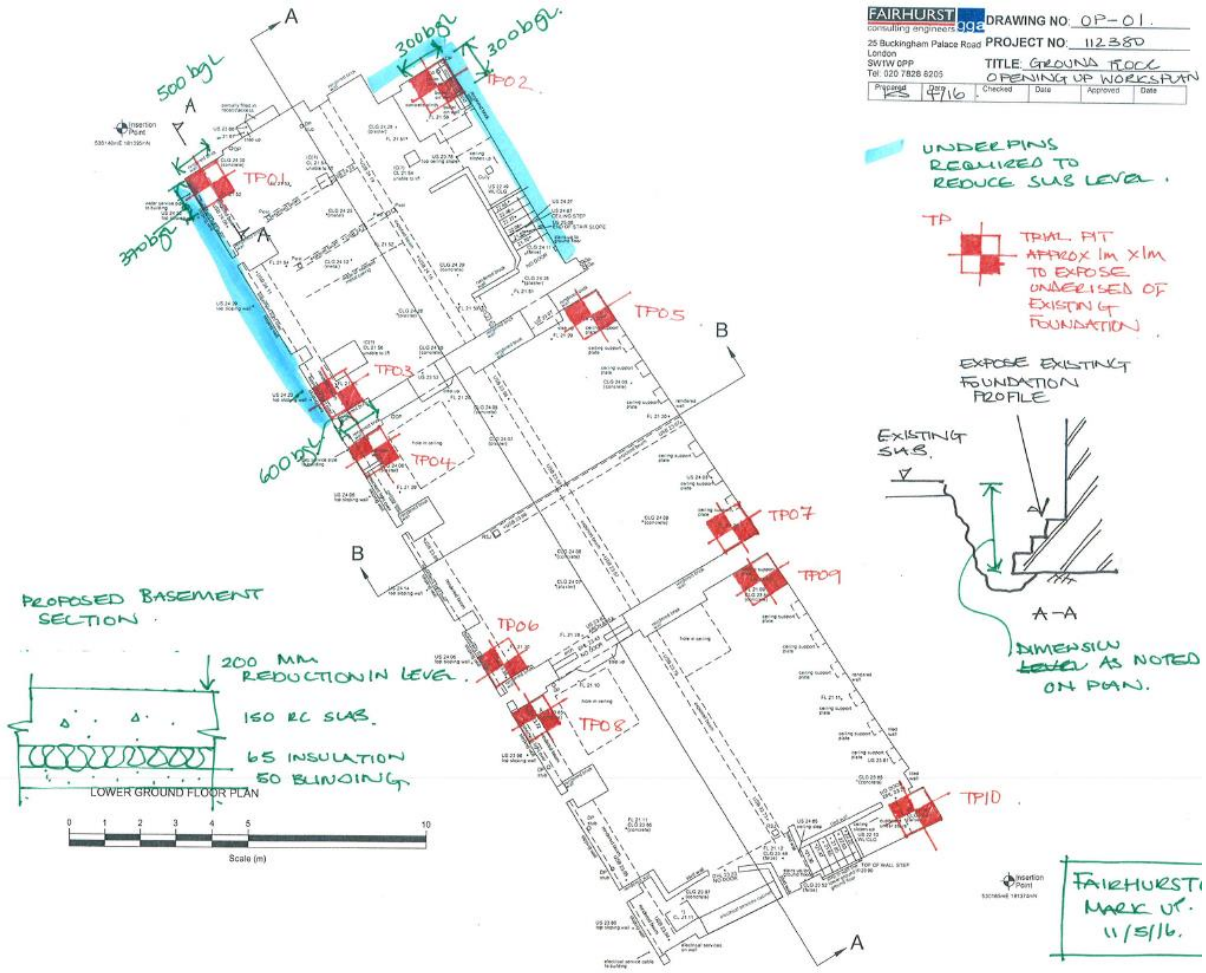


Figure 4 – Location of site relative to the 'Lost Rivers' of London (Source: Barton, 1992)

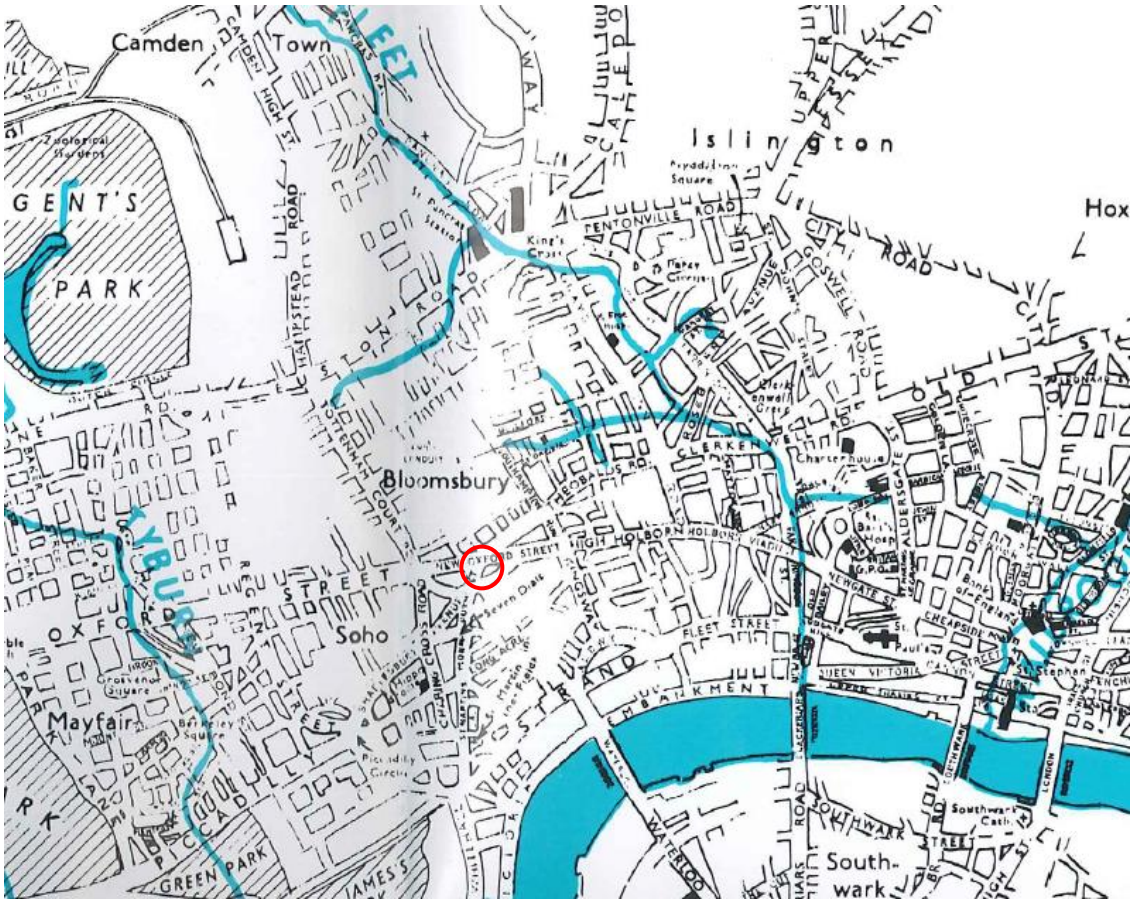
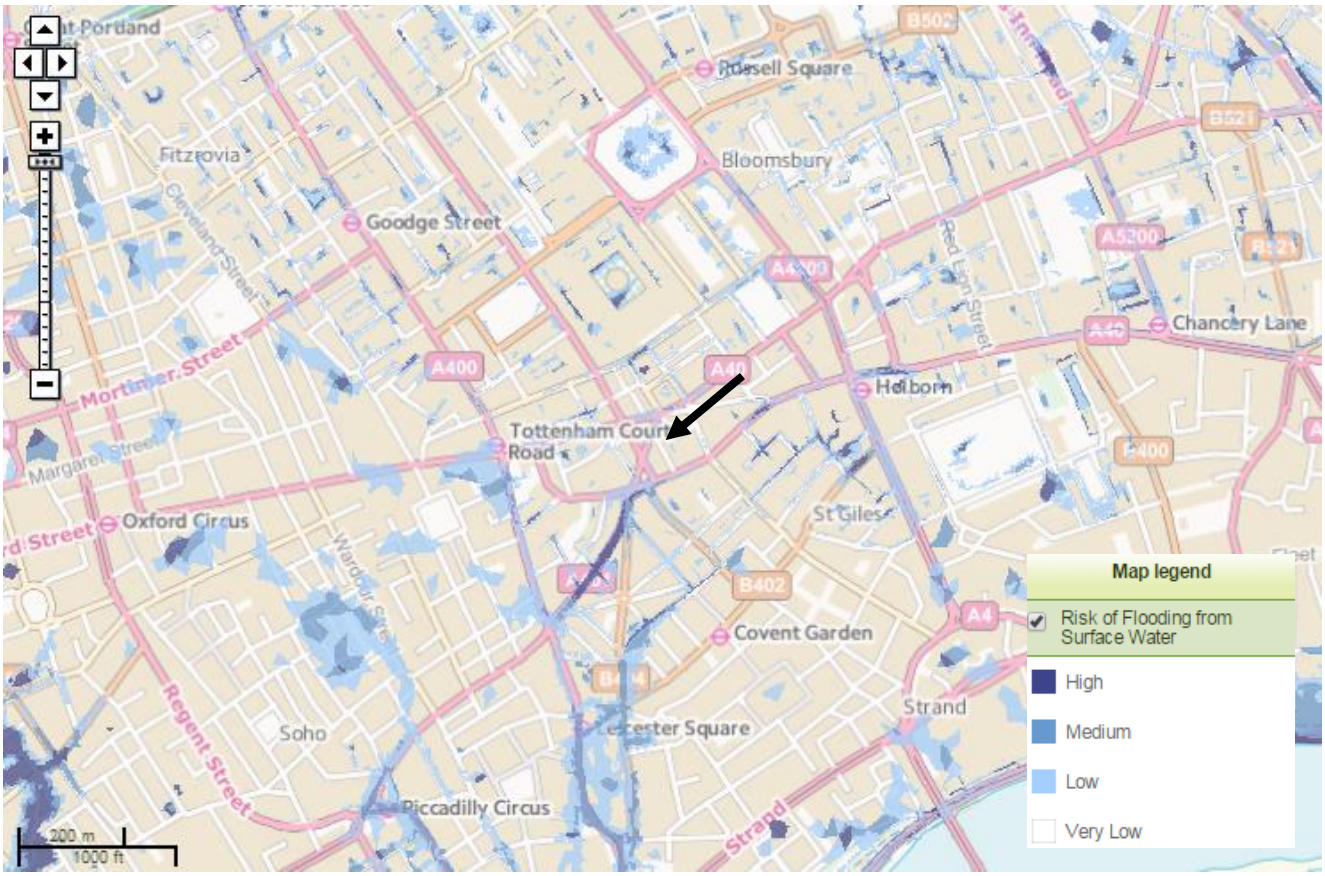


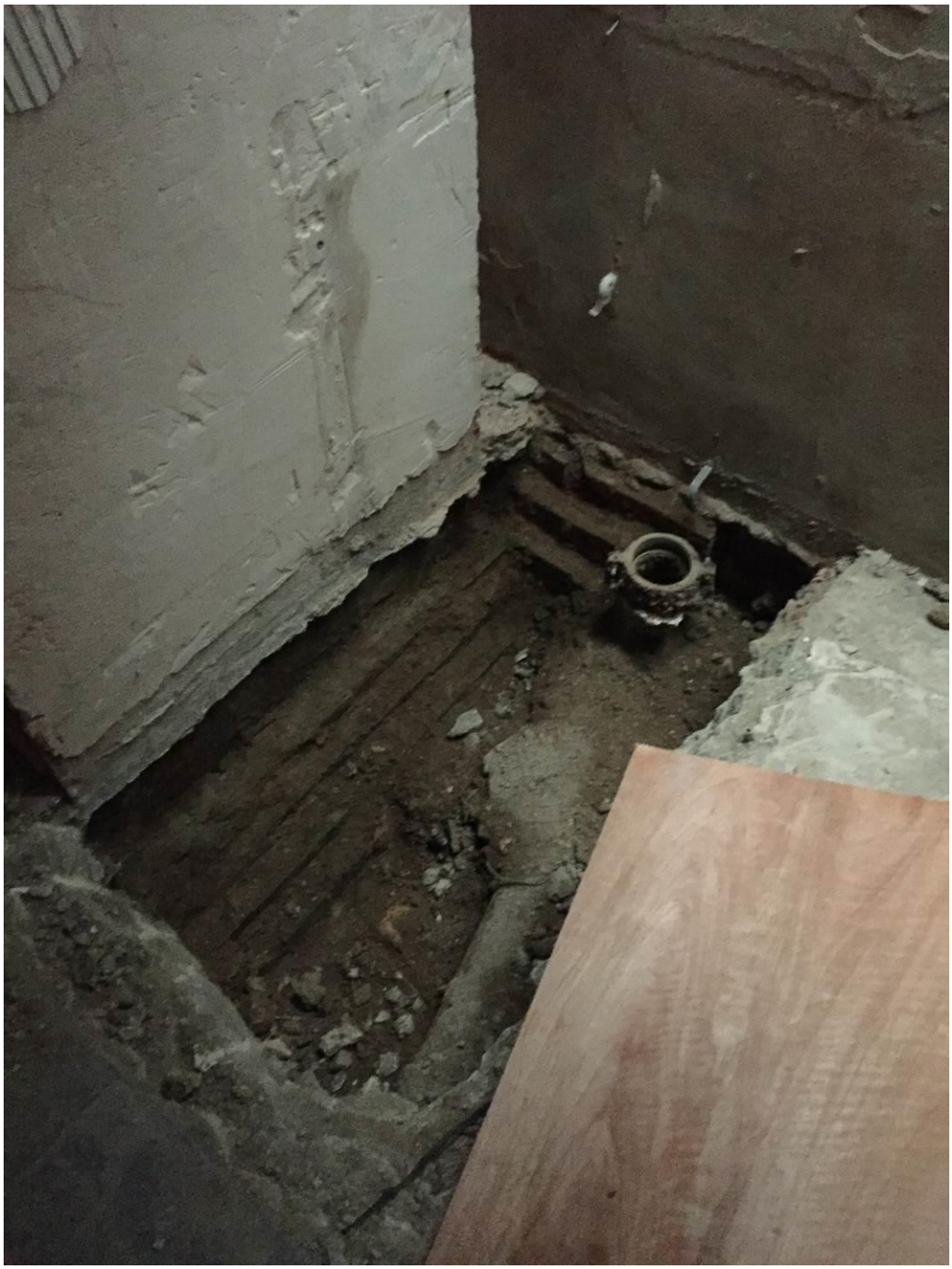
Figure 5 – Risk of Flooding from Surface Water (Source: Environment Agency 2015)



Appendix A – Trial Pit Photographs

Trial Pit 1

Trial Pit 2



Trial Pit 3

Trial Pit 4

Trial Pit 5

Trial Pit 6

Trial Pit 7

Trial Pit 8

Trial Pit 8 (Detail of Lynch Hill River Terrace Gravel)

Trial Pit 9

Trial Pit 10

Appendix B – Responses from Transport For London and DTZ (Post Office Tunnels)

Transport for London
London Underground

London Underground
Infrastructure Protection

3rd Floor
Albany House
55 Broadway
London SW1H 0BD

www.tfl.gov.uk/tube

Your ref: 112380
Our ref: 20403-SI-6-010616

Andrew Smith
Fairhurst
andrew.smith@fairhurst.co.uk

01 June 2016

Dear Andrew,

9-13 Grape Street London WC2H 8DW

Thank you for your communication of 31st May 2016.

I can confirm that London Underground has no assets within 50 metres of your site as shown on the plan you provided.

The site above is located near the Post Office Railway tunnels. Therefore I advise that you also consult:

Kathryn Sullivan
DTZ
125 Old Broad Street
London
EC2N 1AR
Tel: 020 3296 3365
Email: RMG.mailrail@DTZ.com

If I can be of further assistance, please contact me.

Yours sincerely

Shahina Inayathusein
Information Manager
Email: locationenquiries@tube.tfl.gov.uk
Direct line: 020 7918 0016

Fairhurst
25 Buckingham Palace Road
London
SW1W OPP

Email: RMG.Estates@dtz.com
Direct Tel: +44 20 3296 3365
Date:

Your Ref: 112380
Our Ref: Mail Rail

Dear Sir/Madam,

6/13/2016

ROYAL MAIL – MAIL RAIL ENQUIRY
9-13 GRAPE STREET, LONDON, WC2H 8DW.

We refer to your enquiry dated 2 June 2016 to confirm if the above site is above, or within the vicinity of the Royal Mail Rail Tunnel.

As the proposed works are within the vicinity of the Tunnel we are forwarding your communication to Mitch Harris at Royal Mail. Royal Mail retain exact specifications of the tunnel complex and its construction, and they will be able to assist you further regarding any restrictions on the proposed works subject to further fees being payable.

Please note that a copy of this letter is being sent for Royal Mail's information and that no works within the vicinity of the Tunnel should be commenced without Royal Mail's sanction. Please see Royal Mail's contact details below;
Mr Mitch Harris, Royal Mail,
1st Floor, 1 Broadgate, London, EC2M 2QS
Email address: Mitch.Harris@royalmail.com
Phone: 07860 641717

Yours faithfully,

Kat Sullivan
Corporate Real Estate Management

www.fairhurstgga.co.uk

Aberdeen
Birmingham
Bristol
Dundee
Edinburgh
Elgin
Glasgow
Inverness
Leeds
London
Manchester
Newcastle
Sevenoaks
Sheffield
Taunton
Watford

CIVIL ENGINEERING • STRUCTURAL ENGINEERING • TRANSPORTATION • ROADS & BRIDGES
PORTS & HARBOURS • GEOTECHNICAL & ENVIRONMENTAL ENGINEERING • PLANNING &
DEVELOPMENT • WATER SERVICES • CDM COORDINATOR SERVICES