H15745

BASEMENT IMPACT ASSESSMENT REPORT FOR PROPOSED ENLARGEMENT OF BASEMENT LIGHTWELL AT:

238 HAVERSTOCK HILL
LONDON
NW3 2AE

MARKS HEELEY

MARKS HEELEY LTD

JULY 2022 Rev 'A'

The Stables, Cannons Mill Lane, Bishops Stortford, Hertfordshire, CM23 2BN
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CONTENTS

1.0 INTRODUCTION

1.1 We were requested by Wilby & Burnett to prepare an impact assessment in respect of a proposed basement lightwell construction at 238 Haverstock Hill, London NW3 2AE.

2.0 PROPOSED DEVELOPMENT

2.1 It is proposed to create an enlarged lightwell from an existing basement.

2.2 A lightwell does exist to part of the South elevations, the extended lightwell will be to the East and South elevations. See drawing H15745/01 in Appendix 'A'.

2.3 The lightwell will be around 2.5m in depth below ground levels.

2.4 The new lightwell will be formed with reinforced concrete walls bearing on the natural clay strata.

3.0 SITE LOCATION / HISTORY

3.1 The site is located off Haverstock Hill. See SK2 in Appendix 'B' for location.

3.2 The historical map of 1895 records the building and confirms the existing lightwell locations. See SK3 in Appendix 'B'.

4.0 GEOLOGY

4.1 A Soil investigation has been undertaken by HESI. See Appendix 'C', report dated 27 June 2022.

4.2 This confirms a natural clay strata exists and that no water was found in any boreholes. The historical geology map furthermore confirms this. See SK4 in Appendix 'D'.

5.0 WATER COURSES

5.1 The site is located between the 'Tyburn' and 'Fleet', historical water courses. See Appendix 'E' for map of London Rivers SK1. This confirms that there are no natural water courses in this location.

5.2 In Appendix 'F' is further historical data in respect of rivers in Camden.

6.0 TOPOGRAPHY

6.1 See SK5 in Appendix 'G' for site topography.

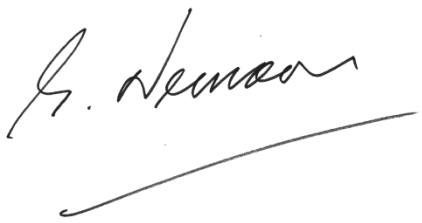
6.2 The site lies between contours 70m and 75m locations, the highest locations in the local area.

7.0 DISCUSSION / CONCLUSION

7.1 From our investigations it is clear that the site lies within the highest location locally and that there is no natural water regime across the site. Furthermore, the site is underlain with impervious clay strata, which does not give the ability for natural water to pass.

Therefore, the scheme proposed will not, in our opinion, have any effect on neighbouring properties, etc.

Author:



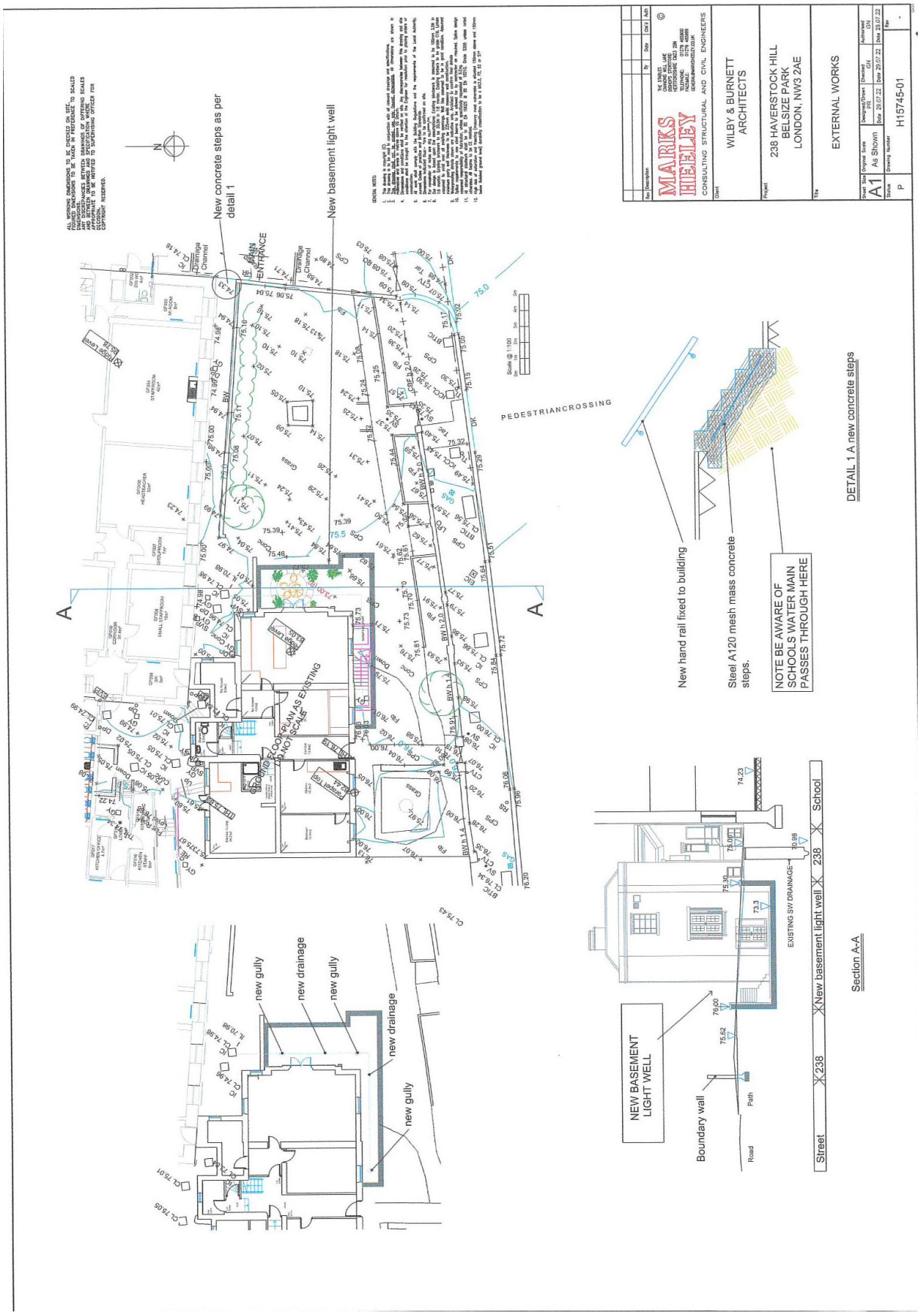
Graham Newman
IEng, AMIStructE

Co-Author/Checked:

Richard Hope
BEng (Hons), CEng, MICE

APPENDIX A

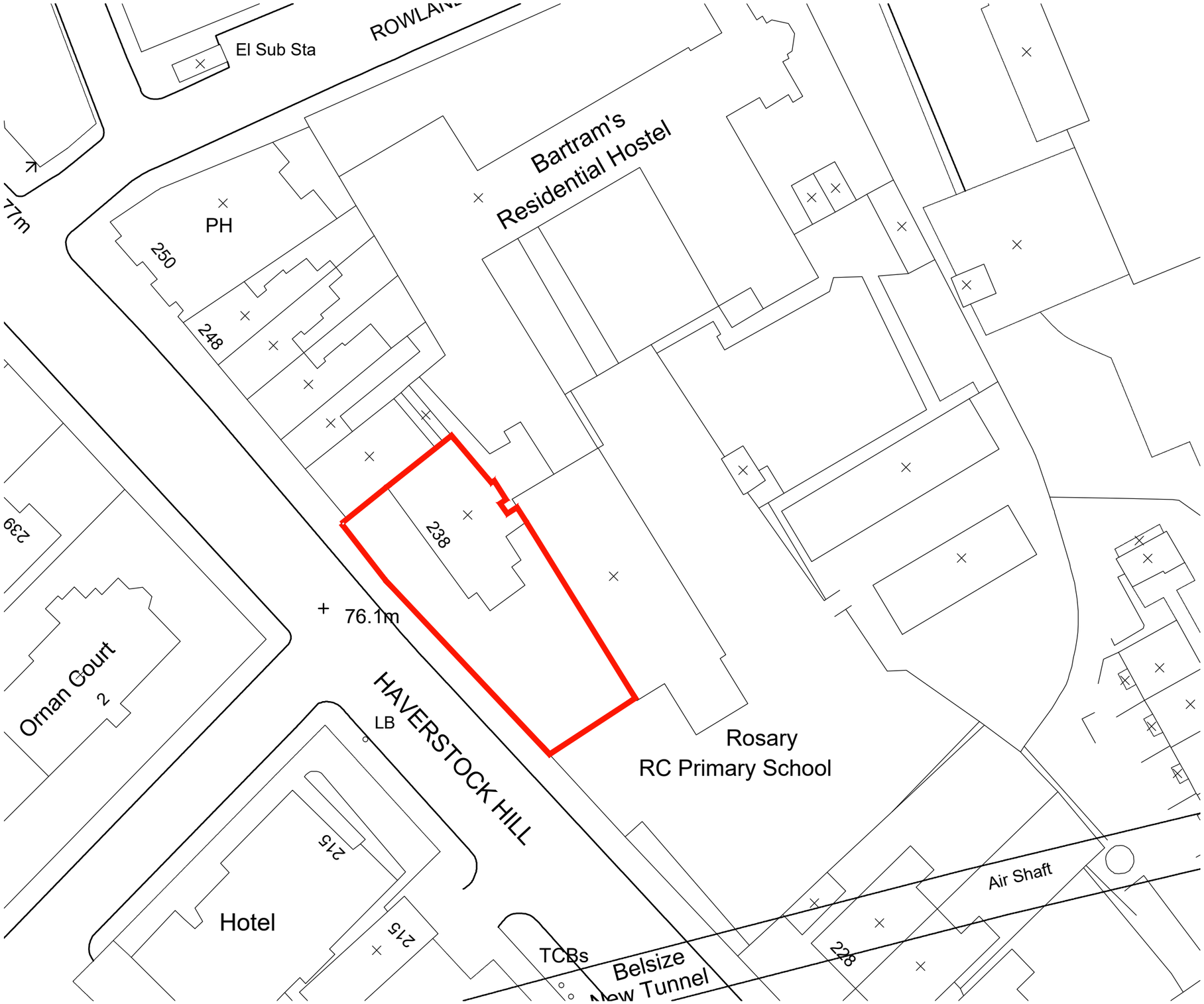
EXTERNAL WORKS – DRAWING H15745-01


New concrete steps as per detail 1
New basement light well
MAIN ENTRANCE
PEDESTRIANCROSSING
FLOOR PLAN AS EXISTING DO NOT SCALE
New hand rail fixed to building
Steel A120 mesh mass concrete steps.
NOTE BE AWARE OF SCHOOLS WATER MAIN PASSES THROUGH HERE
DETAIL 1 A new concrete steps
new gully
new drainage
new gully
new drainage
new gully
NEW BASEMENT LIGHT WELL
Boundary wall
Road
Path
Street
238
New basement light well
238
School
EXISTING SW DRAINAGE
Section A-A
MARKS HEELEY
CONSULTING STRUCTURAL AND CIVIL ENGINEERS
WILBY & BURNETT ARCHITECTS
238 HAVERSTOCK HILL BELSIZE PARK LONDON, NW3 2AE
EXTERNAL WORKS
H15745-01

APPENDIX B

LOCATION PLANS – SK2 & 3

ALL WORKING DIMENSIONS TO BE CHECKED ON SITE.
FIGURED DIMENSIONS TO BE TAKEN IN PREFERENCE TO SCALED DIMENSIONS.
ANY DISCREPANCIES BETWEEN DRAWINGS OF DIFFERING SCALES AND BETWEEN DRAWINGS AND SPECIFICATION WHERE APPROPRIATE TO BE NOTIFIED TO SUPERVISING OFFICER FOR DECISION.



238 HAVERSTOCK HILL
BELSIZE PARK
LONDON
NW3 2AE

DIOCESE OF WESTMINSTER

BLOCK PLAN

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JOB No: H/15745
PROJECT: 238 HAVERSTOCK HILL
REF:

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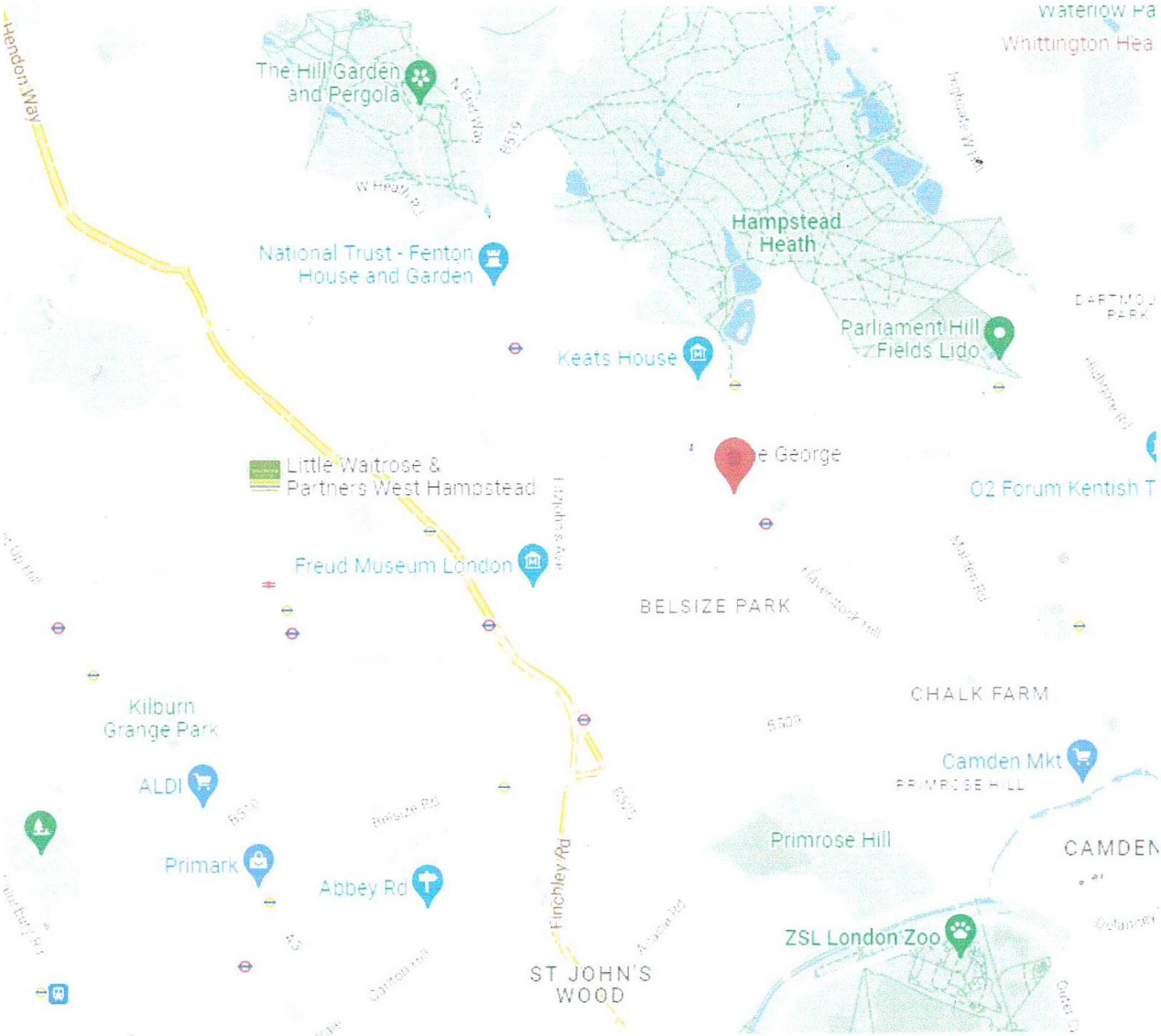
BY: CHKD:



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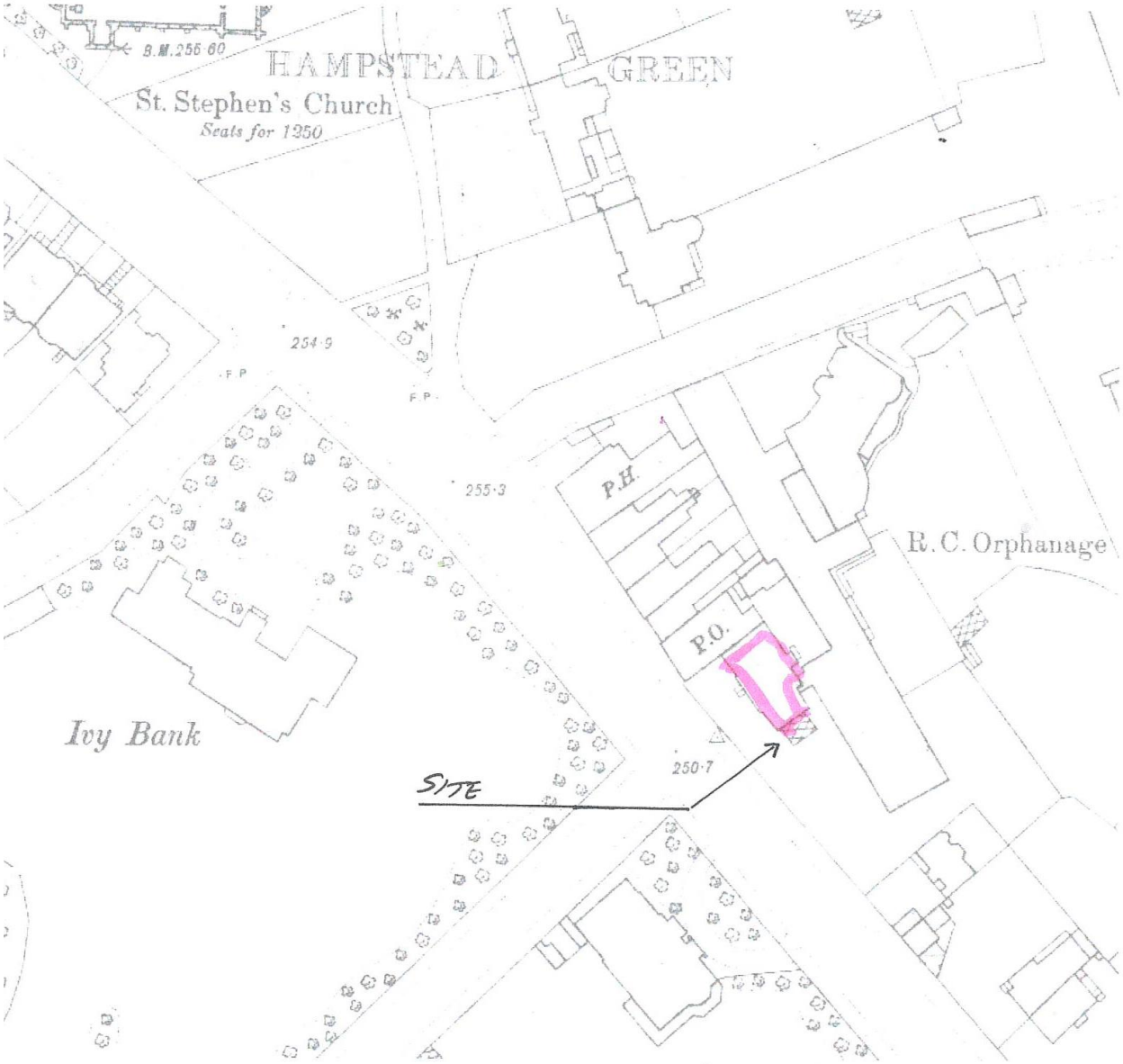

EXTRACT MAP 1895

APPENDIX C

HESI GEOTECHNICAL REPORT

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Geotechnical Assessments | Environmental Assessments | Desktop Studies | Contamination Analysis

GEOTECHNICAL REPORT

Site Address:	238 Haverstock Hill, Belsize Park, London NW3 2AE
Report Date:	27th June 2022
Project No.:	17453
Prepared for:	Wilby & Burnett Provident House, 123 Ashdon Road, Saffron Walden, Essex, CB10 2AJ

Contents

REPORT

APPENDICES

SUMMARY

ADDRESS: 238 Haverstock Hill, Belsize Park, London NW3 2AE

SOIL OVERVIEW:

BH1	GL – 0.70m bgl	MADE GROUND (TOPSOIL)
	0.70m – 6.00m bgl	Firm – very stiff orange, brown mottled grey CLAY
BH2	GL to 0.70m bgl	MADE GROUND (TOPSOIL)
	0.70m bgl to 6.00m bgl	Firm – very stiff orange, brown mottled grey CLAY

ROOT DEPTH OVERVIEW:

BH1	Maximum recorded depth 0.40m bgl
BH2	Maximum recorded depth 1.00m bgl

GROUNDWATER OVERVIEW:

BH1	DRY (Standpipe & cover installed to 3.00m bgl)
BH2	DRY (Standpipe & cover installed to 3.00m bgl)

SOIL ANALYSIS:

Fine Soils

Plasticity:	Intermediate – Very High
Plasticity Index:	21 – 43%
Significant Desiccation:	-
Sulphate Content:	DS-1/AC-1s

Granular Soils

No granular soils were encountered within the boreholes.

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1. Introduction

1.1 In accordance with your instructions, we visited the above site on the 9th of June 2022.

1.2 The purpose of our visit was to undertake two window sampled boreholes, across the above site, in order to identify the underlying subsoil conditions.

1.3 The comments and opinions expressed are based purely on the conditions encountered and the subsequent laboratory.

1.4 Therefore, it is possible that some special conditions prevailing on site have not been encountered or taken into account.

1.5 All groundwater recordings or their absence relate to short term observations and do not allow for fluctuations due to seasonal or other effects.

2. Description of Site

2.1 At the time of our visit the site consisted of a two-storey residential structure surrounded by soft & hard landscaped areas.

2.2 The site is shown within the British Geological Survey Online Geology Viewer (Scale 1:50 000, Solid & Drift), which shows that the site situated with an area London Clay Formation - Clay, Silt And Sand.

3. Fieldwork

3.1 The window sampled boreholes were undertaken in order to detail the underlying geology at depth. The location of these excavations is shown on the site plan forming Appendix 1.

3.2 The various strata encountered were noted and are recorded within the borehole logs forming Appendix 2.

3.3 Undisturbed samples were recovered from the borehole, as noted within the associated log for laboratory testing.

3.4 The location, type and height of any trees was noted, for later use with NHBC Chapter 4.20, if required. We are not Arboriculturists, and a tree identification report should be used, with regard any foundation design.

4. Laboratory Testing

4.1 All samples were tested in accordance with BS: 1377:1990 Methods of Test for Soils for Civil Engineering purposes.

4.2 Selected samples were tested to determine their, Moisture Content, Atterberg Limits, Soluble sulphate content and pH value.

4.3 The results of all laboratory testing are summarised in Appendix 3.

5. Fieldwork Results

5.1 Borehole Results

a) Boreholes one & two recovered MADE GROUND to a depth of 0.70m bgl, where a firm – very stiff orange, brown mottled grey CLAY was then found to the close of both boreholes at 6.00m bgl.

5.2 All boreholes were bored until no further penetration of the geology could be undertaken or their required depth reached. As detailed within the associated logs forming Appendix 2.

5.3 The borehole logs can be found forming Appendix 2.

6. Other Observations from Site Works

6.1 No groundwater was encountered within the excavations undertaken upon the site.

6.2 We also installed two standpipes & covers to depths of 3.00m bgl, within the boreholes as shown within the attached appendices.

6.3 From the hand penetrometer testing it can be seen that the values found within the CLAY geology range between 45 - 102 kN/m^2. This value converts to a minimum allowable bearing pressure of 90 kN/m^2 at 1.00m bgl across the samples tested.

6.4 Roots were encountered within the boreholes based on examination of the soil samples across the site as shown below and recorded within the attached appendices.

Location No.	Depth of Roots
BH1	0.40m bgl
BH2	1.00m bgl

7. Laboratory Testing Results

7.1 The laboratory testing confirmed the CLAY to be of Intermediate – Very High plasticity (PI = 21 - 43%) which indicates a Moderate – High susceptibility of movement associated with moisture content change.

7.2 As the site contains less than 0.50g/l of soluble sulphate it can be categorised as a class 1 site, in accordance with ACEC, and as such any concrete in contact with the subsoil needs no special precautions (DS-1 / AC-1s).

We hope that this is of satisfactory, however if you should require any further information, please do not hesitate to contact us.

Yours faithfully,

D A Hudd
Senior Contract Engineer

C S Gray MSc
Principal Engineer

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Appendix No	1
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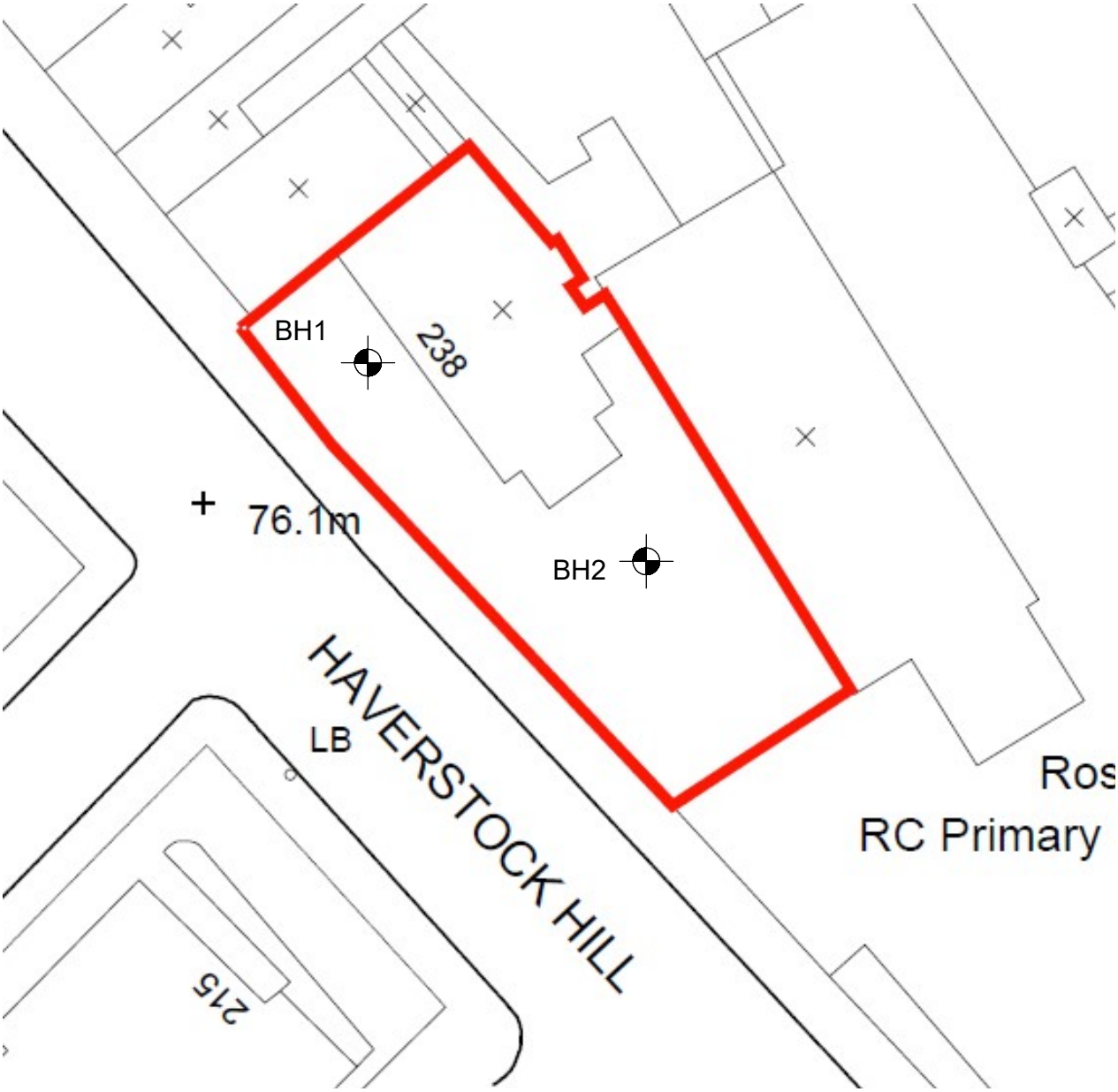
Job No	17453
Date	June 2022

238 Haverstock Hill, Belsize Park, London NW3 2AE

Site Plan



Not to Scale

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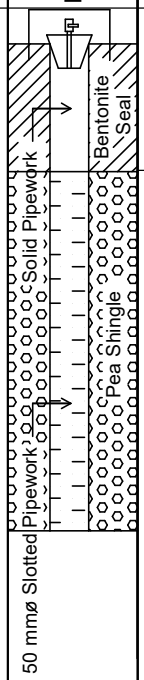
Borehole One

Description of Stratum	Legend	Depth (m bgl)	Strata Thickness (m)	Water Level (m bgl)	Samples No.	Samples Type	Samples Depth (m bgl)	S.P.T N-Value or Vane Strength
Grass over a brown TOPSOIL with occasional brick & gravel fragments - MADE GROUND		0.70	0.70	DRY	1	U	GL - 1.00	
Firm - very stiff orange brown mottled grey CLAY		6.00			2	U	1.00 - 2.00	
					3	U	2.00 - 3.00	
					4	U	3.00 - 4.00	
					5	U	4.00 - 5.00	
					6	U	5.00 - 6.00	
Borehole closed at 6.00m bgl								
Roots to 0.40m bgl								



Casing Depth, (m): 1.00

Remarks : Hand dug pit to 0.50m bgl

Scale 1 : 50

Key : U - Undisturbed Sample (100mm diameter) | B - Bulk Sample | - Water Struck | D - Disturbed Sample | - Water Standing | W - Water Sample | T - Chemical Tub | N - SPT N-Value | V - Shear Vane Test (kN/m²)

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Appendix No	2
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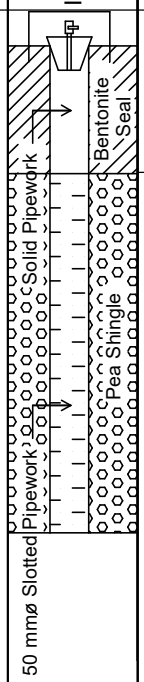
Job No	17453
Date	June 2022

238 Haverstock Hill, Belsize Park, London NW3 2AE

Borehole Two

Description of Stratum	Legend	Depth (m bgl)	Strata Thickness (m)	Water Level (m bgl)	Samples No.	Samples Type	Samples Depth (m bgl)	S.P.T N-Value or Vane Strength
Paving over a brown TOPSOIL with occasional brick & gravel fragments - MADE GROUND		0.70	0.70	DRY	1	U	GL - 1.00	
Firm - very stiff orange brown mottled grey CLAY		6.00			2	U	1.00 - 2.00	
					3	U	2.00 - 3.00	
					4	U	3.00 - 4.00	
					5	U	4.00 - 5.00	
					6	U	5.00 - 6.00	
Borehole closed at 6.00m bgl								
Roots to 1.00m bgl								



Casing Depth, (m): 1.00

Remarks : Hand dug pit to 0.50m bgl

Scale 1 : 50

Key : U - Undisturbed Sample (100mm diameter) | B - Bulk Sample | - Water Struck | D - Disturbed Sample | - Water Standing | W - Water Sample | T - Chemical Tub | N - SPT N-Value | V - Shear Vane Test (kN/m²)

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LOCATION 238 Haverstock Hill, Belsize Park, London NW3 2AE

ATTERBERG LIMITS TEST DATA

Excavation Location Number	Depth (m)	Sample	Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Group Symbol	Ammended Plasticity Index (%)	Desiccation Profile	Percentage Retained on 425 Micron Sieve (%)
BH1	1.00	U	32							
BH1	1.50	U	28	71	28	43	CV	43	-	0
BH1	2.00	U	27						-	
BH1	2.50	U	29						-	
BH1	3.00	U	28	62	27	35	CH	35	-	0
BH1	4.00	U	31						-	
BH1	5.00	U	31						-	
BH1	6.00	U	31	71	28	43	CV	43	-	0
BH2	1.00	U	23	46	16	30	MI/CI	21	-	30
BH2	1.50	U	27						-	
BH2	2.00	U	29	71	29	42	CV	42	-	0
BH2	2.50	U	30						-	
BH2	3.00	U	31						-	
BH2	4.00	U	32						-	
BH2	5.00	U	29	69	27	42	CH	42	-	0
BH2	6.00	U	29						-	

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LOCATION 238 Haverstock Hill, Belsize Park, London NW3 2AE

HAND PENETROMETER STRENGTH TEST RESULTS

Excavation Location Number	Depth (m)	Sample	Natural Moisture Content (%)	Hand Penotrometer (Undrained)	Estimated Allowable Bearing Capacity (kN/m²)	Notes
BH1	1.00	U	32	45	90	
BH1	1.50	U	28	75	150	
BH1	2.00	U	27	84	150+	
BH1	2.50	U	29	63	126	
BH1	3.00	U	28	75	150	
BH1	4.00	U	31	72	144	
BH1	5.00	U	31	81	150+	
BH1	6.00	U	31	90	150+	
BH2	1.00	U	23	45	90	
BH2	1.50	U	27	66	132	
BH2	2.00	U	29	72	144	
BH2	2.50	U	30	75	150	
BH2	3.00	U	31	75	150	
BH2	4.00	U	32	69	138	
BH2	5.00	U	29	75	150	
BH2	6.00	U	29	102	150+	

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LOCATION 238 Haverstock Hill, Belsize Park, London NW3 2AE

SULPHATE ANALYSIS

Excavation Location Number	Depth (m)	Sample	Concentrations of Soluble Sulphate			Classification	pH
			Soil		Groundwater		
			Total SO4 (%)	SO4 in 2:1 Water:soil (g/l)			
BH1	3.00	U		0.27		DS-1 / AC-1s	7.82
BH2	1.00	U		0.32		DS-1 / AC-1s	8.12

APPENDIX D

GEOLOGY – SK4

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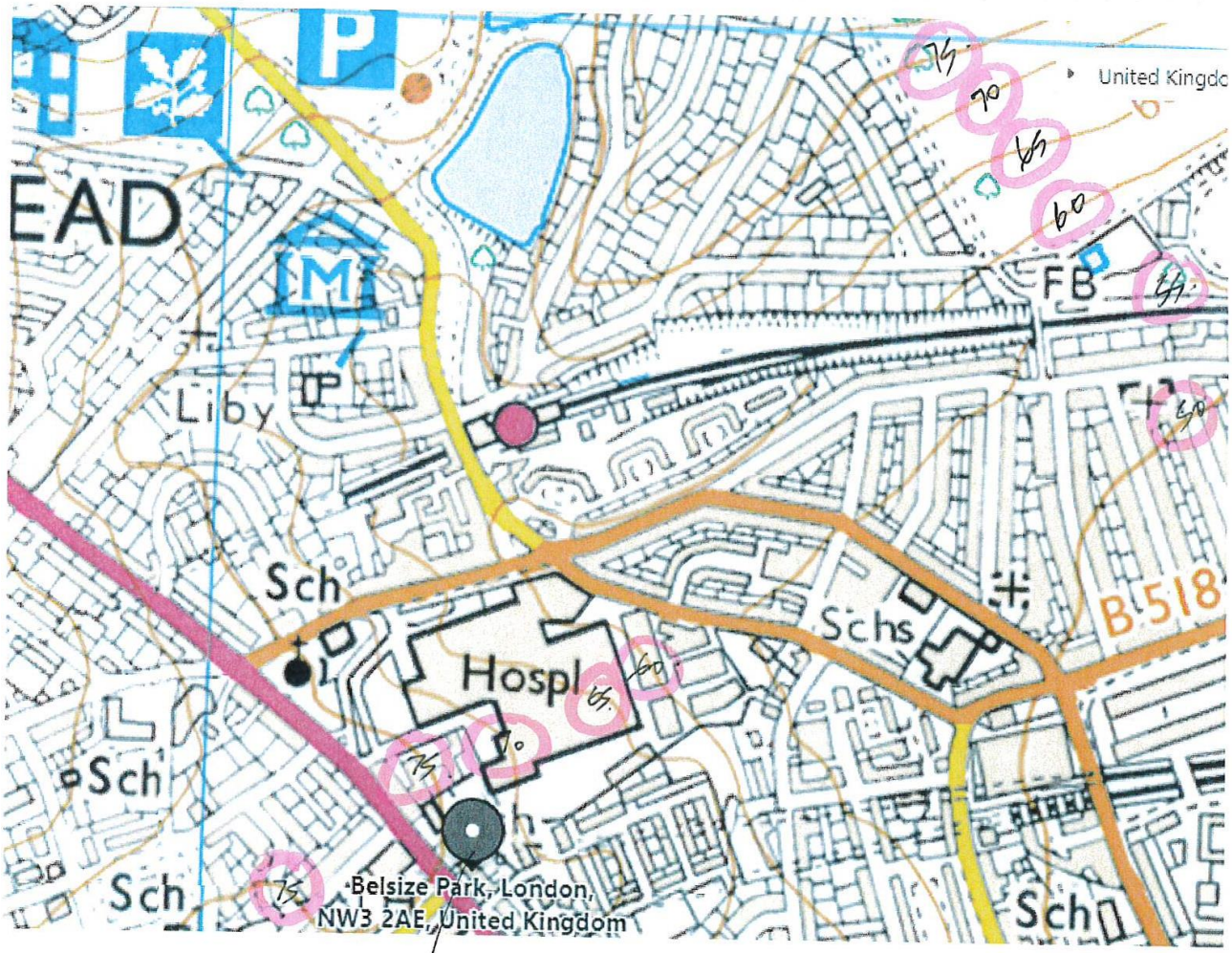

APPENDIX E

LONDON RIVERS MAP – SK1

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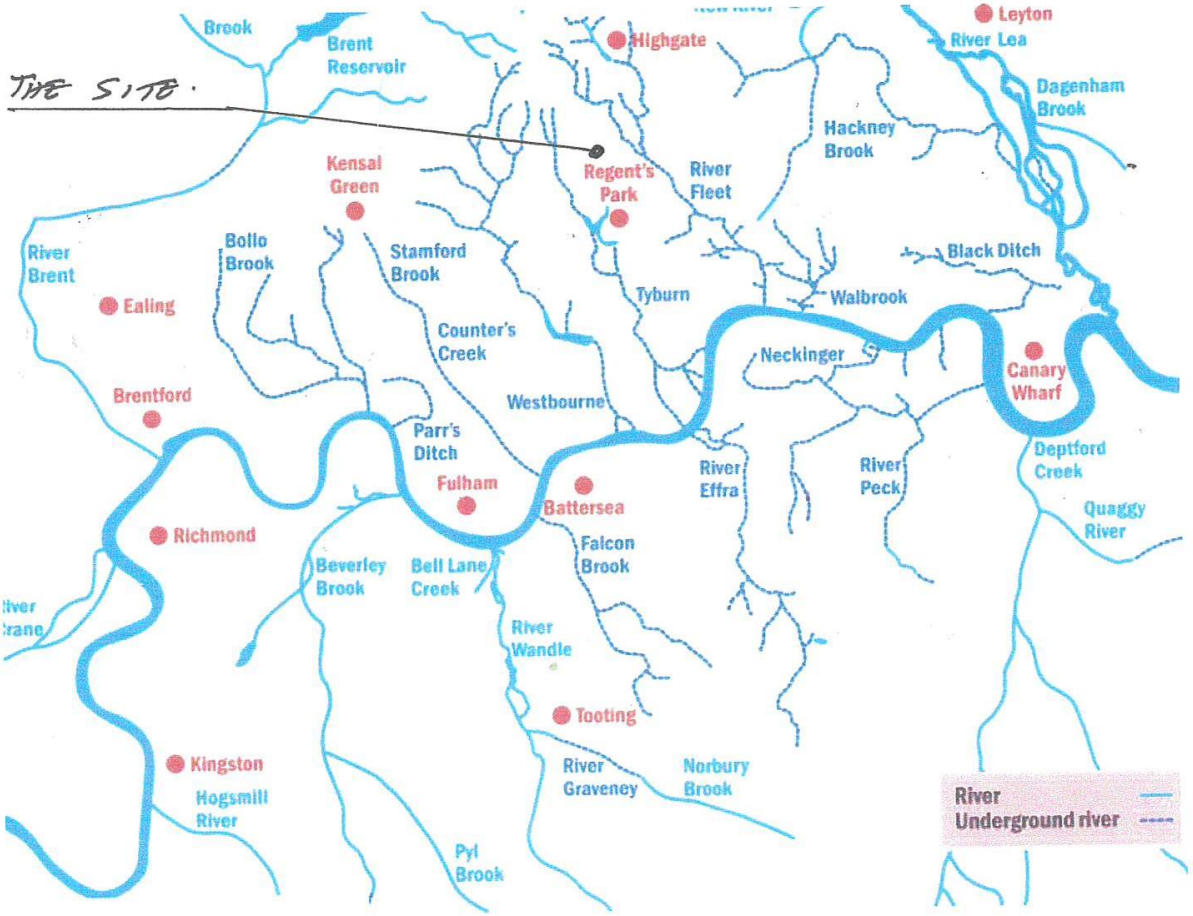

MAP OF LONDON RIVERS

APPENDIX F

HISTORICAL DATA OF RIVERS

CAMDEN RIVER RESTORATION

The History of Lost Rivers in Camden

The Historical Study of the Kilburn and Tyburn

History Report

March 26th 2010

Camden

UCL

Table of Contents

1. The River Kilburn

1.1. Etymology

In the old documents, the 'Kilburn' can be spelt into various ways such as Kyllbourne, kelebourne, kullebourne, Cyneburna or Cycbourne. It is thought to be originated from the old English term 'cyne-burna' (Royal stream) or 'cyna-burna' (cow's stream) (Gover, 1942). Another source for the origination of the name is Kilnbourn, which is from the tile-making in the area.

In addition, Kilburn has been known by many names throughout history, the main alternatives being the Westbourne River, the Bayswater Rivulet and the Ranelagh Sewer (Cruchley, 1829). The name Westbourne was not seen in history until the 19th Century and is most likely derived from Westbourne in Paddington, which is literally the name of the place 'west of the stream', not the name of the stream itself (Barton, 1992). The name Ranelagh sewer was given to the stretch of the river, which was culverted between Sloane Square and the Thames in 1854.

1.2. The Kilburn Route

The Kilburn is the river which is in the western end in the Central London. It originates at the Whitestone Ponds situated on the top of Health Street, near Jack Straw's Castle and runs down to Redington Gardens where it combines with two tributaries; one from Oak Hill and another from Telegraph Hill. The combined stream runs across Finchley Road, West End Lane and joins at Kilburn High Road to the Kilburn Priory. It continues south-west along Kilburn Park Road to Shirland Road. Then it crosses Elgin Avenue and flows south to Dorchester Road, which is under the Grand Union Canal. When the river crosses Bishop's Bridge Road, it swings across Bayswater Road, Hyde Park and then into the west of Lancaster Gate.

Tyburn Brook originates as a small tributary under the flats of Portsea Hall and joins the River Kilburn. It goes out through Albert Gate and spans the Knight's Bridge down to William Street and Lowndes Square and the east end of King's Road.

Finally, the River Kilburn crosses the District and Circle Lines as Sloane Square and runs down to Holbein Place. It then runs under Chelsea Barracks where it is divided into two branches. The eastern branch flows through Ebury Bridge Road and enters

the Thames at the Grosvenor Canal. Whereas, the western branch runs across Chelsea Bridge Road, Ranelagh Gardens and runs down to the Thames between Embankment Gardens and Chelsea Bridge (Trench and Hillman, 1985).

1.3. The Uses of Kilburn

In the early days, the River Kilburn provided drinking water to the Kilburn Priory's moat until the dissolution of the monasteries in 1536, described as 'Nonnerie of Kilnborne' (Richard, 1993). The Chelsea Waterworks reservoir used for water supply in the Green Park, derived its water source from the River Kilburn in Hyde Park (Barton, 1992).

The effects of pollution on the river because clear on the onset of early 19th century because of sewage contamination as more areas in the vicinity of the river developed. The river began to be culverted in 1827, and by early 1854 was fully covered from Sloane Square to the Thames in what was known as the Ranelagh Sewer. The area north of Hyde Park was gradually culverted until it had been completely submerged in 1871 to make way for housing developments.

2. Historical sites and Landmarks of River Kilburn

2.1. Hampstead Heath

Hampstead was well known for its wells and ponds (the Hampstead ponds) during the 17th century, which included the Whitestone Pond. It originally drew its waters from Hampstead Heath (Figure 1) rising at the Whitestone Pond. During this time, Whitestone Pond, otherwise known as the horse pond, was a small dew pond from which the horses drank water. The Pond was completely filled in by 1889 because of the construction of a covered reservoir near the town in 1856. The ponds which began as a series of reservoirs, belonging to the Hampstead Water Co. had been formed to provide London with water around 1692. These ponds (which include Whitestone Pond) came into being by damming the River Fleet.

In the 18th century, Kilburn Wells satiated once on the site of the Abbey of Kilburn, near Oxford Street, which was a favourite resort of visitor, who came here to drink water and indulge in refreshments. It still can be seen adjoining a cottage at the corner of the Station Road and the waters rose about twelve feel below the surface, enclosed in a brick reservoir. These wells were once famous for their saline and

purgative waters, described in the River Kilburn Almanack:

Upon a recent visit we found about five feet six inches of water in the well, and the water very clear and bright, with little or no sediment at the bottom; probably the water has been as high as it now is ever since the roadway parted it from the 'Bell' Tea Gardens, not having been so much used lately as of old." "Is it not strange," asks Mr. W. Harrison Ainsworth, "that, in these water-drinking times, the wells of Hampstead and Kilburn should not come again into vogue?"

Figure 1: Hampstead Heath in 1840 (Walford 1878)

2.2. Kilburn Priory

Shall you prolong the midnight ball
With costly supper at Vaux Hall,
And yet prohibit earlier suppers
At Kilburn, Sadler's Wells, or Kuper's?
Are these less innocent in fact,
Or only made so by the act?"

The River Kilburn ran along modern day Kilburn High Road, finally crossing at Kilburn Priory (Figure 2). The latter has been invariably linked to the River Kilburn. The Kilburn Priory was situated at the River Kilburn crossing on Watling Street which in present days is the junction of Kilburn High Road and Belsize Road. The priory had been constructed on the location of the cell of a hermit known as Godwyn and was home to the community of Augustinian canonesses. Built next to the River Kilburn during the reign of Henry I, the hermitage and the priory founded in 1134, acquired

their name from the river. The Kilburn Priory was at the time dedicated to the "Blessed Virgin Mary and St. John the Baptist" and had become a renowned resting place for pilgrims stopping by on their way to St. Albans and Willesden. Even though the Kilburn Priory no longer exists, its memory lives on in the street signs of "Abbey Road" and "Priory Road".

The River Kilburn, formerly known and first referred to as Cuneburna in 1134, has been invariably linked throughout the ages to the priory which had been constructed on the location of the cell of a hermit known as Godwyn1 and was home to the community of Augustinian canonesses. Built next to the River Kilburn during the reign of Henry I, the hermitage and the priory founded in 1134, acquired their name from the river. Moreover, Kilburn Priory was situated at the River Kilburn crossing on Watling Street which in present days is the junction of Kilburn High Road and Belsize Road. The priory, which was at the time dedicated to the "Blessed Virgin Mary and St. John the Baptist", became a renowned resting place for pilgrims stopping by on their way to St. Albans and Willesden. Furthermore, priory lands incorporated a mansion and a guesthouse or hostium which may have constituted the basis of the Red Lion pub (believed to have been founded in 1444) and the Bell Inn which opened in about 1600 (Figure 3).

Figure 2: Kilburn Priory in 1750 (Walford 1878)

Figure 3: Bell inn in 1750 (Walford 1878)

Following the death of Godwyn and a dispute arising between the Abbot of Westminster and the Bishop of London regarding the spiritual jurisdiction of the priory, the “Nonnerie of Kilnborne” was passed onto the commissioners. The Kilburn Priory was eventually dissolved in 1536 by Henry VIII with nothing of the aforementioned edifice remaining today at the site where it once existed. Nevertheless, its memory is still kept in the names of the streets near the site such as those referring to “Abbey Road” and “Priory Road”.

2.3. Maida vale

The River Kilburn was eventually culverted and buried underground in the late 1850s which in turn led to the creation of the Ranelagh Sewer. A British force led by General Sir John Stuart defeated the French at the Battle of Maida in 1806. After this first Hero of Maida inn was opened, appearing with more houses, it became known as the Maida Hill and later Maida Vale. Then the name was extended to cover the south-east of road including north Paddington, when the mansions and terraces were first built around Warwick Avenue in 1840s and 1850s. Kilburn Park lied in the north of Maida Vale which was opened in 1880, as Si Augustine’s Church opened. The important Pineapple Nursery, on the site of Vale Court, was opened in 1793, run by the Henderson family. It was lasted for a century and gained notoriety in 1836 from a murder who committed outside it (Weinreb at el. 2008).

2.4. Bayswater Road

As the River Kilburn exits Kilburn and Maida Vale, it enters Bayswater. As laid down in recorded documents, the River Kilburn was within two hundred to three hundred yards of the Grand Junction Water Company's reservoirs. It has been reported that Kensington palace used to receive part of the water supply by the aid of a

water-wheel placed at Bayswater Bridge. Nevertheless, the water wheel was removed once the Chelsea Waterworks was establishment near Bayswater.

Bayswater took its name from Bayard's Watering, the chief of the district's springs near Queensway, which used to be a natural drinking place for houses. Westminster Abbey built a water supply from this source in 1943, the Bayswater Conduit shown in Figure 4, to the city of London. When it interfered with the development of the Bishop of London, it stopped flow (Weinreb 2008)

Figure 4: The Bayswater conduit in 1798 (Walford 1878)

2.5. The Serpentine

The waters from the Bayswater Brook otherwise known as the Ranelagh Sewer or the River Kilburn River were conveyed in 6-inch leaden pipes into the neighbouring dwellings from Bayswater.

The Serpentine River (Figure 5), in Hyde park, was ordered to dam by Queen Caroline, wife of George II. In 1730, the lake shaped into the present size. Nevertheless, it only led to the pollution the lake and for that matter it was eventually supplied from water pumped from the Thames, through the Park and through Chelsea in 1834.

In the 1820s, the park was redesigned and the Serpentine Bridge (Figure 6) was built

by John Rennie, which marked the boundary between Hyde Park and Kensington Gardens, as well as the western boundary of the Serpentine (Walford 1878).

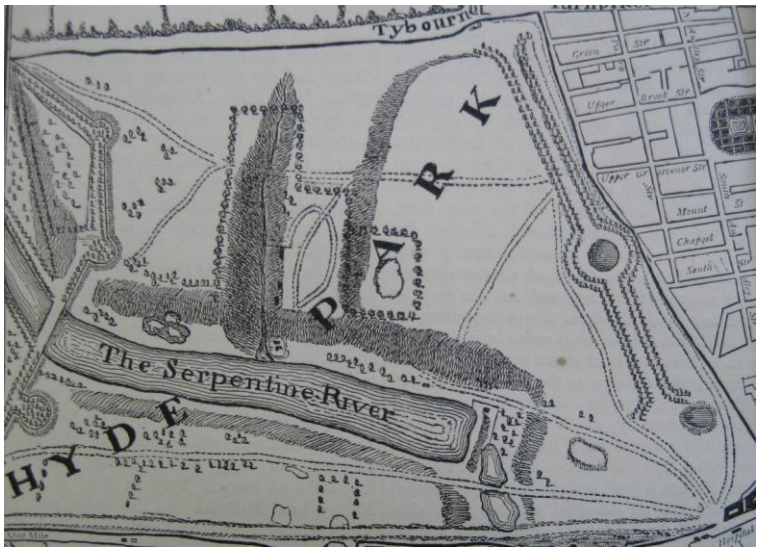

Figure 5: The Serpentine River in Hyde Park (Walford 1878)

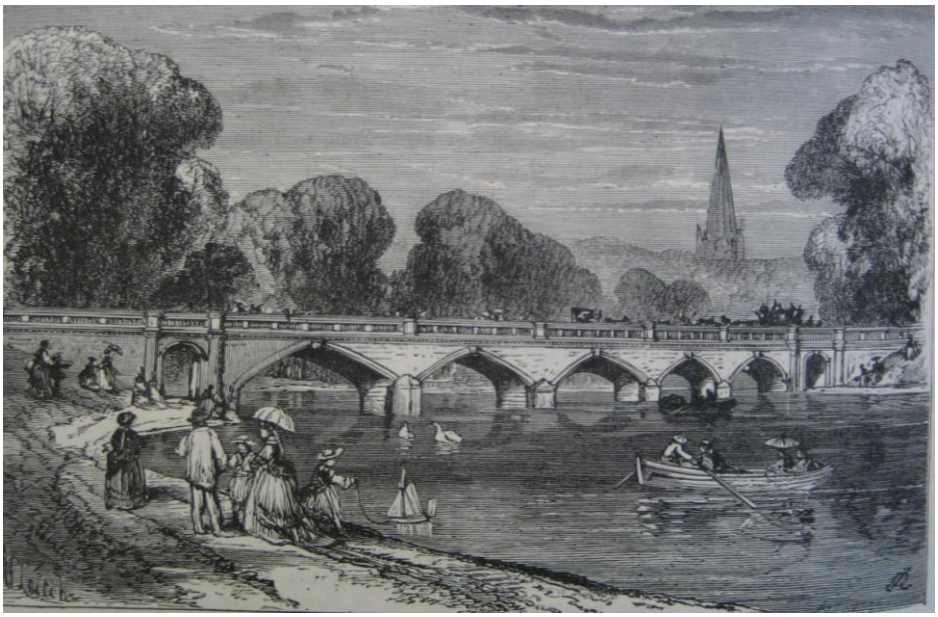

Figure 6: A bridge over the Serpentine (Walford 1878)

2.6. Knightsbridge

Kilburn Brook passed through Knightsbridge (Figure 7) and this was an important feature for this area as it contributed to the sustained growth of Knightsbridge. The River Kilburn passed beneath the bridge carrying a road and is to this present day known as Albert Gate. This was a focal point for Knightsbridge and it is from this bridge that Knightsbridge derived its name as it used to be called King's Bridge. The

hamlet’s principal establishment being a lazar-house was also situated next to the Kilburn.

The original name of Knightsbridge was known as King’s bridge and the first recorded as Kyngesbyrig in a charter of Edward the Confessor. Several contributors gave rise to the fashionable fame to Knightsbridge. The first factor was convenient transport to the central, 'scarcely more remote from the houses of parliament, and the places of gay resort, than several of the fashionable squares of London'. Then, natural and scenic views formed the fame of St George’s Hospital in 1733, the Benefit of a County Air.

Figure 7: Knightsbridge crossed the River Kilburn, near the site of the present Albert Gate, Hyde Park (London Metropolitan Archives, 1798)

2.7. Sloane Square

The name of Sloane Square originated from Sir Hans Sloane, lord of the Manor of Chelsea, where the grassland was enclosed in 1771 and housed were built later around the direction of Henry Holland. It is on the boundaries of the fashionable London districts of Knightsbridge, Belgravia and Chelsea. (Weinreb et al. 2008).

The Kilburn began to be culverted in 1827, and by 1854 was fully covered from Sloane Square to the Thames in what was known as the Ranelagh Sewer (Trench and Hillman, 1985). The River Kilburn is now thus encased within the steel aqueduct

crossing over the train tracks of the Circle and District Lines in Sloane Square tube station (Figure 8), which was opened in 1868. The station was restored due to train collision accident, lasting 11years to complete, was opened in time of the Festival of Britain in 1951(Weinreb et al. 2008).

Figure 8: The Kilburn flowing above Sloane Square Tube Station in a cast conduit

2.8. Albert Gate

The River Kilburn is the boundary canalized under the roadway of Albert Gate (Figure 8), which betweenthe parishes of St George, Hanover Square, to the east (previously part of St Martin-in-theFields), and St Margaret, Westminster, to the west. (Greenacombe 2000).

Figure 9: Albert Gate (London Metropolitan Archives 1847)

It was built in the early 1840s from the small later-Georgian houses of Mills's Buildings and Park Row, and the Cannon Brewhouse of 1804, to Albert Gate by Thomas Cubitt in 1840. The development of Albert Gate helped put Knightsbridge as fashionable mark of London and created a conservation area for providing a gateway to Hyde Park (1989).

2.9. Chelsea

The River Kilburn ran from Sloane Square and from beneath Chelsea Bridge Road and into the grounds of the Ranelagh Gardens (Figure 9). Chelsea used to be a village around London and Westminster, where housed eminent residents in 17th Century. It developed more particularly and gained the fame of the 18th-century riverside pleasure resort for public leisure.

The kenel was Ranelagh Gardens, opened in 1742, by the riverside being was fashioned as a popular place for dining and get-togethers and contributed to Chelsea drawing greater artistic attention during the late 18th century. These are also the grounds where a young Mozart used to play for the crowds.

Chelsea Bridge, as a suspension bridge, was proposed in the 1840s. It intended to provide convenient access from the north bank with high density to the new bank, which built and operated by Government. It was demolished and reopened in 1937 duo to its narrow and structural unsound. During the early 1950s, it became popular with motorcyclists. It was dismantled in 1945. The River Kilburn finally discharges to the Thames at Battersea Park.

Figure 10: View of the Canal, Chinese Building and Rotunda in Ranelagh Gardens, Chelsea. (London Metropolitan Archives 1750)

3. The River Tyburn

3.1. Etymology

The name ‘Tyburn’ is derived from the old English ‘reo’ for boundary and ‘burna’ for stream; therefore, it means that any watercourse marks a boundary. The alternative suggestion is thought to be from ‘Twa-burne’ referring to ‘two streams’. However, it would appear unlikely as it would have given us the name of Twyburn (as in Twyford, two-fords) rather than Tyburn. Whilst the river name has been previously recorded as Tybourne, Tyborne, Tiborne, Tyburne, Tibourne, Tiburne, Tiburn, and Tiborn, the ‘twy’ prefix has been consistently absent. The Tyburn Manor (a manor of Marylebone) and Tyburn (a village) was named after the River Tyburn. Also, Oxford Street and Park Lane, which were formerly named Tyburn Road and Tyburn Lane respectively got its name from the river (Weinreb and et al., 2008).

3.2. The Tyburn Route

In early days of London, the River Tyburn River originated from two small sources in Hampstead (north London) (Trench and Hillman, 1985).

The eastern source is a spring behind Hampstead Town Hall on Haverstock Hill. It runs along Belsize Avenue, across Adelaide and Avenue Roads to the intersection of Norfolk and Woronzow Roads.

Whereas, the western source originates from behind the Shepherd’s Well and Haverstock Hill. The river then flows across the eastern sides of Fitzjohn’s Avenue, under the Central School of Speech and Drama, behind the Hampstead Theatre and under Adelaide Road, to join the eastern source at the Worzonw Road.

The united stream runs through the valley between Primrose Hill and Ordnance Hill, crossing Prince Albert Road and running over the Grand Union Canal in a cast-iron pipe built in the Brick Footbridge. Beyond the Grand Union Canal, it flows down to the American Ambassador’s residence across Regent’s Park to the artificial lake and London Zoo. Then, it continues down the Gloucester Place and along the eastern side of Baker Street, Aybrook Street and Marylebone Lane. Crossing Oxford Street, it runs under the present HMV record shop, where it was diverted by the proprietors of the Central London Railway in 1899.

The river then turns west into Curzon Street, across Piccadilly, and flows under Buckingham Palace, where it is split into two branches by Thorney Island at Westminster Abbey found in 1065 A.D (shown in Figure 10). The southern branch runs down to Palace Street, and flows across Victoria Street and Vauxhall Bridge Road and finally joins the Thames River under the Tachbrook Estate. The eastern branch splits at Tothill Street; one branch flows towards the east along Broad Sanctuary, across Treasury, and into the Thames by the 'old' New Scotland Yard; Whereas, the other branch flows towards the south under Great Smith Street and into the Thames at Millbank.

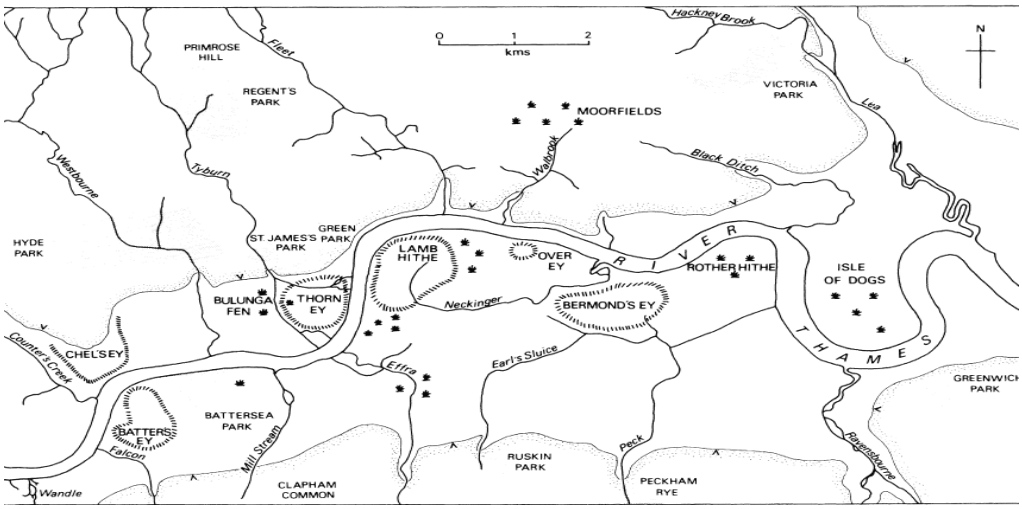

Figure11: The pre-urban setting of London as deduced from historical sources (Nunn, 1983)

3.3. The Uses of Tyburn

The Thames and its tributaries have been used until now as a source of drinking water for Central London, and the River Tyburn, one tributary of the Thames, was one of the first conduits used for this purpose (Bromehead, 1942). By 1236, springs from the banks of Tyburn located near the old Marylebone Town Hall was already being carried in a conduit for the local residential. Then similar schemes for bringing water to the city of London were constructed. Joseph motioned:

In the following year, the supply to the cisterns at the River Tyburn was augmented by the waters of some springs at Paddington, obtained from the Abbot of Westminster; and this continued to be the only great source of supply, until the middle of the sixteenth century, although the water of various springs in the

neighbouring fields were brought to particular buildings or localities in the city; the conduits at Holborn erected a water-wheel, to be worked by the tide, and a set of force pumps to raise Thames water for the supply of the neighbourhood.

On the other hand, the River Tyburn was initially proposed to covert as the King's Scholars' Pond Sewer near Vauxhall Bridge in 1848 due to its heavy contamination. When housing boomed around Hampstead in 1672, its lower reaches had been recognised as a sewer. After that, it had been entirely bricked over when John Hollingshead travelled in 1860 (Trench and Hillman, 1985):

The entrance to King's Scholar's Pond Main Sewer, that I decided to go down by, is close to the cab-stand at St John's Wood Chapel… The side entrance is a square brick-built shaft, having a few iron ring driven into two of its sides…We pass through an iron tube, about three feet high and two feet broad, which conveys the sewage over the Regent's Canal through the crown of the bridge. It was not until we got onto some lower levels, towards Backer Street, that the sewer became sufficiently large to allow us to stand upright…The end of this creek, where it enters the Thames, is closed with tidal gates, which are watched by a kind of swer lock-keeper, who lives in the cottage immediately over the sewer.

Apart from that, the River Tyburn (Barton, 1962) had also been used to feed animals in the early ages, as in Shepherd's well which is the source of River Tyburn. In addition, the lake in Regent's Park had been used for rowing and sailing is fed by the river Tyburn. Finally, it used as a boundary for differentiating the south-west boundary of Regent's park as well as Regent's Canal which is the northern boundary.

4. Historical sites and Landmarks of River Tyburn

4.1. Shepherd's Well

In the Shepherd's fields (Walford, 1875), the public spring, northwest of Rosslyn House, was conducted and known by 1829 as Shepherd's Well. It is the main source of the river Tyburn and used to be an arch over and rails around the conduit (Figure 11).

Figure 12: Shepherd's Well, one source of the River Tyburn River (Walford 1878).

It used to provide a glass of the clearest and purest water to visitors. Later, the spring served the dwellers in Hampstead and poor people sold it by the bucket. In the early mid 19th century, the well supplied residents by using water carriers to a mile away. During that time, the pipes of Camden Town were extended to the southernmost part of the parish in the 1830s and 1840s.

The conduit of Shepherd's Well became neglected since Hampstead has been supplied by the New River Company in1884 (Elrington 1989), and now the spring is only a small dirty swamp. Hone's "Table book" describes the former Shepherd's Well:

The arch, embedded above and around by the green turf, forms a conduit-head to a beautiful spring; the specific gravity of the fluid, which yields several tons a day, is little more than that of distilled water. Hampstead abounds in other springs, but they are mostly impregnated with mineral substances. The water of 'Shepherd's Well,' therefore, is in continual request; and those who cannot otherwise obtain it are supplied through a few of the villagers, who make a scanty living by carrying it to houses for a penny a pailful. There is no carriage-way to the spot, and these poor things have much hard work for a very little money. … The water of Shepherd's Well is remarkable for not being subject to freeze. There is another spring sometimes resorted to near the River Kilburn; but this and the ponds in the Vale of Health are the ordinary sources of public supply to Hampstead. The chief inconvenience of habitations in this delightful village is the inadequate distribution of good water. Occasional visitants, for the sake of health, frequently sustain considerable injury by the insalubrity of private springs, and charge upon the fluid they breathe the mischief they derive from the fluid they drink. The localities of the place afford almost every variety of aspect and temperature that invalids require; and a constant sufficiency of

wholesome water might be easily obtained by a few simple arrangements.

Based on the above statement, the desire of good water is not among the requirements of Hampstead at present, what Lord Loughborough was unable to effect in the way of stopping the supply of water from this spring, was partially accomplished about the years 1860–70, through the excavation of tunnels under the hill on the side of which it stands, when the spring became almost dried up.

4.2. Tyburn Tree

The original 'Tyburn Tree' recorded in the book 'Old and New London' (Walford 1878)describes:

Five hundred ago, or less, it was a pleasant brook enough, with rows of elms growing on its banks. There trees were a place of execution in those days; Roger de Mortimer, the paramour of Queen Eleanor, widow of Edward 2., was dragged thither on a hurdle, and hung and quartered, his body being exposed there for several days. Elem's Lame. Bayswater, now swept away, preserved down to our own time the memory of these fatal elms, which are to be regarded as the original "Tyburn Trees".

As a well known spot at the water's edge, it used to hang criminals at the gallows for execution (Figure 12). Then, it removed to Marble Arch in 1571, where it continued executions for a further two centuries until Newgate prison, the main provider of bodies for the drop, began to carry out their own executions (2008).

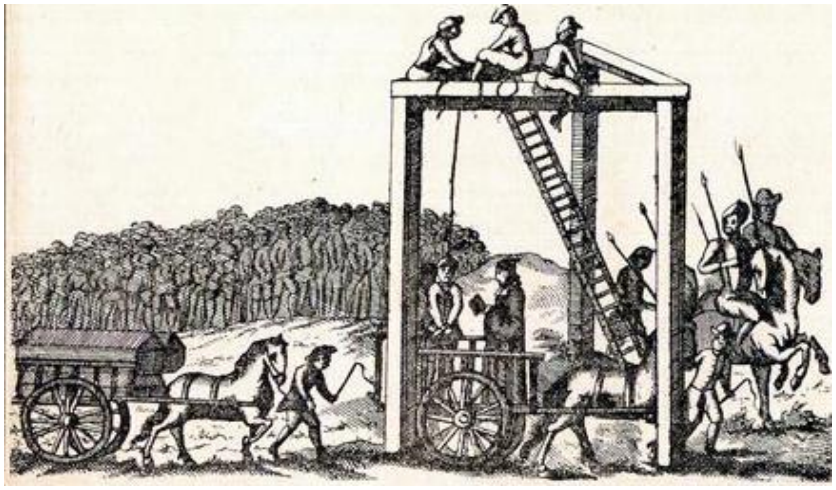

Figure 13: The execution at the Tyburn Tree (The National Archives)

4.3. Regent's Canal

The River Tyburn crosses through Regent's Canal began to build in 1821 and it opened in two stages (Weinreb and et al. 2008). The first was from Paddington to Camden in 1816 and the remainder in 1820. The river dammed a reservoir to supply this canal duo to shortage of water in the beginning which cost 750000. Linked with Grand Junction Canal at Paddington Basin, it goes eastward to Edgware Road, Maida Hill and St John's Wood and on through Camden Town and Islington. Then it flows to the City Basin and joined at the Thames at Limehouse (Figure 13).

Figure 14: Barges entering the Regent's Canal ad Limehouse from a watercolour (London Metropolitan Archives 1823)

The canal was nationalised in 1948 under the Docks and Island Waterway Executive, and is a part of the British Transport Commission. By this time, its importance for the commercial traffic was shrinking compared with horse-drawn commercial traffic and it even ceased to operate by the late 1960s. As a result, the Regent's Canal was closure for shipping in 1969. Later it became a leisure facility and the towpath opened to the Public.

4.4. Regent's Park

The River Tyburn flows through Charlbert Bridge in the Regent's Park (Duncan 2007). The original name of Regent's Park is Marylebone Park which was appropriated to use as a hunting ground by Henry VIII. At that time, the only boundaries were a ditch and a rampart. Henry would hardly recognise the stylish gardens and sports fields that now stand in its place (Weinreb 2008).

The present park was originally developed as the Prince Regent's residence in Pall Mall (the northern termination of the Regency Metropolitan Improvement in great town plan) in the first three decades of the nineteenth century.

When the Prince Regent reverted to The Crown in 1806, the scheme for the whole area of this park was ordered to design. John Nash, an architect, published his design in 1812 and approved by Treasury. The design was provided a vast rounded park with palatial terraces, a lake, a canal, planned villas (only eight ever built) and a second home for the Prince (which was never built). The new erections in the Regent's Park described as the "dawning of a new and better taste" in Brande's Quarterly Journal (1827):

Regent's Park and its circumjacent buildings promise, in few years, to afford something like an equipoise to the boasted Palace-group of Paris. If the plan already acted upon is steadily pursued, it will present a union of rural and architectural beauty on a scale of greater magnificence than can be found in any other place. The variety is here in the detached groups, and not as formerly in the individual dwellings, by which all unity and grandeur of effect was, of course, annihilated. These groups, undoubtedly, will not always bear the eye of a severe critic, but altogether they exhibit, perhaps, as much beauty as can easily be introduced into a collection of dwelling-houses of moderate size. Great care has been taken to give something of a classical air to every composition; and with this object, the deformity of door-cases has been in most cases excluded, and the entrances made from behind. The Doric and Ionic orders have been chiefly employed; but the Corinthian, and even the Tuscan, are occasionally introduced. One of these groups is finished with domes; but this is an attempt at magnificence which, on so small a scale, is not deserving of imitation.

Figure 15: Botanical Gardens in Regent's Park (Walford 1878)

It firstly opened to the general public in the 1845. Now Regent's Park is the largest grass area for sports in Central London and offers a wide variety of activities, as well as an Open Air Theatre, the London Zoo, restaurants and gardens (Figure 14).

4.5. Baker Street Station

Baker Street Station situates at the junction of Baker Street and the Marylebone Road, and on the London Underground. It locates in Zone 1 and involves service in five different lines. It is the world's first underground railway opened in 1863. It is aslo famous for a statue of Sherloch Holmes which outside the Marylebone Road, which commemorates the fictional detective's association with Baker Street (Figure 16). This cast-iron conduit in the Baker Street Station is waterway of the lost River River Tyburn shown in Figure 17.

Figure 16: Unique tilework in Baker Street Station.

Figure 17: The River Tyburn in a cast-iron conduit
running through Baker Street Station

4.6. Oxford Street

Oxford Street (Weinreb and et al.2008) is on the route of a Roman road which linked Hampshire with the Suffolk coast and it runs from Marble Arch to the St Giles Circus now. It used as a route to west, named the Waye from Uxbridge, the King's Highway

(1678), the Road to Oxford (1682), and the Acton Road (1691). It was sometimes called Tyburn Way as the River Tyburn crossed Form Stratford Place to Davies Street. The 'Tyburn Tree' were at the west end, near Marble Arch. Oxford Street gave its name in 18the century due to the coincidence that the north side of the land had been acquired by Edward Harley in 1713, 2nd Earl of Oxford (Sheppard 1980).

Street started to develop in 1739 by Thomas Huddle, a gardener, from the north side as the east end. The further development ascended from 1763 and 1793, by the end of the century Oxford Street stretched from St Giles Circus to Park Lane.

In the late 19th century, Oxford Street (Figure 18) began to change from residential area to commercial area. It was mentioned (Weinreb and et al.and etd. 2008):

Their places have been taken by middle-of-the-market chain stores, popular fashion brands and a few small malls. "Too many bargains, to many sales, to many goods marked down …too blatant and raucous" singed a Virginia Woolf as early as 1952.

Now, Oxford Street, as the shipping haven, is the home to numerous Brands' flagship Stores and smaller shops. In addition, it is decorated with festive lights in each Christmas from the late middle in November until early in January from 1959 until now.

Figure 18: Old Oxford Street (Trench and Hillman 1985)

4.7. Gray Antique Market

Gray Antique Market, as a famous antique centre, is close to Bond Street Station. There are over two hundred dealers selling antiques from ancient artefacts from

40BC up to 20th century and this market is divided into 2 sections, Grays and the Mews.

The Mews section of Grays was built approximately in 1900. It was found a lost tributary of the River Tyburn running through the basement of the Mews. As a featured restoration, Bennie Gray made an artificial channel to bring spring running though the basement shown in Figure 19.

Figure 19: The River Tyburn in Gray Antique Market

4.8. Buckingham Palace

Buckingham Palace (Waltford 1878), as the royal London residence of the British monarch, locates in the city of Westminster from the west end of St. James's Park upon to the south which formed form the Manor of Ebury. The marshy ground fed by the River Tyburn, which still flows below the courtyard and south wing of the palace. However, the River Tyburn has become a sewer running through Buckingham Palace. John described his exploration of the River Tyburn through Backingham Palace (Trench and Hillman 1985):

In Piccadilly we went to the side entrance, just to get a mouthful of fresh ari, and a glimpse of Green Park, and then went down again to our journey… We had not proceeded much further in our downward course when…. the guides stopped short, and asked me where I supposed I was now? I thought the questions quite unnecessary, as my position in the sewer was pretty evident…
'I give up,' I replied…
'Well, Buckingham Palace ', was the answer.
Of course my loyalty was at once excited, and, taking off my fan-tailed cap, I led the way with the National Anthem, insisting that my guides should join in the chorus.

Figure 20: The Sewer running through the Buckingham Palace
(Trench and Hillman 1985)

The kernel is Buckingham House (Weinreb 2008), built 1702-1705 from John Sheffield, Duke of Buckingham and Normanby, by William Winde. It had been in private ownership for atl east for 150 years. It subsequently acquired by George III in 1761as a private residence for Queen Charlotte, and known as "The Queen's House". During the 19th, it was enlarged by John Nash and Edward Blore. Finally, it has became the royal residence of the British monarch on the succession of Queen Victoria in 1837.

4.9. Westminster Abbey

Westminster Abbey (Figure 21), as the heart of Westminster, a mainly Gothic Church standing in Thorney Island, where the River Tyburn was split into two main branches (Thornbury 1878).

Figure 21: Westminster Abbey designed by Christopher Wren (Walford 1878)

It established as a tradition of daily worship in the middle of the tenth century. It has been the coronation church since 1066, which is the final resting place of seventeen monarchs. It opened in 1245 by Henry III.

In addition, the most significant people in the nation's history are buried or commemorated in Westminster Abbey. Taken as a whole the tombs and memorials comprise the most significant single collection of monumental sculpture anywhere in the United Kingdom.

4.10. Vauxhall Bridge

Vauxhall Bridge (Sheppard 1956) crosses the River Thames between Vauxhall on the south Bank and Westminster on the North Bank, which is the outfall of the River Tyburn. In the beginning, it had planned to build a masonry bridge by Rennie in 1811, but then it adopted James Walker's cheaper cast-iron design by the Vauxhall Bridge Company in the two years later. It was open in 1816 (Figure 22) and firstly called Regent's Bridge, which was also the first iron bridge over the Thames. Two central piers were removed and replaced by three of its nine arches into one to aid navigation. During 1895-1906, Sir Alexander Binnie redesigned the structure of the bridge with five steel arches on granite piers. F.W. Pomeroy and Alfred Drury were responsible for operation and maintenance of this bridge and it was freed from tolls in 1879.

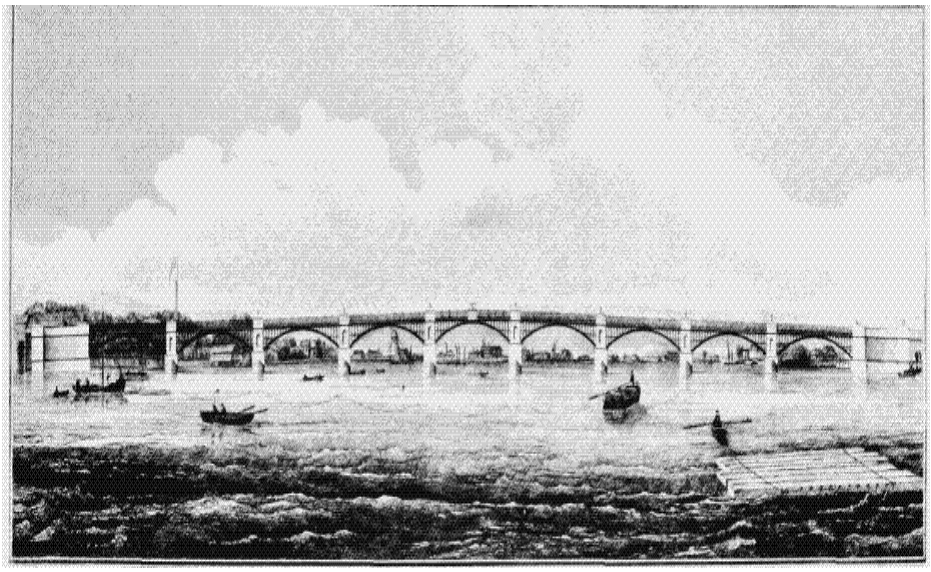

Figure 22: Old Vauxhall Bridge in 1816 (Walford 1878)

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APPENDIX G

SITE TOPOGRAPHY – SK5

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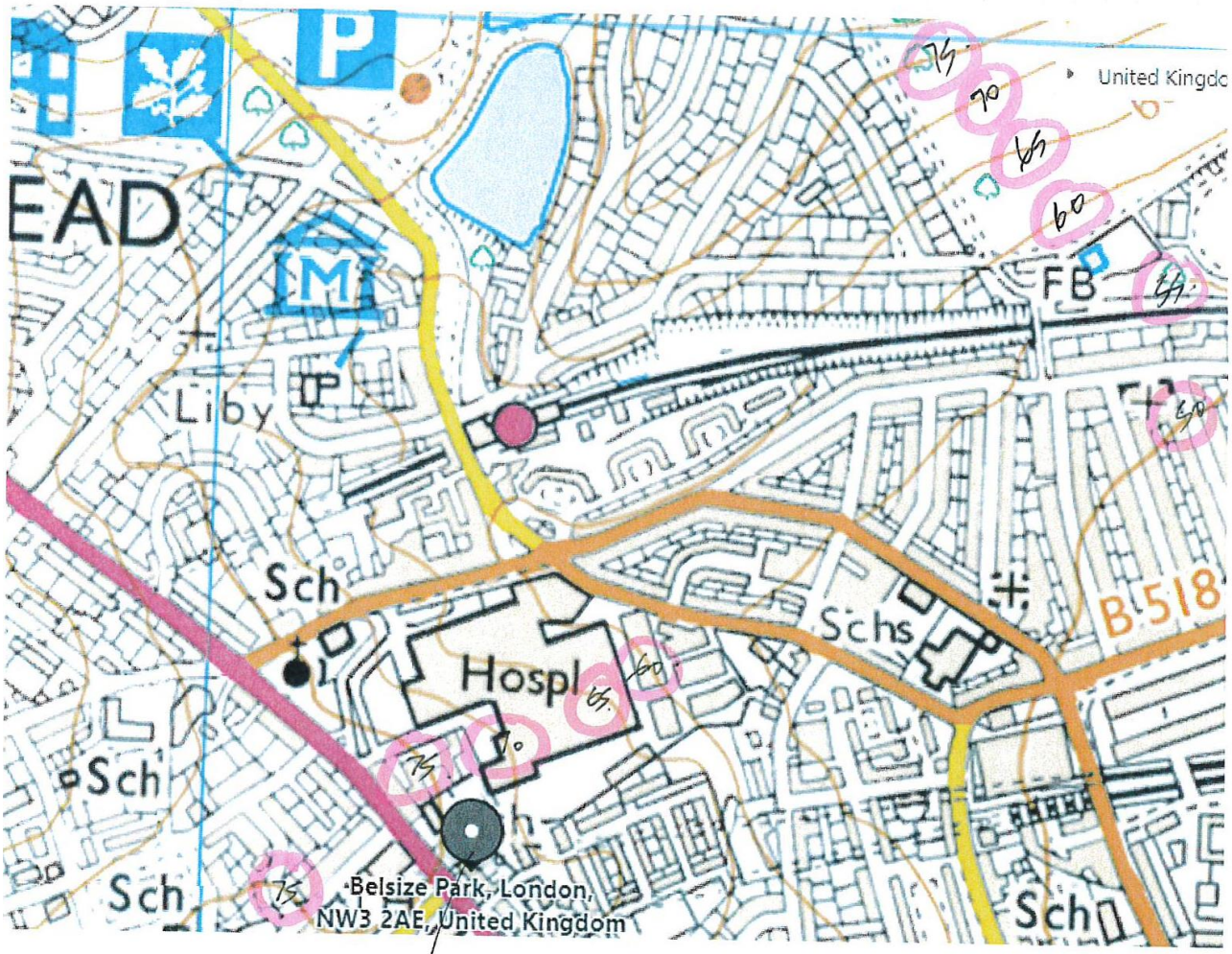

APPENDIX H

PHOTOGRAPHS