APPENDIX

Borehole Records

Trial Pit Records

Historical Maps

Site Plan

Geotechnical & Environmental Associates	Tyttenhanger House Coursers Road St Albans AL4 0PG	**Site** 122 Drummond Street, London, NW1 2HN	**Number** **BH1**

Excavation Method	**Dimensions**	**Ground Level (mOD)**	**Client**	**Job Number**
Drive-in Window Sampler			Julia Pyper	J14127
	Location	**Dates** 09/05/2014	**Engineer** Michael Alexander	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.01)	Tile		
					0.01			
					(0.09)	Concrete		
					0.10			
0.50	D				(0.30)	MADE GROUND (greyish light brown gravelly sand with fragments of brick)		
					0.40			
					(0.30)	MADE GROUND (greyish very dark brown sandy gravelly clay with fragments of ash, brick and occasional clinker)		
					0.70			
						Orange-brown fine to coarse SAND and fine to coarse GRAVEL		
					(2.30)			
2.00	D		Water strike(1) at 2.50m.					▽1
					3.00			
					(0.30)	Soft becoming firm brown silty sandy gravelly CLAY		
					3.30			
3.50	D				(0.70)	Firm grey silty fissured CLAY with selenite crystals		
					4.00			
						Complete at 4.00m		

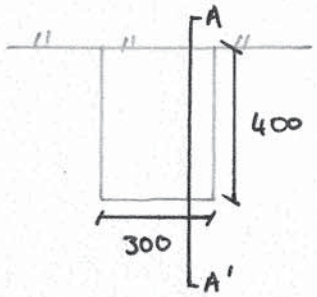
Remarks
Borehole collapsed to a depth of 3.6 m upon completion and water measured at a depth of 3.48 m

Scale (approx)	**Logged By**
1:50	ME

Figure No.
J14127.BH1

GEA Geotechnical & Environmental Associates	Tyttenhanger House Coursers Road Herts AL4 0PG	Site 122 Drummond Street, London, NW1 2HN	Trial Pit Number 1
Excavation Method Manual	**Dimensions (mm)**	**Ground Level (mOD)**	**Client** Julia Pyper	**Job Number** J14127
	Location	**Dates** 09/05/2014	**Engineer** Michael Alexander	**Sheet** 1 / 1

PLAN



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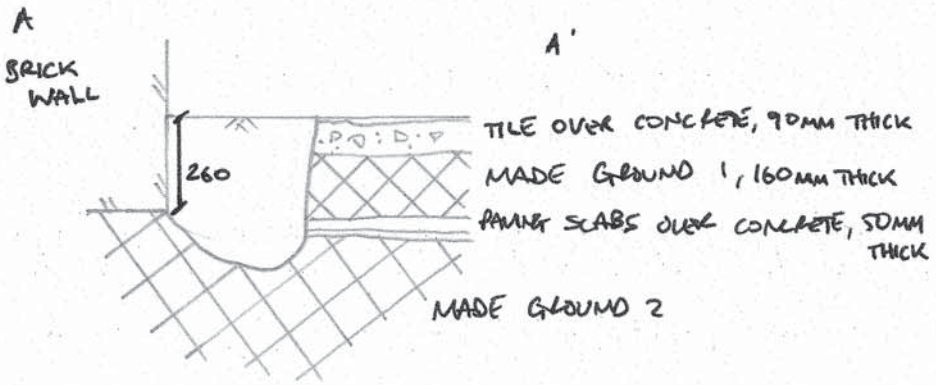


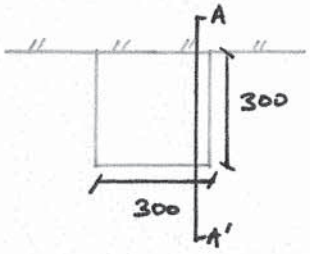
MADE GROUND 1 – LIGHT BROWN SLIGHTLY CLAYEY GRAVELLY SAND WITH OCCASIONAL BRICK FRAGMENTS

MADE GROUND 2 – BLACKISH DARK BROWN GRAVELLY CLAY WITH FRAGMENTS OF COAL, ASH AND BRICK.

Remarks:	Scale:
All dimensions in millimetres	1:20
Sides of trial pit remained stable during excavation	Logged by:
Groundwater not encountered	ME

GEA Geotechnical & Environmental Associates	Tyttenhanger House Coursers Road Herts AL4 0PG	Site: 122 Drummond Street, London, NW1 2HN	Trial Pit Number: 2
Excavation Method: Manual	**Dimensions (mm):**	**Ground Level (mOD):**	**Client:** Julia Pyper / **Job Number:** J14127
	Location:	**Dates:** 09/05/2014	**Engineer:** Michael Alexander / **Sheet:** 1 / 1

PLAN



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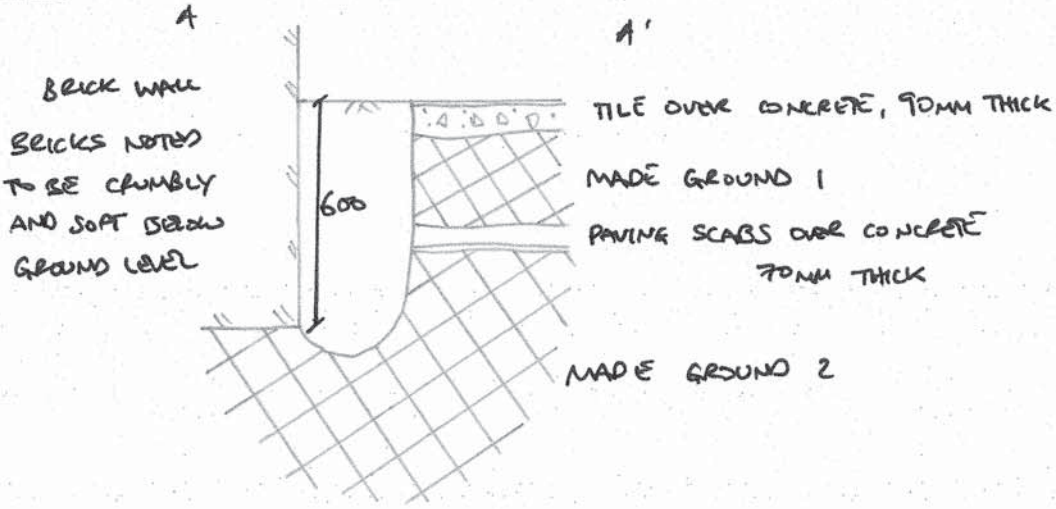


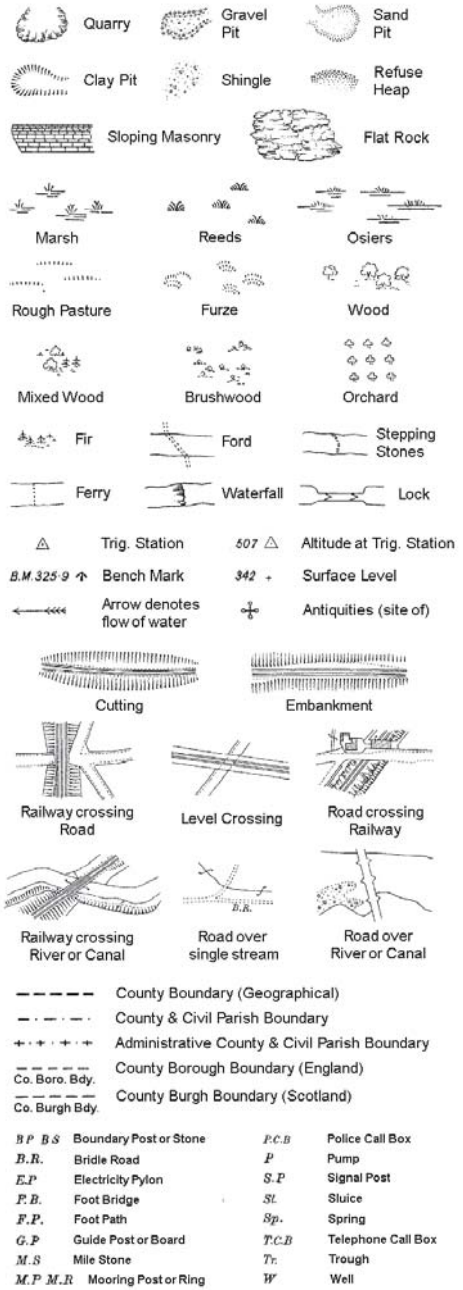
MADE GROUND 1 - LIGHT BROWN SLIGHTLY CLAYEY GRAVELLY SAND WITH OCCASIONAL BRICK FRAGMENTS

MADE GROUND 2 - BLACKISH DARK BROWN GRAVELLY CLAY WITH FRAGMENTS OF COAL, ASH AND BRICKS

Remarks:	Scale:
All dimensions in millimetres	1:20
Sides of trial pit remained stable during excavation	Logged by:
Groundwater not encountered	ME

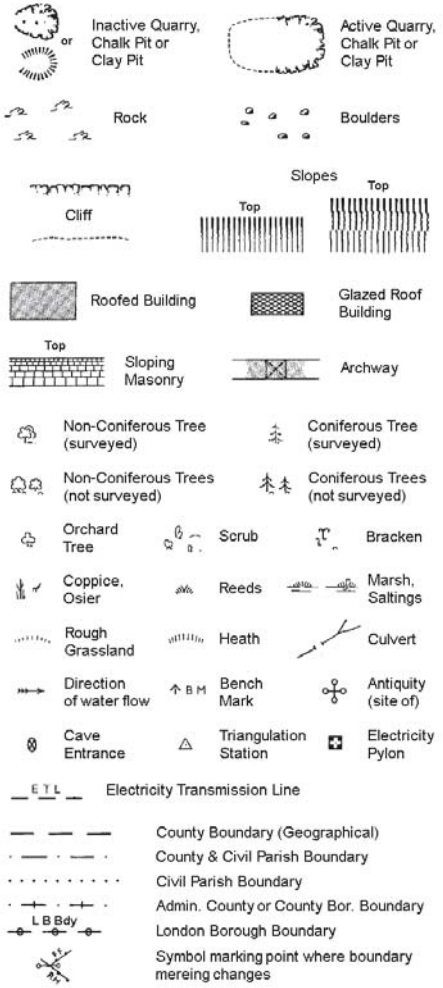
Historical Mapping Legends

Ordnance Survey County Series and Ordnance Survey Plan 1:2,500



B P B S	Boundary Post or Stone	P.C.B	Police Call Box
B.R.	Bridle Road	P	Pump
E.P	Electricity Pylon	S.P	Signal Post
F.B.	Foot Bridge	St.	Sluice
F.P.	Foot Path	Sp.	Spring
G.P	Guide Post or Board	T.C.B	Telephone Call Box
M.S	Mile Stone	Tr.	Trough
M.P M.R	Mooring Post or Ring	W	Well

Ordnance Survey Plan, Additional SIMs and Supply of Unpublished Survey Information 1:2,500 and 1:1,250



BH	Beer House	P	Pillar, Pole or Post
BP, BS	Boundary Post or Stone	PO	Post Office
Cn, C	Capstan, Crane	PC	Public Convenience
Chy	Chimney	PH	Public House
D Fn	Drinking Fountain	Pp	Pump
El P	Electricity Pillar or Post	SB, S Br	Signal Box or Bridge
FAP	Fire Alarm Pillar	SP, SL	Signal Post or Light
FB	Foot Bridge	Spr	Spring
GP	Guide Post	Tk	Tank or Track
H	Hydrant or Hydraulic	TCB	Telephone Call Box
LC	Level Crossing	TCP	Telephone Call Post
MH	Manhole	Tr	Trough
MP	Mile Post or Mooring Post	Wr Pt, Wr T	Water Point, Water Tap
MS	Mile Stone	W	Well
NTL	Normal Tidal Limit	Wd Pp	Wind Pump

Large-Scale National Grid Data 1:2,500 and 1:1,250

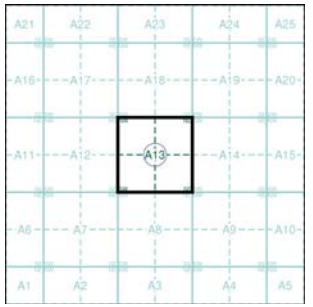
Bks	Barracks	P	Pillar, Pole or Post
Bty	Battery	PO	Post Office
Cemy	Cemetery	PC	Public Convenience
Chy	Chimney	Pp	Pump
Cis	Cistern	Ppg Sta	Pumping Station
Dismtd Rly	Dismantled Railway	PW	Place of Worship
El Gen Sta	Electricity Generating Station	Sewage Ppg Sta	Sewage Pumping Station
El P	Electricity Pole, Pillar	SB, S Br	Signal Box or Bridge
El Sub Sta	Electricity Sub Station	SP, SL	Signal Post or Light
FB	Filter Bed	Spr	Spring
Fn / D Fn	Fountain / Drinking Ftn.	Tk	Tank or Track
Gas Gov	Gas Valve Compound	Tr	Trough
GVC	Gas Governer	Wd Pp	Wind Pump
GP	Guide Post	Wr Pt, Wr T	Water Point, Water Tap
MH	Manhole	Wks	Works (building or area)
MP, MS	Mile Post or Mile Stone	W	Well

GEA Geotechnical & Environmental Associates

Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
London	1:2,500	1876	2
London	1:2,500	1896	3
London	1:2,500	1916	4
Historical Aerial Photography	1:1,250	1946 - 1949	5
Ordnance Survey Plan	1:1,250	1953	6
Additional SIMs	1:1,250	1953 - 1990	7
Ordnance Survey Plan	1:2,500	1954	8
Ordnance Survey Plan	1:1,250	1959 - 1969	9
Ordnance Survey Plan	1:1,250	1968 - 1977	10
Ordnance Survey Plan	1:2,500	1970	11
Supply of Unpublished Survey Information	1:1,250	1973	12
Additional SIMs	1:1,250	1978 - 1982	13
Ordnance Survey Plan	1:1,250	1986 - 1987	14
Additional SIMs	1:1,250	1986	15
Large-Scale National Grid Data	1:1,250	1991	16
Large-Scale National Grid Data	1:1,250	1992 - 1993	17
Large-Scale National Grid Data	1:1,250	1993	18
Large-Scale National Grid Data	1:1,250	1996	19

Historical Map - Segment A13



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National Grid Reference:	529320, 182550
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	100

Site Details

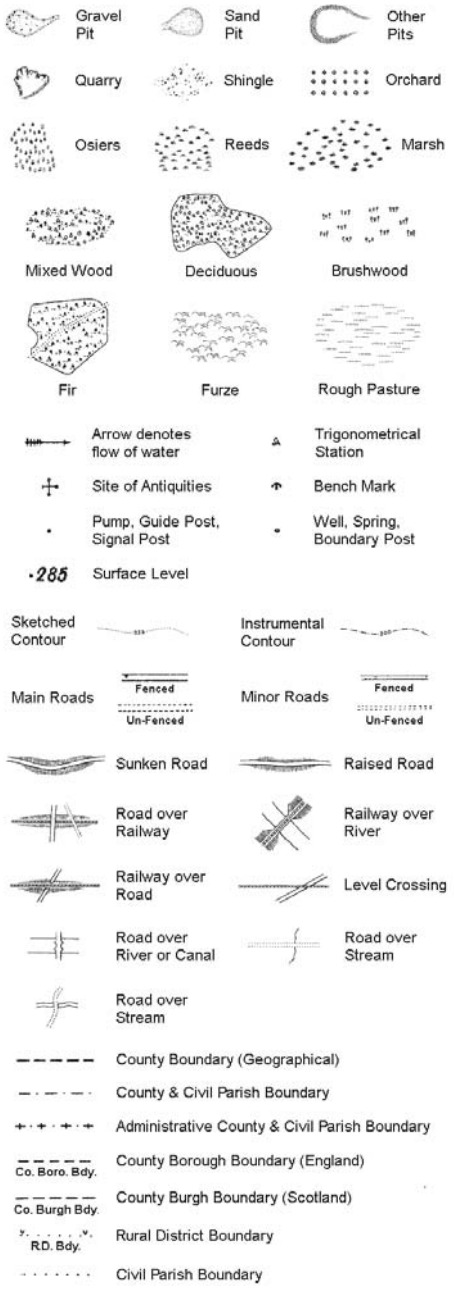
122, Drummond Street, LONDON, NW1 2HN

Landmark Information Group

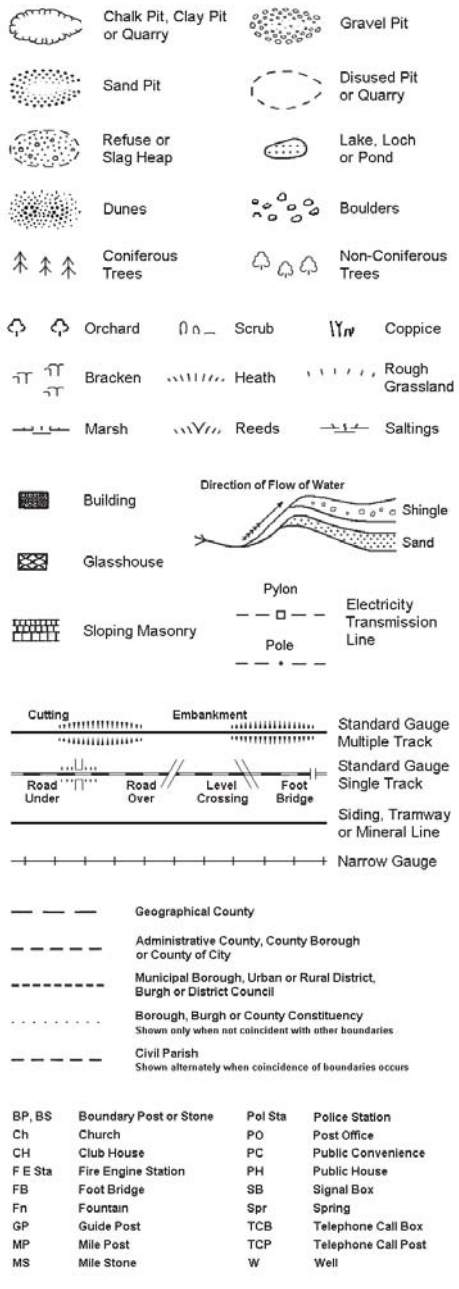
Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk

Historical Mapping Legends

Ordnance Survey County Series 1:10,560

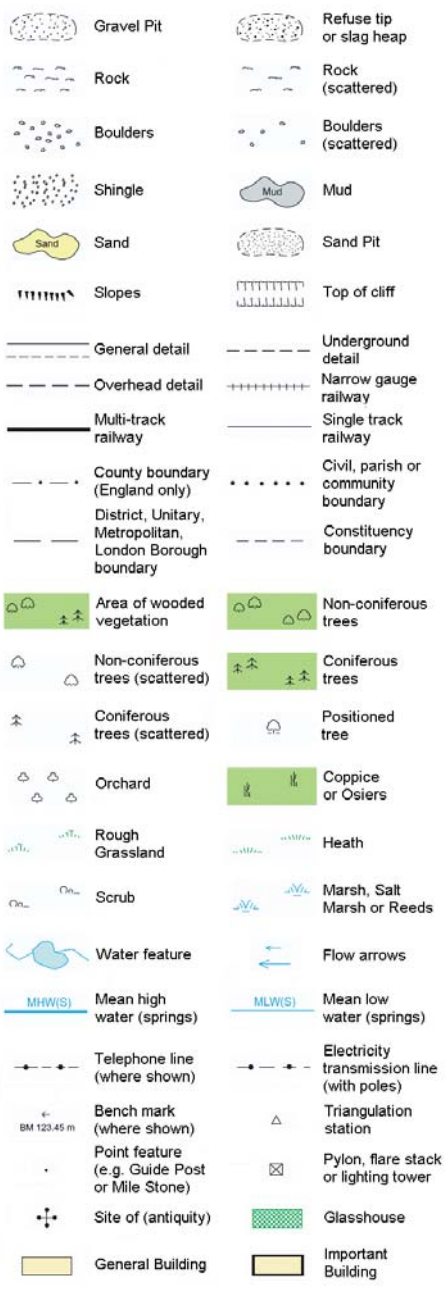


Ordnance Survey Plan 1:10,000



BP, BS	Boundary Post or Stone	Pol Sta	Police Station
Ch	Church	PO	Post Office
CH	Club House	PC	Public Convenience
F E Sta	Fire Engine Station	PH	Public House
FB	Foot Bridge	SB	Signal Box
Fn	Fountain	Spr	Spring
GP	Guide Post	TCB	Telephone Call Box
MP	Mile Post	TCP	Telephone Call Post
MS	Mile Stone	W	Well

1:10,000 Raster Mapping



GEA Geotechnical & Environmental Associates

Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
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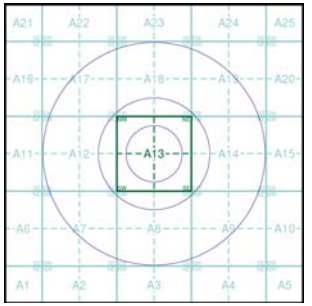
Middlesex	1:10,560	1882	4
London	1:10,560	1896	5
Surrey	1:10,560	1898	6
London	1:10,560	1920	7
London	1:10,560	1938	8
Ordnance Survey Plan	1:10,000	1940 - 1951	9
Historical Aerial Photography	1:10,560	1949	10
Ordnance Survey Plan	1:10,000	1957	11
Ordnance Survey Plan	1:10,000	1966 - 1968	12
Ordnance Survey Plan	1:10,000	1972 - 1974	13
Ordnance Survey Plan	1:10,000	1979	14
London	1:25,000	1985	15
Ordnance Survey Plan	1:10,000	1991 - 1995	16
10K Raster Mapping	1:10,000	2006	17
VectorMap Local	1:10,000	2014	18

Historical Map - Slice A



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Search Buffer (m):	1000

Site Details

122, Drummond Street, LONDON, NW1 2HN

Landmark Information Group
Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk

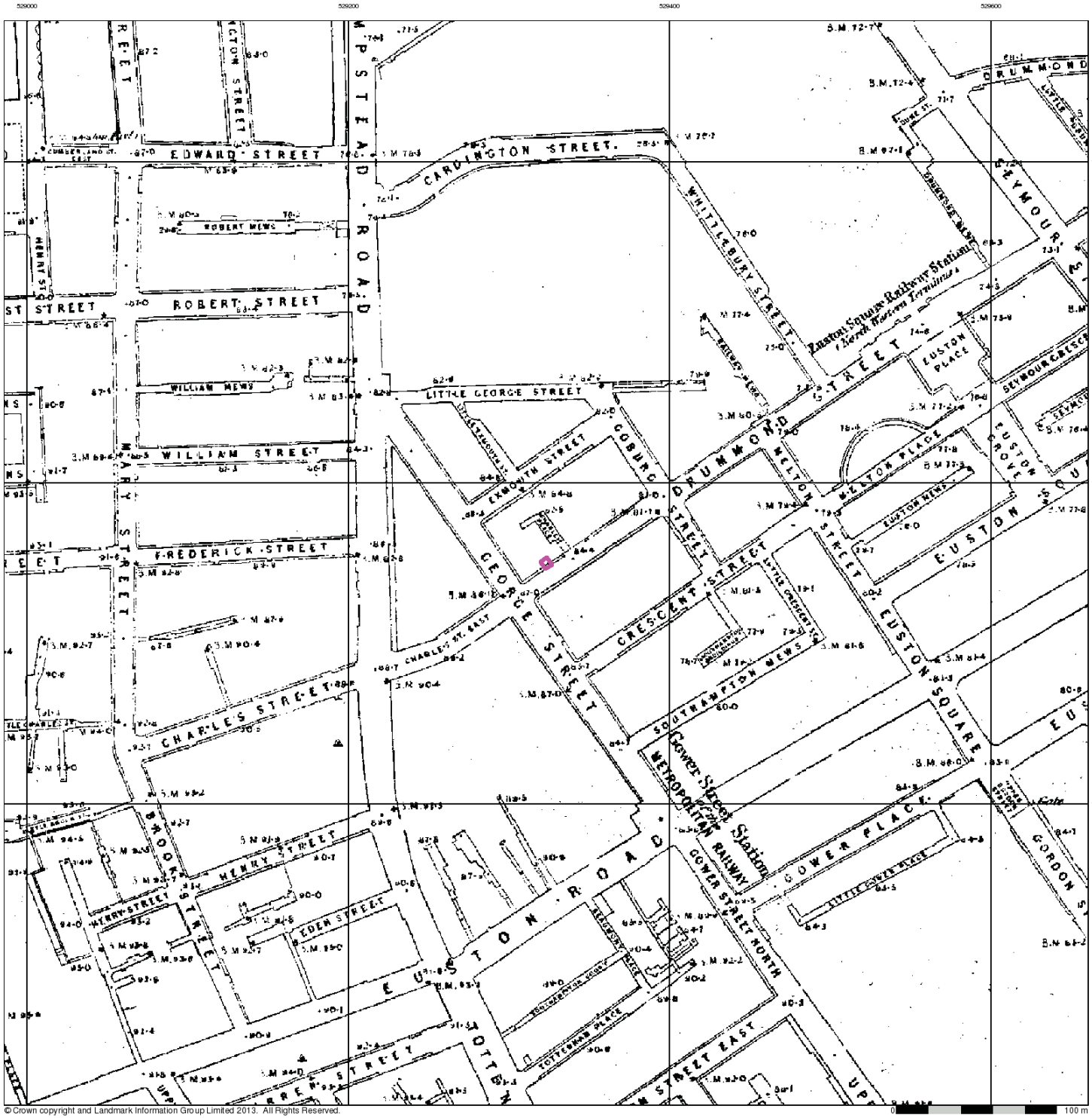
Document Control

Project title	122 Drummond Street, London, NW1 2HN	**Project ref**	J14127
Report prepared by	Matthew Elcock BEng FGS		
With input from	Martin Cooper BEng CEng MICE FGS		
Report checked and approved for issue by	Steve Branch BSc MSc CGeol FGS FRGS MIEnvSc		

Issue No	Status	Date	Approved for Issue
1	Final	15 May 2014	

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 824666	mail@gea-ltd.co.uk
	Nottinghamshire	tel 01509 674888	midlands@gea-ltd.co.uk



GEA Geotechnical & Environmental Associates

London

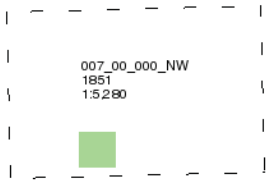
Published 1851

Source map scale - 1:5,280

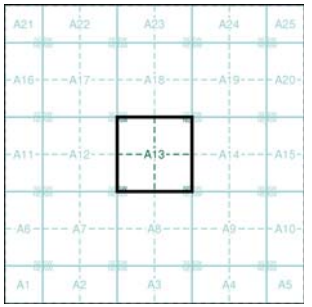
The historical town plans shown derive from Ordnance Survey mapping from the early to mid 1850s. The 1:2640 scale was introduced in the early 1850s, to survey districts covered by the Local Boards of Health and for a map of the Osborne Estate of Queen Victoria. The general style is similar to that of the early 1:2500s published shortly afterwards.
1:5280 scale was surveyed shortly afterwards in the mid 1850s as general purpose mapping with a standard of content similar to the more contemporary 1:10.560 mapping. The scale was also used for a reduction of the 1:1056 'skeleton survey' of London that was undertaken between 1848 and 1850.

Please note: Due to the partial coverage of Historical Town Plans, it is possible that not all segments within an order will contain mapping. Only the segments that have Town Plan coverage will be generated.

Map Name(s) and Date(s)



Historical Town Plan - Segment A13



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Site Area (Ha):	0.01
Search Buffer (m):	0

Site Details

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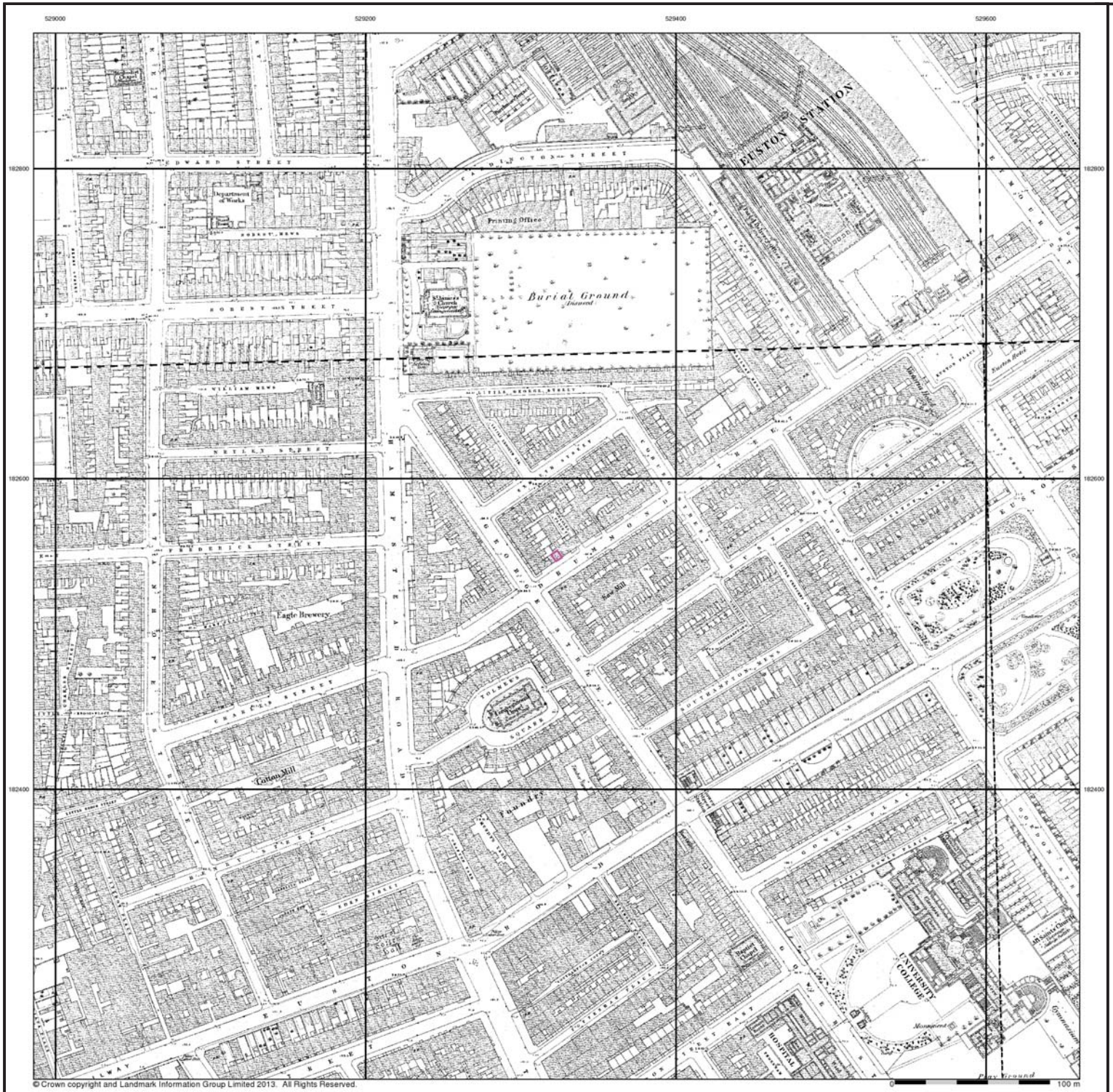

GEA Geotechnical & Environmental Associates

London

Published 1873 - 1874

Source map scale - 1:1,056

The 1:1056 scale of Ordnance Survey mapping was adopted from Ireland in 1848 and was used to survey towns with a population of over 4000, plus county towns of lesser population, in those counties mapped at the six-inch scale in 1841-55. The scale was the largest scale at which London was mapped by the Ordnance Survey and a 'skeleton' survey of the capital, showing little more than streets, street names, frontages and altitudes, was undertaken between 1848 and 1850. The majority of the 1:1056 surveys were later replaced by 1:500 surveys; although almost all the remainder were revised at this scale, sometimes more than once before 1895. The type of detail shown on the 1:1056 scale is broadly similar to that on 1:500; the apparent omission of minor details such as sewer access points and street lights may be as much a reflection of the generally earlier date of these plans, as of the specification of the map.

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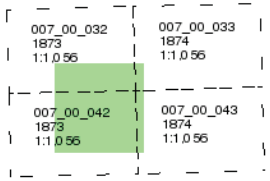
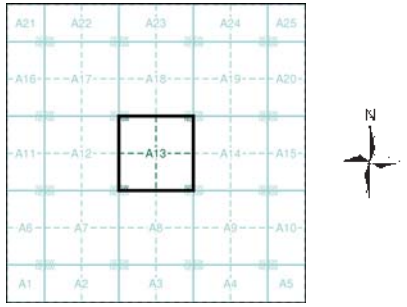


Historical Town Plan - Segment A13



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GEA Geotechnical & Environmental Associates

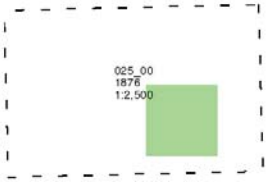
London

Published 1876

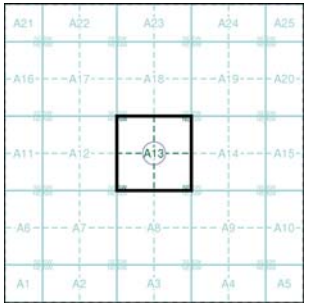
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



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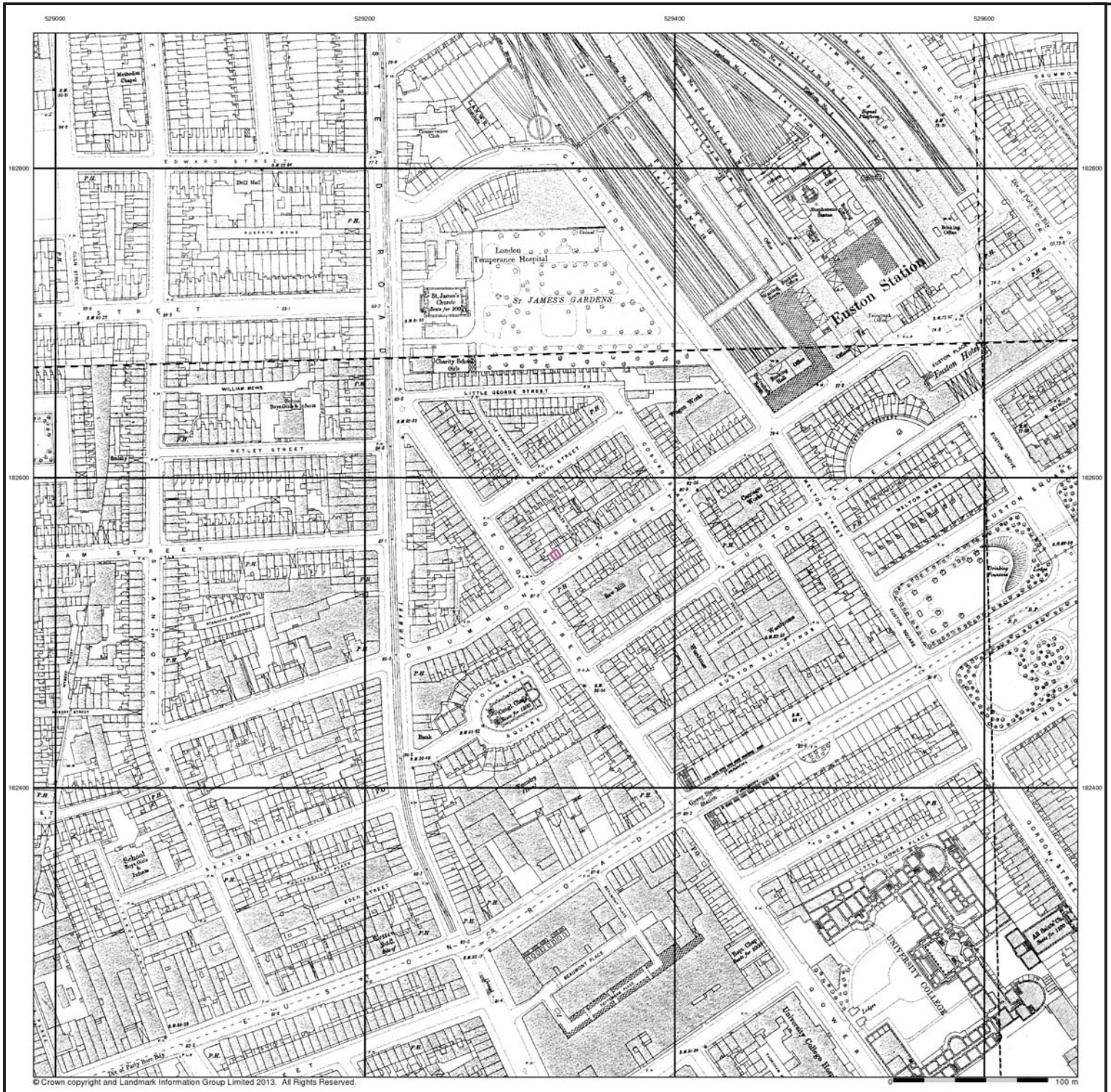

GEA Geotechnical & Environmental Associates

London

Published 1895

Source map scale - 1:1,056

The 1:1056 scale of Ordnance Survey mapping was adopted from Ireland in 1848 and was used to survey towns with a population of over 4000, plus county towns of lesser population, in those counties mapped at the six-inch scale in 1841-55. The scale was the largest scale at which London was mapped by the Ordnance Survey and a 'skeleton' survey of the capital, showing little more than streets, street names, frontages and altitudes, was undertaken between 1848 and 1850. The majority of the 1:1056 surveys were later replaced by 1:500 surveys; although almost all the remainder were revised at this scale, sometimes more than once before 1895. The type of detail shown on the 1:1056 scale is broadly similar to that on 1:500; the apparent omission of minor details such as sewer access points and street lights may be as much a reflection of the generally earlier date of these plans, as of the specification of the map.

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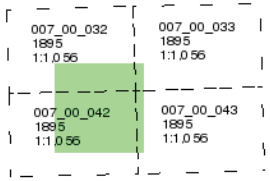
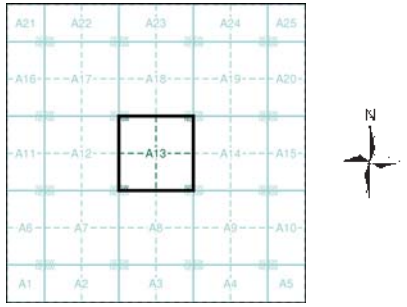
Map Name(s) and Date(s)



Historical Town Plan - Segment A13



Order Details

Order Number:	55992834_1_1
Customer Ref:	J14127
National Grid Reference:	529320, 182550
Slice:	A
Site Area (Ha):	0.01
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Site Details

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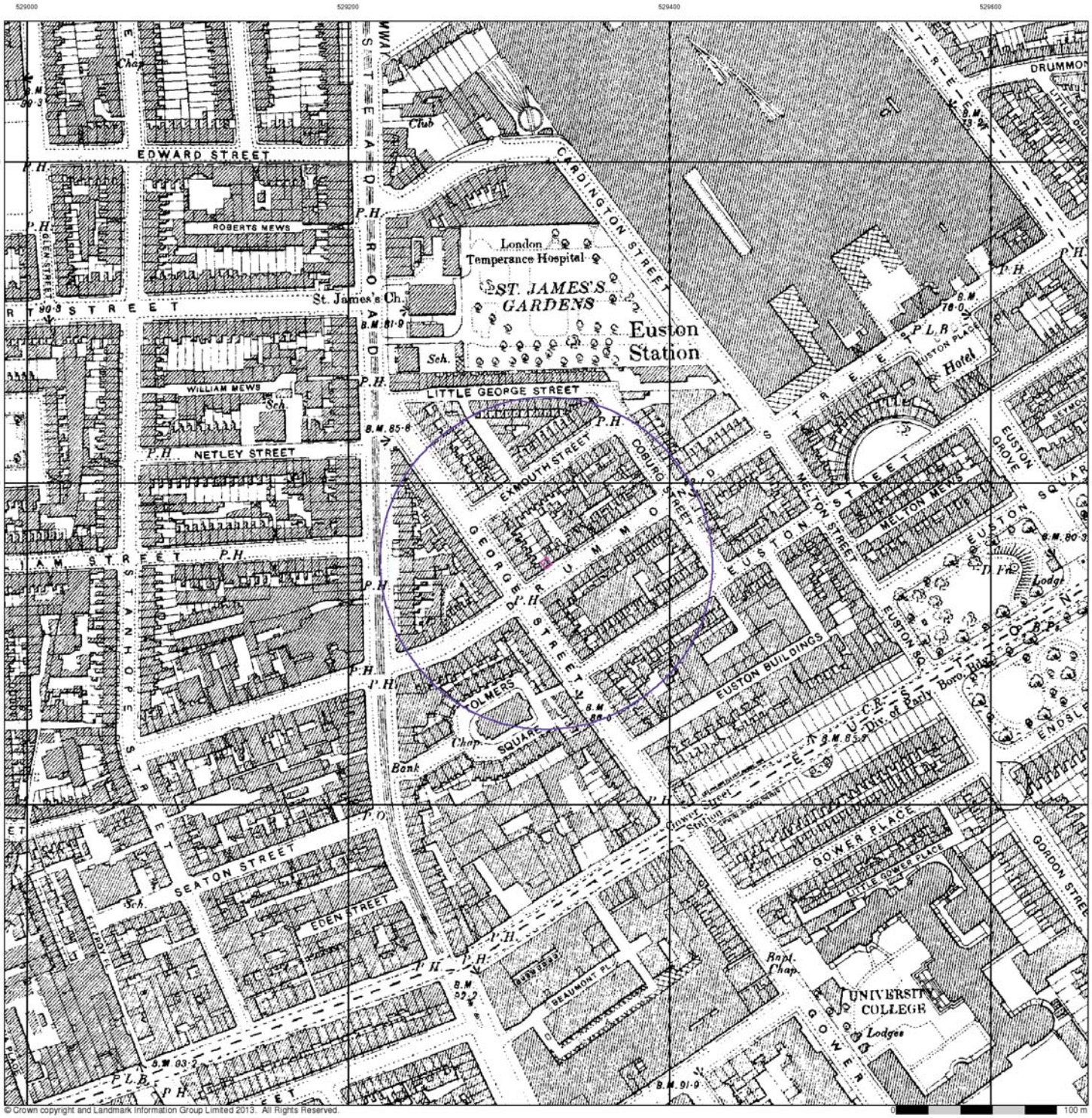


GEA Geotechnical & Environmental Associates

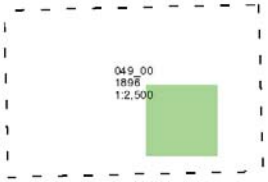
London

Published 1896

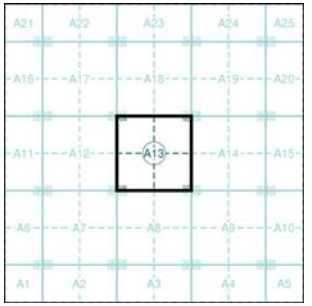
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number:	55992834_1_1
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National Grid Reference:	529320, 182550
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	100

Site Details

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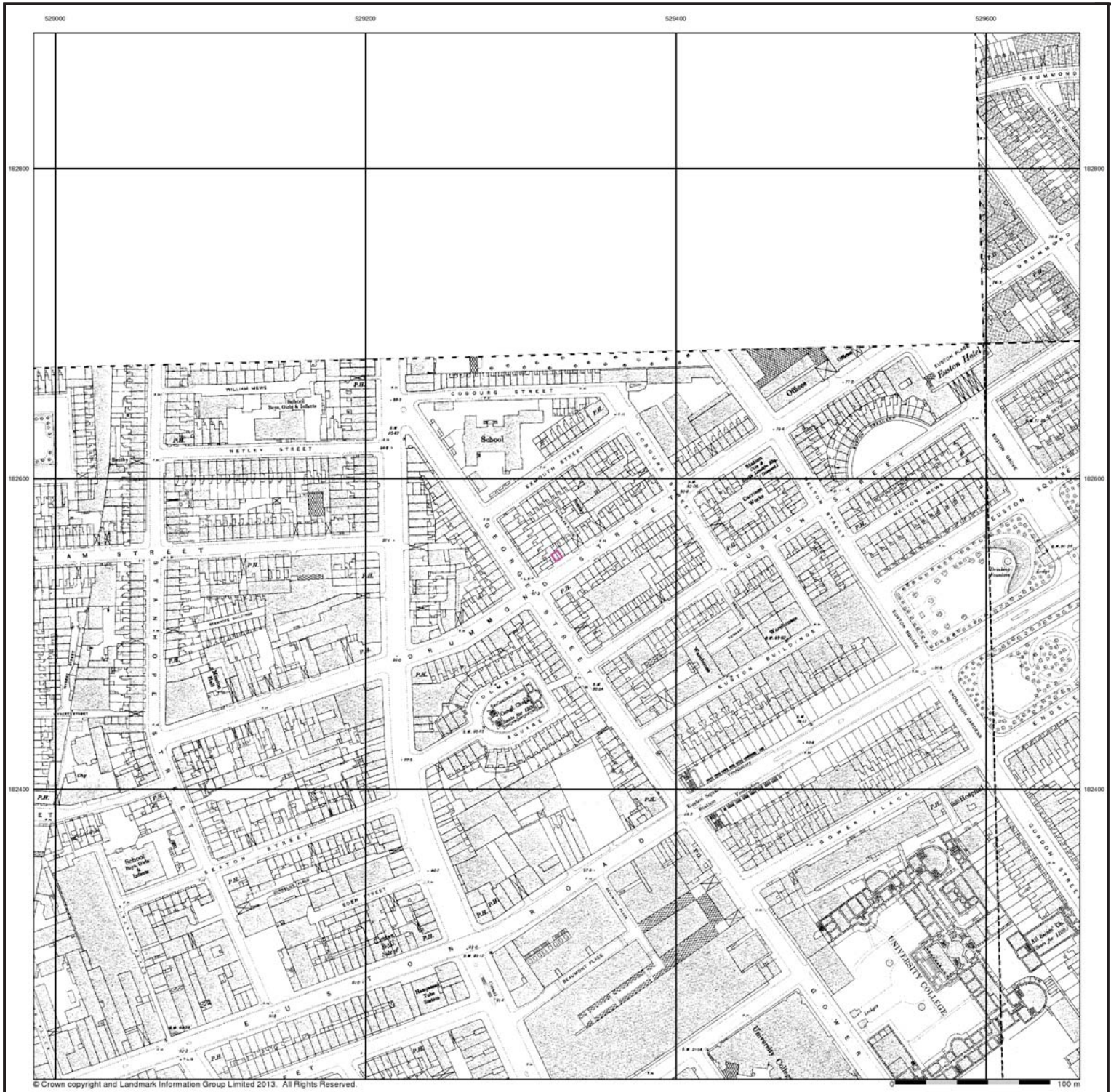


GEA Geotechnical & Environmental Associates

London

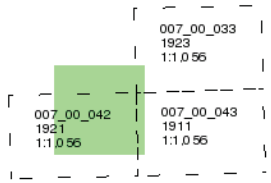
Published 1911 - 1923

Source map scale - 1:1,056

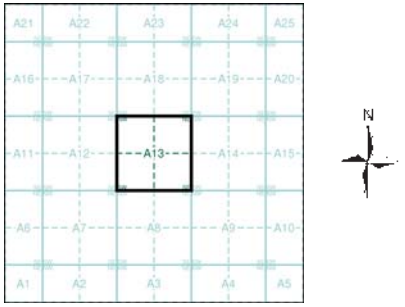
The 1:1056 scale of Ordnance Survey mapping was adopted from Ireland in 1848 and was used to survey towns with a population of over 4000, plus county towns of lesser population, in those counties mapped at the six-inch scale in 1841-55. The scale was the largest scale at which London was mapped by the Ordnance Survey and a 'skeleton' survey of the capital, showing little more than streets, street names, frontages and altitudes, was undertaken between 1848 and 1850. The majority of the 1:1056 surveys were later replaced by 1:500 surveys; although almost all the remainder were revised at this scale, sometimes more than once before 1895. The type of detail shown on the 1:1056 scale is broadly similar to that on 1:500; the apparent omission of minor details such as sewer access points and street lights may be as much a reflection of the generally earlier date of these plans, as of the specification of the map.

Please note: Due to the partial coverage of Historical Town Plans, it is possible that not all segments within an order will contain mapping. Only the segments that have Town Plan coverage will be generated.

Map Name(s) and Date(s)



Historical Town Plan - Segment A13



Order Details

Order Number:	55992834_1_1
Customer Ref:	J14127
National Grid Reference:	529320, 182550
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	0

Site Details

122, Drummond Street, LONDON, NW1 2HN

Landmark Information Group
Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk

GEA Geotechnical & Environmental Associates

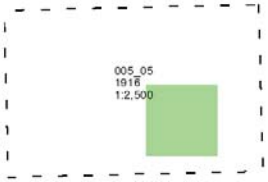
London

Published 1916

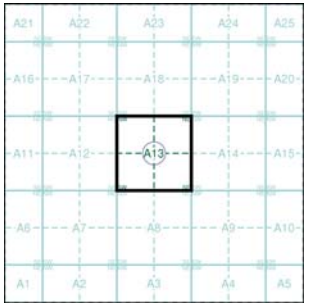
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



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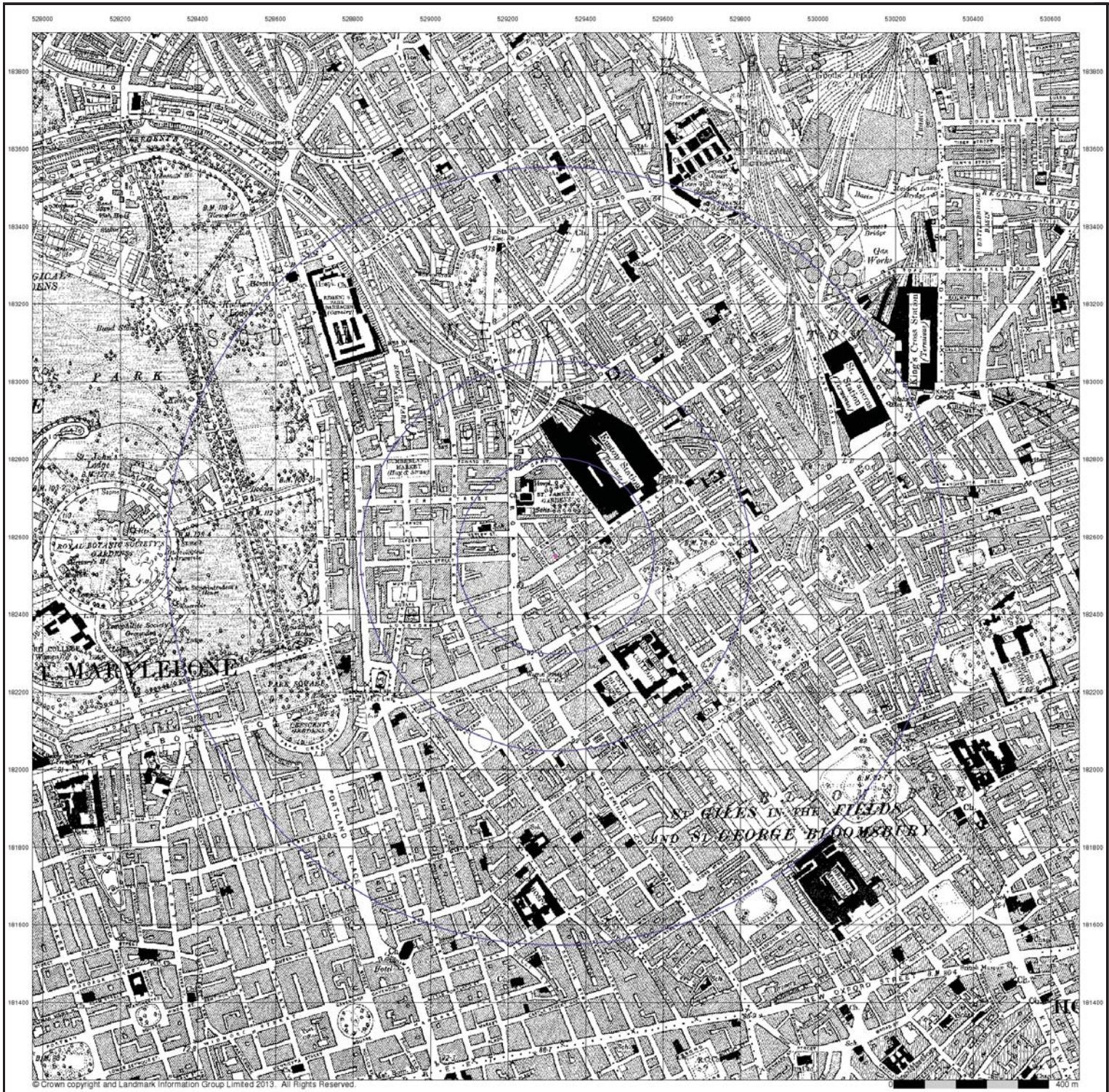
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	100

Site Details

122, Drummond Street, LONDON, NW1 2HN

Landmark Information Group

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



GEA Geotechnical & Environmental Associates

London

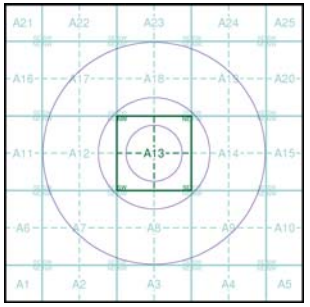
Published 1920

Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940`s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)

Historical Map - Slice A



Order Details

Order Number:	55992834_1_1
Customer Ref:	J14127
National Grid Reference:	529320, 182550
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	1000

Site Details

122, Drummond Street, LONDON, NW1 2HN

Landmark Information Group

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk

CONTENTS

EXECUTIVE SUMMARY

This executive summary contains an overview of the key findings and conclusions. No reliance should be placed on any part of the executive summary until the whole of the report has been read. Other sections of the report may contain information that puts into context the findings that are summarised in the executive summary.

BRIEF

This report describes the findings of a site investigation carried out by Geotechnical and Environmental Associates Limited (GEA), on the instructions of Michael Alexander Consulting Engineers, on behalf of Julia Pyper, with respect to the deepening of the vaults below the site by about 1.0 m. The purpose of the investigation has been to research the history of the site with respect to possible contaminative uses, to determine the ground conditions and hydrogeology, to assess the extent of any contamination and to provide information to assist with the design of the basement support and suitable foundations for the proposed development. The report also includes information required to comply with the London Borough of Camden (LBC) Planning Guidance CPG4.

SITE HISTORY

Greenwood's map of London, dated 1827, shows the site to have been developed with a building fronting onto Drummond Street to the south. The earliest Ordnance Survey (OS) map studied, dated 1873, shows the site to have been developed with the existing building and the surrounding area is in a similar layout as existing. Drummond Street is shown to the south of the site and the site appears to have been immediately surrounded by houses or shops. A saw mill is shown about 30 m south of the site, on the opposite side of Drummond Street. A smithy is shown about 20 m northeast of the site on the 1911 map. Sometime between the 1916 and 1953 map, buildings about 50 m northeast of the site were converted into a chemical works and engineering works which were labelled as warehouses from between 1959 to 1970. Fire Insurance Plans dating between 1889 and 1966 show the site to be occupied by a shop. The maps show the site to have remained unchanged from prior to 1873 until the present day.

GROUND CONDITIONS

The investigation has generally confirmed the expected ground conditions in that, below a limited thickness of made ground, Lynch Hill Gravel was encountered over the London Clay Formation, which extended to the maximum depth of the investigation, of 4.00 m. The made ground initially comprised greyish light brown slightly clayey gravelly sand with fragments of brick and extended to depths of between 0.25 m and 0.40 m and was underlain by a layer of paving stones, about 70 mm thick, below which blackish and greyish very dark brown sandy gravelly clay with fragments of coal, ash and bricks was encountered and extended to a depth of 0.70 m in Borehole No 1. The Lynch Hill Gravel comprised orange-brown sand and gravel and extended to a depth of 3.00 m. The London Clay initially comprised soft becoming firm brown silty sandy gravelly clay, which extended to a depth of 3.30 m, whereupon firm grey silty fissured clay with selenite crystals was encountered and extended to the maximum depth of the investigation, of 4.00 m. Groundwater was encountered at a depth of 2.50 m. Two trial pits excavated against the southern and eastern vault walls showed the brick walls to be directly bearing on made ground at depths of 260 mm and 600 mm respectively.

RECOMMENDATIONS

It is understood that the maximum excavation depth will be about 1.0 m, to accommodate a lower floor level in the vaults that will give an increased headroom. The investigation has indicated that groundwater will not be encountered in the 1.0 m deep excavation, and it should therefore be possible to simply underpin the existing foundations to bear in the Lynch Hill Gravel. Foundations bearing at this depth may be designed to apply a net allowable bearing pressure of 100 kN/m^2.

Part 1: INVESTIGATION REPORT

This section of the report details the objectives of the investigation, the work that has been carried out to meet these objectives and the results of the investigation. Interpretation of the findings is presented in Part 2.

1.0 INTRODUCTION

Geotechnical and Environmental Associates (GEA) has been instructed by Michael Alexander Consulting Engineers, on behalf of Julia Pyper, to carry out a limited desk study, including hydrogeological assessment, and ground investigation at 122 Drummond Street, London, NW1 2HN.

1.1 Proposed Development

It is understood that it is proposed to deepen the existing vaults by a maximum of 1.0 m to provide further habitable space for the lower ground floor flat.

This report is specific to the proposed development and the advice herein should be reviewed once the development proposals are finalised.

1.2 Purpose of Work

The principal technical objectives of the work carried out were as follows:

- to check the history of the site with respect to previous contaminative uses;
- to determine the ground conditions and their engineering properties;
- to investigate the configuration of existing foundations;
- to assess the possible impact of the proposed development on the local hydrogeology;
- to provide advice with respect to the design of suitable foundations and retaining walls; and
- to assess the risk that any such contamination may pose to the proposed development, its users or the wider environment.

1.3 Scope of Work

In order to meet the above objectives, a limited desk study was carried out followed by a ground investigation. The desk study comprised:

- a review of historical Ordnance Survey (OS) maps sourced from the Envirocheck database;
- a review of readily available geology maps; and
- a walkover survey of the site carried out in conjunction with the fieldwork.

In the light of this desk study an intrusive ground investigation was carried out which comprised, in summary, the following activities:

- a single borehole advanced by window sample techniques to a depth of 4.00 m;
- two hand excavated trial pit advanced to examine existing foundations; and
- provision of a report presenting and interpreting the above data, together with our advice and recommendations with respect to the proposed development.

The report includes a contaminated land assessment which has been undertaken in accordance with the methodology presented in Contaminated Land Report (CLR) 11[1] and involves identifying, making decisions on, and taking appropriate action to deal with, land contamination in a way that is consistent with government policies and legislation within the United Kingdom. The risk assessment is thus divided into three stages comprising Preliminary Risk Assessment, Generic Quantitative Risk Assessment, and Site-Specific Risk Assessment.

1.3.1 Basement Impact Assessment

The work carried out also includes information required for a Hydrogeological Assessment and Land Stability Assessment (also referred to as Slope Stability Assessment), which form part of the BIA procedure specified in the London Borough of Camden (LBC) Planning Guidance CPG4[2] and their Guidance for Subterranean Development[3] prepared by Arup. The aim of this work is to provide information on the groundwater conditions specific to this site and land stability, in particular to assess whether the development will affect the stability of neighbouring properties and whether any identified impacts can be appropriately mitigated.

The BIA elements of the work have been carried out by Martin Cooper, a BEng in Civil Engineering, a chartered engineer (CEng) and member of the Institution of Civil Engineers (MICE), who has over 20 years specialist experience in ground engineering. The assessment has been made in conjunction with Steve Branch, a BSc in Engineering Geology and Geotechnics, MSc in Geotechnical Engineering, a chartered geologist (CGeol) and Fellow of the Geological Society (FGS) with 25 years' experience in geotechnical engineering, engineering geology and hydrogeology. Both assessors meet the Geotechnical Advisor criteria of the Site Investigation Steering Group and satisfy the qualification requirements of the Council guidance.

1.4 Limitations

The conclusions and recommendations made in this report are limited to those that can be made on the basis of the investigation. The results of the work should be viewed in the context of the range of data sources consulted and the number of locations where the ground was sampled. No liability can be accepted for information in other data sources or conditions not revealed by the sampling or testing. Any comments made on the basis of information obtained from the client or other third parties are given in good faith on the assumption that the information is accurate; no independent validation of such information has been made by GEA.

1 *Model Procedures for the Management of Land Contamination* issued jointly by the Environment Agency and the Department for Environment, Food and Rural Affairs (DEFRA) Sept 2004
2 London Borough of Camden Planning Guidance CPG4 *Basements and lightwells*
3 Ove Arup & Partners (2010) *Camden geological, hydrogeological and hydrological study. Guidance for Subterranean Development.* For London Borough of Camden November 2010

2.0 THE SITE

2.1 Site Description

The site is located approximately 100 m west of Euston London Underground and railway station and fronts onto Drummond Street to the south and is bordered by a similar three-storey terrace building to the east, a single storey building to the west and another building fronting onto Gower Street to the rear. The site may be additionally located by National Grid Reference 529348, 182570.

A walkover of the site was carried out by a geotechnical engineer from GEA at the time of the fieldwork, at which time access was only possible to the lightwell and vaults. The site is occupied by a four-storey building, including the lower ground floor level. A shop is present at ground floor level and the upper floors are presumably residential, as is the lower ground floor, which was unoccupied at the time of the investigation.

A lightwell is present in the front of the site and a staircase allows access to lower ground floor level. There are two vaults under the pavement, but it was only possible to access the eastern vault. The surrounding area is sensibly flat and the building occupies the entire site, which is devoid of vegetation.

2.2 Site History

The site history has been researched by reference to internet sources and historical Ordnance Survey (OS) maps obtained from the Envirocheck database.

Greenwood's map of London, dated 1827, shows the site to have been developed with a building fronting onto Drummond Street to the south.

The earliest Ordnance Survey (OS) map studied, dated 1873, shows the site to have been developed with the existing building and the surrounding area is in a similar layout as existing. Drummond Street is shown to the south of the site and the site appears to have been immediately surrounded by houses or shops. A saw mill is shown about 30 m south of the site, on the opposite side of Drummond Street. A disused burial ground is labelled about 105 m north of the site and Euston Station is also shown about 200 m to the northeast of the site.

The burial ground is labelled as St. James Gardens from 1895 and a smithy is shown about 20 m northeast of the site on the 1911 map. Sometime between the 1916 and 1953 maps, buildings about 50 m northeast of the site were converted into chemical works and engineering works which were labelled as warehouses from 1970 onward.

Fire Insurance Plans dating between 1889 and 1966 show the site to be occupied by a shop.

The maps show the site to have remained unchanged from prior to 1873 until the present day.

2.3 Other Information

Reference to records compiled by the Health Protection Agency (formerly the National Radiological Protection Board) indicates that the site falls within an area where less than 1% of homes are affected by radon emissions and therefore radon protective measures will not be necessary.

The Slope Angle Map (Fig 16) within the ARUP document indicates that the site and surrounding area does not have slopes greater than 7°.

Online mapping information suggests that London Underground tunnels are in close proximity of the site.

2.4 Geology and Hydrogeology

The British Geological Survey (BGS) map of the area indicates that the site is underlain by the Lynch Hill Gravel, which overlies the London Clay Formation.

The Lynch Hill Gravel is typically described as a sand and gravel but can contain layers of clay, silt and peat. The London Clay Formation is homogenous, slightly calcareous silty clay to very silty clay, with some beds of clayey silt grading to silty fine grained sand.

The Lynch Hill Gravel is classified by the Environment Agency as a Secondary 'A' Aquifer, which refers to 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.

Under the same classification system the London Clay is designated as unproductive strata, which refers to deposits that have low permeability and negligible significance for water supply or river base flow.

Groundwater flow in the region of the site is likely to be controlled by contours, and thus generally toward the south.

3.0 EXPLORATORY WORK

In order to meet the objectives described in Section 1.2 as far as possible in view of the limited available access, a single window sample borehole was drilled in the lightwell to a depth of 4.00 m and two trial pits were excavated in the vaults to investigate the shallow foundations. The work was carried out under the supervision of a geotechnical engineer from GEA.

Disturbed samples were obtained from the borehole, but have not been tested to date.

The borehole and trial pit records are appended, together with a site plan indicating the exploratory positions.

4.0 GROUND CONDITIONS

The investigation has generally confirmed the expected ground conditions in that, below a limited thickness of made ground, the Lynch Hill Gravel was encountered over the London Clay, which extended to the maximum depth of the investigation.

4.1 Made Ground

The made ground initially comprised greyish light brown slightly clayey gravelly sand with fragments of bricks and extended to depths of between 0.25 m and 0.40 m which was underlain by a layer of paving slabs typically noted to be about 70 mm thick. Below the slabs blackish and greyish very dark brown sandy gravelly clay with fragments of coal, ash and bricks was encountered and extended to a depth of 0.70 m in Borehole No 1.

Apart from the presence of fragments of extraneous material noted above, no visual or olfactory evidence of contamination was observed during the fieldwork.

4.2 Lynch Hill Gravel Member

The Lynch Hill Gravel was only encountered in the borehole and comprised orange-brown fine to coarse sand and fine to coarse gravel and extended to a depth of 3.00 m.

These soils were observed to be free from obvious contamination.

4.3 London Clay Formation

The London Clay initially comprised a weathered zone of soft becoming firm brown silty sandy gravelly clay which extended to a depth of 3.30 m, whereupon firm grey silty fissured clay with selenite crystals was encountered and extended to the maximum depth of the investigation, of 4.00 m.

These soils were observed to be free from obvious contamination.

4.4 Groundwater

Groundwater was not encountered in the trial pits, but was indicated at a depth of 2.50 m in the sampling tubes.

The borehole was dipped upon completion and had collapsed to a depth of 3.60; water was measured at a depth of 3.48 m.

4.5 Existing Foundations

Trial Pit No 1, excavated on the southern vault elevation showed the brick wall to be directly bearing on made ground at a depth of 260 mm.

Trial Pit No 2, excavated adjacent to the eastern vault wall similarly showed the brick to be directly bearing on made ground, but at a greater depth of 600 mm.

The trial pit records are included in the Appendix.