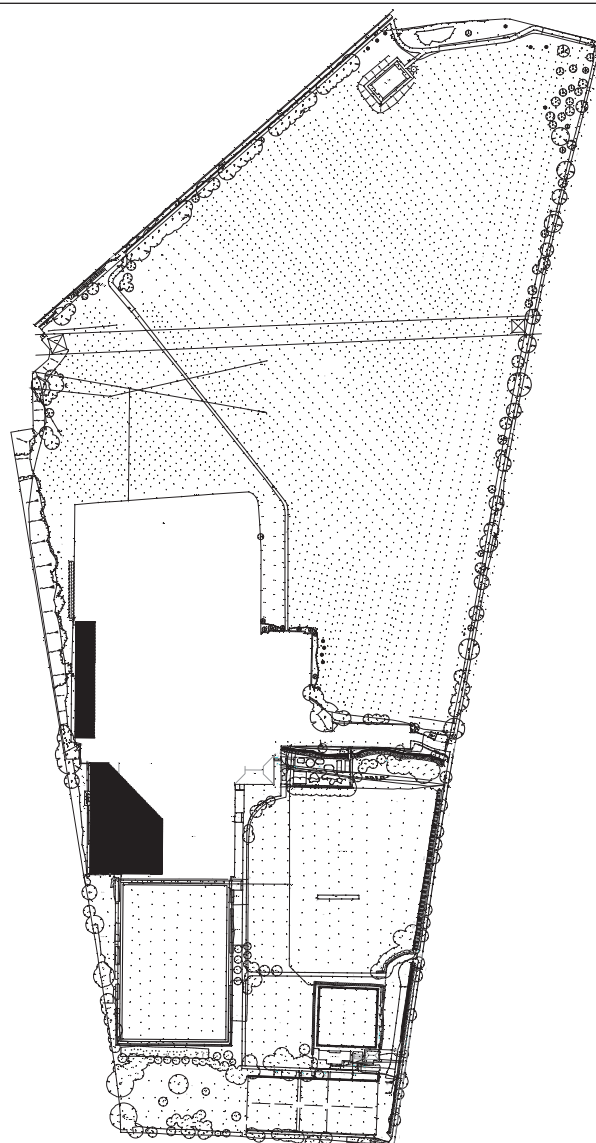


Appendix





SHEET LAYOUT

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9	10		11
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	15	16	
	17	18	
	19	20	

[illegible][illegible]

UTILITY NOTES

SOME DRAINAGE FLOODED - LITS
POOR TRACE ON SOME ELECTRICAL
PE WATER PRESENT ON SITE
UNABLE TO CONDUCT GAS LOCATION - POSSIBLE LEAK ON

TOPOGRAPHICAL NOTES			
Station	Easting	Northing	Level
0.001	525451.612	146507.237	10.00
0.502	525182.837	146220.189	35.91
0.513	525182.837	146220.189	34.58
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ALL LEVELS ARE IN METERS DERIVED FROM GPS TRANSFORMATION ILM LK DISTDGE
EDGRD RATE GSD IS DERIVED FROM GPS TRANSFORMATION ILM LK DISTDGE.
THREE SPACES ARE INDICATED WHERE KNOWN HOWEVER IT IS RECOMMENDED THAT
ONLY ONE SPACE BE COMPILED FOR EACH VALUE.
OVERHEAD WINDS ARE EXPRESSED TO CHANGING WEATHER CONDITIONS AND SHOULD
TAKEN AS APPROXIMATE.

REV	DATE	DESCRIPTION



RWC

ROSEHILL REC
ROSEHILL
SUTTON

DRAWING TITLE:	
TOPOGRAPHIC & UTILIT	
SURVEYED BY:	APPROVED BY:
SJ SC	SJ/SC/AW
DRAWING NO:	SURVEY DATE:
1214-RWC-8221	08-12-1
SCALE:	SHEET NO:
1:500 @ 1"	25 00

DISCLAIMER: THE LOCATION OF UNDER GROUND SERVICES SHOWN IN THIS DRAWING HAS BEEN DETERMINED USING ELECTRO-MAGNETIC (AND/OR GROUND) PROBING RADAR, WHERE REQUESTED. TECHNIQUES AND VISUAL OBSERVATIONS, THE LIMITATIONS OF THIS DRAWING SHOULD BE REALIZED AND NO GUARANTEE CAN BE GIVEN THAT ALL SERVICES HAVE BEEN IDENTIFIED. THIS DRAWING MAY NOT INCLUDE THE LOCATION OF ALL PUBLIC SERVICES THAT MAY CROSS THE SITE AND THEREFORE THE RELEVANT SERVICE DRAWINGS SHOULD BE OBTAINED FROM THE APPROPRIATE UTILITY COMPANY AND USED IN CONJUNCTION WITH THIS DRAWING. ADDITIONAL SERVICES, STRUCTURES OR OTHER BELOW GROUND OBSTRUCTIONS NOT INDICATED ON THIS DRAWING MAY BE PRESENT ON SITE. REFERENCE SHOULD BE MADE TO HISTORICAL PLANS AND AS BUILT DRAWINGS. EXCAVATIONS IN THE VICINITY OF SERVICES SHOULD BE CARRIED OUT WITH DUE CAREFULNESS. REF: HSG47 DOCUMENT "AVOIDING DANGERS FROM UNDERGROUND SERVICES". LOCATION ACCURACY IS DETERMINED BY THE QUALITY OF THE DATA PROVIDED BY THE CLIENT AND THE QUALITY OF THE DATA PROVIDED BY THE CLIENT.

Appendix



Desk Study



Report On A Phase I Desk Study

at

**Rosehill Recreation Ground, Rose Hill, Sutton,
Surrey SM1 3HH**

for

London Borough of Sutton

**Soils Limited
Newton House
Cross Road
Tadworth
Surrey KT20 5SR
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REPORT 14663/DS

Phase I Desk Study

Job Title: Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

Client: London Borough of Sutton

CONTROL DOCUMENT

SOILS LIMITED DOCUMENT REFERENCE NUMBER:
14663/DS

DOCUMENT TYPE:
PHASE I DESK STUDY

DOCUMENT STATUS: FINAL

REVISION: 1.0

DATE: March 2015

Note: This is not a valid document for use in the design of the project unless it is titled **Final** in the Document Status box.

	Name	Signature
Prepared by:	S. J. Bevins (sb@soilslimited.co.uk)	
Checked by:	R. B. Higginson	

Current regulations and good practice were used in the preparation of this report. The recommendations given in this report must be reviewed by an appropriately qualified person at the time of preparation of the scheme design to ensure that any recommendations given remain valid in light of changes in regulation and practice, or additional information obtained regarding the site.



**Soils Limited
Newton House
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Surrey KT20 5SR
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Table of Contents

Section 1 Commission	4
1.1 Commission	4
1.2 Caveat	4
Section 2 Introduction	5
2.1 Objective	5
2.2 Location	5
2.3 Proposed Redevelopment	5
2.4 Legislation and Liability	7
2.5 Limitations and Disclaimers	8
Section 3 Site Conditions	9
3.1 Site Walkover	9
3.2 Site Drainage	9
3.3 Site Photographs	9
Section 4 Geology, Hydrogeology, Hydrology and Radon	10
4.1 Anticipated Geology	10
4.1.1 Head	10
4.1.2 London Clay Formation	10
4.2 Hydrogeology	10
4.3 Hydrology	11
4.4 Radon Gas	11
Section 5 Site History	12
5.1 Historic Map Study	12
Section 6 Environmental Records and Consultation	14
6.1 Dataset Information	14
6.2 Site Sensitivity Maps	14
6.3 Soil Geochemistry	15
Section 7 Discussion and conclusions	16
7.1 General	16
Section 8 Preliminary Conceptual Site Model	18
8.1 General	18
8.2 Sources of Contamination	18
8.2.1 On-Site Potential Contamination Sources	18
8.2.2 Off-Site Potential Contamination Sources	18
8.2.3 Potential Contamination	19
8.3 Potential Pathways	19
8.4 Potential Receptors	22
8.5 Preliminary Risk Assessment	22
8.6 Preliminary Conceptual Site Model	23
Section 9 Recommendations	26
9.1 General	26
9.2 Impact of Construction Activities on Controlled Waters and Site Neighbours	26
9.3 Proposed further Site Works	26
9.3.1 Phase II Intrusive Investigation	26

9.3.2 Geotechnical site investigation	26
9.4 Discovery Strategy	27

List of Figures

Figure 2.1. Site Location Map (N to top. NTS)	5
Figure 2.2. Proposed Development Plan (NTS)	6

List of Tables

Table 3.1. Site Walkover Record (On-site)	9
Table 3.2. Site Walkover Record (Off-site)	9
Table 4.1. Hydrogeological Assessment	10
Table 4.2. Groundwater Flow Direction	11
Table 5.1. Sources of Pollution Indicated from Historic Maps	12
Table 5.2. Historic Development of the Site	12
Table 6.1. Environmental Significance Of Data	14
Table 6.2. Geological Hazards	15
Table 6.3. Soil Geochemistry	15
Table 7.1. Summary of Potential Contamination Sources	16
Table 8.1. On-Site – Potentially Contaminative Sources	18
Table 8.2. Off-Site – Potentially Contaminative Sources	18
Table 8.3. Potential Contaminants or Properties	19
Table 8.4. On-Site Sources, Pathways and Potential Receptors	21
Table 8.5. Off-Site Potential Pathways	22
Table 8.6. Potential Receptors	22
Table 8.7. Risk Assessment	23
Table 8.8. Preliminary Conceptual Site Model And Risk Assessment Methodology	24
Table 8.9. Reasoning Behind Risk Assessment	25
Table 8.10. Proposed Further Works	27
Table A. 1. Classification Of Consequence	34
Table A. 2. Classification Of Probability	34
Table A. 3. Comparison Of Consequence Against Probability	34
Table A. 4. Risk Classifications	35

List of Appendices

Appendix A - County Series and Ordnance Survey Maps	30
Appendix B - Landmark Envirocheck Report	31
Appendix C - Site Sensitivity Maps	32
Appendix D - Site Photographs	33
Appendix E - Risk Assessment Criteria	34

List of Photographs

Photo 1 – View of electric substation and pylon on western boundary	33
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Photo 2 – View of railway line adjacent to western boundary. 33
Photo 3 – View of open green space, including former landfill site area and overhead lines. 33
Photo 4 – View of stream on site. 33
Photo 5 – View of buildings and further electric substation. 33
Photo 6 – View of tennis courts and various sports halls / site buildings. 33

Report on a Phase I Desk Study

at

Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

for

London Borough of Sutton

Section 1 Commission

1.1 Commission
Soils Limited was commissioned by the London Borough of Sutton to carry out a Phase I Desk Study and a Site Walkover on the site located on land at Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH.

1.2 Caveat
Whilst reasonable skill and care has been taken to determine the site history and the environmental setting within the time constraints applied by the project, it should be appreciated that uncertainties may occur owing to the natural variability of soil material within a defined area or as a result of unknowns that are associated with contaminated land assessment in general. The site conditions may be different from that indicated by this desk study, particularly on a site with a history of past development. No responsibility can be accepted should such conditions alter the recommendations made in this report.

Ref: 14663/DS Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

Section 2 Introduction

2.1 Objective

The Phase I Desk Study was undertaken to advise the client on the risk pertaining to the site, with special reference to former and present day potential contaminative uses. This also included their impact on sensitive receptors, such as, human health, controlled waters, ecological features, building structures and services.

2.2 Location

This site had an area of 19.33ha and was located at land at Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH at O.S. National Grid Reference of TQ 25800, 66040. The site location map is presented in Figure 2.1 and the full Site Walkover discussed in Section 3.1 of this report.

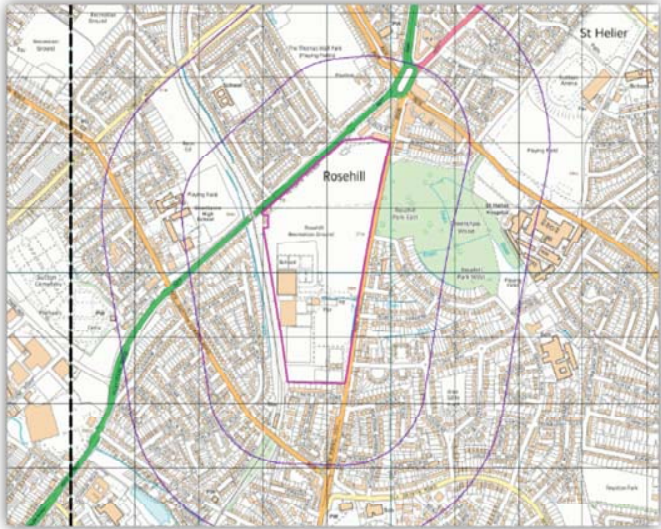


Figure 2.1. Site Location Map (N to top. NTS)

2.3 Proposed Redevelopment

The proposed redevelopment at the site was for a new secondary school comprising main school building, games courts, sports pitches, soft landscaping, access roads and parking areas. An approximate zonal plan is presented in Figure 2.2.

Ref: 14663/DS Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH



Figure 2.2. Proposed Development Plan (N to top. NTS)

Ref: 14663/DS

Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

In compiling this report reliance was placed on a proposed site layout plan provided as part of 'Sutton Secondary Schools_Presentation-1', dated December 2014 prepared by Atkins and supplied by Gleeds Advisory Ltd. Any change or deviation from the scheme outlined in the drawing could invalidate the recommendations presented within this report. Soils Limited must be notified about any such changes.

2.4 Legislation and Liability

The primary legislative mechanism for contaminated land management in the UK is Part 2A of the Environmental Protection Act, 1990 (EPA). Part 2A was introduced into the EPA under Section 57 of the Environment Act 1995 to help deal with the substantial legacy of land contamination. The legislation provides powers in relation to the identification, remediation and apportionment of liability for contaminated land. Part 2A applies where there is unacceptable risk, assessed on the basis of the current use and the relevant circumstances of the land. It is not directed to assessing risks in relation to a future use of the land that would require a specific grant of planning permission.

Under Part IIA of the Environment Act 1995, Local Authorities are required to identify contaminated land and serve on every person who is an appropriate person a remediation notice setting out what is to be done by way of remediation and the period within which it must be done.

If the person who caused, or knowingly permitted the contaminating substance cannot be found, the owner and/or occupier for the time being of the property can be the appropriate person.

Under the legislation, Contaminated Land is defined as: -

Land which is in such a condition by reason of substances in, on or under the land that significant harm is being caused or that there is a significant possibility of such harm being caused or that pollution of controlled waters is being, or is likely to be caused.

Where the Act defines harm as: -

'harm to the health of living organisms or other interference with the ecological systems of which they form a part and, in the case of man, includes harm to his property.'

and pollution of controlled waters is defined as: -

'the entry into controlled waters of any poisonous, noxious or polluting matter or any solid waste matter.'

In addition, The Radioactive Contaminated Land (Modification of Enactments) (England) Regulations 2006 introduced the additional definition of harm to include: lasting exposure to any person resulting from the after-effects of a radiological emergency, past practice or past work activity.

With regard to contaminated waters, the Environment Act 1995 amends the Water Resources Act 1991 and provides the Environment Agency with the power to force clean-up of historical contamination by issuing a Works Notice, with remediation paid for by the responsible parties.

The Groundwater Regulations (1998) stated that entry of List 1 substances into groundwater must be prevented, and List II substances must be controlled.

Ref: 14663/DS

Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

2.5 Limitations and Disclaimers

This Phase I Desk Study Report relates to the site located on land at Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH and was prepared for the sole benefit of London Borough of Sutton (The "Client") for the brief described in Section 1.1 of this report.

Soils Limited disclaims any responsibility to the Client and others in respect of any matters outside the scope of the above.

This report has been prepared by Soils Limited, with all reasonable skill, care and diligence within the terms of the contract with the Client, incorporation of our General Conditions of Contract of Business and taking into account the resources devoted to us by agreement with the Client.

The report is personal and confidential to the Client and Soils Limited accept no responsibility of whatever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report wholly at its own risk.

The Client may not assign the benefit of the report or any part to any third party without the written consent of Soils Limited.

The ground is a product of continuing natural and artificial processes. As a result, the ground will exhibit a variety of characteristics that vary from place to place across a site, and also with time. Whilst a ground investigation will mitigate to a greater or lesser degree against the resulting risk from variation, the risks cannot be eliminated.

The investigation, interpretations, and recommendations given in this report were prepared for the sole benefit of the client in accordance with their brief. As such these do not necessarily address all aspects of ground behaviour at the site.

Current regulations and good practice were used in the preparation of this report. An appropriately qualified person must review the recommendations given in this report at the time of preparation of the scheme design to ensure that any recommendations given remain valid in light of changes in regulation and practice, or additional information obtained regarding the site.

There may be other sources of information not included in those listed that hold data relevant to the Phase I Desk Study undertaken at the site that could materially affect the conclusions made in this report.

Ownership of land brings with it onerous legal liabilities in respect of harm to the environment. "Contaminated Land" is defined in Section 57 of the Environment Act 1995 as presented in section 2.4 of this report.

Where a contaminative use is identified in the Phase I Desk Study this does not determine whether contamination has actually occurred, or if it has the degree to which it may have taken place. An intrusive investigation(s) and analysis is required to establish the nature and degree of any contamination present.

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Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

Section 3 Site Conditions

3.1 Site Walkover

A Site Walkover was undertaken in January 2015 and the details are presented in Tables 3.1 and 3.2.

Table 3.1. Site Walkover Record (On-site)		
On-Site	Use of site	Recreation ground with all-weather sports pitches, bowling green, sports halls, tennis club and large open green space.
	Structures	Playground equipment, single-storey pavilions, large sports halls, flood-lit astro-pitches. Overhead electricity lines run across northern part of the site.
	Site topography	Slight downward slope from northeast to southwest.
	Site covering	Mostly grass, astroturf, tarmacadam, block paving.
	Vegetation	Mature trees along all boundaries and in centre of site.
	Potential Contamination Sources	Electric substation adjacent to the bowling green in the south of the site.
	Odour	None sensed.
	Drainage	Drainage ditches along east and west boundaries. Small stream running east to west through middle of the site.

Table 3.2. Site Walkover Record (Off-site)		
Off-Site	Use of Land	Predominately residential with local shopping areas to the north and east, a railway line to the west and an electricity substation adjacent to western boundary.
	Area topography	Sloping downwards to the northwest.
	Vegetation	Mature trees and shrubs along railway line and occasionally in residential gardens.
	Potential Contamination Sources	Railway line, electricity substations.

3.2 Site Drainage

Drainage ditches along east and west boundaries. Small stream running east to west through middle of the site. Site slopes downwards to the southwest, so any surface water run-off likely to be in that direction.

3.3 Site Photographs

Photographs taken of the site during the site walkover are presented in Appendix D.

Ref: 14663/DS

Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

Section 4 Geology, Hydrogeology, Hydrology and Radon

4.1 Anticipated Geology

The 1:50,000 BGS map showed the site to be located on bedrock of the London Clay Formation with overlying superficial geology of Head recorded across the majority of the site. The southern edge and northern third of the site are shown to not be underlain by Head.

4.1.1 Head

Head Deposits are drifts produced by solifluxion, the downslope movement of debris outwash during the periglacial period, and characteristically comprise poorly sorted soils of local derivation.

4.1.2 London Clay Formation

London Clay comprises stiff grey fissured clay, weathering to brown near surface. Concretions of argillaceous limestone in nodular form (Claystones) occur throughout the formation. Crystals of gypsum (Selenite) are often found within the weathered part of the London Clay, and precautions against sulphate attack to concrete are sometimes required.

The lowest part of the formation is a sandy beds with black rounded gravel and occasional layers of sandstone and is known as the Basement Beds.

4.2 Hydrogeology

To assess the vulnerability of groundwater to contamination, consideration must be given to the leaching characteristics of the overlying soils and the characteristics of the strata in the unsaturated zone. Information on the geological strata, such as lithological type and permeability characteristics has been combined with the physical properties of the soil to produce varying degrees of vulnerability. Table 4.1 presents the hydrological data that is relevant to the site.

Table 4.1. Hydrogeological Assessment				
Hydrogeological Data		Comment	Risk Likely	
			Yes	No
On-site Aquifers	Superficial	Secondary Undifferentiated Aquifer ¹	✓	
	Bedrock	Unproductive Strata ²		✓
Source Protection Zones (SPZ)		Zone II on site (related to Chalk at depth)		✓
Abstraction	Potable	None within 1000m		✓
	Non-potable	557m E		✓
Sensitive land uses		NVZ on site	✓	
Surface Water Features		On site	✓	
Flood Risk From Rivers and Sea		Zone II and Zone III on site ³	✓	

¹ 'Secondary Undifferentiated' was assigned in cases where it has not been possible to attribute either category A or B to a rock type. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type.

² 'These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow'.

³ 'An area that could be affected by flooding, either from rivers or the sea, if there were no flood defences: from the sea by a flood that has a 0.5 per cent (1 in 200) or greater chance of happening each year; or from a river by a flood that has a 1 per cent (1 in 100) or greater chance of happening each year.

Ref: 14663/DS

Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

The overall groundwater vulnerability of the site was on a Secondary Aquifer with soils of high permeability across the majority of the site. Therefore, controlled water will be vulnerable to potential contaminants that may be present onsite.

Any works or development, which may have an impact on surface water, aquifer or groundwater quality, must be approved by the Environment Agency prior to implementation.

According to Environment Agency guidance given to Local Authorities, a flood risk assessment may be required as a part of the application for planning permission and guidance should be obtained from the Planning Department.

4.3 Hydrology

The approximate elevation of the site was 35.0m AOD (Above Ordnance Datum).The anticipated groundwater flow direction is given in Table 4.2.

Table 4.2. Groundwater Flow Direction	
Direction	Comment
Northwest	In line with the topography of the wider area.

4.4 Radon Gas

The site was **not situated** within an area where protection or risk assessment against the ingress of radon was required. **No radon protection measures** will need to be installed within the proposed new development. It is not possible in the course of a survey or inspection to determine whether radon gas is present as the gas is colourless and odourless. Tests can be undertaken to assess the concentration of radon in existing structures.

Ref: 14663/DS

Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

Section 5 Site History

5.1 Historic Map Study

The object of this study was to report on the evidence of site history and redevelopment of the site and its environs from available County Series and Ordnance Survey Maps dating from the mid to late 19th Century to the present day as downloaded from Landmark Environmental.

Maps only represent a "snap shot" of the site and its environs at the date of the survey. Changes that had occurred either to the site and/or the environs may well not have been recorded on the maps and could represent a hazard to the site.

Any distances quoted for features remote from the site have been scaled from the maps and are only approximate. Where dates have been noted in brackets, these are the actual dates applicable to the map editions.

The information reported might not represent all pertinent information that could be obtained.

The interpretation of the maps and/or other data commented on in this report is subjective.

In the following sections dealing with individual maps, only features considered to have a potential contaminative impact on the site and usually within a notional 250m radius are discussed. The north point and approximate extent of the site are indicated on each figure. The historic maps referred to are appended to this report (Appendix A).

A précis of the features identified, if any from the maps are given in Tables 5.1 and 5.2.

Table 5.1. Sources of Pollution Indicated from Historic Maps

Feature	Direction	Distance ¹ (m)	Date Range	
			From	To
1 Rosehill Farm	N	5	1868	1955
2 Ponds	Various	15 – 165	1868	1935
3 Greenshaw Farm	E	15	1895	1935
4 Railway Line	W	5	1935	2014
5 Electric Substation	N	155	1955	2014

¹ Approximate distance to the site boundary

Table 5.2. Historic Development of the Site

Site Development	Date Range	
	From	To
Oldfields Farm in northeast corner of site, otherwise site is undeveloped.	1871	1897
Small pond noted in west of site.	1897	1933-38
Farm no longer evident. Tennis courts and pavilion noted in centre of site and sports ground in the south.	1933-38	1955
Refuse Heap (landfill) noted across the western part of the site, covering approximately one quarter of the site area.	1955	1968

Ref: 14663/DS

Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

Table 5.2. Historic Development of the Site

Site Development	Date Range	
	From	To
Tennis courts no longer evident. Overhead electricity cables and pylons noted across northern part of the site from east to west and electric substation in the west.	1968	1975
Further building now noted in centre of site, adjacent to pavilion. Sports ground to south now comprises tennis courts, bowling green and putting green. Refuse heap only evident from slope to the western site boundary.	1975	1993
Further sports pitches and sports hall noted in south and west of the site with various buildings.	1993	2014
School now noted in centre of site with additional sports hall and sports pitches / courts.	2014	-

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Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

Section 6 Environmental Records and Consultation

6.1 Dataset Information

A Landmark Envirocheck Report was obtained for the site by Soils Limited on 17th February 2015. A copy of the report is appended to this report (Appendix B) and a summary is given in Tables 6.1 and 6.2.

6.2 Site Sensitivity Maps

No other significant potential sources of contamination were shown on the Landmark Envirocheck Site Sensitivity Maps, copies of which are presented in Appendix C, beyond those listed in Tables 6.1 and 6.2.

Table 6.1. Environmental Significance Of Data

Source	Direction	Distance (m)	Maximum Radius (m)
Contaminated Land Register Entries and Notices	-	-	1000
Discharge Consents	-	-	250
Integrated Pollution Prevention and Control	-	-	250
Local Authority Pollution Prevention and Controls	NE	8	250
Local Authority Pollution Prevention and Control Enforcements	-	-	250
Nearest Surface Water Feature	-	On site	250
Pollution Incidents to Controlled Waters (Significant Incidents only)	-	-	250
Prosecutions Relating to Authorised Processes	-	-	250
Registered Radioactive Substances	-	-	250
Substantiated Pollution Incident Register	-	-	250
Nearest potable abstraction point	-	-	1000
Nearest non-potable abstraction point	E	557	1000
Water Industry Act Referrals	-	-	250
Source Protection Zones	-	On site	500
Extreme Flooding from Rivers or Sea without Defences	-	On Site	250
Flooding from rivers or sea without defences	-	On Site	250
Areas benefiting from flood defences	-	-	250
Flood Water Storage Areas	-	-	250
Flood Defences	-	-	250
BGS Recorded Landfill Sites	-	-	250
Historical Landfill Sites	S	On site	250
Licensed Waste Management Facilities	-	-	250
Local Authority Recorded Landfill Sites	-	-	250
Registered Landfill Sites	-	-	250
Registered Waste Transfer Sites	-	-	250
Registered Waste Treatment or Disposal Sites	-	-	250
Control of Major Accident Hazards Sites (COMAH)	-	-	250
Notification of Installations Handling Hazardous Substances	-	-	250
Planning Hazardous Substance Consents	-	-	250
Contemporary Trade Directory within 250m¹	Direction	Distance (m)	Status
1. Damp and Dry Rot Control	S	31	Inactive
2. Car Washing and Polishing Equipment & Supplies	S	34	Inactive
3. Cleaning Services – Domestic	E	70	Inactive
4. Car Dealers	S	144	Inactive

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Ref: 14663/DS

Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

Table 6.1. Environmental Significance Of Data

5. Printers	SE	172	Inactive
6. Garage Services	SW	186	Inactive
7. Petrol Filling Station	W	205	Inactive

¹ Those likely to impact the underlying soil and/or groundwater, date not supplied. Most of these activities either (i) operate according to environmental guidance (i.e. environmental permitting or IPPC) therefore may not be considered as source of contamination, (ii) are remote from the site or (iii) are not located up gradient of the site therefore have no direct impact on identified receptors.

Table 6.2. Geological Hazards

Source	Nearest distance from site/type
Non Coal Mining Affected Areas	No hazard recorded
Mining Instability	None
Natural and Mining Cavities	None within 500m
Potential For Collapsible Ground Stability Hazards	On-site: Very low
Potential For Compressible Ground Stability Hazards	On-site: Very low
Potential For Ground Dissolution Stability Hazards	On-site: No hazard
Potential For Landslide Ground Stability Hazards	On-site: Very low
Potential For Running Sand Ground Stability Hazards	On-site: Very low
Potential For Shrinking or Swelling Ground Stability Hazards	On-site: Moderate
Shallow Mining Hazards	Unknown

6.3 Soil Geochemistry

Potential levels of contaminants have been contoured in the area of study as presented on the Landmark Environmental check report (Appendix B). Risk to future receptors from these contaminants were assessed against the appropriate environmental quality standards (e.g. SGV) for the sites proposed end use as shown in Table 6.3. The assessment showed that a no hazard exists to identified receptors.

Table 6.3. Soil Geochemistry

Determinand	Most Sensitive Proposed Land Use	Indicated Soil Geochemistry (mg kg ⁻¹)	Soil Guideline For Residential (mg kg ⁻¹)	Potential Hazard	
				Yes	No
Lead	Residential with plant uptake	<150.0	200.0		✓
Arsenic		< 15.0	37.0		✓
Cadmium		<1.8	26.0		✓
Chromium		60.0 – 90.0	3000.0*		✓
Nickel		15.0 – 30.0	130.0		✓

Notes: Guidelines presented in the table are based on soils with 6% SOM. *Guideline value given is for Chromium (III).

Please note that there are only a limited number of landuses for which data on determinands have been published or can be readily determined.

Ref: 14663/DS

Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

Section 7 Discussion and conclusions

7.1 General

Summary of potential on-site contamination sources identified during the study of the historic maps, the Dataset Information and Landmark Envirocheck Report and the Site Walkover are outlined in Table 7.1.

Table 7.1. Summary of Potential Contamination Sources

Sources/Environmental Impact		Direction ¹	Distance (m)	Date Range		Source
				From	To	
On-site	Oldfields Farm	NE	On-site	1871	1933	HM
	Pond	W	On-site	1897	1946	
	Historical landfill site	W	On-site	Unknown	1950	HM/DS
	Electricity substations	W,S	On-site	1968	2015	SW/HM
Off-site	Railway line	W	5			SW/HM
	Electric substation	W	5			
	Rosehill Farm	N	5	1868	1955	HM
	Ponds	Various	15 – 165	1868	1935	
	Greenshaw Farm	E	15	1895	1935	
	Electric Substation	N	155	1955	2014	DS
	Former petrol filling station (Local Authority Pollution Prevention and Controls)	NE	8			
	Damp and Dry Rot Control	S	31			
	Car Washing and Polishing Equipment & Supplies	S	34			
	Cleaning Services – Domestic	E	70			
	Car Dealers	S	144			
	Printers	SE	172			
	Garage Services	SW	186			
	Petrol Filling Station	W	205			

Notes: Data Origin: ¹ SW=Site Walkover, HM=Historic Maps, DS=Data Set. ² For on-site relative to the centre of the site. The activities reported in the envirocheck report that are not listed in the table are either (i) operating according to environmental guidance (i.e. environmental permitting or IPPC) therefore may not be considered as source of contamination, (ii) remote from the site or (iii) not located up gradient of the site therefore have no direct impact on identified receptors.

The findings of the Phase I Desk Study are summarised below:

- The 1:50,000 BGS map showed the site to be located on bedrock of the London Clay Formation with overlying superficial geology of Head recorded across the majority of the site. The southern edge and northern third of the site are shown to not be underlain by Head.
- Examination of the Environment Agency records showed that the site was located within a Zone II GSPZ, although this is understood to relate to the underlying chalk formation.
- The Environment Agency Hydrogeological Maps showed the site to be located on a **Secondary Aquifer with soils of high permeability**. Therefore, controlled water will be vulnerable to potential contaminants that may be present onsite.
- The regional groundwater flowed to the northwest in line with the topography of the wider area.

Ref: 14663/DS

Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

5. The Building Research Establishment report BRE 211 (2007) showed that **no radon protection measures were required.**
6. Environment Agency records showed that the **site was at risk from flooding from rivers or the sea, being located on a Zone II and Zone III floodplain.** Other sources of flooding e.g. groundwater, pluvial or drainage infrastructure have not been considered. A Flood Risk Assessment may be required by the Environment Agency. Soils Limited can carry out a Flood Risk Assessment if required.
7. The site has been occupied by a farm, a refuse heap (landfill site) and electricity substations, and overhead power lines. The landfill site accepted industrial, commercial and household waste. As such, there was a potential risk of contamination identified from these sources. In the surrounding area another electricity substation and railway line are recorded adjacent to the western site boundary.
8. Any suspicious ground conditions encountered during groundworks should be reported to a competent person for further inspection.

Ref: 14663/DS

Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

Section 8 Preliminary Conceptual Site Model

8.1 General

Environment Agency guidance provided in CLR11 indicates the Conceptual Site Model should identify those contaminants, pathways and receptors which are 'likely' to represent an 'unacceptable' risk either to human health or the surrounding environment. The following sections present potential contaminants and receptors based on this desktop study. Pathways have been established on reasonable scientific knowledge of the behaviour of the contaminants in the ground.

8.2 Sources of Contamination

From the study of the Landmark Envirocheck Report and Site Walkover, the Phase I Desk Study has assessed and outlined potential contaminative sources (Table 7.1). Initial assessment of the likelihood each contaminative source poses a hazard to the site are considered in Sections 8.2.1 – 8.2.3.

8.2.1 On-Site Potential Contamination Sources

Map evidence, study of the Landmark Envirocheck Report and the Site Walkover showed the following potentially contaminative sources, given in Table 8.1.

Table 8.1. On-Site – Potentially Contaminative Sources			
Sources	Direction ¹	Likelihood	
		Likely	Unlikely
Oldfields Farm	NE		✓
Pond	W		✓
Historical landfill site	W	✓	
Electric substations	W	✓	

Notes: ¹ Direction relative to the centre of the site. Sources are marked as 'Unlikely' if the hazard to the site was considered negligible. These considerations are based on type of contamination, age of source and anticipated significance.

8.2.2 Off-Site Potential Contamination Sources

Map evidence, study of the Landmark Envirocheck Report and the Site Walkover showed the following potentially contaminative sources, given in Table 8.2.

Table 8.2. Off-Site – Potentially Contaminative Sources					
Sources	Direction	Distance (m)	Likelihood		Reasoning
			Likely	Unlikely ¹	
Railway line	W	5	✓		Present and proximal source
Electric substation	W	5	✓		
Rosehill Farm	N	5		✓	Age and direction of source (upstream)
Ponds	Various	15–165		✓	Age and scale of source, unlikely to generate lateral flow
Greenshaw Farm	E	15		✓	Age of source
Electric Substation	N	155		✓	Distance and direction of source

Ref: 14663/DS

Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

Former petrol filling station (Local Authority Pollution Prevention and Controls)	NE	8	✓		Proximal and likely source of potentially mobile contamination
Damp and Dry Rot Control	S	31		✓	Low potential for contamination
Car Washing and Polishing Equipment & Supplies	S	34		✓	
Cleaning Services – Domestic	E	70		✓	
Car Dealers	S	144		✓	Distance of source
Printers	SE	172		✓	
Garage Services	SW	186		✓	Distance and direction of source
Petrol Filling Station	W	205		✓	

Notes: ¹ Sources are marked as 'Unlikely' if the hazard to the site was considered negligible. These considerations are based on type of contamination, age of source, anticipated significance and taking account of the source distance from the site.

8.2.3 Potential Contamination

From the Risk Assessment in Tables 8.1 and 8.2, the main groups of contaminants are presented in Table 8.3.

Table 8.3. Potential Contaminants or Properties			
Contaminants/Chemical Properties For Testing ¹		Potential Contaminative Sources	Hazard
P1	Ammonia		
P2	Asbestos	Railway line, landfill site	✓
P3	De-icing agents, fire-fighting chemical		
P4	Herbicides/pesticides		
P5	Metals and semi-metals (e.g. Arsenic, Chromium)	Railway line, landfill site	✓
P6	Non-chlorinated solvents		
P7	Organic compounds (e.g. PAHs and TPHs)	Railway line, landfill site, former petrol filling station	✓
P8	Organic solvents (e.g. chlorinated solvents)		
P9	Polychlorinated Biphenyl (PCBs)	Electric substations	✓
P10	Sulphate		
P11	Pathogens		
P12	Radioactive		
P13	Soil gas	Landfill site	✓

Notes: ¹ Based on DOE industrial profiles or on knowledge of the processes involved in the activity carried out on site.
P=Properties

8.3 Potential Pathways

A pathway is a route or routes by which a receptor is exposed to a contamination source. Pathways can also determine the likelihood of the contamination source contacting a receptor.

Anthropogenic (or artificial) pathways for contaminant migration can be present in the form of land drains etc. Leaking sewage supply pipes and site drainage could also provide pathways for potential contaminant migration. Granular backfill to trenches for cables, gas pipes, water pipes etc. can also provide pathways for movement of mobile contaminants and contaminated groundwater.

The 1:50,000 BGS map showed the site to be located on bedrock of the London Clay Formation with overlying superficial deposits of the Head recorded across the majority of the site. The groundwater vulnerability of the site was a Secondary Aquifer with soils of high permeability.

Ref: 14663/DS

Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

Therefore, controlled water within the superficial deposits will be vulnerable to potential contaminants that may be present onsite and will act as a pathway. The underlying London Clay Formation would not act as a pathway.

Ref: 14663/DS

Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

Table 8.4. On-Site Sources, Pathways and Potential Receptors									
Type of Attack	Standard Exposure Pathways	Factors	Site Assessment		Risk To Potential Receptors				
			Likely	Unlikely	HH	BS	EF	Controlled water (SW, GW, SPZ & A)	
Oral	Direct soil and dust ingestion	Contaminants & Soft landscaping areas	✓		✓				
	Consumption of home-grown produce	Contaminants & Gardens areas	✓		✓				
Dermal	Dermal contact	Contaminants & Soft landscaping areas	✓		✓				
	Inhalation of dust (indoor and outdoor)	Contaminants & Soft landscaping areas	✓		✓				
Inhalation	Inhalation of vapours (indoor and outdoor)	Volatile compounds & Soft landscaping areas	✓		✓				
	Inhalation of soil gases	Soil gases (e.g. CH ₄ and CO ₂) within 0-250m	✓		✓				
Physical	Fire and explosion ¹	UXO (e.g. Bombs or projectile sites) (0-250m) ² Combustible material in soil	Not assessed						
	Via anthropogenic pathways (services trenches)	Soil gases within 0-250m	✓	x		✓			
	Others physical pathways ³	Degradation of fills, blast... etc...	✓	x		✓			✓
	Location of service supply pipes in contaminated soils	Hydrocarbons & Pipes	✓			✓			
Chemical	Direct contact of concrete with concrete aggressive soils	Sulphate, Acids & Concrete	✓			✓			
		Radon		x					
Others	Irradiation ⁴	Radioactive materials		x					
		UXO within 0-250m	Not assessed						
	Via surface water runoff	Contaminants & Gradient (Area)		x					
	Migration downwards via granular soils	Contaminants & Drift: Secondary Aquifer	✓	x					✓
	Migration downwards via permeable soils and bedrock	Contaminants & Bedrock: Unproductive Strata		x					
		Contaminants & Groundwater vulnerability: Secondary Aquifer and high permeability soils	✓						✓
	Plant uptake and phytotoxicity ⁵	Metallic contaminants	✓				✓		
		Soil gases within 0-250m	✓				✓		
	Plant uptake and ecotoxicological effects ⁶	Contaminants	✓				✓		

Notes: BS= Building Structures & services. EF= Ecological Features, Controlled water (SW= Surface Water, GW=Groundwater, SPZ=Source Protection Zone and A= Abstractions within 250m of the site).
HH=Human Health. ✓ = Likely and x=Unlikely.
¹ Both underground fires and biodegradable may produce toxic or flammable gases;
² UXO= Unexploded Ordnance. Although risk is generally low in the UK, a risk assessment (i.e. using Find map for example) may be needed if an UXO is found onsite;
³ Blast-furnace and steel-making slag may expand. Degradation of fills may cause settlement and voids in buried tanks and drums may collapse as corrosion occurs or under loading;
⁴ Radioactive materials emitting gamma rays that can be inhaled and absorbed through the skin and also cause a radiation response;
⁵ Prevention or inhibition of plant growth;
⁶ Contaminants in soil may affect microbial, animal and plant populations. Ecosystems or individual species on the site, in surface waters or areas affected by migration from the site may be indirectly affected.

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21

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Ref: 14663/DS

Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

Table 8.5. Off-Site Potential Pathways			
Receptors	Off-Site Potential Pathways	Likely	Unlikely
Human Health	Migration via surface water runoff (Surface flow)		✓
Building Materials			
Human Health	Migration via air	✓	
Building Materials			
Groundwater	Migration via groundwater flows	✓	
Human Health			
Building Materials			

8.4 Potential Receptors

With respect to land contamination, potential receptors include human health, ecological features, controlled waters, and buildings and materials.

The presence of potential receptors has been evaluated from our understanding of the current and future land use of the site, an assessment of surrounding land uses and currently available information pertaining to the site.

The assessment for potential receptors at the site is shown in Table 8.6.

Table 8.6. Potential Receptors			
Potential Receptor		Present	
		Likely	Unlikely
Human Health	Future users of the site	✓	
	Visitors to the site	✓	
	Construction workers on site	✓	
	Service and maintenance workers	✓	
	Site neighbours and wider public	✓	
Groundwater/Controlled Waters	Groundwater/Future Potable Water Supply	✓	
	Surface Water	✓	
Buildings & Materials	Construction materials	✓	
	Buildings and confined spaces	✓	
Ecosystems	Flora and fauna in surface water	✓	

8.5 Preliminary Risk Assessment

A preliminary risk assessment has been undertaken relating to the potential proposed development based on a qualitative assessment of the likely presence of a pollutant linkage. A pollutant linkage is the relationship between a contaminant source, a pathway and a receptor. Unless all three elements of a pollutant linkage are present, a risk is not considered to exist. Each of the three elements was considered in Sections 8.3, 8.4 and 8.5.

The approach adopted was to screen the site based on assigning a risk category. The preliminary risk assessment is presented in Table 8.7 with the risk assessment criteria attached to this report (Appendix E).

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22

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Ref: 14663/DS

Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

Table 8.7. Risk Assessment					
Features	Direction ¹	Distance (m) ¹	Pathway	Receptor	Risk
Historical landfill site	W	-	✓	✓	Med
Electric substations	W	-	✓	✓	Low
Railway line	W	5	✓	✓	Low
Electric substation	W	5	✓	✓	Low
Former petrol filling station	NE	8	✓	✓	Low

Note: ¹ Approximately from centre of the site.

The classification tables are presented in Appendix E are modified from, 'Contaminated land risk assessment: A guide to good practice, 2001, CIRIA C552'.

8.6 Preliminary Conceptual Site Model

The preliminary conceptual site model, including linkages that require further actions is presented in Table 8.8 and the reasoning behind the decision taken shown in Table 8.9.

Ref: 14663/DS

Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

Table 8.8. Preliminary Conceptual Site Model And Risk Assessment Methodology							
Linkage No	Potential Contaminants Identified (Table 8.3)	Pathway (See Tables 8.4 & 8.5)	Receptor (See Table 8.6)	Risk Assessment Methodology (plus anticipated quantitative risk assessment methods)	Site specific settings	Risk Classification: Based on Desk Study	Pollutant Linkage & Action Required
1	P2, P5, P7 & P9	e.g. Uptake (root and stomata), ingestion, inhalation and dermal absorption (by animal)	Ecological features (i.e. Flora and Fauna)	Presence of SSSI, Museum, Natural reserves and others within 0-250m to the site. Use EA Science Report	No ecological features within 250m of site.	Negligible	No action needed. The local council* should be consulted if necessary.
2	P2, P5, P7 & P9	e.g. Chemical attack	Building structures/ services	Soil testing & use BRE 2005 for risk assessment. Water UK (2014) for pipes. Use Anglian Water trigger for services risk assessment	Proposed foundations and services pipes to be used.	Low	Further action: Phase II intrusive site investigation.
3	P2, P5, P7 & P9	e.g. Inhalation, ingestion and dermal contact	Human health Site residents	Use CLEA for human risk assessment	Residential with Plant Uptake End-use.	Medium	Further action: Phase II intrusive site investigation.
			Human Health Workers	Assessment not within the scope of this Desk study (responsibility of building contractor). Ground workers should follow regulations on health and safety during development. (HSE, 1991).	Workers and the general public should follow regulation on health and safety during development. (HSE, 1991).	Low	Follow HSE procedures
4	P2, P5, P7 & P9	e.g. Leaching (direct precipitation, overland flow and through flow)	Shallow groundwater/ Surface Water	Assess distance from watercourse and direction of flow - Consider use of R&D 20 publication and EA remediation target for risk assessment	Nearest surface water feature is on site.	Medium	Further action: Phase II intrusive site investigation.
5	P2, P5, P7 & P9	e.g. Leaching (direct precipitation, overland flow, through and groundwater flow)	Deep groundwater	Undertake groundwater or leachate testing depending on site specific ground conditions. - Consider use of R&D 20 publication and EA remediation target for risk assessment if contamination is identified	Site is located on Secondary Aquifer with high permeability soils (superficial deposits).	Low	Further action: Phase II intrusive site investigation.
6	P13	e.g. Through fissures, shafts, high permeability strata and inhalation by human	Human and Building Structures	Current or former Landfill sites within 0-250m to the site. Assess nature/age/size of site for Risk Assessment. Use CIRIA 149 & 665 to assess need for gas protection measures where necessary following ground gas testing	Former landfill site recorded on site.	Medium	Further action: Phase II intrusive site investigation.

Notes: HSE= Health and Safety Executive, SPZ= Source Protection Zone and P=Property. P2=Asbestos, P5=Metals and semi-metals, P7=Organic compounds (e.g. PAHs and TPHs), P9=Polychlorinated Biphenyls, P13=Soil gas. *i.e. London Borough of Sutton.

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Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

Table 8.9. Reasoning Behind Risk Assessment		
Linkage No	Receptor	Reasoning
1	Ecological features (i.e. Flora and Fauna)	None of note identified on site or in surrounding area.
2	Building structures/services	Potential sources identified so there is a potential risk to foundations / service pipes.
3	Human health Residents Human Health workers	All site works must be carried out according to Health and Safety Executive (HSE) procedures. Sensitive end-use (school) and sources identified so there is a potential risk.
4	Surface Water	Nearest SW feature is on site so is at risk from identified sources.
5	Groundwater	The site is underlain by a Secondary Aquifer and soils of high permeability so there is a potential risk to superficial deposits.
6	Human and Building Structures: Possible soil gas	Significant potential for soil gas generation from historical landfill site noted on site.

The intrusive investigation may reveal on site sources of contamination that were not established by the Phase I Desk Study and Site Walkover that could modify the Conceptual Site Model.

Ref: 14663/DS

Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

Section 9 Recommendations

9.1 General

Based on the information obtained during the desk study and the preliminary conceptual site model derived for the site, an intrusive contaminated land investigation is required to determine actual pollution linkages and to quantify the risk to the receptors.

The intrusive investigation may reveal on-site sources of contamination that were not established by the Phase I Desk Study and Site Walkover, and thus require modification of the conceptual model.

9.2 Impact of Construction Activities on Controlled Waters and Site Neighbours

A construction risk assessment must be undertaken and appropriate measures taken to mitigate against mobilisation and to monitor impact to groundwater and surface waters.

9.3 Proposed further Site Works

The proposal is a combined geotechnical and Phase II Intrusive Investigation (Table 8.10) in order to obtain further information as follows:

9.3.1 Phase II Intrusive Investigation

The Preliminary CSM allows for the identification of the test parameters relevant to the investigation, though this may require modification or addition from the findings of the intrusive investigation. Phase II intrusive site investigation will be carried out in order to investigate and assess pollutant linkages 2, 3, 4, 5 and 6 of the preliminary Conceptual Site Model presented in Table 8.8.

The works to be undertaken on the site would comprise (i) soil sampling that is appropriate to the potential sources and (ii) testing for the potential contaminants given in the CSM or other sources identified during the intrusive investigation (iii) the installation of gas monitoring well(s) to allow monitoring for soil gas.

9.3.2 Geotechnical site investigation

The purpose of the geotechnical investigation will be to obtain data regarding engineering properties of the soils to enable the design of foundations, pavements and drainage.

The works to be undertaken on the site would comprise (i) soil sampling, (ii) drilling boreholes with window sampler at selected locations within the site and (iii) probing using either DPH or DPSH to establish foundation design parameters.

Ref: 14663/DS

Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

Table 8.10. Proposed Further Works			
Further works	Environmental Phase II Intrusive site Investigation	Geotechnical Site Investigation	Purpose
Soil sampling	✓	✓	Take sampling for laboratory testing across the site
In situ or laboratory soils testing	✓		Determine the nature and extent of contamination across the site
		✓	Engineering parameters for foundation design
Borehole installation for gas monitoring	✓		Assess the risk present on site in respect of soil gas, pollutant linkage 6 (Table 8.8).
Generic and/ or site specific risk assessment	✓		Assess pollutant Linkages 2, 3, 4 & 5 (Table 8.8) based on current contaminated land guidance
Remediation	✓		If intrusive investigation and site specific risk assessment reveal that the site was contaminated
Soils testing for validation	✓		If remediation was carried out on site
Drilling boreholes with window sampler across the site	✓	✓	Determine the nature of the ground
Borehole installations for groundwater monitoring	✓		If generic and site specific risk assessments reveal groundwater contamination
Probing using either DPH or DPSH		✓	Establish foundation design and engineering parameters for foundation design

9.4 Discovery Strategy

There may be areas of contamination not identified during the course of the investigation. Such occurrences may also be discovered during the demolition and construction phases for the redevelopment of the site.

Care should be taken during excavation works especially to investigate any soils, which appear by eye (e.g. such as fibrous materials, large amounts of ash and unusual discolouration), odour (e.g. fuel, oil and chemical type odours or unusual odours such as sweet odours or fishy odours) or wellbeing (e.g. light headedness and/or nausea, burning of nasal passages and blistering or reddening of skin due to contact with soil) to be contaminated or of unusual and/or different character to standard soils or those analysed.

In the event of any discovery of potentially contaminated soils or materials, this discovery should be quarantined and reported to the most senior member of site staff or the designated responsible person at the site for action. The location, type and quantity must be recorded and the Local Authority, and a competent and appropriate third party Engineer/Environmental consultant notified immediately. An approval from the Local authority must be sought prior to implementing any

Ref: 14663/DS

Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

proposed mitigation action.

The discovery strategy must remain on site at all times and must demonstrate a clear allocation of responsibility for reporting and dealing with contamination. A copy of the strategy must be placed on the health and safety notice board and /or displayed in a prominent area where all site staff are able to take note of and consult the document at any time. Any member of the workforce entering the site to undertake any excavation must be made aware of the potential to discover contamination and the discovery strategy.

Ref: 14663/DS

Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

The following appendices complete this report:

- Appendix A – County Series and Ordnance Survey Maps
- Appendix B – Landmark Envirocheck Report
- Appendix C – Site Sensitivity Maps
- Appendix D – Site Photographs
- Appendix E – Risk Assessment Criteria



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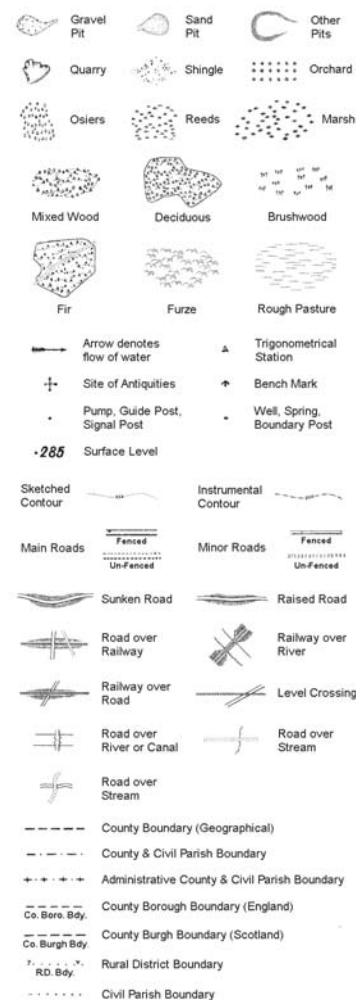


Eur Ing. R. B. Higginson B.Sc., PG. Dip., C.Eng. MICE., FGS.
Geotechnical Advisor

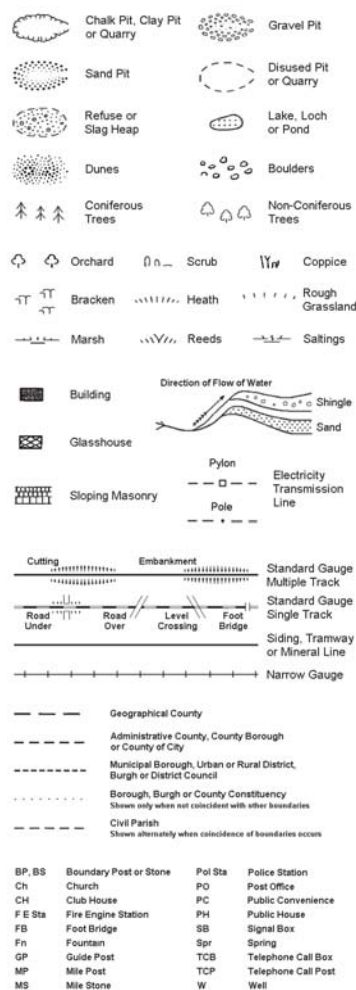
Appendix A - County Series and Ordnance Survey Maps

Historical Mapping Legends

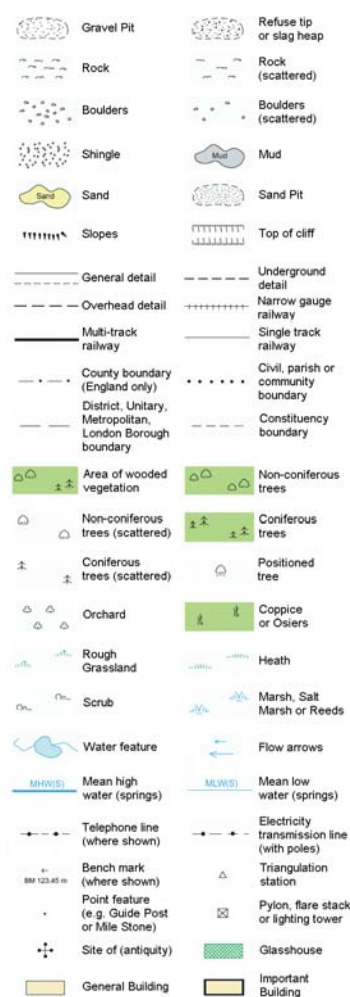
Ordnance Survey County Series 1:10,560



Ordnance Survey Plan 1:10,000



1:10,000 Raster Mapping

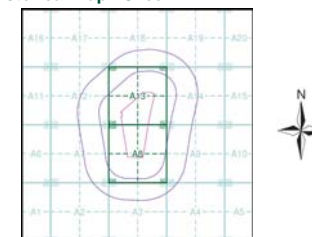


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Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Surrey	1:10,560	1871	3
Surrey	1:10,560	1897 - 1898	4
Surrey	1:10,560	1914	5
London	1:10,560	1919	6
Surrey	1:10,560	1933 - 1934	7
Surrey	1:10,560	1938	8
Surrey	1:10,560	1938	9
Ordnance Survey Plan	1:10,000	1940 - 1951	10
Historical Aerial Photography	1:10,560	1948	11
Ordnance Survey Plan	1:10,000	1957	12
Ordnance Survey Plan	1:10,000	1961 - 1968	13
Ordnance Survey Plan	1:10,000	1965 - 1967	14
Ordnance Survey Plan	1:10,000	1975 - 1976	15
Ordnance Survey Plan	1:10,000	1984	16
London	1:25,000	1985	17
Ordnance Survey Plan	1:10,000	1992 - 1993	18
VectorMap Local	1:10,000	2014	19

Historical Map - Slice A



Order Details

Order Number: 63593207_1_1
Customer Ref: 14663/SB
National Grid Reference: 525800, 166040
Site: A
Site Area (Ha): 19.33
Search Buffer (m): 500

Site Details

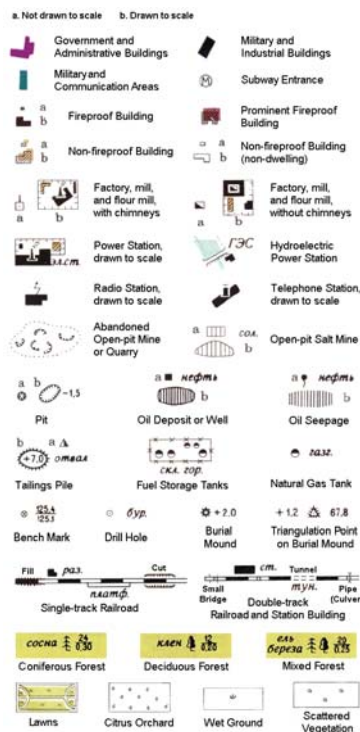
Sutton Junior Tennis Club, Rosehill Recreation Ground, Rose Hill, SUTTON, Surrey, SM1 3HH

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Russian Military Mapping Legends

1:5,000 and 1:10,000 mapping

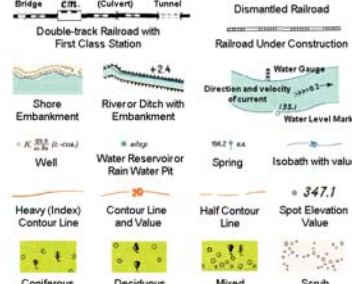
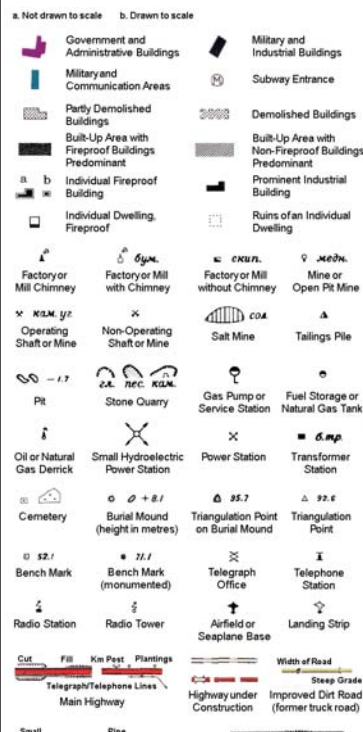


243.8 Values for prominent elevations
186.0 Numbers for spot elevations, depth soundings, contour lines, etc.
0.2 Velocity of the current, width of river bed, depth of river
Fractional terms: length and capacity of bridges; depth of fords and condition of the river bottom; height of forest and the diameter of trees

Russian Alphabet (For reference and phonetic interpretation of map text)

А а (A)	З з (Z)	П п (P)	Ч ч (CH)
Б б (B)	И и (I)	Р р (R)	Ш ш (SH)
В в (V)	Й й (Y)	С с (S)	Щ щ (SHCH)
Г г (G)	К к (K)	Т т (T)	Ъ (-)
Д д (D)	Л л (L)	У у (U)	Ы (Y)
Е е (E)	М м (M)	Ф ф (F)	Ь (')
Ё ё (YO)	Н н (N)	Х х (KH)	Э э (E)
Ж ж (ZH)	О о (O)	Ц ц (TS)	Ю ю (YU or IU)
		Я я (YA or IA)	

1:25,000 mapping



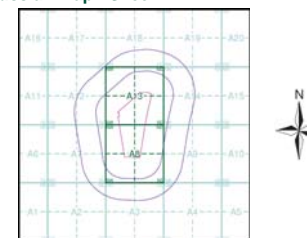
Key to Numbers on Mapping



Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Surrey	1:10,560	1871	3
Surrey	1:10,560	1897 - 1898	4
Surrey	1:10,560	1914	5
London	1:10,560	1919	6
Surrey	1:10,560	1933 - 1934	7
Surrey	1:10,560	1938	8
Surrey	1:10,560	1938	9
Ordnance Survey Plan	1:10,000	1940 - 1951	10
Historical Aerial Photography	1:10,560	1948	11
Ordnance Survey Plan	1:10,000	1957	12
Ordnance Survey Plan	1:10,000	1961 - 1968	13
Ordnance Survey Plan	1:10,000	1965 - 1967	14
Ordnance Survey Plan	1:10,000	1975 - 1976	15
Ordnance Survey Plan	1:10,000	1984	16
London	1:25,000	1985	17
Ordnance Survey Plan	1:10,000	1992 - 1993	18
VectorMap Local	1:10,000	2014	19

Russian Map - Slice A



Order Details

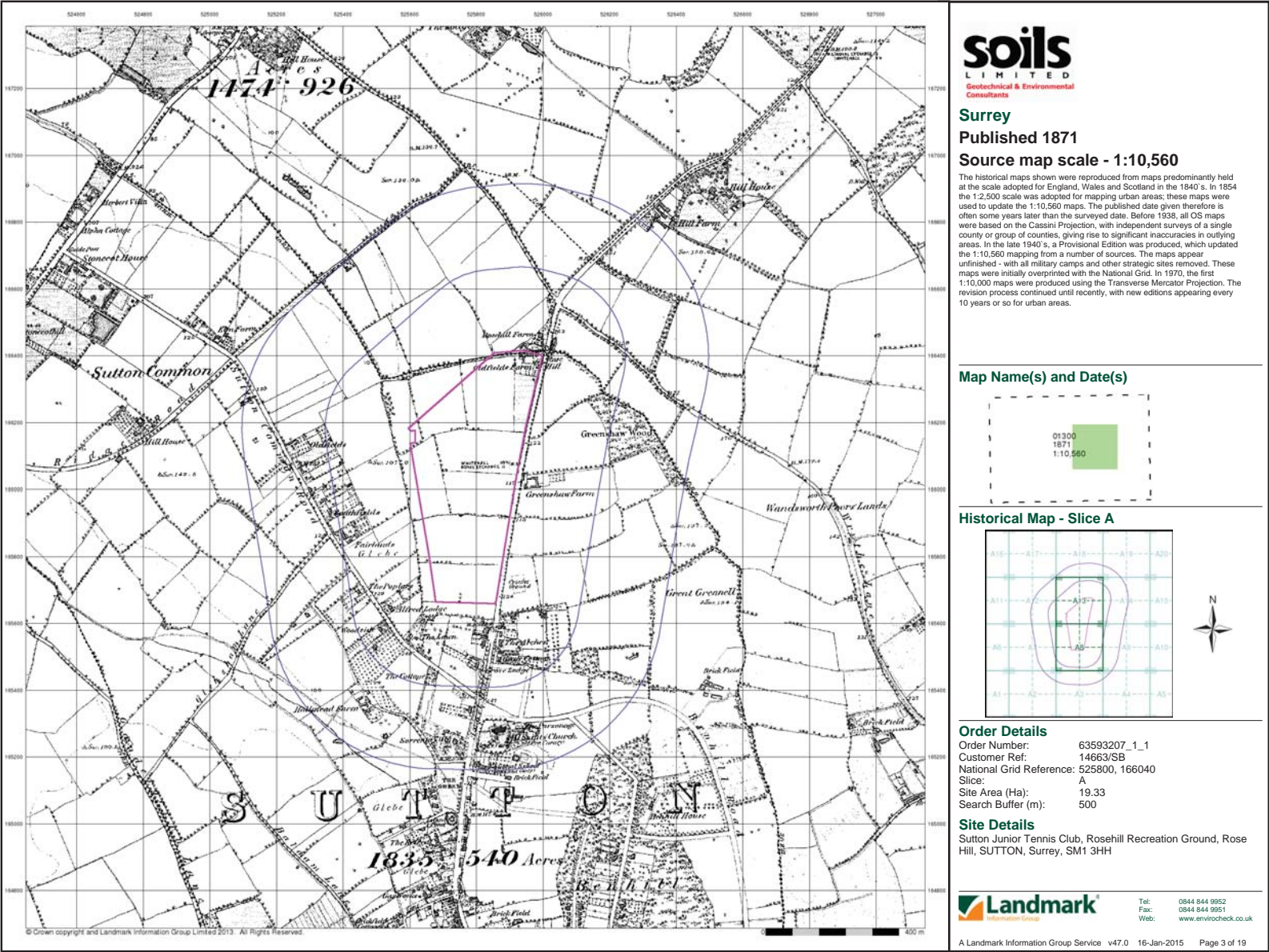
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Customer Ref: 14863/SB
National Grid Reference: 525800, 166040
Slice: A
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Search Buffer (m): 500

Site Details

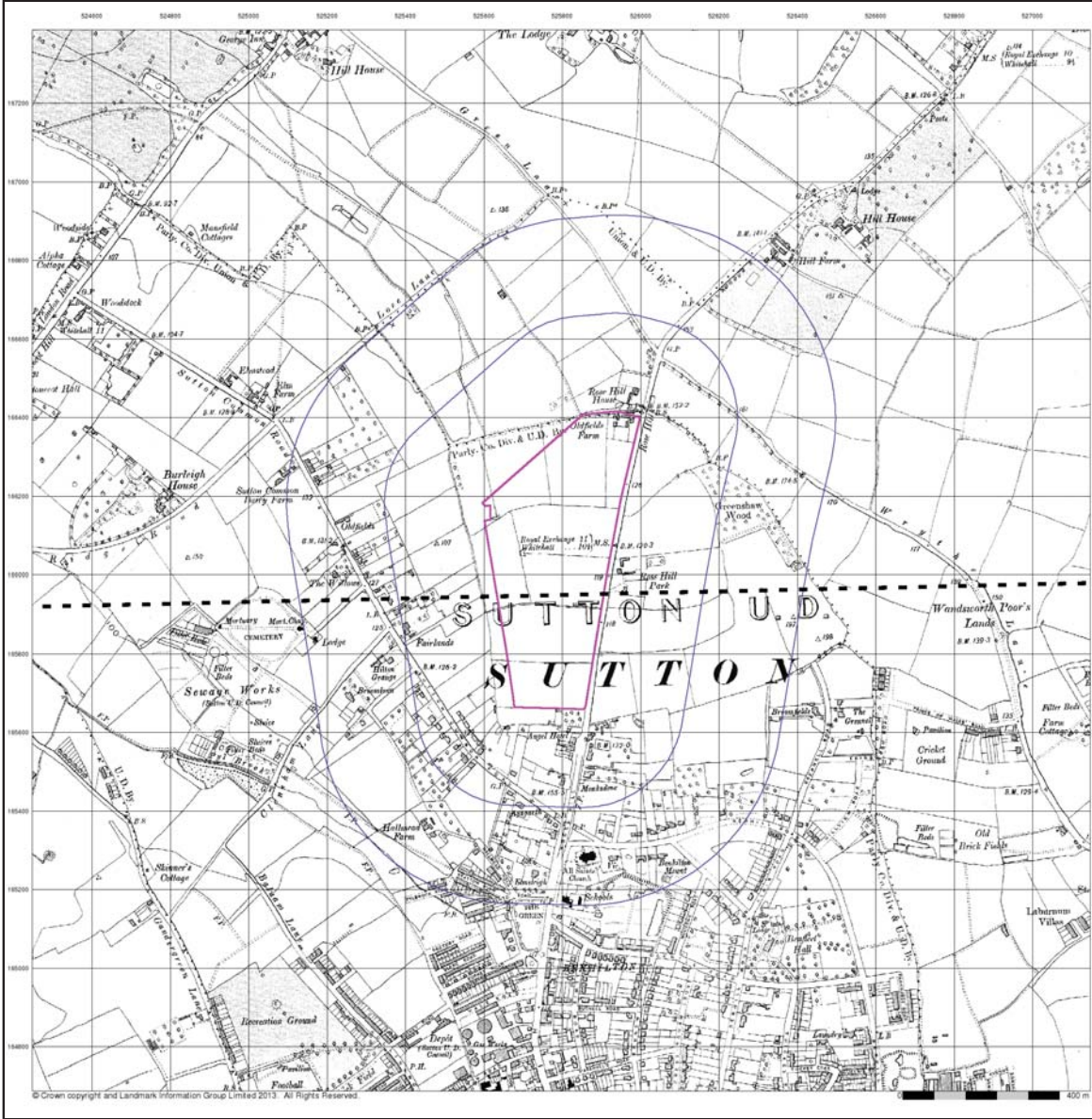
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Surrey

Published 1914

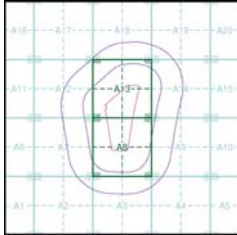
Source map scale - 1:10,560

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)

013NE
1914
1:10,560
013SE
1914
1:10,560

Historical Map - Slice A



Order Details

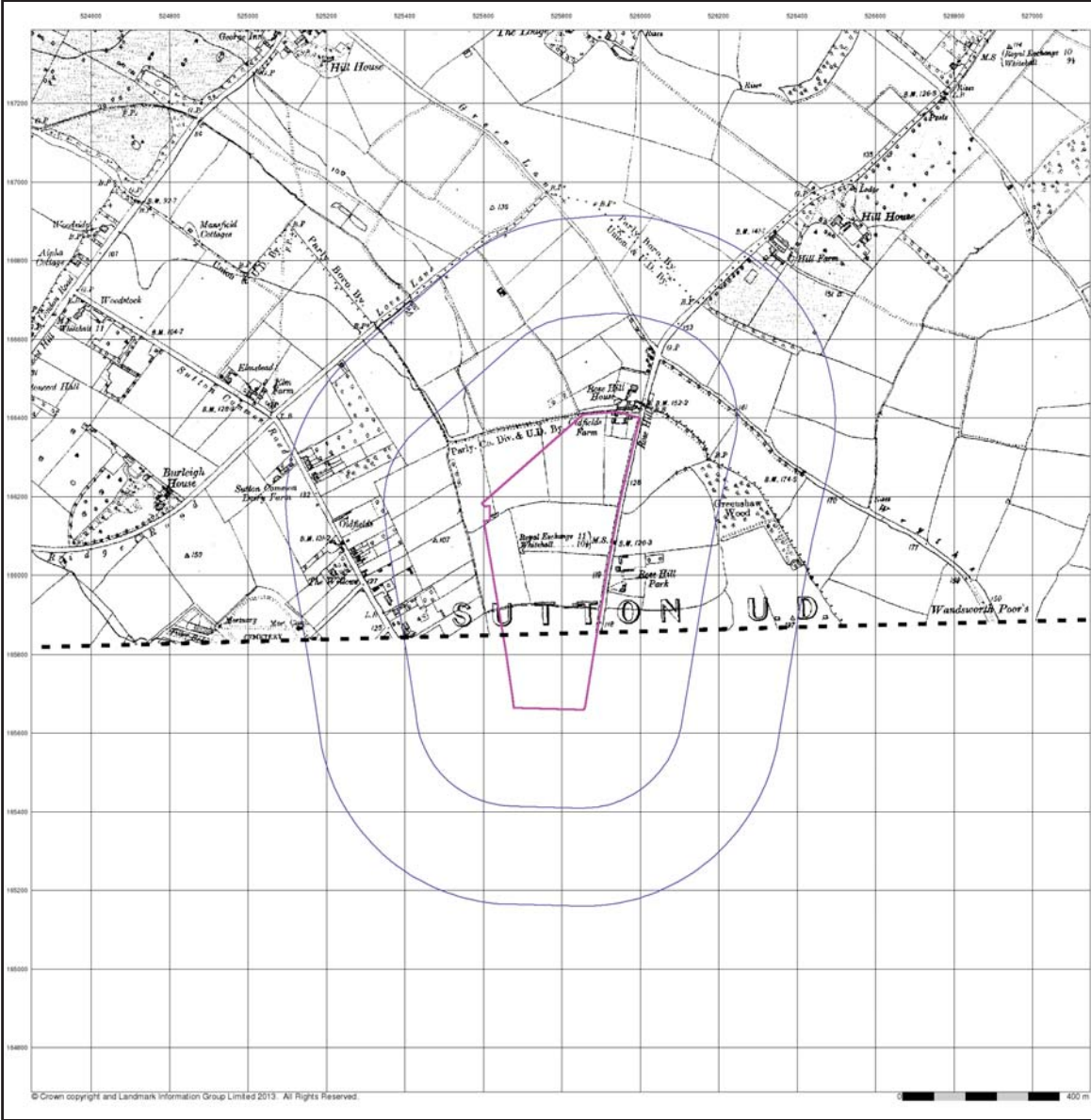
Order Number: 63593207_1_1
Customer Ref: 14663/SB
National Grid Reference: 525800, 166040
Slice: A
Site Area (Ha): 19.33
Search Buffer (m): 500

Site Details

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London

Published 1919

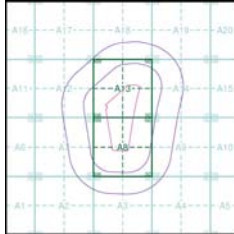
Source map scale - 1:10,560

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: 63593207_1_1
Customer Ref: 14663/SB
National Grid Reference: 525800, 166040
Slice: A
Site Area (Ha): 19.33
Search Buffer (m): 500

Site Details

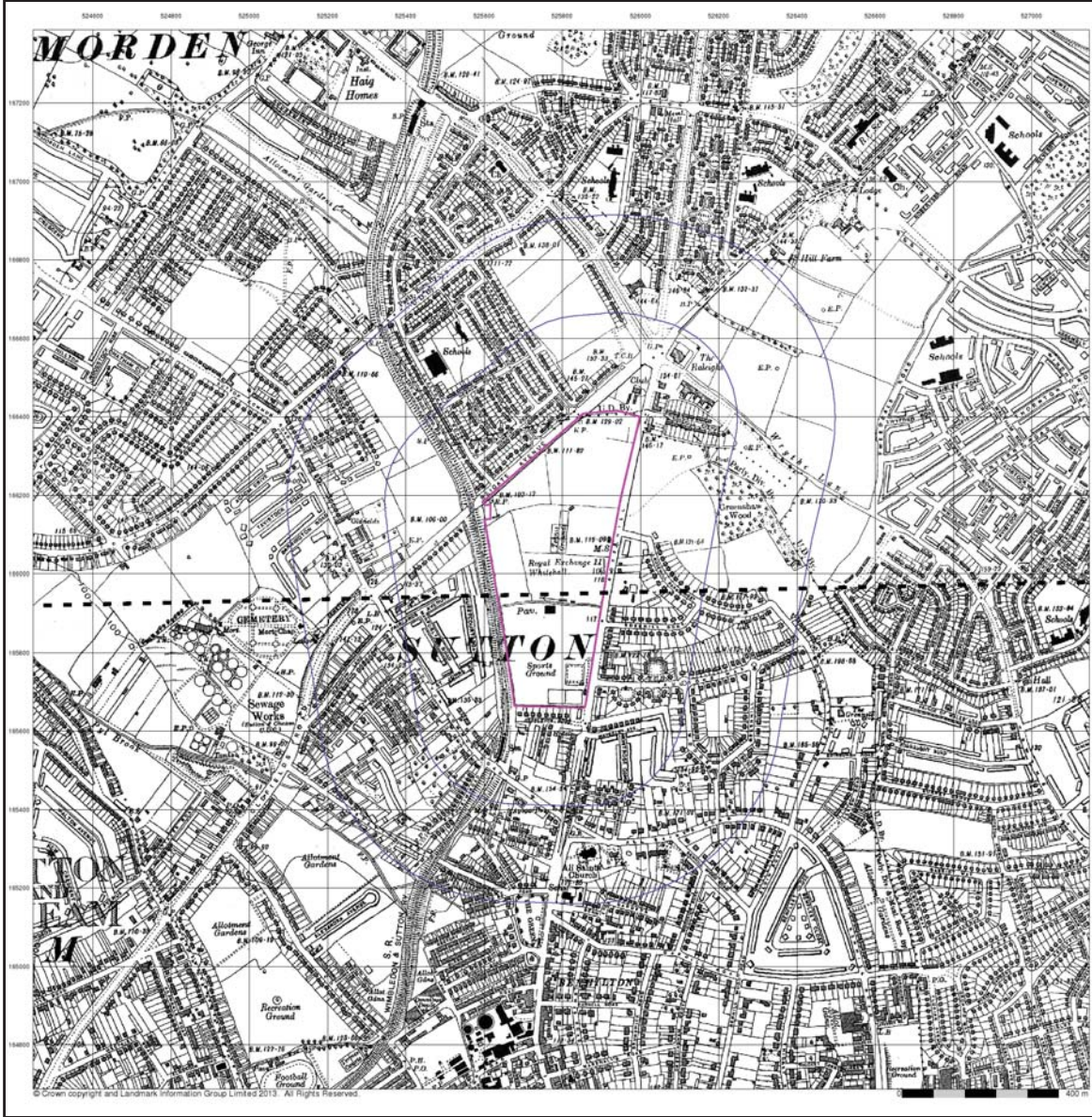
Sutton Junior Tennis Club, Rosehill Recreation Ground, Rose Hill, SUTTON, Surrey, SM1 3HH

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Surrey

Published 1938

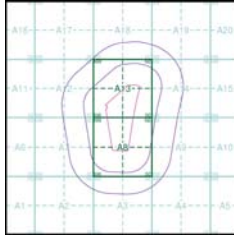
Source map scale - 1:10,560

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)

013NE
1938
1:10,560
0139E
1938
1:10,560

Historical Map - Slice A



Order Details

Order Number: 63593207_1_1
Customer Ref: 14663/SB
National Grid Reference: 525800, 166040
Slice: A
Site Area (Ha): 19.33
Search Buffer (m): 500

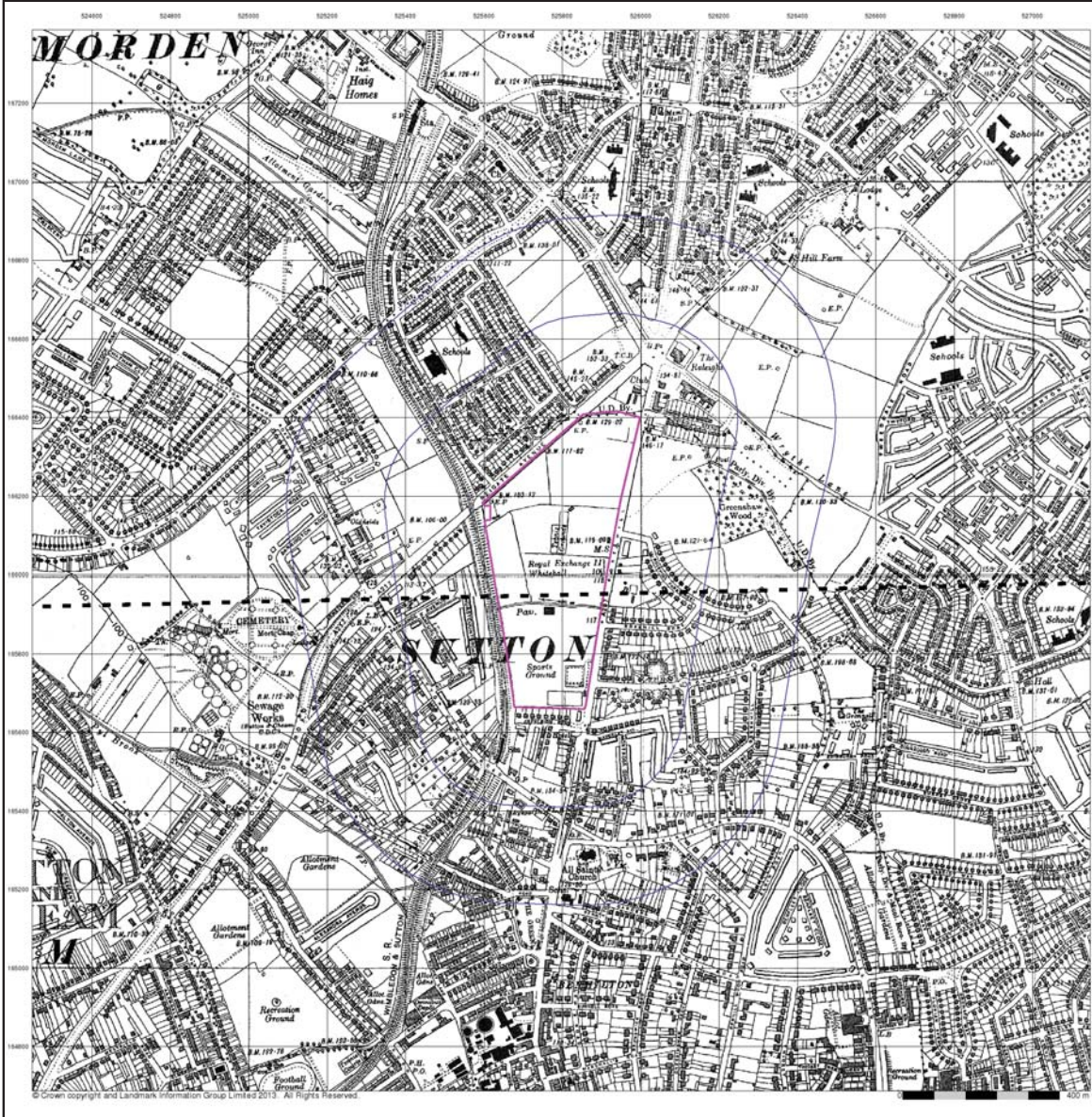
Site Details

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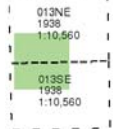
Surrey

Published 1938

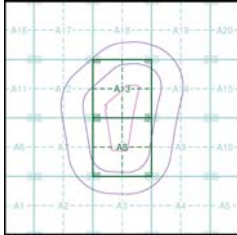
Source map scale - 1:10,560

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

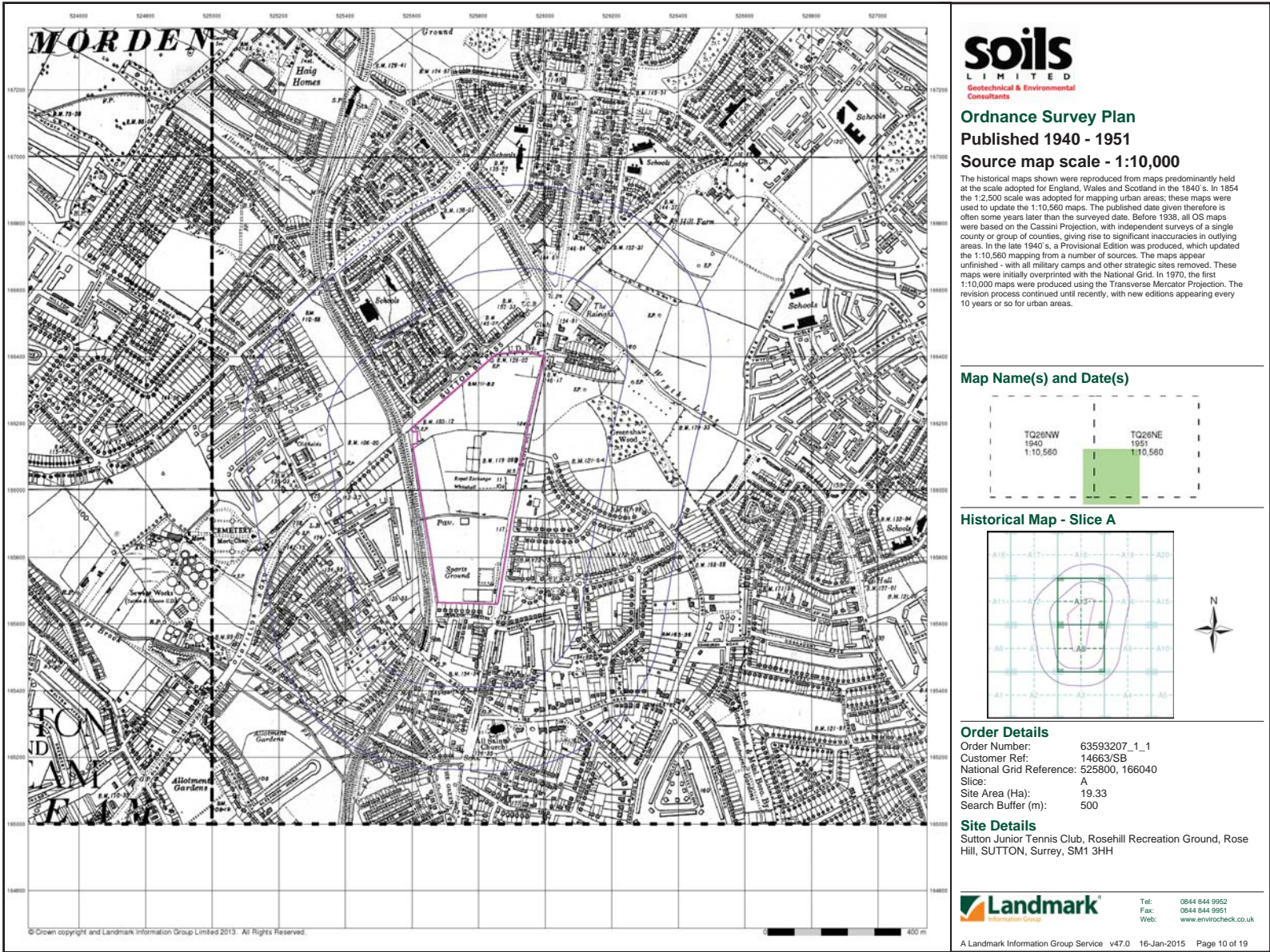
Order Number: 63593207_1_1
Customer Ref: 14663/SB
National Grid Reference: 525800, 166040
Slice: A
Site Area (Ha): 19.33
Search Buffer (m): 500

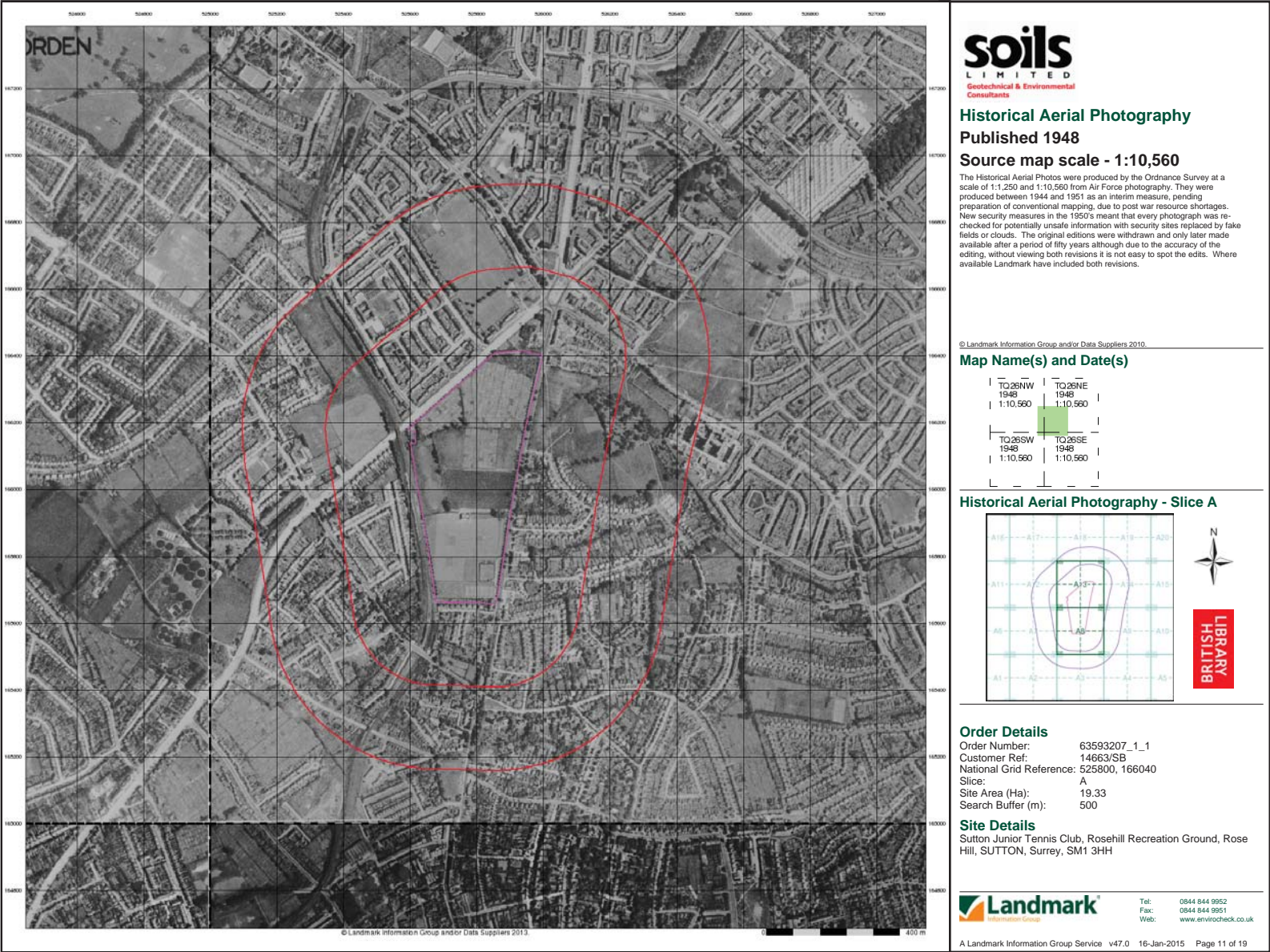
Site Details

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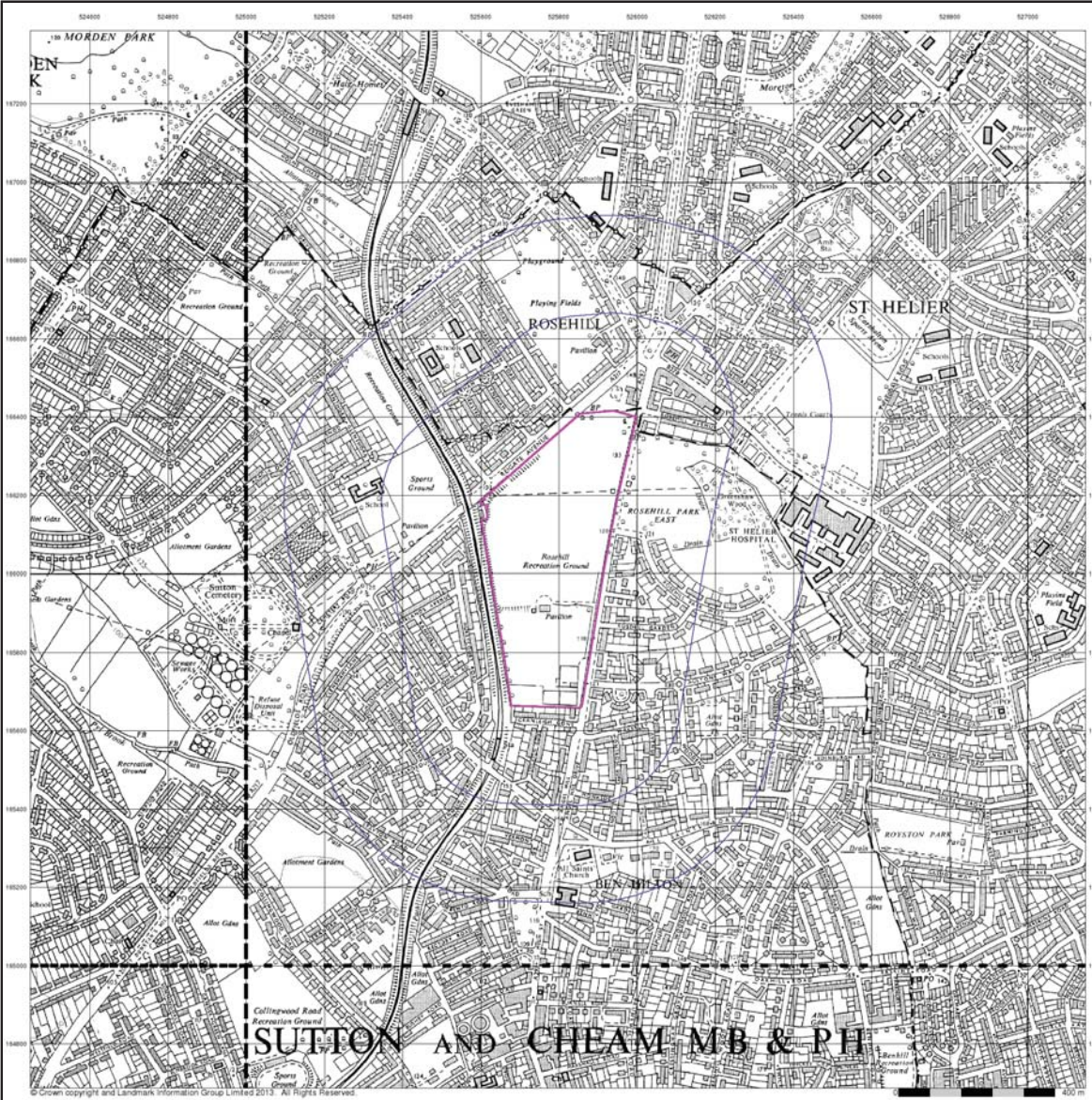
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Ordnance Survey Plan

Published 1961 - 1968

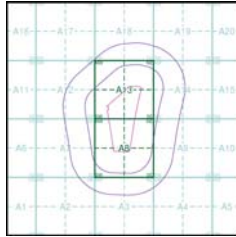
Source map scale - 1:10,000

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)

TQ26NW	TQ26NE
1967	1968
1:10,560	1:10,560
TQ26SW	TQ26SE
1962	1961
1:10,560	1:10,560

Historical Map - Slice A



Order Details

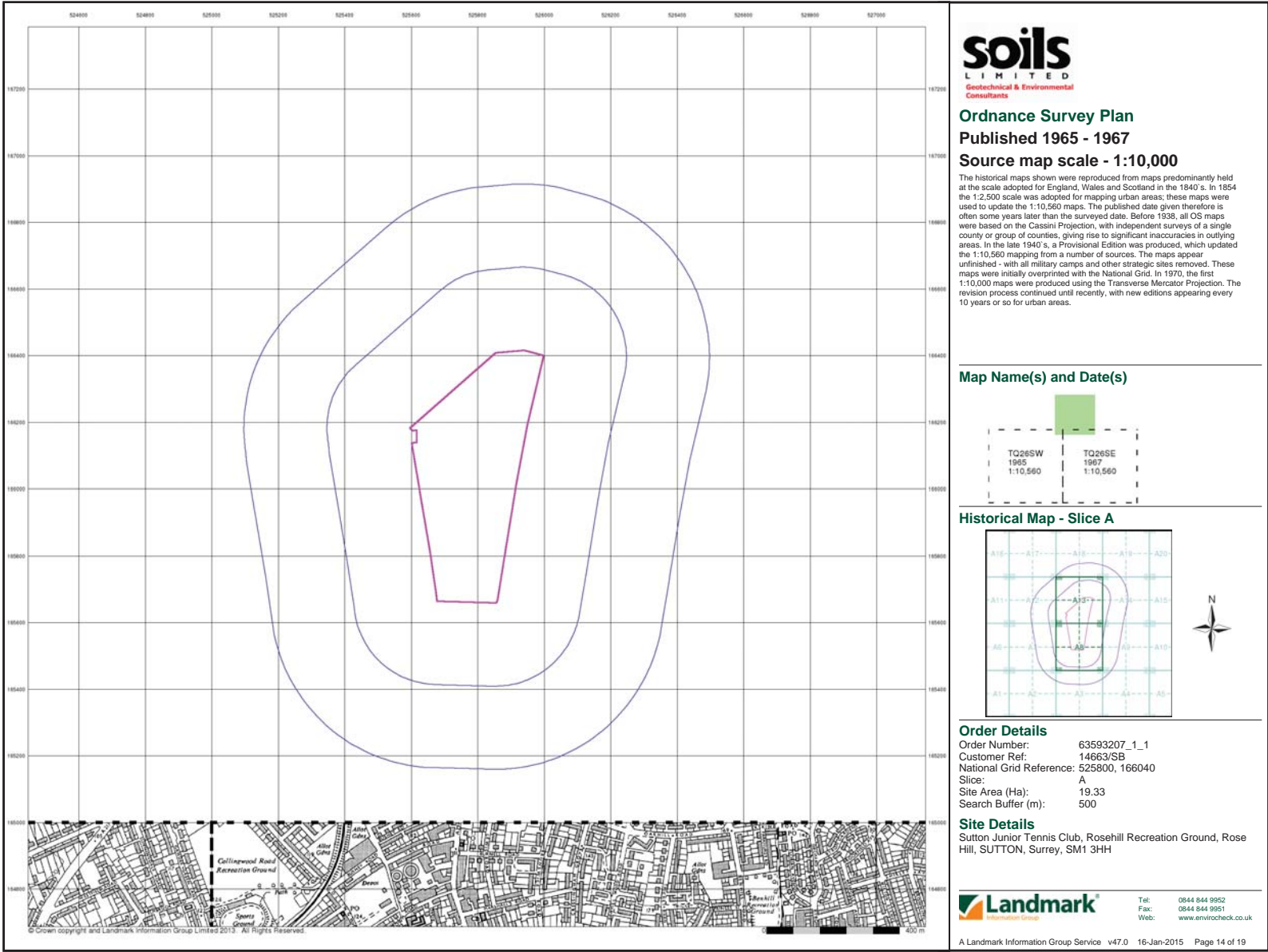
Order Number: 63593207_1_1
Customer Ref: 14663/SB
National Grid Reference: 525800, 166040
Slice: A
Site Area (Ha): 19.33
Search Buffer (m): 500

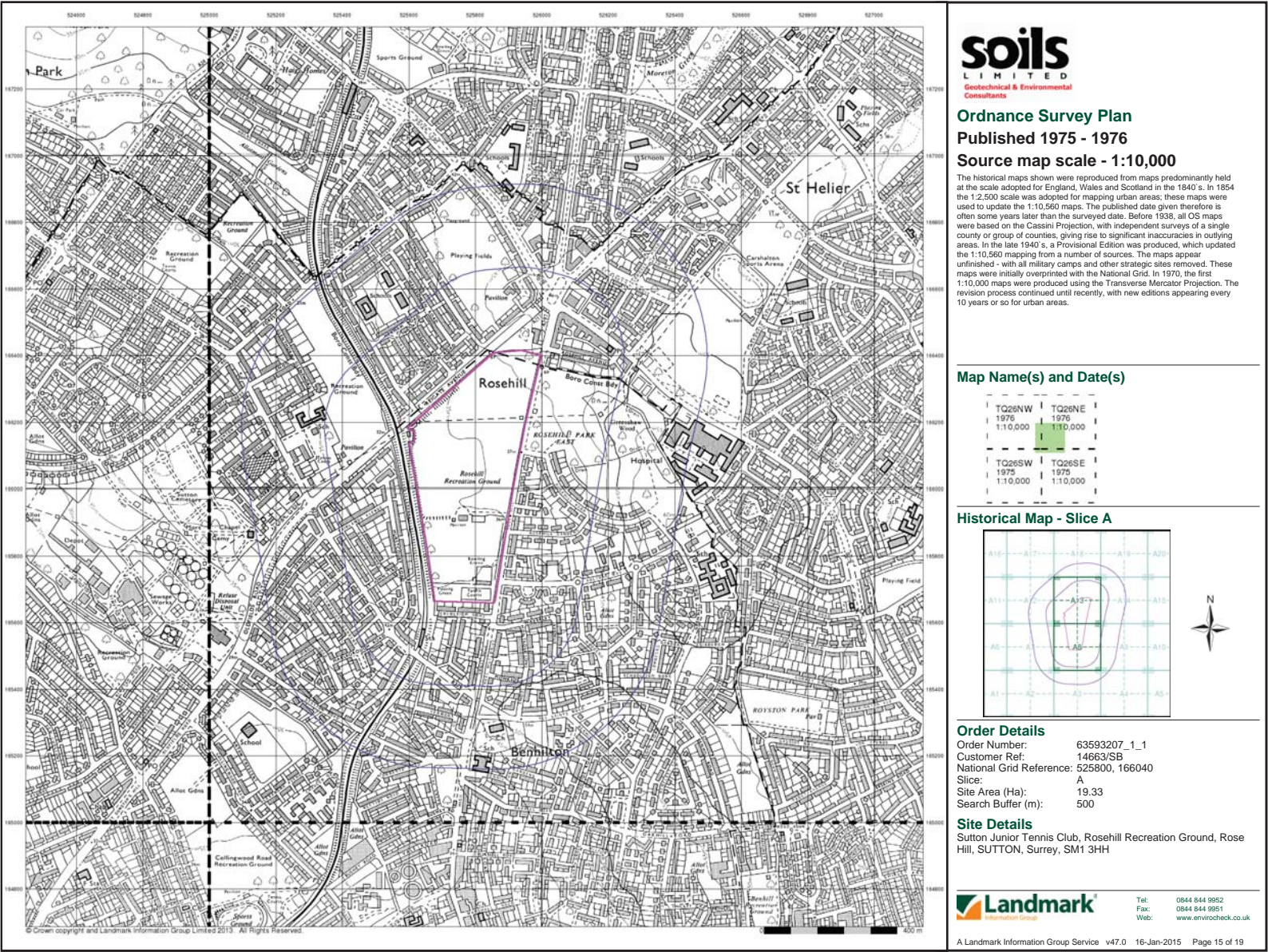
Site Details

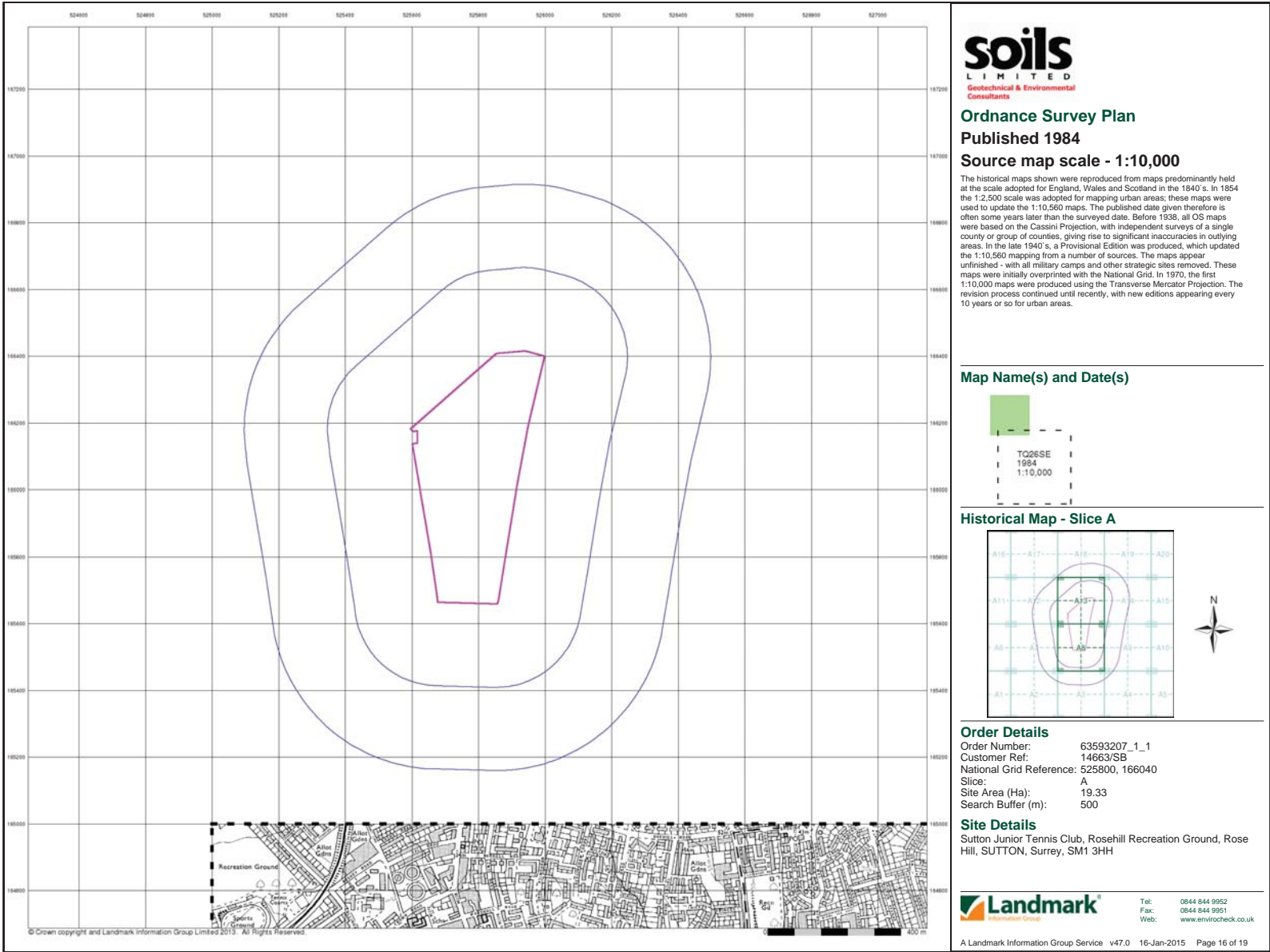
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Published 1985

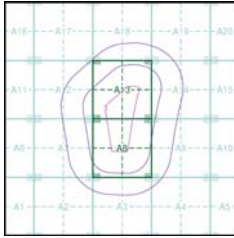
Source map scale - 1:25,000

These maps were produced by the Russian military during the Cold War between 1950 and 1997, and cover 103 towns and cities throughout the U.K. The maps are produced at 1:25,000, 1:10,000 and 1:5,000 scale, and show detailed land use, with colour-coded areas for development, green areas, and non-developed areas. Buildings are coloured black and important building uses (such as hospitals, post offices, factories etc.) are numbered, with a numbered key describing their use. They were produced by the Russians for the benefit of navigation, as well as strategic military sites and transport hubs, for use if they were to have invaded the U.K. The detailed information provided indicates that the areas were surveyed using land-based personnel, on the ground, in the cities that are mapped.

Map Name(s) and Date(s)

TC25
1985
1:25,000

Russian Map - Slice A



Order Details

Order Number: 63593207_1_1
Customer Ref: 14663/SB
National Grid Reference: 525800, 166040
Slice: A
Site Area (Ha): 19.33
Search Buffer (m): 500

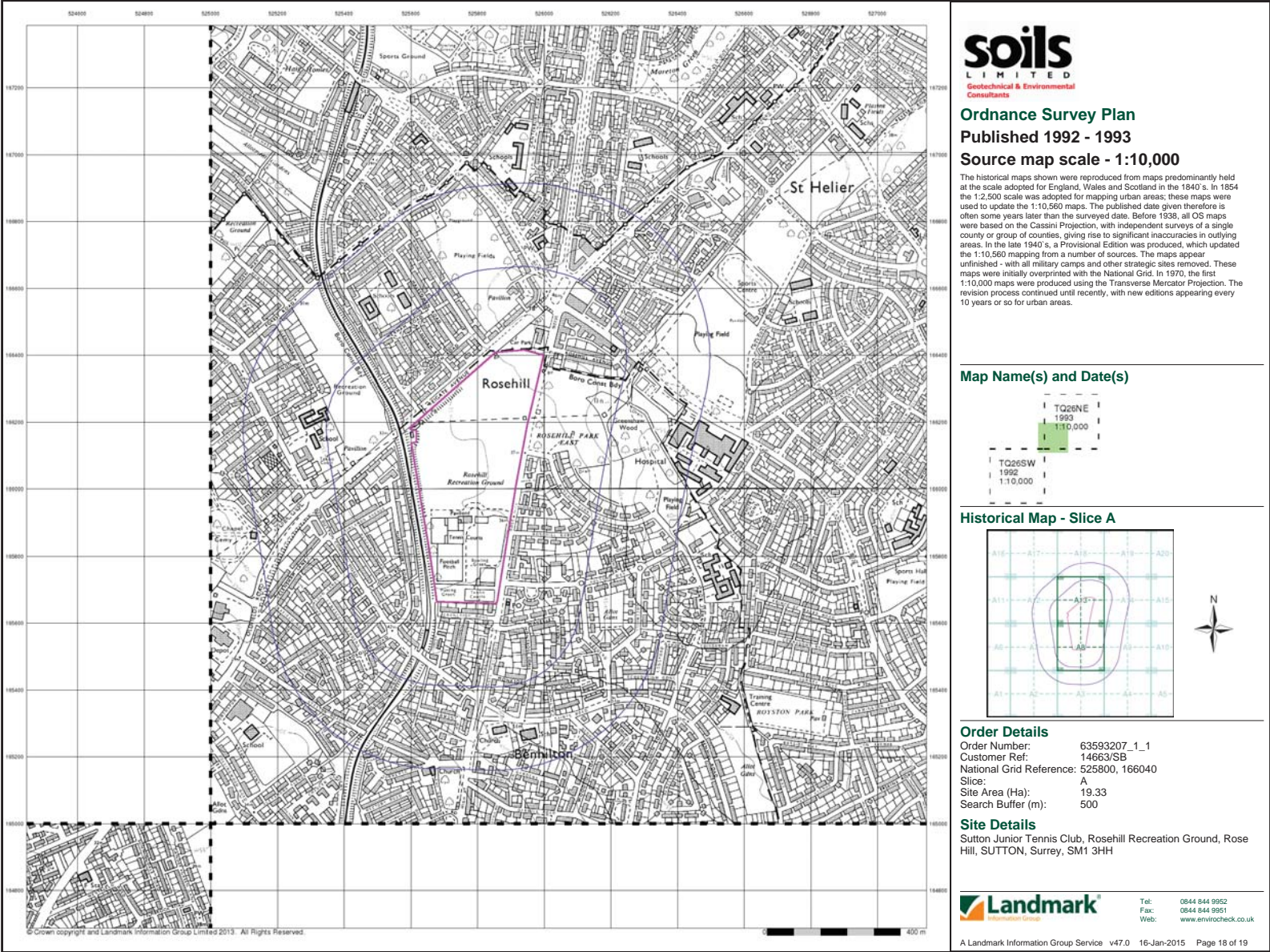
Site Details

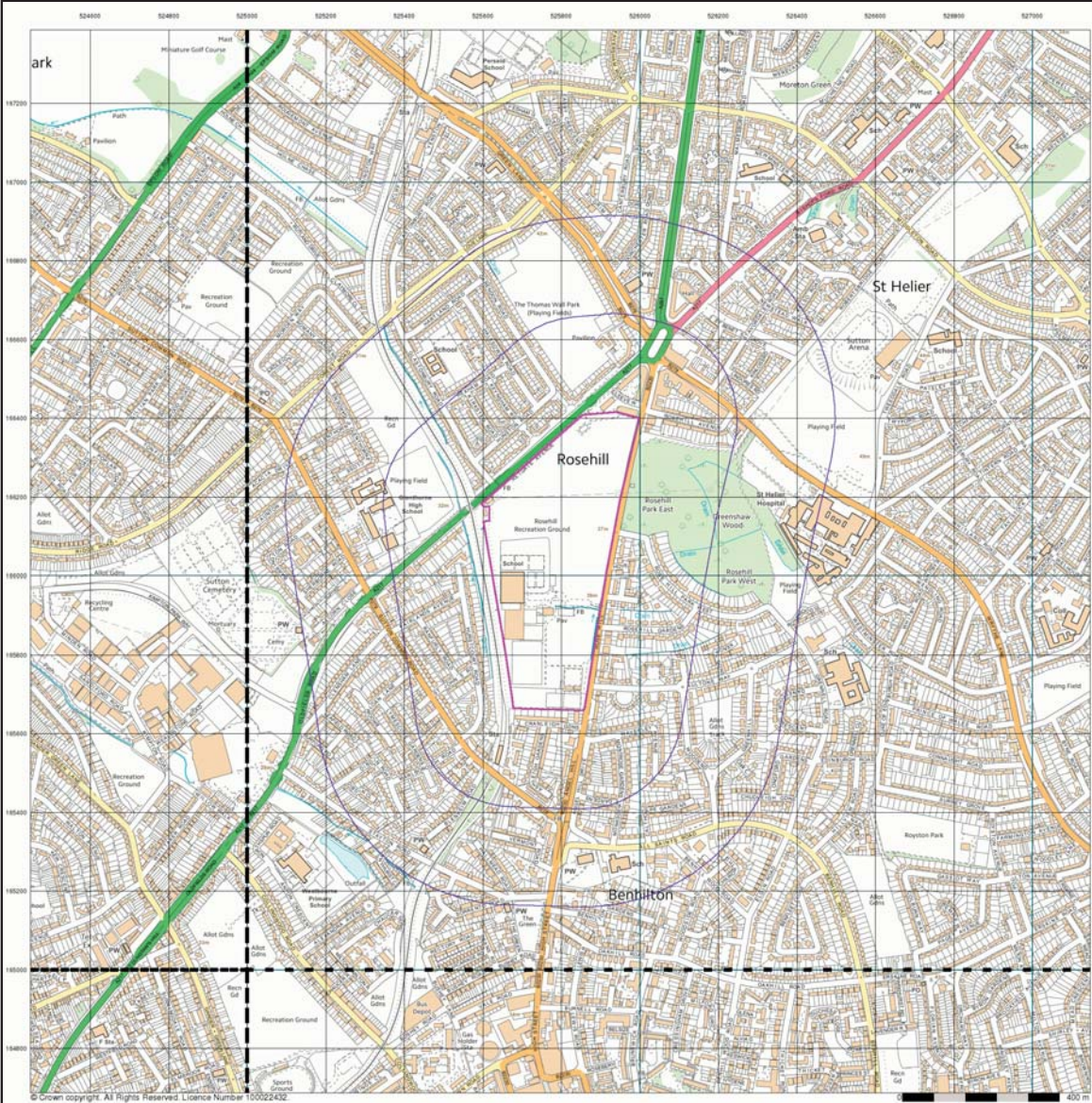
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VectorMap Local
Published 2014

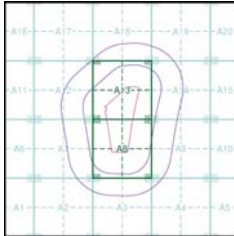
Source map scale - 1:10,000

VectorMap Local (Raster) is Ordnance Survey's highest detailed 'backdrop' mapping product. These maps are produced from OS's VectorMap Local, a simple vector dataset at a nominal scale of 1:10,000, covering the whole of Great Britain, that has been designed for creating graphical mapping. OS VectorMap Local is derived from large-scale information surveyed at 1:1250 scale (covering major towns and cities), 1:2500 scale (smaller towns, villages and developed rural areas), and 1:10 000 scale (mountain, moorland and river estuary areas).

Map Name(s) and Date(s)

TQ26NW	TQ26NE
2014	2014
Variable	Variable
TQ26SW	TQ26SE
2014	2014
Variable	Variable

Historical Map - Slice A



Order Details

Order Number: 63593207_1_1
Customer Ref: 14663/SB
National Grid Reference: 525800, 166040
Slice: A
Site Area (Ha): 19.33
Search Buffer (m): 500

Site Details

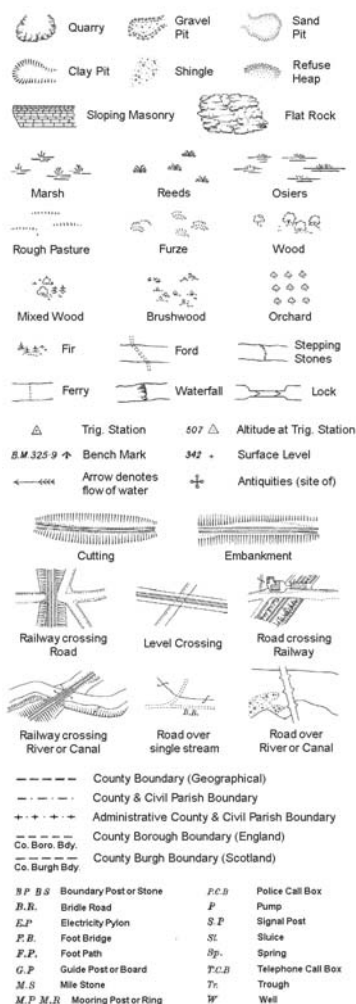
Sutton Junior Tennis Club, Rosehill Recreation Ground, Rose Hill, SUTTON, Surrey, SM1 3HH



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Historical Mapping Legends

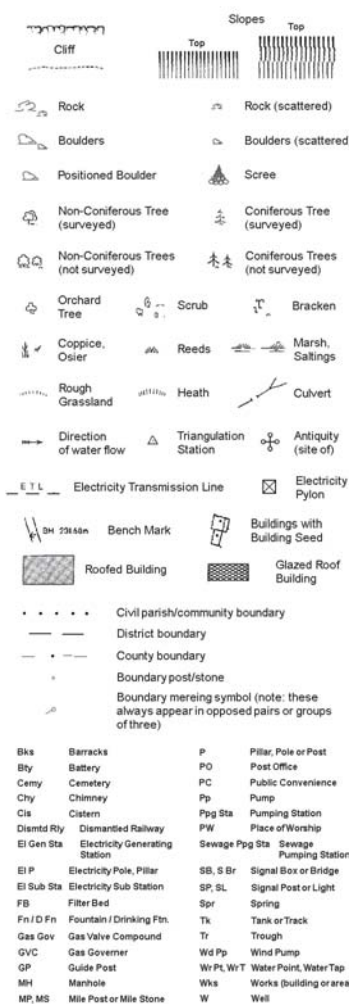
Ordnance Survey County Series and Ordnance Survey Plan 1:2,500



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



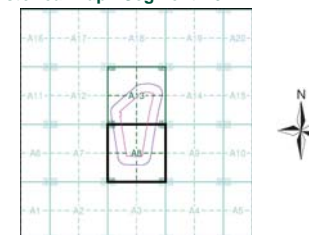
Large-Scale National Grid Data 1:2,500 and 1:1,250



Historical Mapping & Photography included:

Mapping Type	Scale	Date	Page
Surrey	1:2,500	1865 - 1868	2
Surrey	1:2,500	1868	3
Surrey	1:2,500	1894	4
Surrey	1:2,500	1895 - 1896	5
Surrey	1:2,500	1913	6
Surrey	1:2,500	1935	7
Historical Aerial Photography	1:1,250	1945 - 1946	8
Ordnance Survey Plan	1:2,500	1955 - 1956	9
Ordnance Survey Plan	1:1,250	1955	10
Additional SIMs	1:1,250	1955 - 1991	11
Ordnance Survey Plan	1:1,250	1960 - 1973	12
Ordnance Survey Plan	1:1,250	1966 - 1979	13
Ordnance Survey Plan	1:2,500	1969	14
Ordnance Survey Plan	1:1,250	1974	15
Supply of Unpublished Survey Information	1:1,250	1975	16
Additional SIMs	1:1,250	1985 - 1988	17
Large-Scale National Grid Data	1:1,250	1991	18
Large-Scale National Grid Data	1:1,250	1992 - 1995	19
Large-Scale National Grid Data	1:1,250	1996	20

Historical Map - Segment A8



Order Details

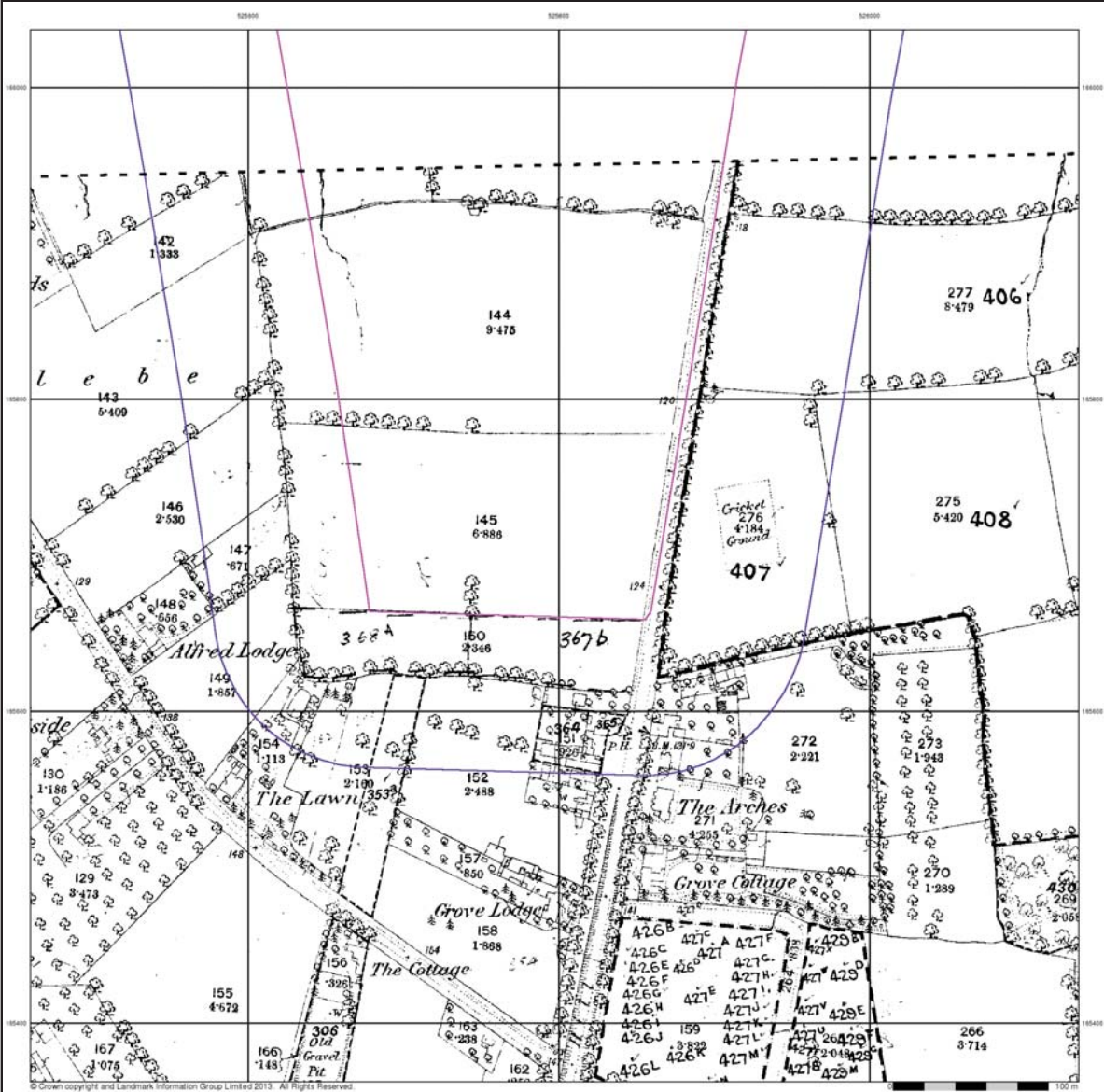
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Customer Ref: 14663/SB
National Grid Reference: 525800, 166040
Slice: A
Site Area (Ha): 19.33
Search Buffer (m): 100

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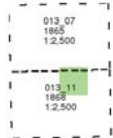
Surrey

Published 1865 - 1868

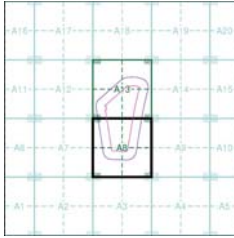
Source map scale - 1:2,500

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 A8



Order Details

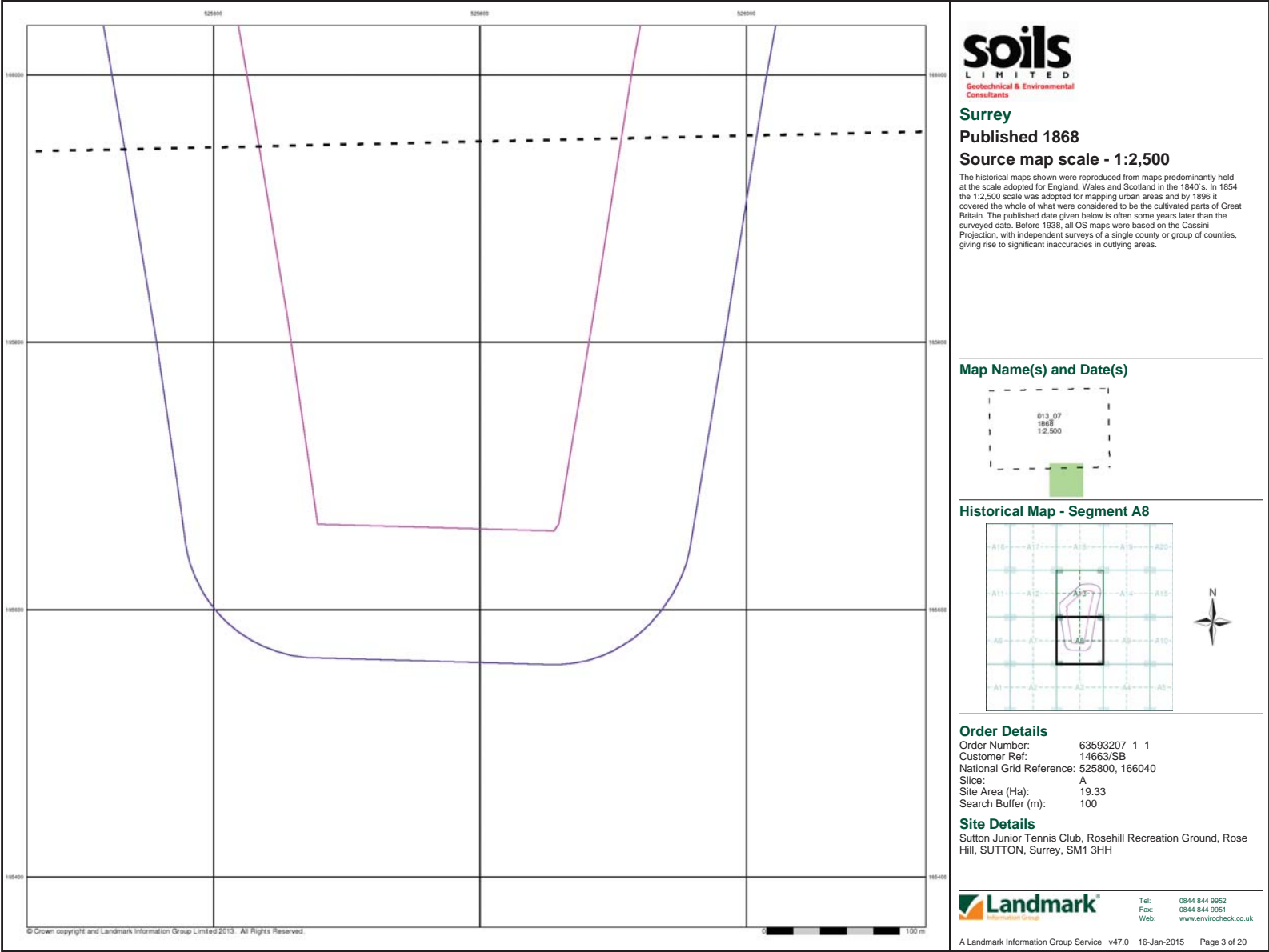
Order Number: 63593207_1_1
Customer Ref: 14663/SB
National Grid Reference: 525800, 166040
Slice: A
Site Area (Ha): 19.33
Search Buffer (m): 100

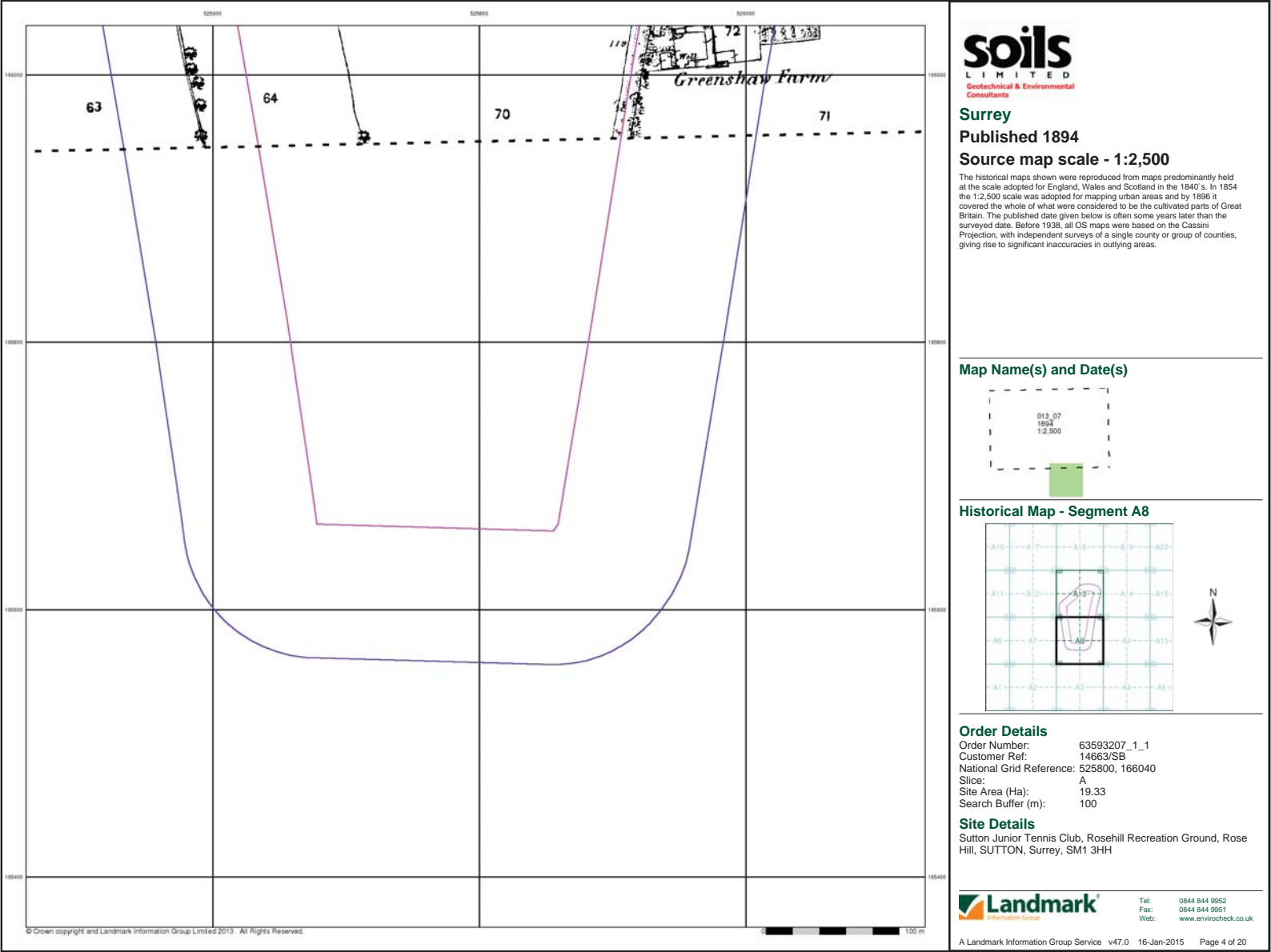
Site Details

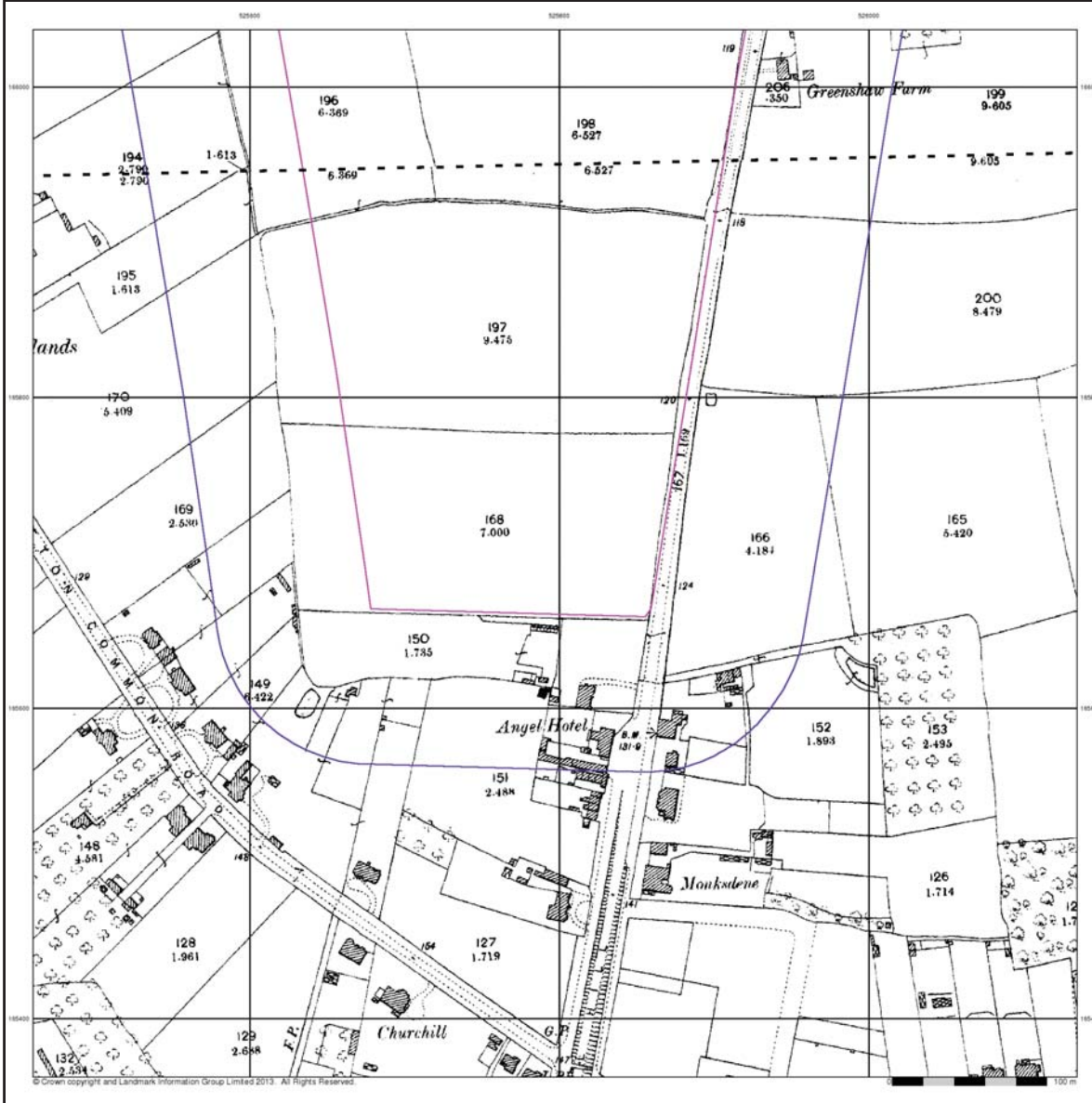
Sutton Junior Tennis Club, Rosehill Recreation Ground, Rose Hill, SUTTON, Surrey, SM1 3HH

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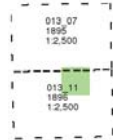


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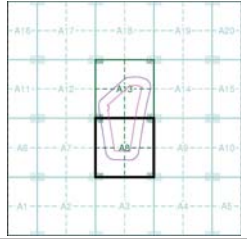
Surrey
Published 1895 - 1896
Source map scale - 1:2,500

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 A8



Order Details

Order Number: 63593207_1_1
Customer Ref: 14663/SB
National Grid Reference: 525800, 166040
Site: A
Site Area (Ha): 19.33
Search Buffer (m): 100

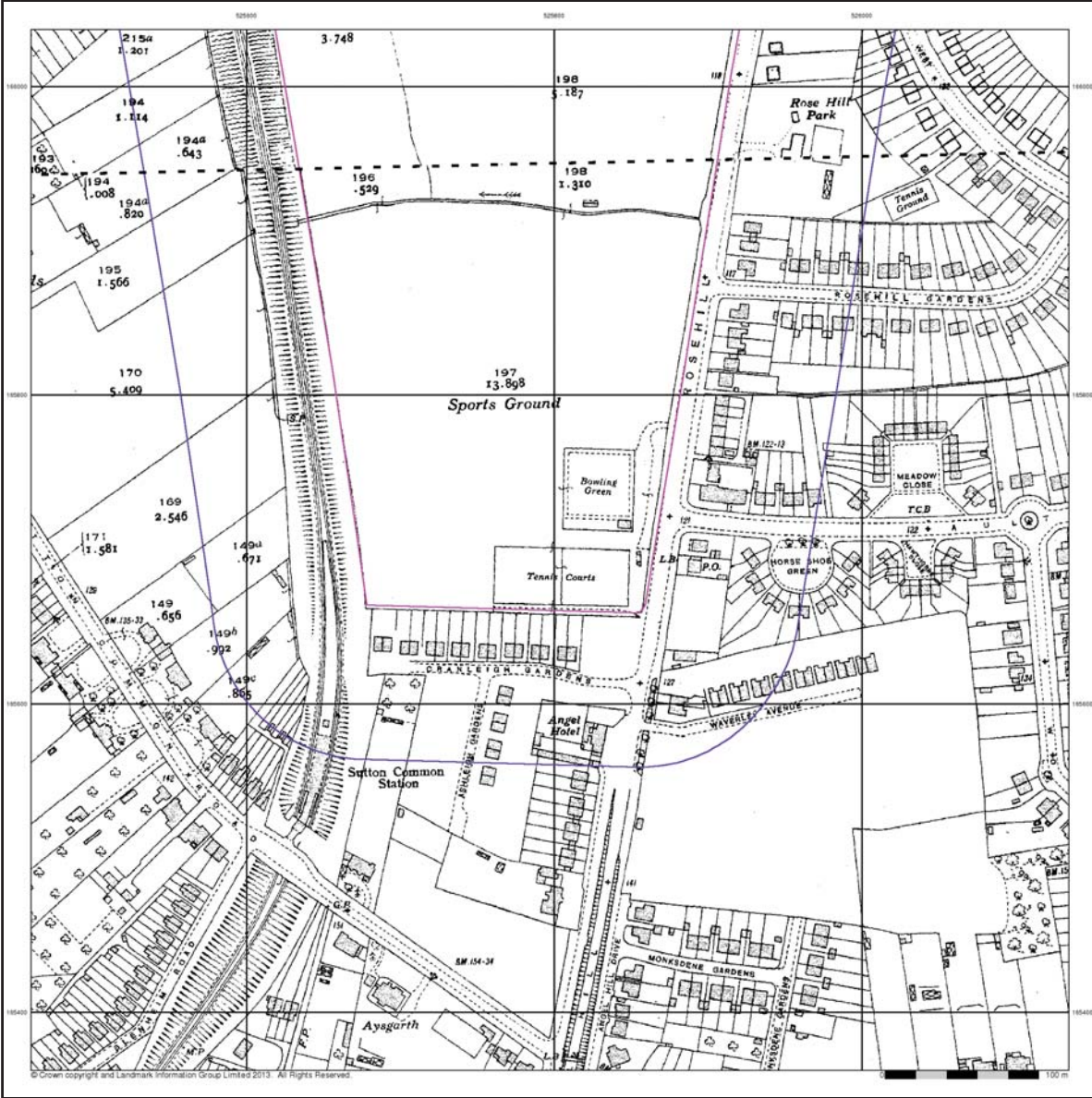
Site Details

Sutton Junior Tennis Club, Rosehill Recreation Ground, Rose Hill, SUTTON, Surrey, SM1 3HH

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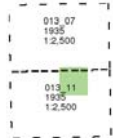
Surrey

Published 1935

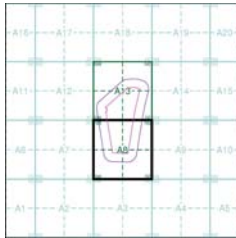
Source map scale - 1:2,500

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 A8



Order Details

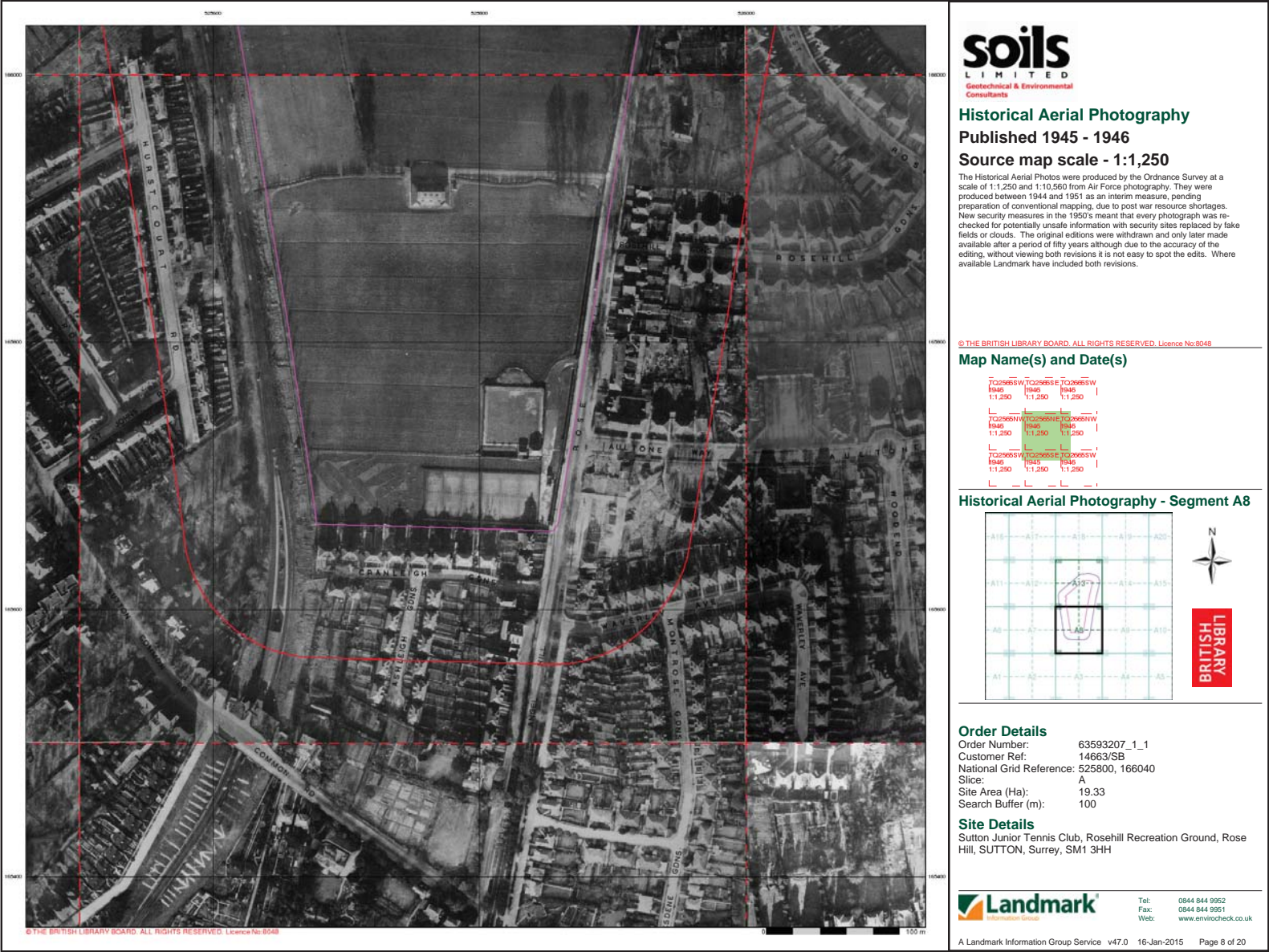
Order Number: 63593207_1_1
Customer Ref: 14663/SB
National Grid Reference: 525800, 166040
Site: A
Site Area (Ha): 19.33
Search Buffer (m): 100

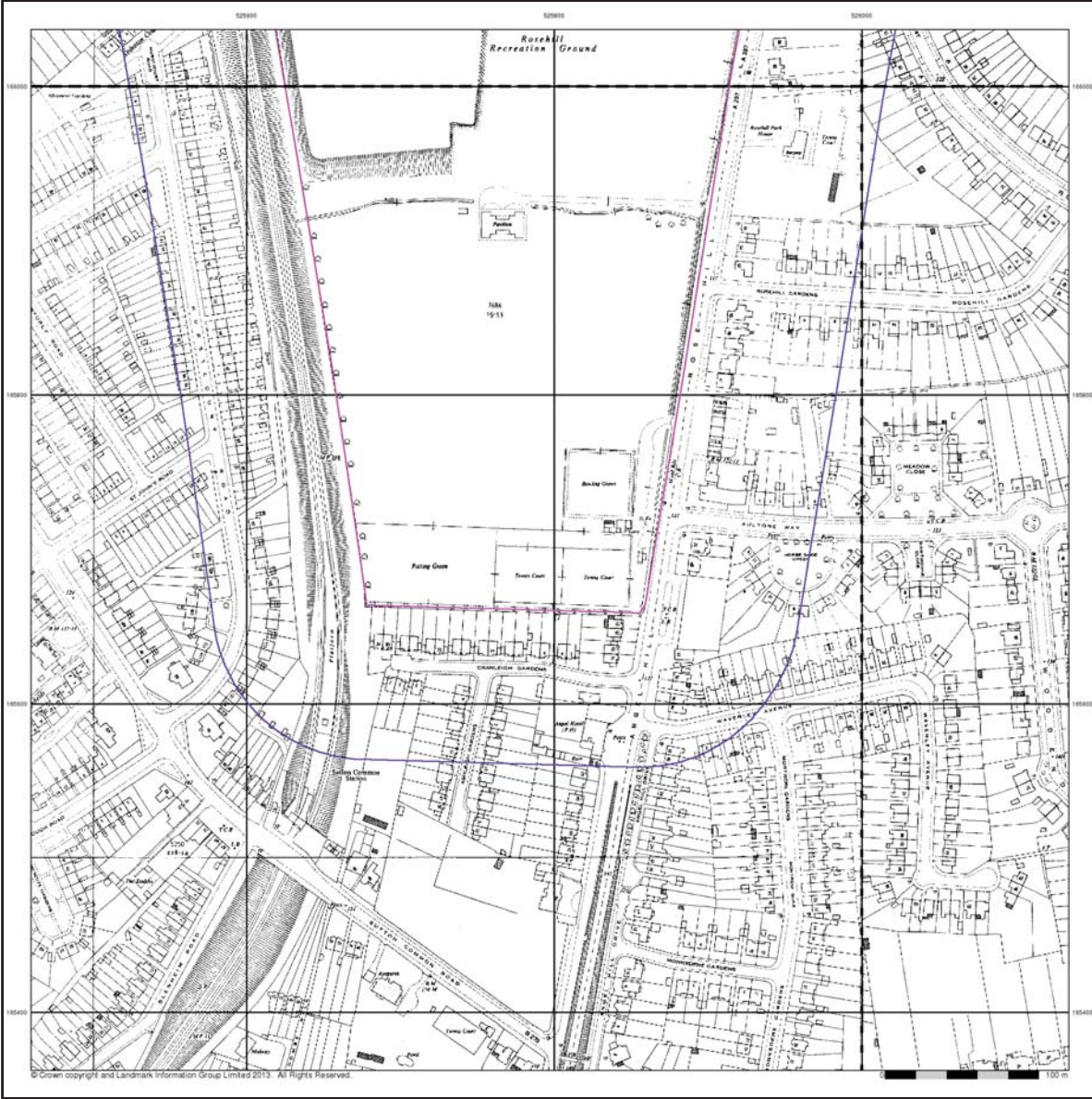
Site Details

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Ordnance Survey Plan

Published 1955 - 1956

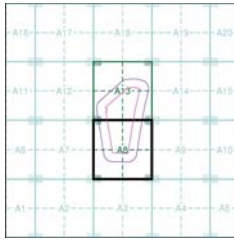
Source map scale - 1:2,500

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)

TQ2566	TQ2666
1955	1955
1:2,500	1:2,500
TQ2565	TQ2665
1956	1956
1:2,500	1:2,500

Historical Map - Segment A8



Order Details

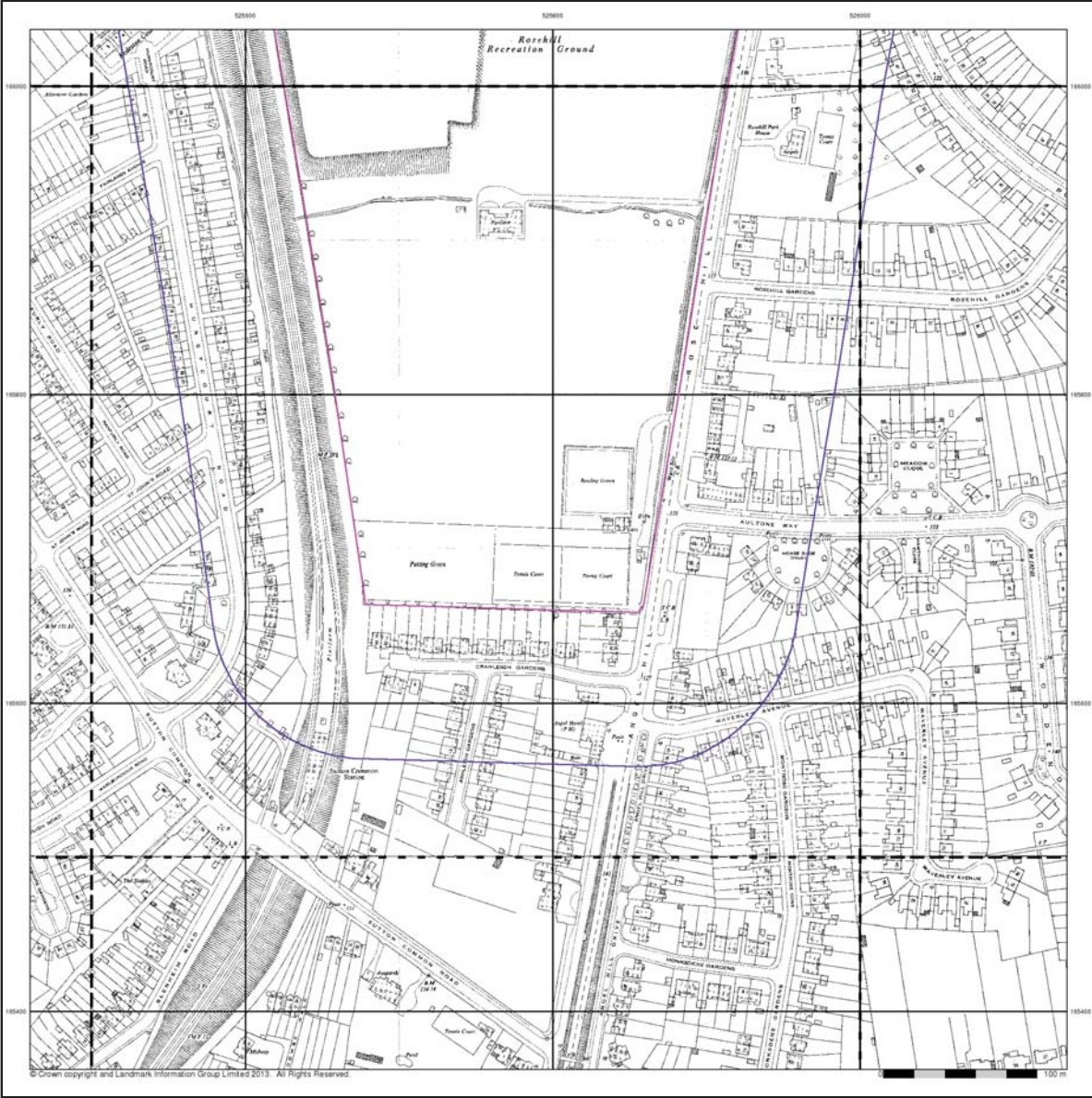
Order Number: 63593207_1_1
Customer Ref: 14663/SB
National Grid Reference: 525800, 166040
Site: A
Site Area (Ha): 19.33
Search Buffer (m): 100

Site Details

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Ordnance Survey Plan

Published 1955

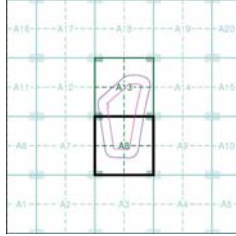
Source map scale - 1:1,250

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)

TQ25665W	TQ25665E	TQ25665W
1955	1955	1955
1:1,250	1:1,250	1:1,250
TQ2565NW	TQ2565NE	TQ2565NW
1955	1955	1955
1:1,250	1:1,250	1:1,250
TQ2565SW	TQ2565SE	TQ2565SW
1955	1955	1955
1:1,250	1:1,250	1:1,250

Historical Map - Segment A8



Order Details

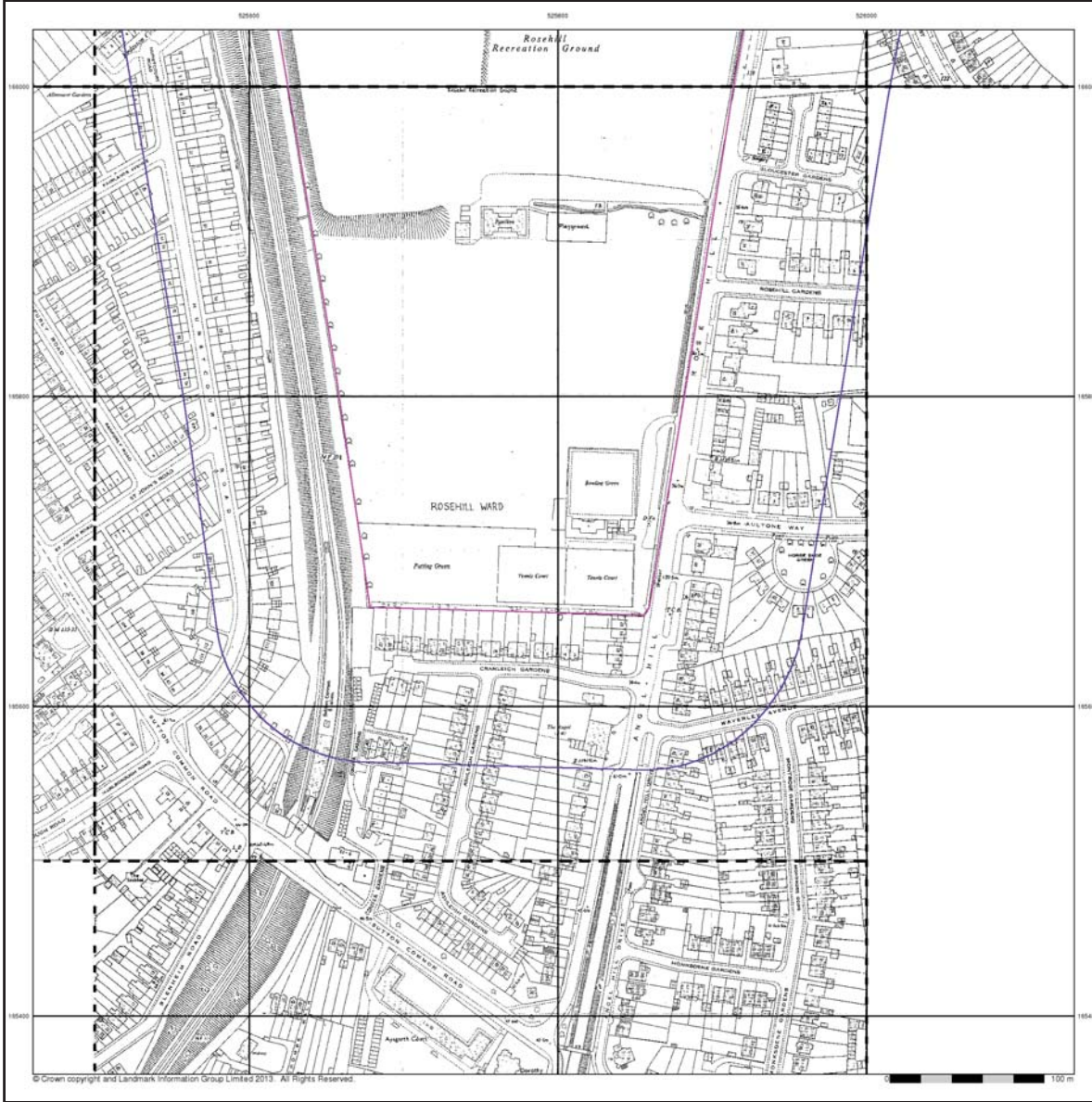
Order Number: 63593207_1_1
Customer Ref: 14663/SB
National Grid Reference: 525800, 166040
Slice: A
Site Area (Ha): 19.33
Search Buffer (m): 100

Site Details

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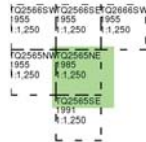
Additional SIMs

Published 1955 - 1991

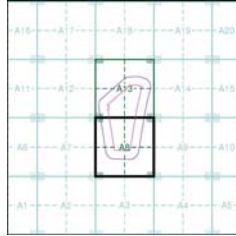
Source map scale - 1:1,250

The SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A8



Order Details

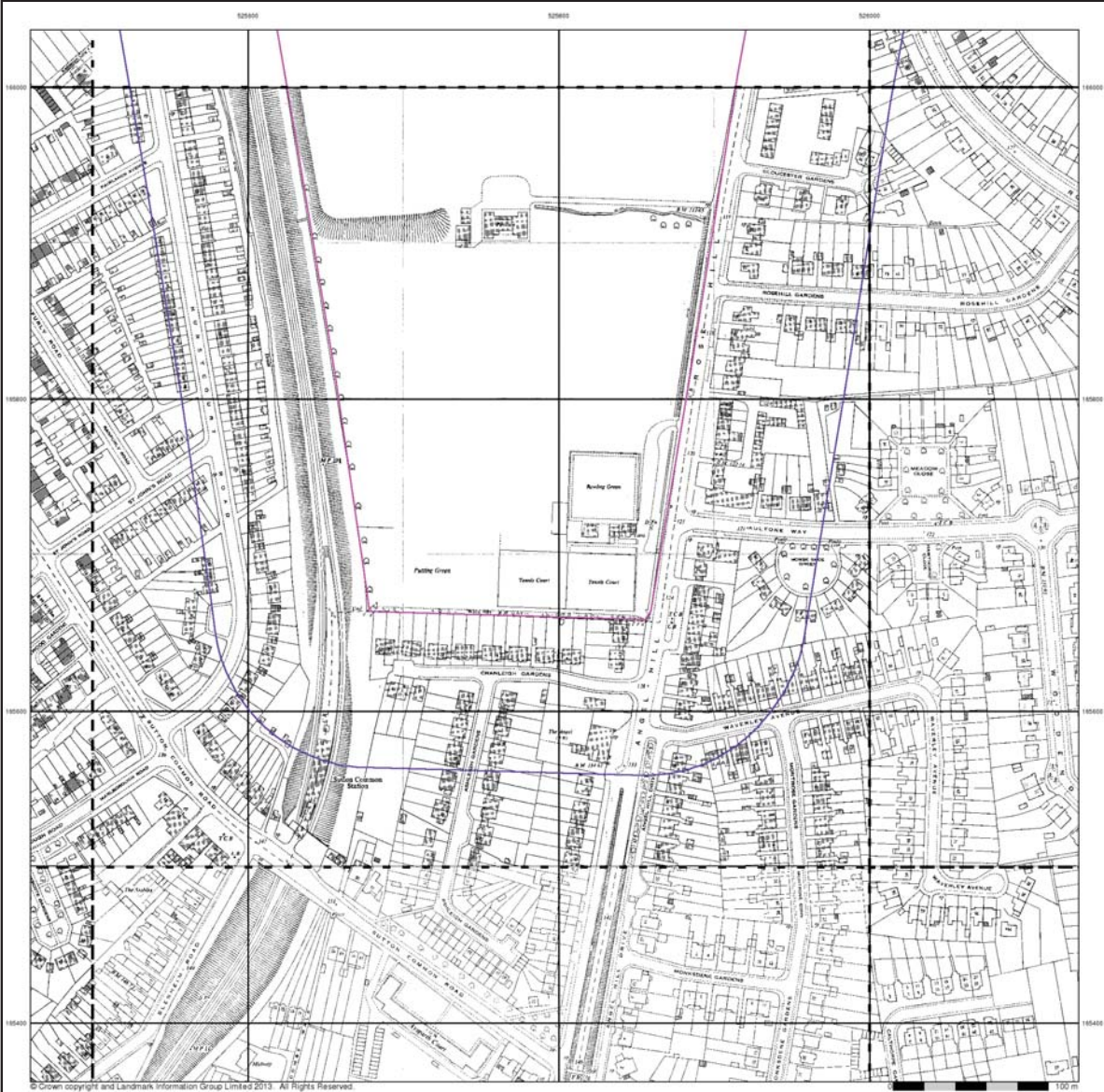
Order Number: 63593207_1_1
Customer Ref: 14663/SB
National Grid Reference: 525800, 166040
Site: A
Site Area (Ha): 19.33
Search Buffer (m): 100

Site Details

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Ordnance Survey Plan

Published 1960 - 1973

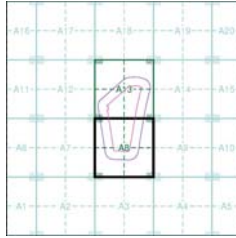
Source map scale - 1:1,250

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)

TQ258665W	TQ258665W
1972	1973
1:1,250	1:1,250
TQ258665W	TQ258665W
1972	1973
1:1,250	1:1,250
TQ258665W	TQ258665W
1987	1991
1:1,250	1:1,250

Historical Map - Segment A8



Order Details

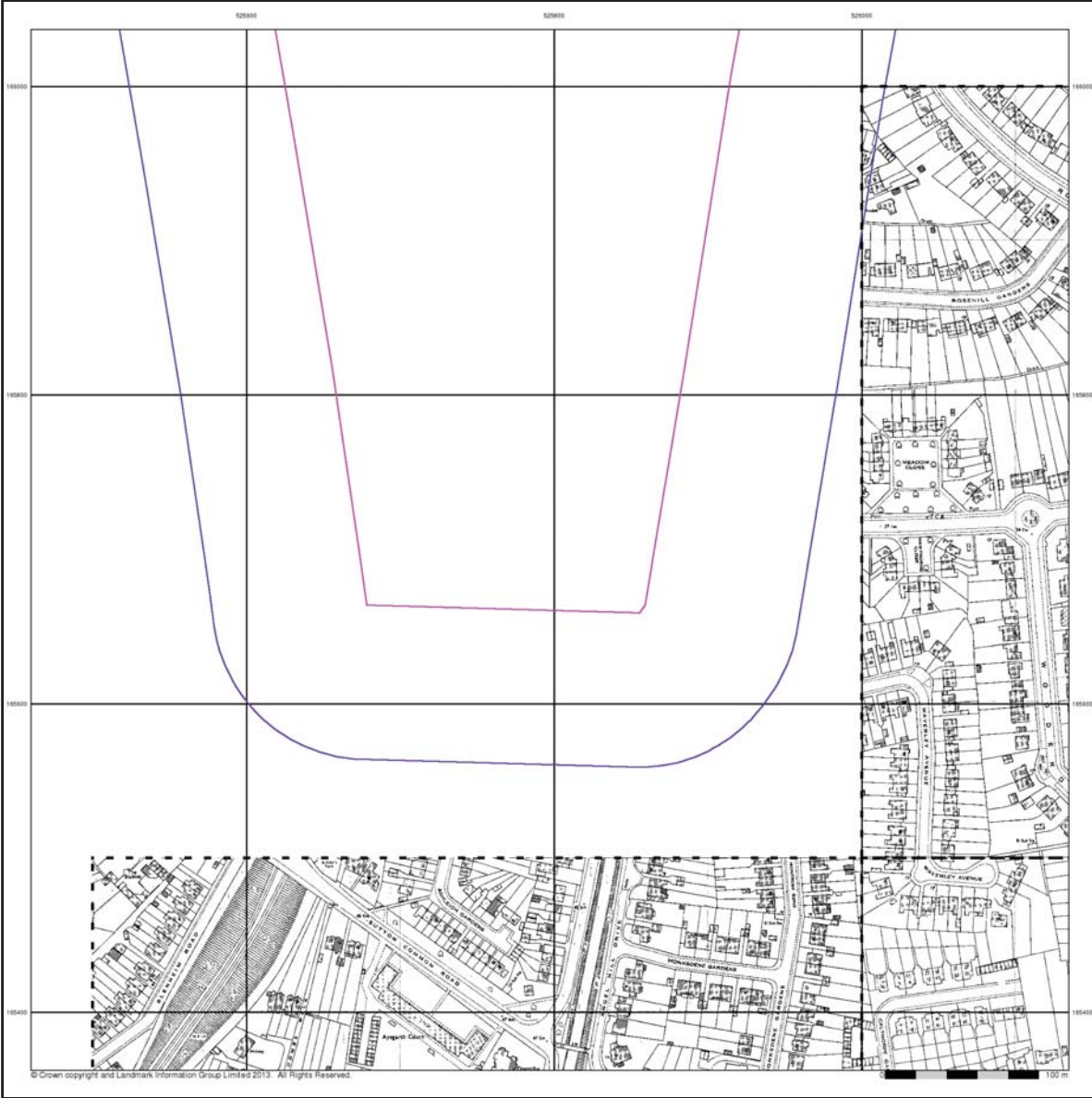
Order Number: 63593207_1.1
Customer Ref: 14663/SB
National Grid Reference: 525800, 166040
Slice: A
Site Area (Ha): 19.33
Search Buffer (m): 100

Site Details

Sutton Junior Tennis Club, Rosehill Recreation Ground, Rose Hill, SUTTON, Surrey, SM1 3HH

Landmark

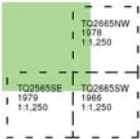
Tel: 0844 844 9952
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Web: www.envirocheck.co.uk



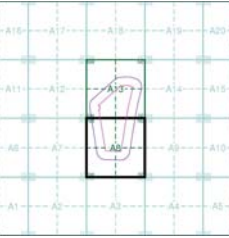
Ordnance Survey Plan
Published 1966 - 1979
Source map scale - 1:1,250

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 A8



Order Details

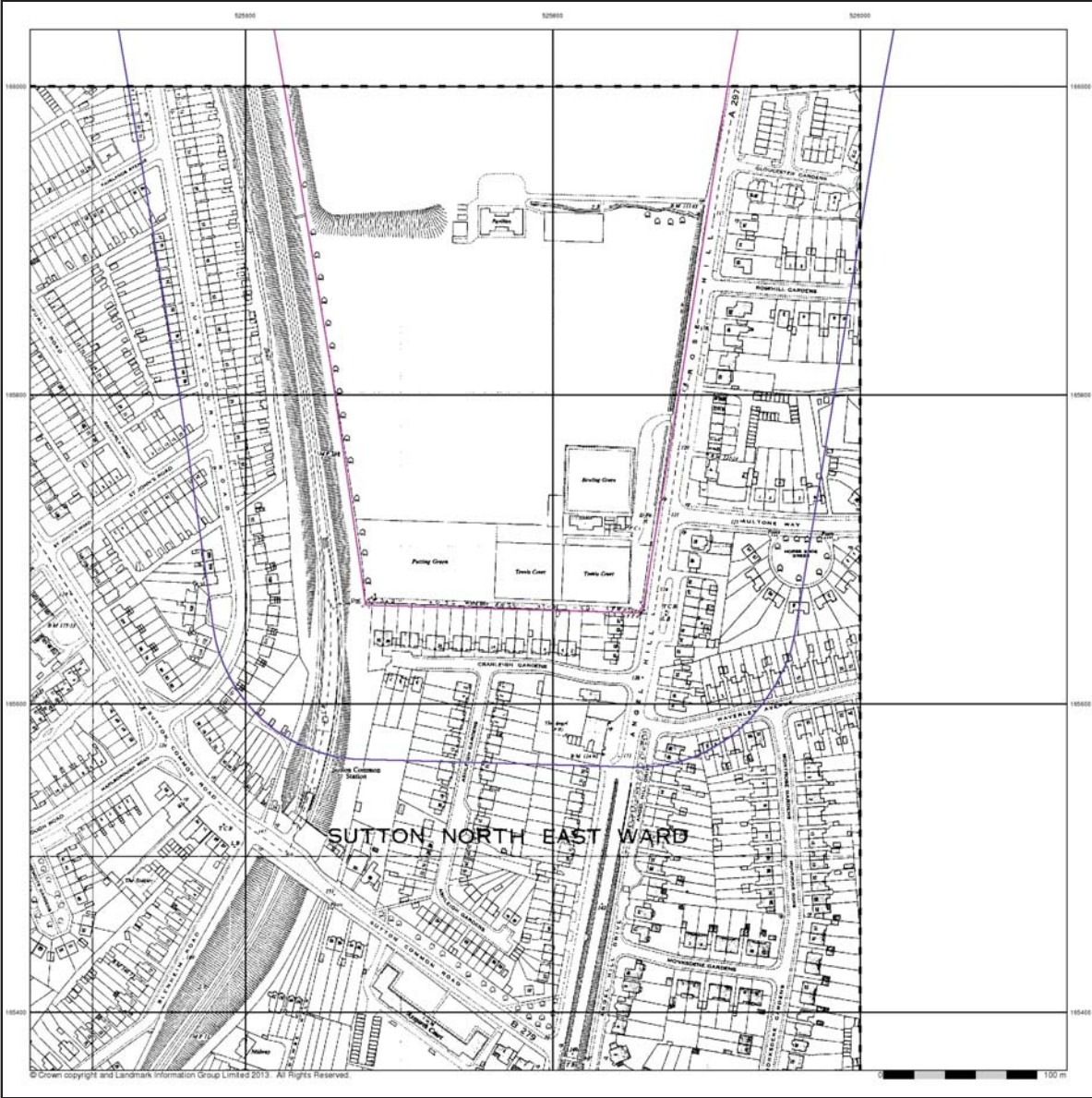
Order Number: 63593207_1_1
Customer Ref: 14663/SB
National Grid Reference: 525800, 166040
Site: A
Site Area (Ha): 19.33
Search Buffer (m): 100

Site Details

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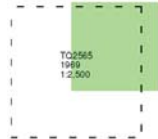
Ordnance Survey Plan

Published 1969

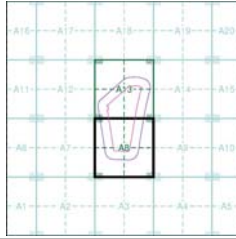
Source map scale - 1:2,500

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 A8



Order Details

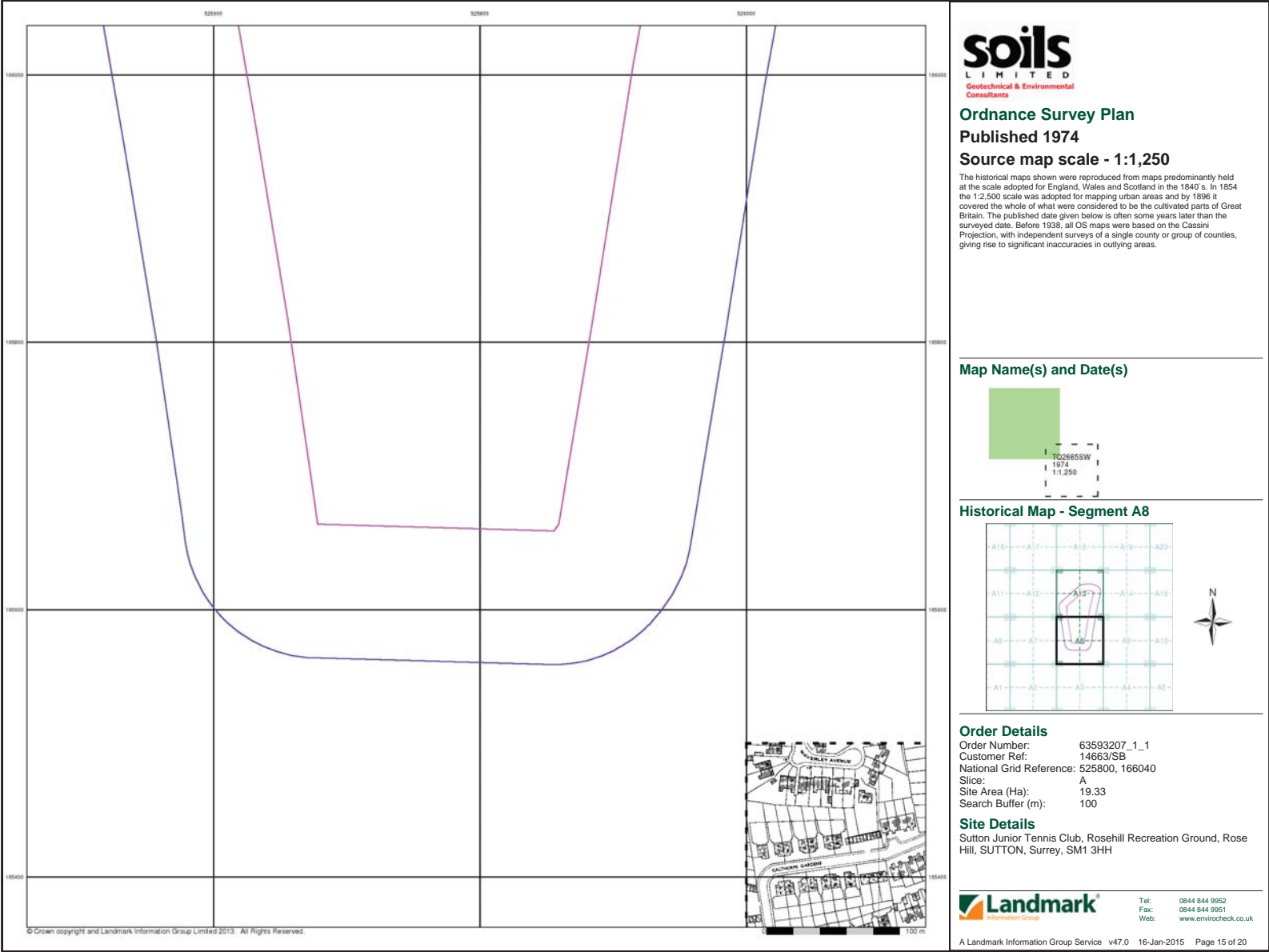
Order Number: 63593207_1_1
Customer Ref: 14663/SB
National Grid Reference: 525800, 166040
Slice: A
Site Area (Ha): 19.33
Search Buffer (m): 100

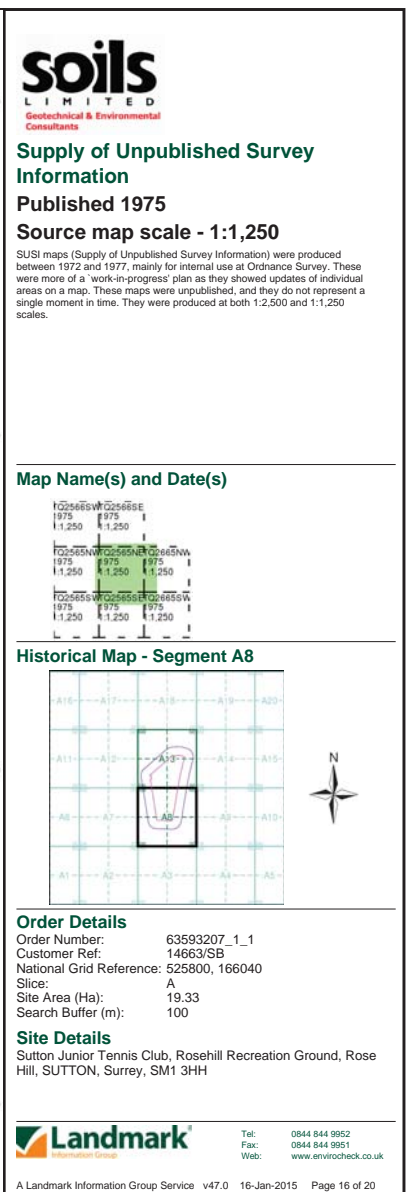
Site Details

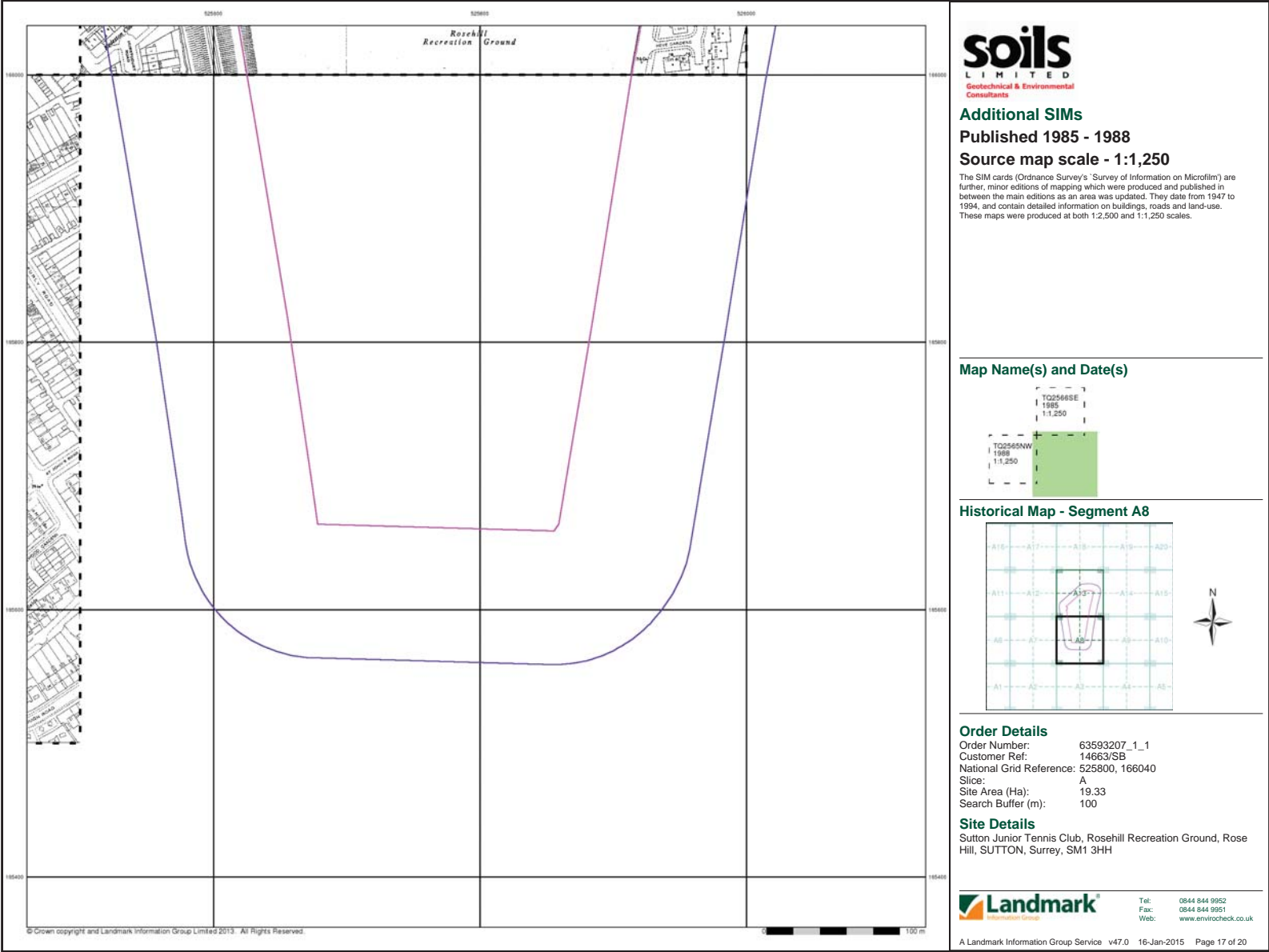
Sutton Junior Tennis Club, Rosehill Recreation Ground, Rose Hill, SUTTON, Surrey, SM1 3HH

Landmark

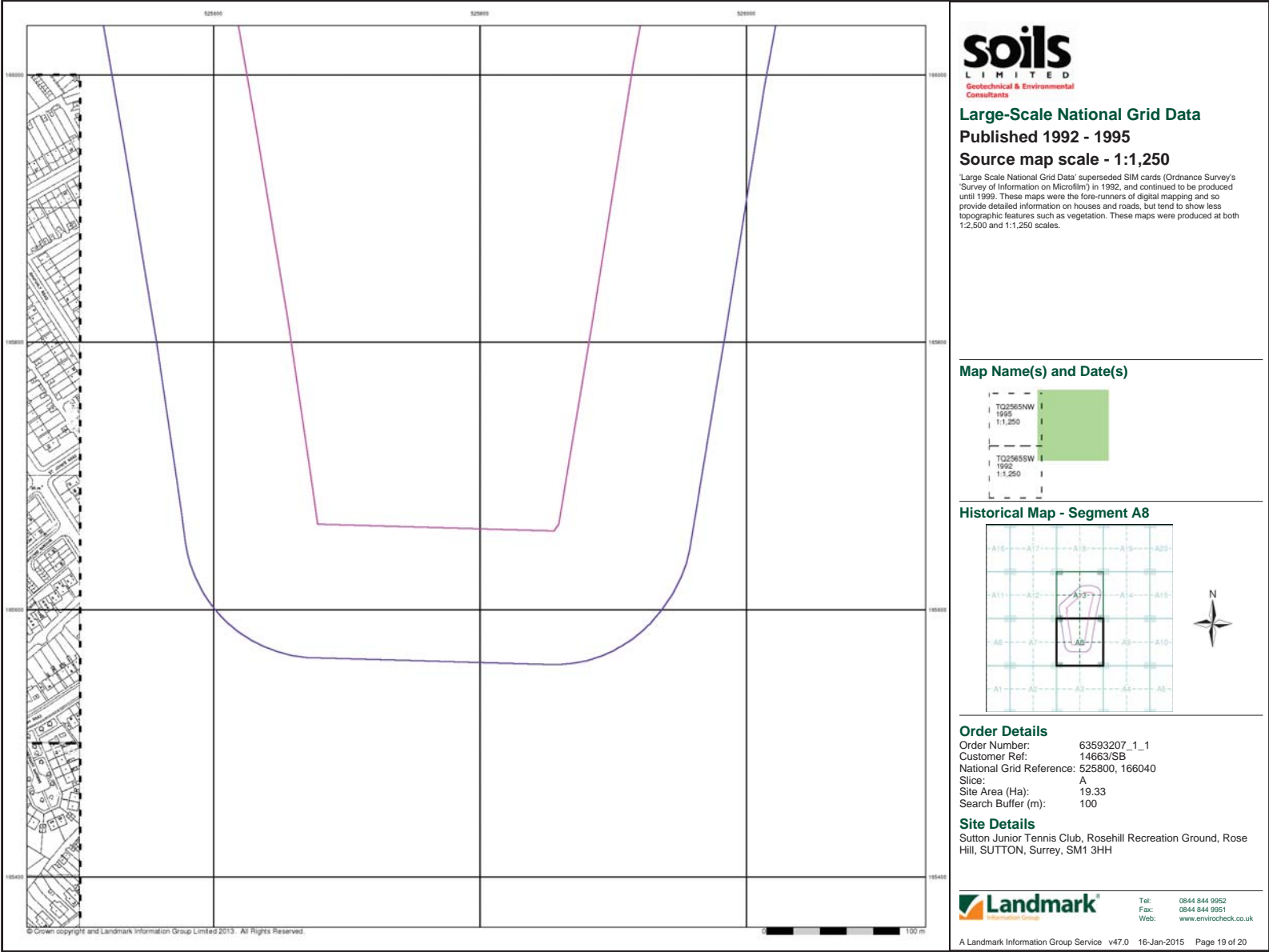
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Fax: 0844 844 9951
Web: www.envirocheck.co.uk

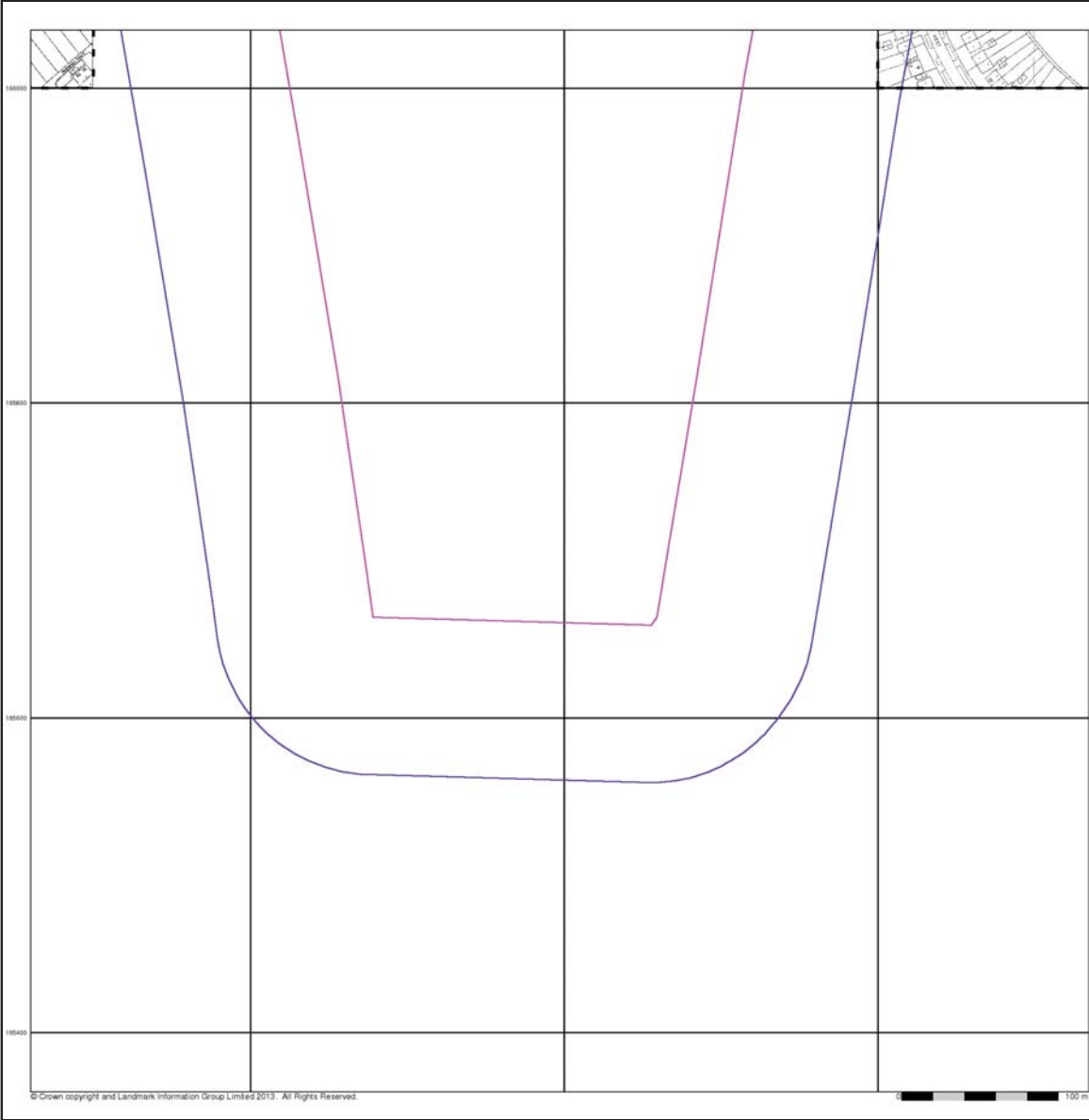












Large-Scale National Grid Data
Published 1996

Source map scale - 1:1,250

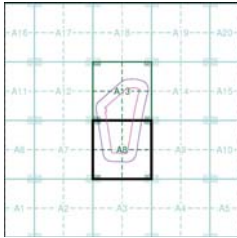
'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

TC2566SW 1996 1:1,250	TC2666SW 1996 1:1,250
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Historical Map - Segment A8



Order Details

Order Number: 63593207_1_1
Customer Ref: 14663/SB
National Grid Reference: 525800, 166040
Slice: A
Site Area (Ha): 19.33
Search Buffer (m): 100

Site Details

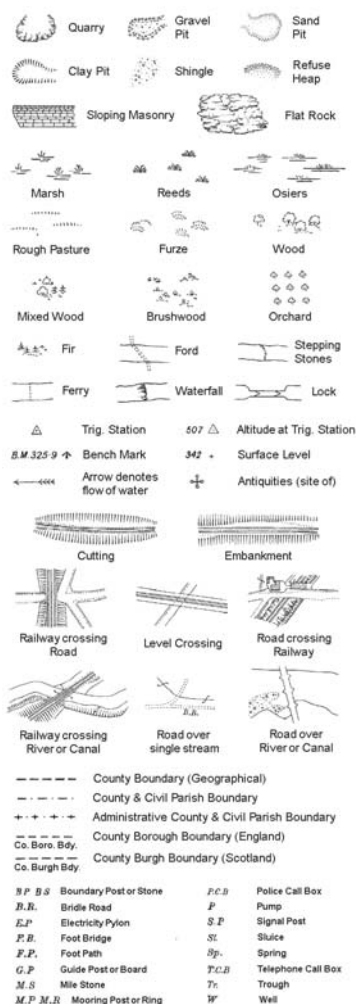
Sutton Junior Tennis Club, Rosehill Recreation Ground, Rose Hill, SUTTON, Surrey, SM1 3HH



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Historical Mapping Legends

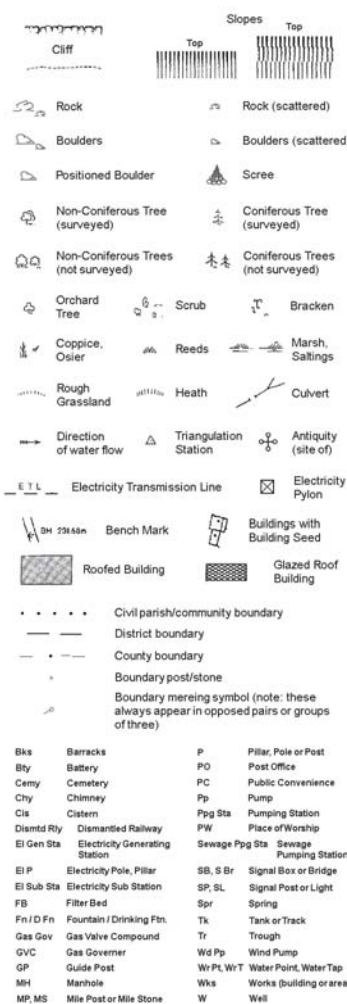
Ordnance Survey County Series and Ordnance Survey Plan 1:2,500



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



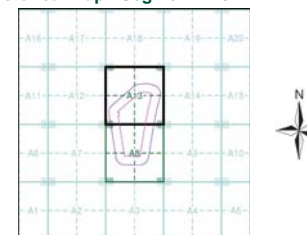
Large-Scale National Grid Data 1:2,500 and 1:1,250



Historical Mapping & Photography included:

Mapping Type	Scale	Date	Page
Surrey	1:2,500	1865	2
Surrey	1:2,500	1868	3
Surrey	1:2,500	1894	4
Surrey	1:2,500	1895	5
Surrey	1:2,500	1913	6
Surrey	1:2,500	1935	7
Historical Aerial Photography	1:1,250	1946 - 1947	8
Ordnance Survey Plan	1:2,500	1955	9
Ordnance Survey Plan	1:1,250	1955	10
Additional SIMs	1:1,250	1955 - 1982	11
Ordnance Survey Plan	1:1,250	1972 - 1978	12
Supply of Unpublished Survey Information	1:1,250	1975	13
Additional SIMs	1:1,250	1985	14
Large-Scale National Grid Data	1:1,250	1991	15
Large-Scale National Grid Data	1:1,250	1993	16
Large-Scale National Grid Data	1:1,250	1996	17

Historical Map - Segment A13



Order Details

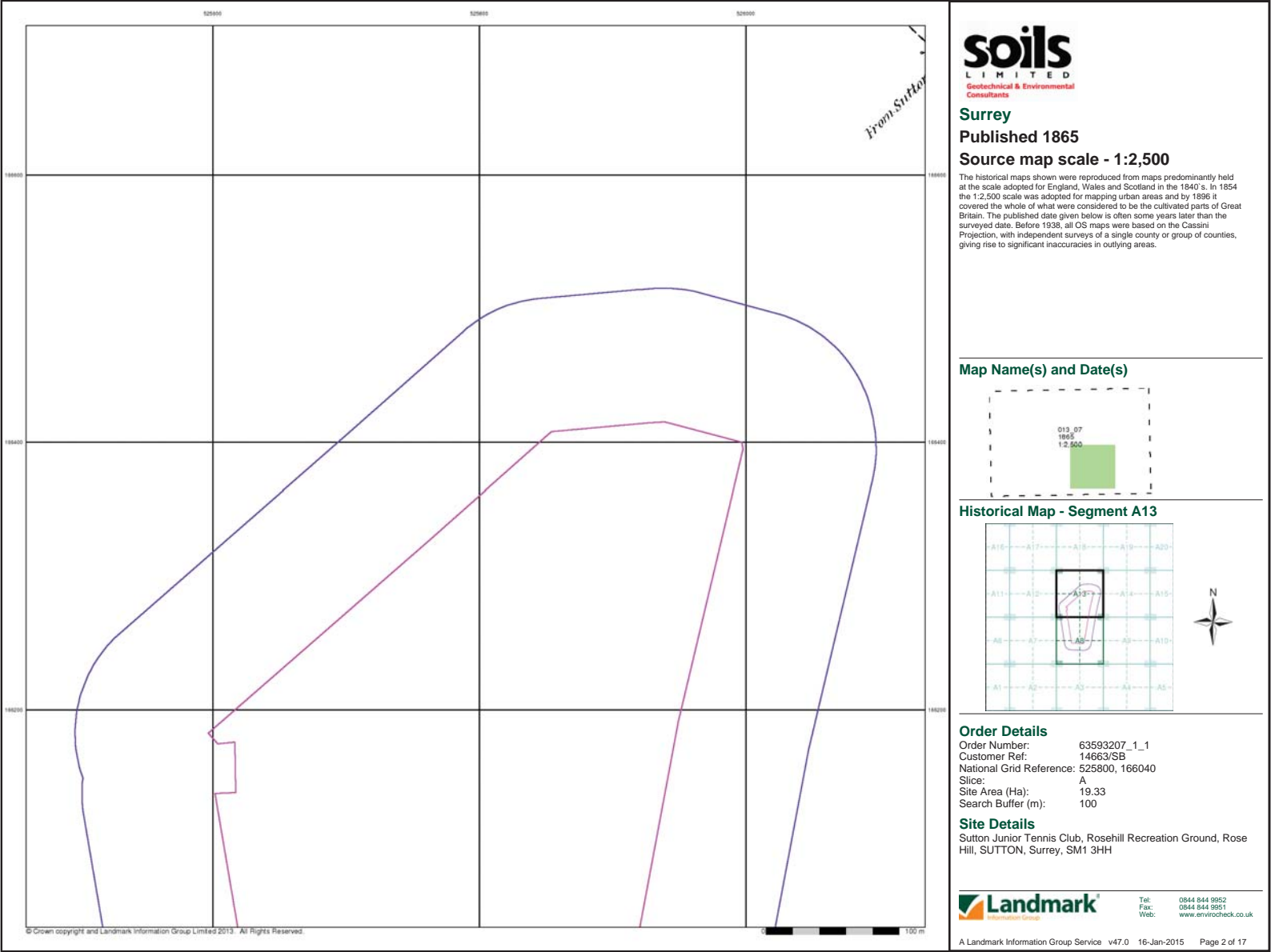
Order Number: 63593207_1_1
Customer Ref: 14663/SB
National Grid Reference: 525800, 166040
Slice: A
Site Area (Ha): 19.33
Search Buffer (m): 100

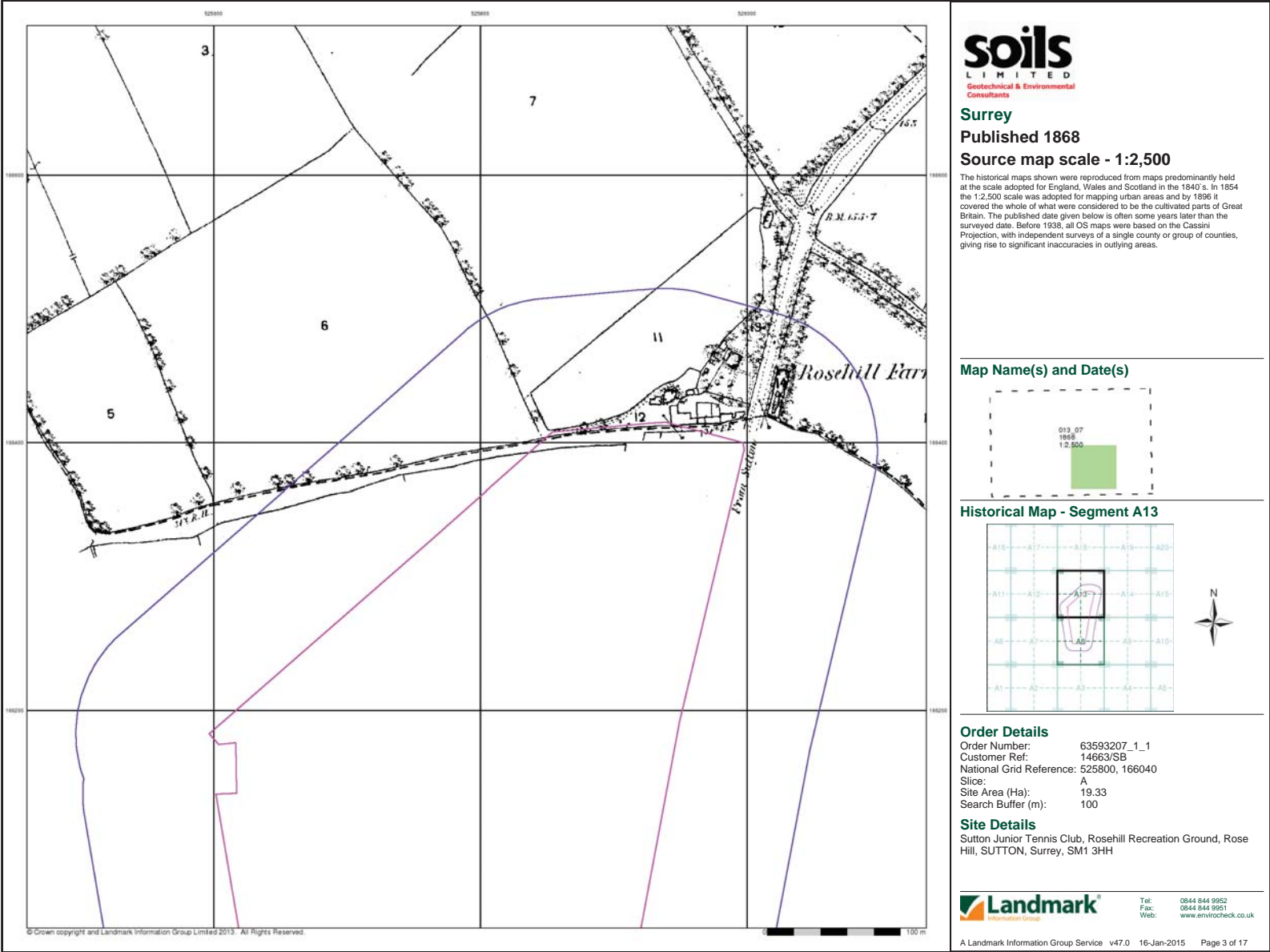
Site Details

Sutton Junior Tennis Club, Rosehill Recreation Ground, Rose Hill, SUTTON, Surrey, SM1 3HH

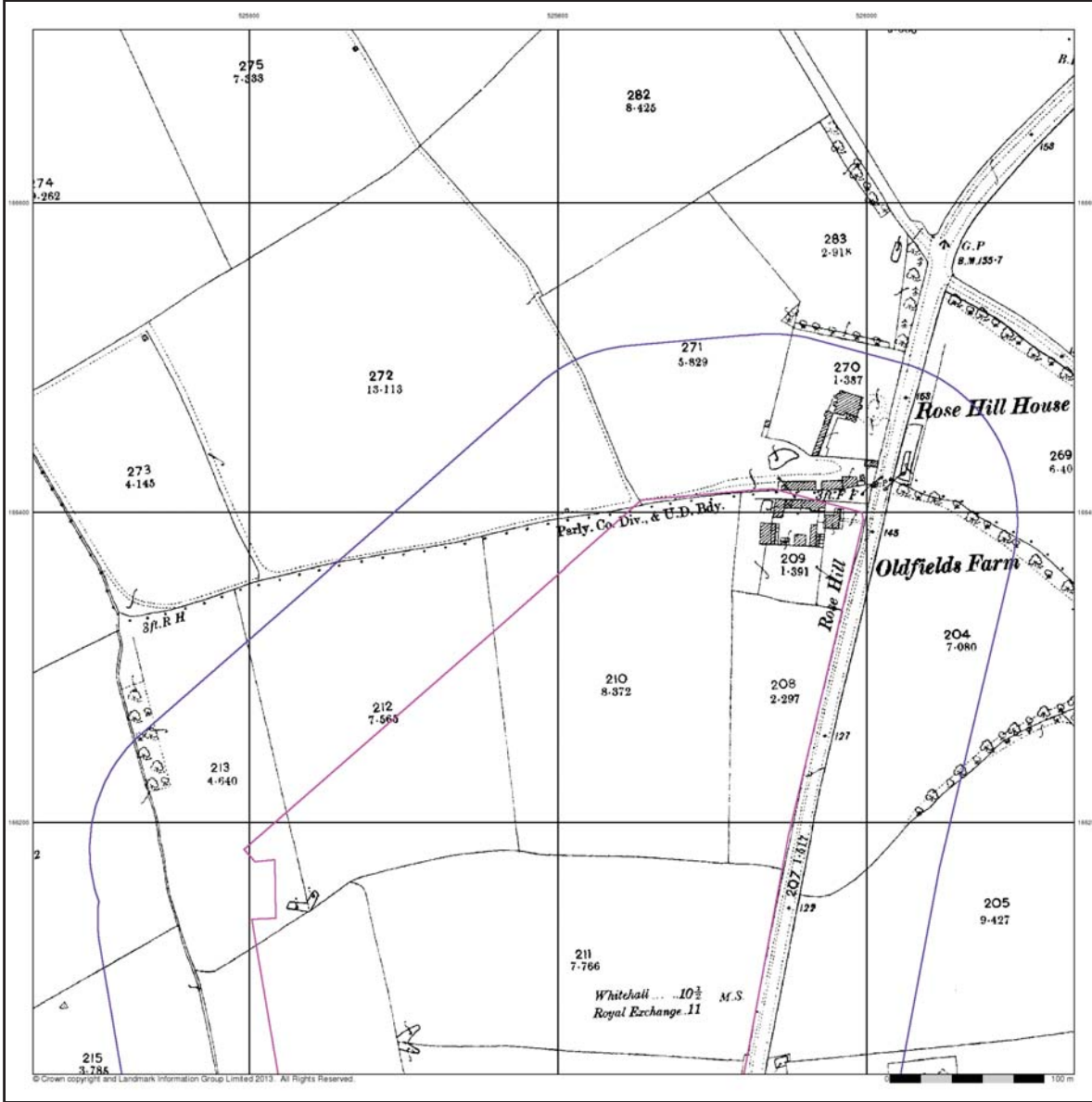


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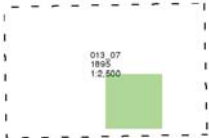
Surrey

Published 1895

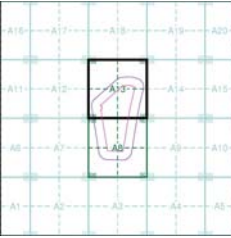
Source map scale - 1:2,500

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

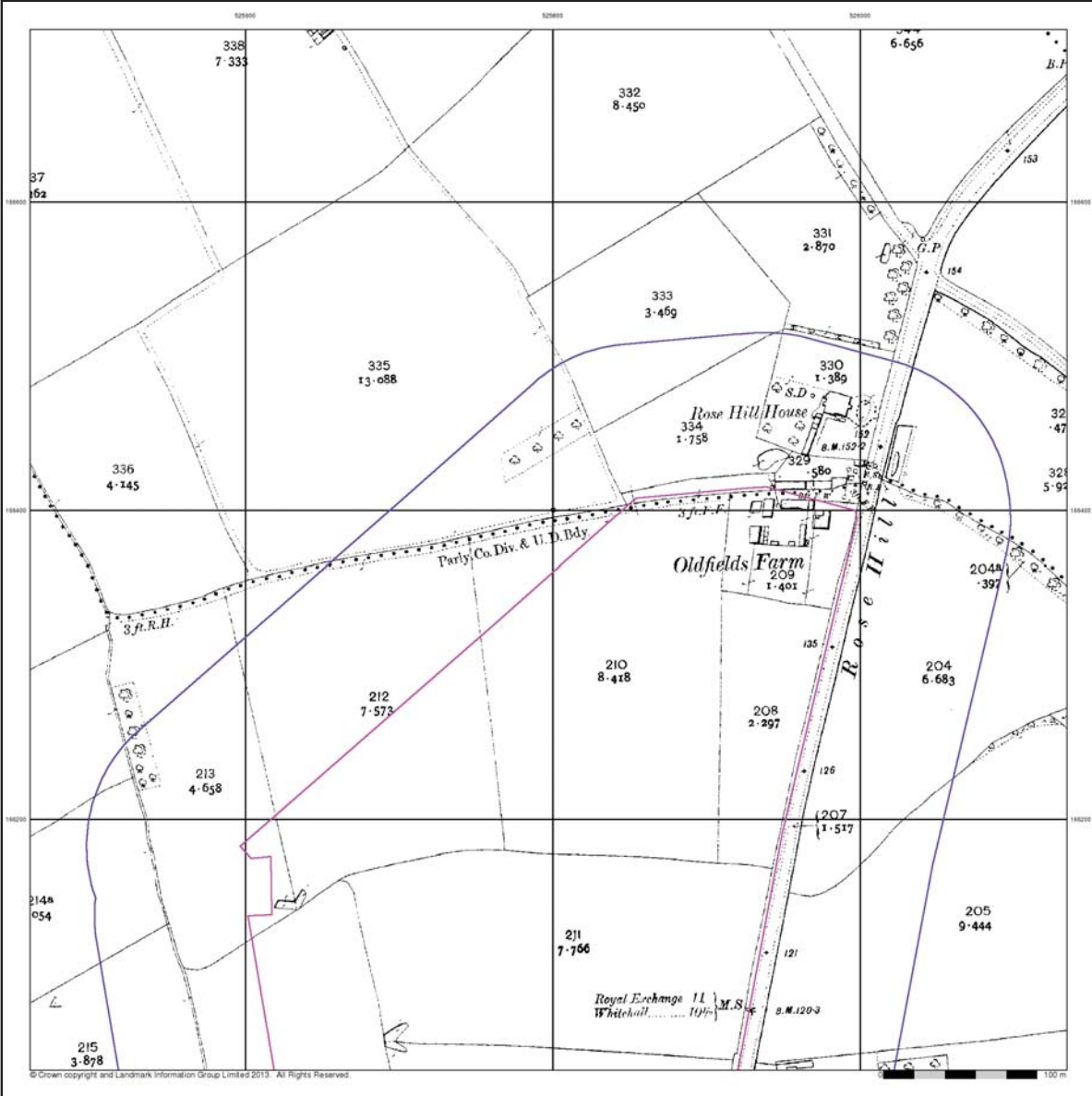
Order Number: 63593207_1_1
Customer Ref: 14663/SB
National Grid Reference: 525800, 166040
Slice: A
Site Area (Ha): 19.33
Search Buffer (m): 100

Site Details

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Historical Aerial Photography Published 1946 - 1947 Source map scale - 1:1,250

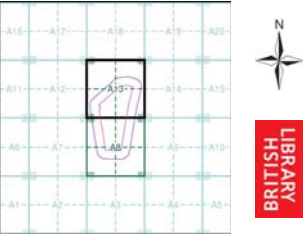
The Historical Aerial Photos were produced by the Ordnance Survey at a scale of 1:1,250 and 1:10,560 from Air Force photography. They were produced between 1944 and 1951 as an interim measure, pending preparation of conventional mapping, due to post war resource shortages. New security measures in the 1950's meant that every photograph was re-checked for potentially unsafe information with security sites replaced by fake fields or clouds. The original editions were withdrawn and only later made available after a period of fifty years although due to the accuracy of the editing, without viewing both revisions it is not easy to spot the edits. Where available Landmark have included both revisions.

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Map Name(s) and Date(s)

TC2588NW 1947 1:1,250	TC2588NE 1948 1:1,250	TC2588NW 1948 1:1,250
TC2588SW 1948 1:1,250	TC2588SE 1948 1:1,250	TC2588SW 1948 1:1,250

Historical Aerial Photography - Segment A13



Order Details

Order Number: 63593207_1_1
Customer Ref: 14663/SB
National Grid Reference: 525800, 166040
Slice: A
Site Area (Ha): 19.33
Search Buffer (m): 100

Site Details

Sutton Junior Tennis Club, Rosehill Recreation Ground, Rose Hill, SUTTON, Surrey, SM1 3HH



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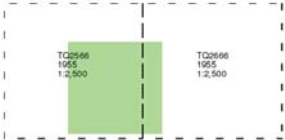
Ordnance Survey Plan

Published 1955

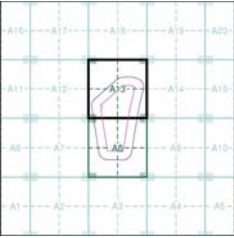
Source map scale - 1:2,500

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

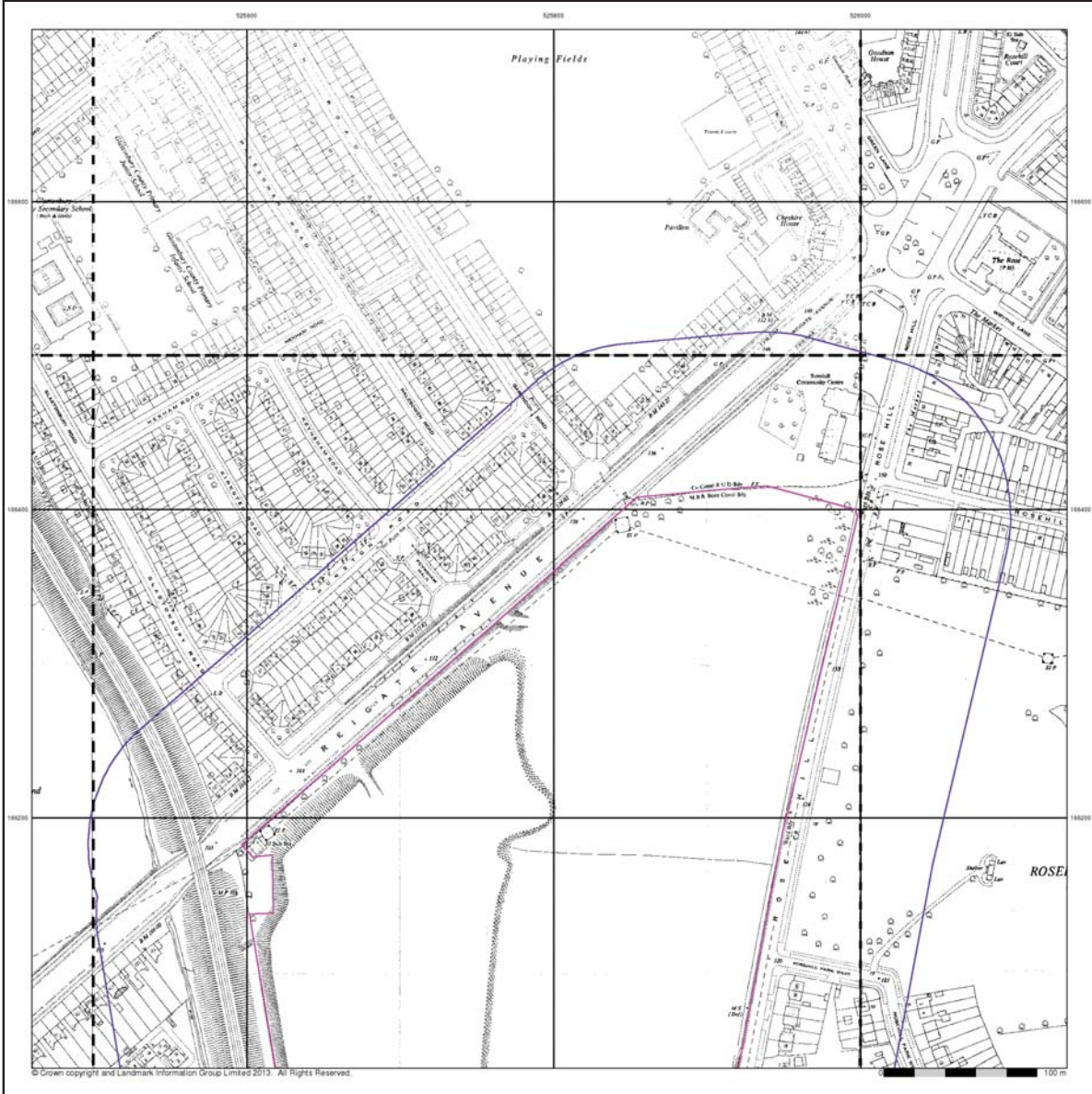
Order Number: 63593207_1_1
Customer Ref: 14663/SB
National Grid Reference: 525800, 166040
Site: A
Site Area (Ha): 19.33
Search Buffer (m): 100

Site Details

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Ordnance Survey Plan

Published 1955

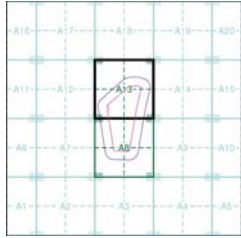
Source map scale - 1:1,250

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)

TQ2566NW 1955 1:1,250	TQ2566NE 1955 1:1,250	TQ2566NW 1955 1:1,250
TQ2566SW 1955 1:1,250	TQ2566SE 1955 1:1,250	TQ2566SW 1955 1:1,250

Historical Map - Segment A13



Order Details

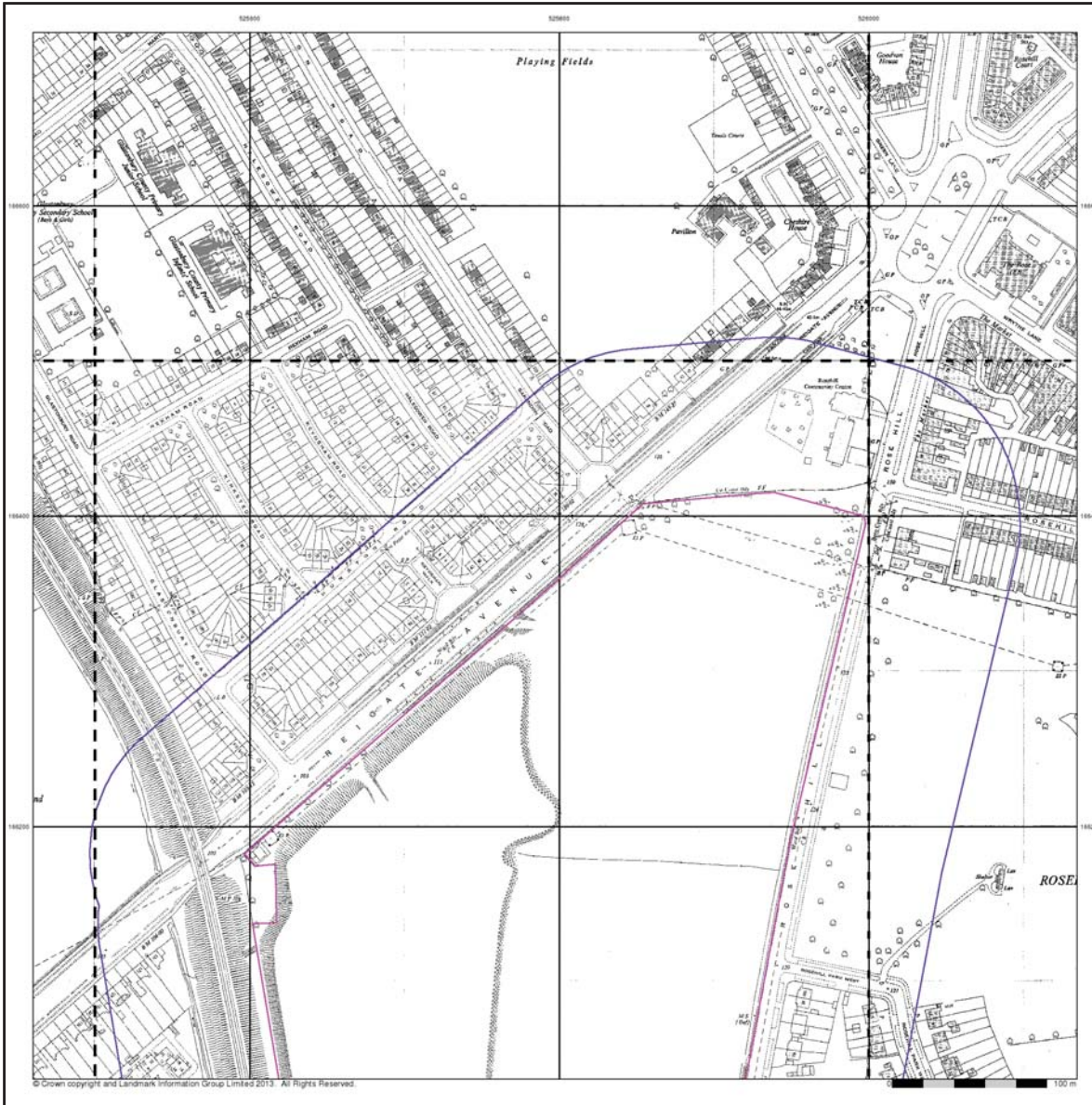
Order Number: 63593207_1_1
Customer Ref: 14663/SB
National Grid Reference: 525800, 166040
Slice: A
Site Area (Ha): 19.33
Search Buffer (m): 100

Site Details

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Additional SIMs

Published 1955 - 1982

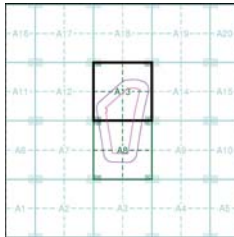
Source map scale - 1:1,250

The SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

TQ2566NW 1982 1:1,250	TQ2566NE 1955 1:1,250	TQ2566NW 1955 1:1,250
TQ2566SW 1955 1:1,250	TQ2566SE 1955 1:1,250	TQ2566SW 1955 1:1,250

Historical Map - Segment A13



Order Details

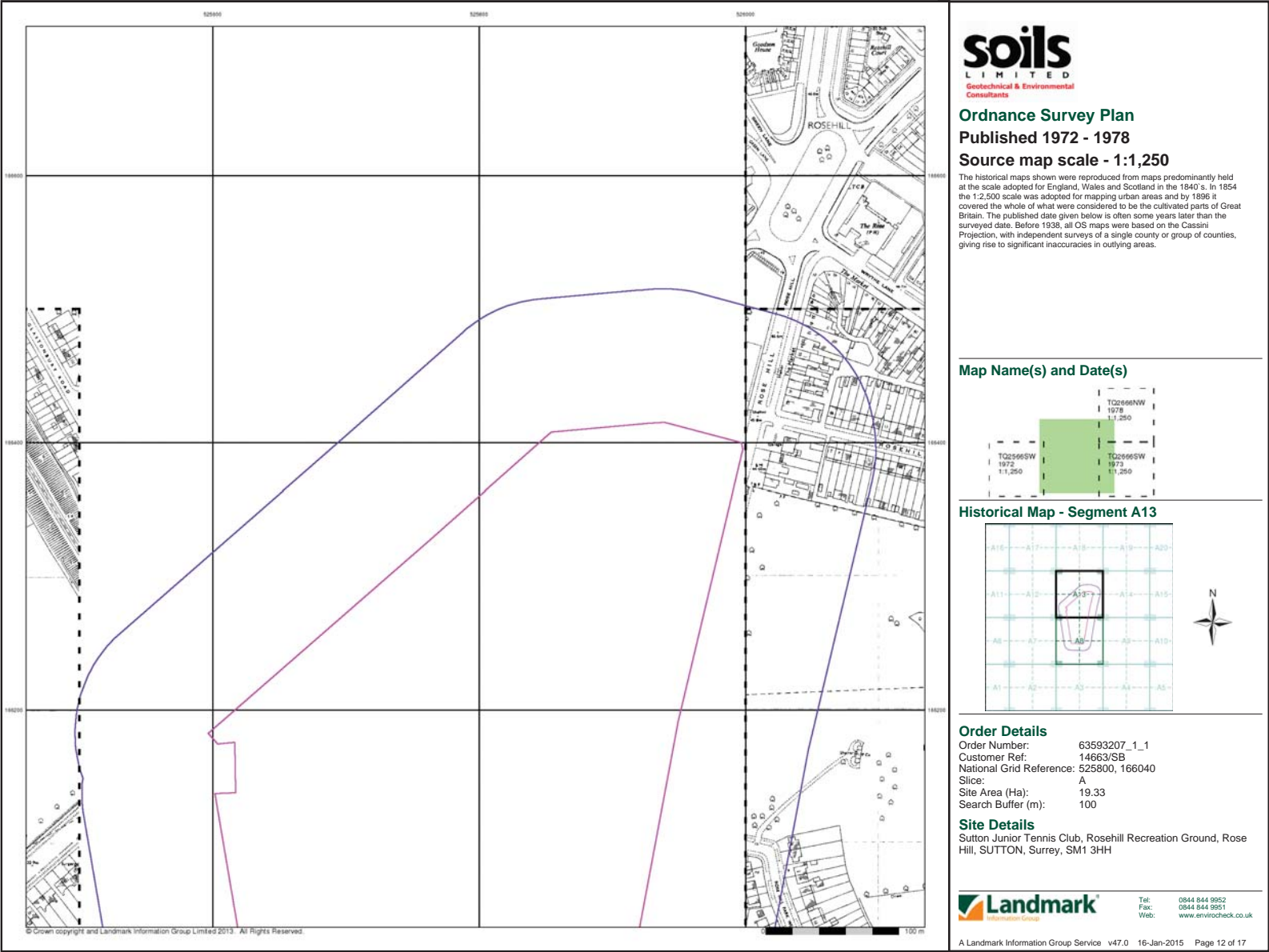
Order Number: 63593207_1_1
Customer Ref: 14663/SB
National Grid Reference: 525800, 166040
Slice: A
Site Area (Ha): 19.33
Search Buffer (m): 100

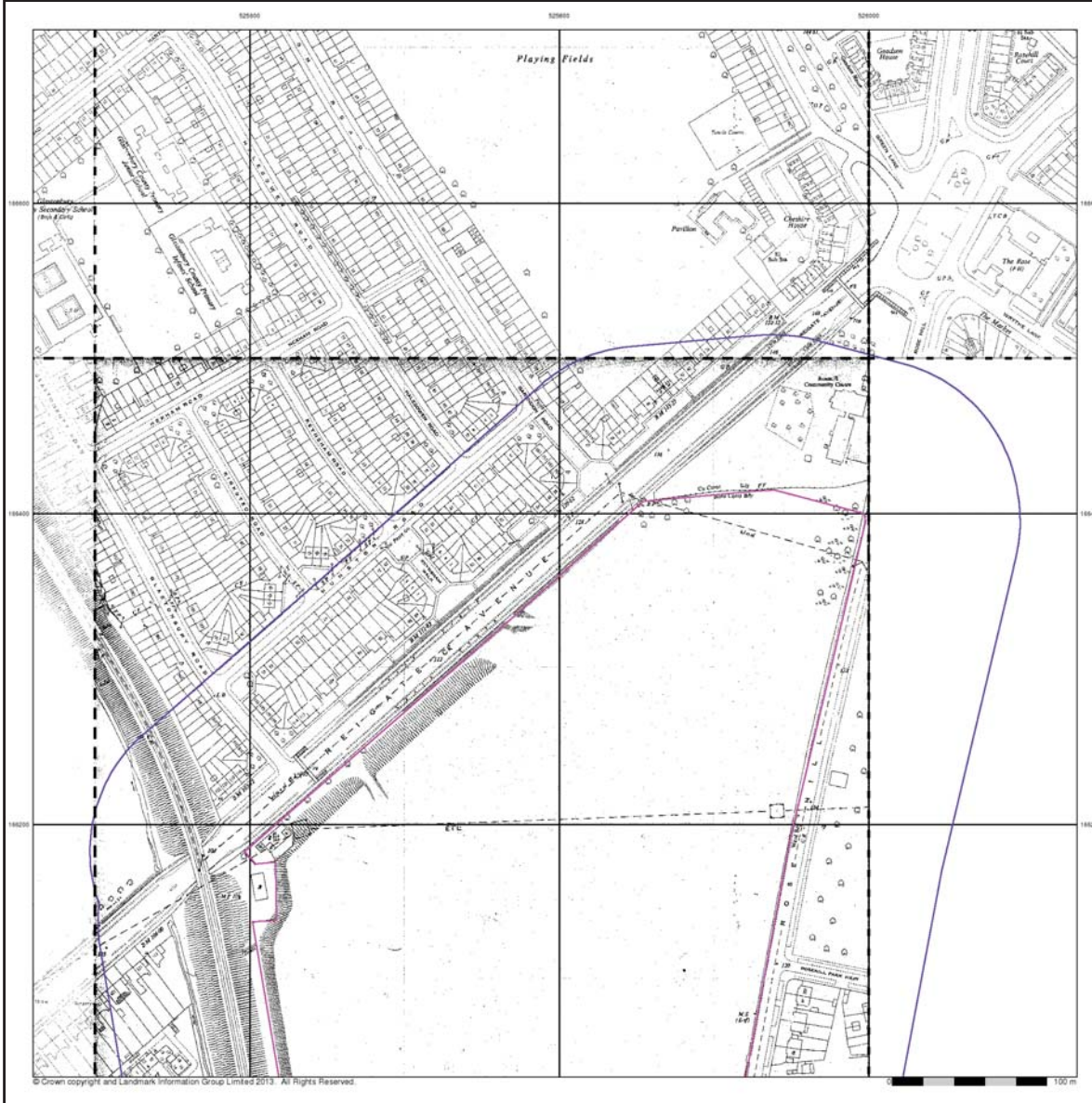
Site Details

Sutton Junior Tennis Club, Rosehill Recreation Ground, Rose Hill, SUTTON, Surrey, SM1 3HH

Landmark
Information Group

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





Supply of Unpublished Survey Information
Published 1975

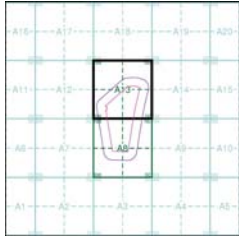
Source map scale - 1:1,250

SUSI maps (Supply of Unpublished Survey Information) were produced between 1972 and 1977, mainly for internal use at Ordnance Survey. These were more of a 'work-in-progress' plan as they showed updates of individual areas on a map. These maps were unpublished, and they do not represent a single moment in time. They were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

TQ2566NW	TQ2566NE	TQ2566NW
1975	1975	1975
1:1,250	1:1,250	1:1,250
TQ2566SW	TQ2566SE	
1975	1975	
1:1,250	1:1,250	

Historical Map - Segment A13



Order Details

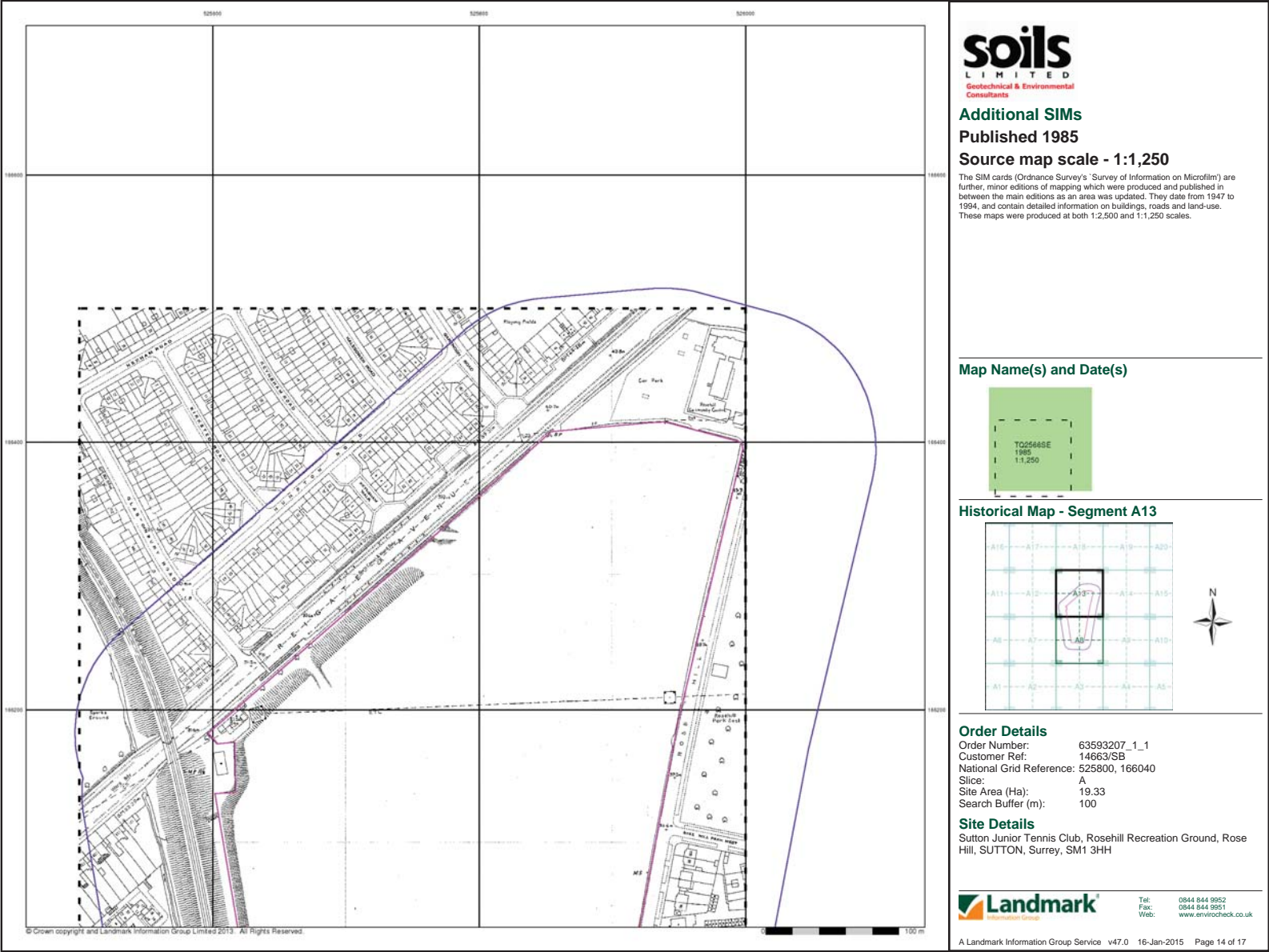
Order Number: 63593207_1_1
Customer Ref: 14663/SB
National Grid Reference: 525800, 166040
Slice: A
Site Area (Ha): 19.33
Search Buffer (m): 100

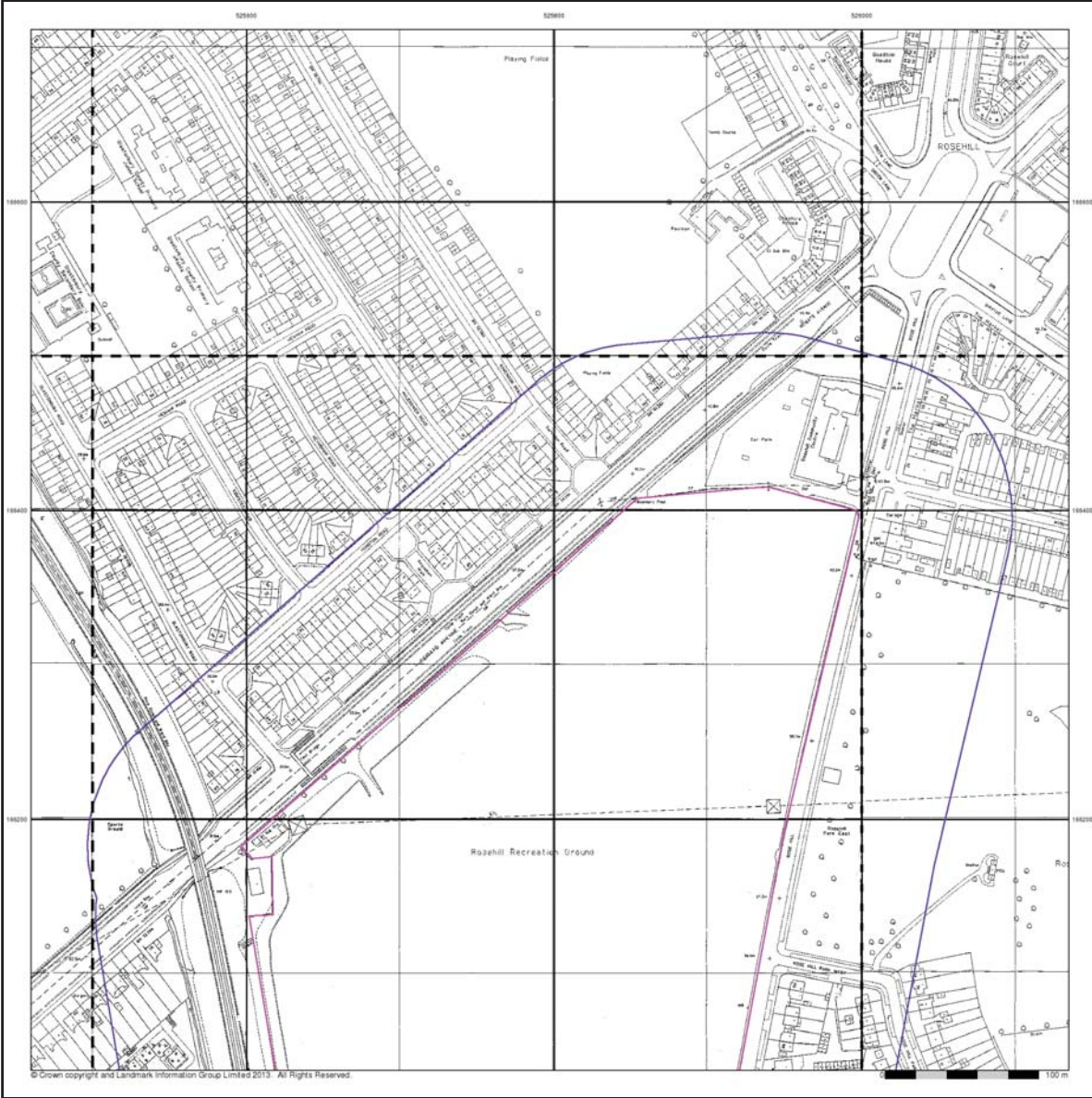
Site Details

Sutton Junior Tennis Club, Rosehill Recreation Ground, Rose Hill, SUTTON, Surrey, SM1 3HH



Tel: 0844 844 9952
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Large-Scale National Grid Data

Published 1991

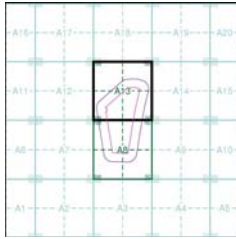
Source map scale - 1:1,250

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

TQ2566NW	TQ2566NE	TQ2566NW
1991	1991	1991
1:1,250	1:1,250	1:1,250
TQ2566SW	TQ2566SE	TQ2566SW
1991	1991	1991
1:1,250	1:1,250	1:1,250

Historical Map - Segment A13



Order Details

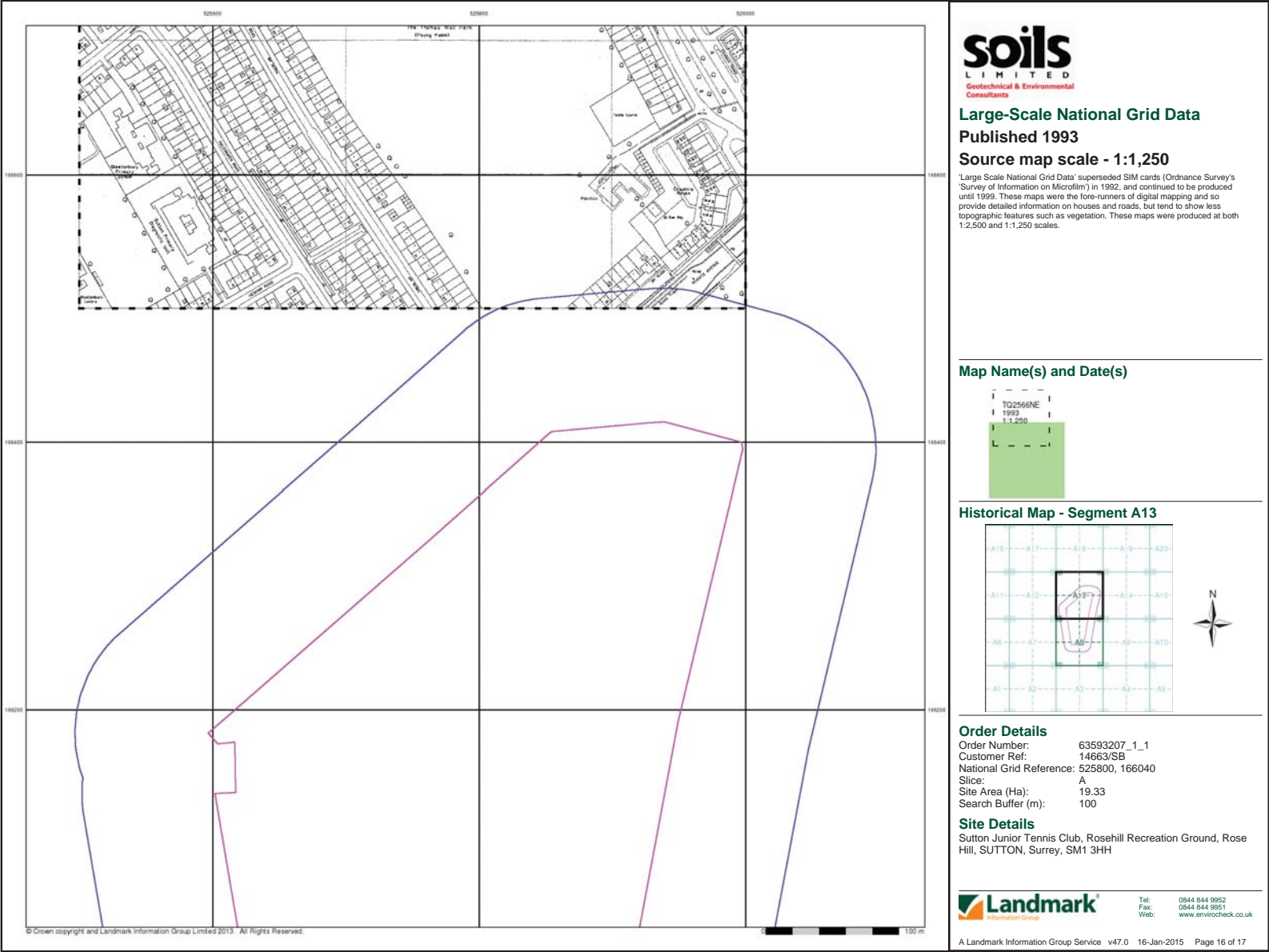
Order Number: 63593207_1_1
Customer Ref: 14663/SB
National Grid Reference: 525800, 166040
Slide: A
Site Area (Ha): 19.33
Search Buffer (m): 100

Site Details

Sutton Junior Tennis Club, Rosehill Recreation Ground, Rose Hill, SUTTON, Surrey, SM1 3HH



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A Landmark Information Group Service v47.0 16-Jan-2015 Page 17 of 17



Appendix B - Landmark Envirocheck Report

Envirocheck® Report:

Datasheet

Order Details:

Order Number:
63593207_1_1

Customer Reference:
14663/SB

National Grid Reference:
525800, 166040

Slice:
A

Site Area (Ha):
19.33

Search Buffer (m):
500

Site Details:

Sutton Junior Tennis Club
Rosehill Recreation Ground, Rose Hill
SUTTON
Surrey
SM1 3HH

Client Details:

Mr N Lambert
Soils Ltd
Newton House
Cross Road
Tadworth
Surrey
KT20 5SR



Contents

Report Section	Page Number
Summary	-
Agency & Hydrological	1
Waste	9
Hazardous Substances	-
Geological	10
Industrial Land Use	16
Sensitive Land Use	20
Data Currency	21
Data Suppliers	26
Useful Contacts	27

Introduction

The Environment Act 1995 has made site sensitivity a key issue, as the legislation pays as much attention to the pathways by which contamination could spread, and to the vulnerable targets of contamination, as it does the potential sources of contamination. For this reason, Landmark's Site Sensitivity maps and Datasheet(s) place great emphasis on statutory data provided by the Environment Agency/Natural Resources Wales and the Scottish Environment Protection Agency; it also incorporates data from Natural England (and the Scottish and Welsh equivalents) and Local Authorities; and highlights hydrogeological features required by environmental and geotechnical consultants. It does not include any information concerning past uses of land. The datasheet is produced by querying the Landmark database to a distance defined by the client from a site boundary provided by the client.

In the attached datasheet the National Grid References (NGRs) are rounded to the nearest 10m in accordance with Landmark's agreements with a number of Data Suppliers.

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Radon Potential dataset Copyright Notice

Information supplied from a joint dataset compiled by The British Geological Survey and Public Health England.

Report Version v49.0



Summary

Data Type	Page Number	On Site	0 to 250m	251 to 500m ('up to 1000m)
Agency & Hydrological				
Contaminated Land Register Entries and Notices				
Discharge Consents				
Enforcement and Prohibition Notices				
Integrated Pollution Controls				
Integrated Pollution Prevention And Control				
Local Authority Integrated Pollution Prevention And Control				
Local Authority Pollution Prevention and Controls	pg 1		4	
Local Authority Pollution Prevention and Control Enforcements				
Nearest Surface Water Feature		Yes		
Pollution Incidents to Controlled Waters	pg 1	1	1	3
Prosecutions Relating to Authorised Processes				
Prosecutions Relating to Controlled Waters				
Registered Radioactive Substances				
River Quality				
River Quality Biology Sampling Points				
River Quality Chemistry Sampling Points				
Substantiated Pollution Incident Register				
Water Abstractions	pg 2			(*2)
Water Industry Act Referrals				
Groundwater Vulnerability	pg 2	Yes	n/a	n/a
Bedrock Aquifer Designations	pg 3	Yes	n/a	n/a
Superficial Aquifer Designations	pg 3	Yes	n/a	n/a
Source Protection Zones	pg 3	2		
Extreme Flooding from Rivers or Sea without Defences	pg 3	Yes	Yes	n/a
Flooding from Rivers or Sea without Defences	pg 5	Yes	Yes	n/a
Areas Benefiting from Flood Defences				n/a
Flood Water Storage Areas				n/a
Flood Defences				n/a
Detailed River Network Lines	pg 5	Yes	Yes	Yes
Detailed River Network Offline Drainage	pg 8		Yes	Yes



Summary

Data Type	Page Number	On Site	0 to 250m	251 to 500m ('up to 1000m)
Waste				
BGS Recorded Landfill Sites				
Historical Landfill Sites	pg 9	1		
Integrated Pollution Control Registered Waste Sites				
Licensed Waste Management Facilities (Landfill Boundaries)				
Licensed Waste Management Facilities (Locations)				
Local Authority Recorded Landfill Sites				
Registered Landfill Sites				
Registered Waste Transfer Sites				
Registered Waste Treatment or Disposal Sites				
Hazardous Substances				
Control of Major Accident Hazards Sites (COMAH)				
Explosive Sites				
Notification of Installations Handling Hazardous Substances (NIHHS)				
Planning Hazardous Substance Consents				
Planning Hazardous Substance Enforcements				
Geological				
BGS 1:625,000 Solid Geology	pg 10	Yes	n/a	n/a
BGS Estimated Soil Chemistry	pg 10	Yes	Yes	Yes
BGS Recorded Mineral Sites	pg 11			1
BGS Urban Soil Chemistry	pg 12	Yes	Yes	Yes
BGS Urban Soil Chemistry Averages	pg 14	Yes		
Brine Compensation Area			n/a	n/a
Coal Mining Affected Areas			n/a	n/a
Mining Instability			n/a	n/a
Man-Made Mining Cavities				
Natural Cavities				
Non Coal Mining Areas of Great Britain				n/a
Potential for Collapsible Ground Stability Hazards	pg 14	Yes		n/a
Potential for Compressible Ground Stability Hazards	pg 14	Yes	Yes	n/a
Potential for Ground Dissolution Stability Hazards				n/a
Potential for Landslide Ground Stability Hazards	pg 14	Yes		n/a
Potential for Running Sand Ground Stability Hazards	pg 14	Yes	Yes	n/a
Potential for Shrinking or Swelling Clay Ground Stability Hazards	pg 15	Yes		n/a
Radon Potential - Radon Affected Areas			n/a	n/a
Radon Potential - Radon Protection Measures			n/a	n/a



Summary

Data Type	Page Number	On Site	0 to 250m	251 to 500m ('up to 1000m)
Industrial Land Use				
Contemporary Trade Directory Entries	pg 16		24	19
Fuel Station Entries	pg 19		2	
Sensitive Land Use				
Areas of Adopted Green Belt				
Areas of Unadopted Green Belt				
Areas of Outstanding Natural Beauty				
Environmentally Sensitive Areas				
Forest Parks				
Local Nature Reserves				
Marine Nature Reserves				
National Nature Reserves				
National Parks				
Nitrate Sensitive Areas				
Nitrate Vulnerable Zones	pg 20	1	1	
Ramsar Sites				
Sites of Special Scientific Interest				
Special Areas of Conservation				
Special Protection Areas				



Agency & Hydrological

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
1	Local Authority Pollution Prevention and Controls Name: Rosehill Service Station Location: 108 Rose Hill, SUTTON, Surrey, SM1 3HB Authority: London Borough of Sutton, Environmental Health Department Permit Reference: LBS34 Dated: Not Supplied Process Type: Local Authority Air Pollution Control Description: PG1/14 Petrol filling station Status: Authorisation revoked Positional Accuracy: Manually positioned to the road within the address or location	A13NE (NE)	8	3	526003 166363
2	Local Authority Pollution Prevention and Controls Name: Cleaners A Whistle Location: 45 The Market, Rosehill, Sutton, Sm1 3he Authority: London Borough of Sutton, Environmental Health Department Permit Reference: LBS 92/EP2 Dated: 14th May 2008 Process Type: Local Authority Pollution Prevention and Control Description: PG6/46 Dry cleaning Status: Permitted Positional Accuracy: Manually positioned to the address or location	A13NE (NE)	132	3	526058 166517
3	Local Authority Pollution Prevention and Controls Name: Sutton Common Engineering Location: R/O 71-73 Sutton Common Road, SUTTON, Surrey, SM1 3HN Authority: London Borough of Sutton, Environmental Health Department Permit Reference: LBS26 Dated: 18th November 1998 Process Type: Local Authority Air Pollution Control Description: PG1/Waste oil burners, less than 0.4MW net rated thermal input Status: Authorisation has varied Positional Accuracy: Manually positioned to the address or location	A8SW (SW)	186	3	525566 165516
4	Local Authority Pollution Prevention and Controls Name: Fairlands Service Station Location: 155 Reigate Avenue, SUTTON, Surrey, SM1 3JR Authority: London Borough of Sutton, Environmental Health Department Permit Reference: LBS38 Dated: 1st March 1999 Process Type: Local Authority Air Pollution Control Description: PG1/14 Petrol filling station Status: Authorised Positional Accuracy: Manually positioned to the address or location	A7NE (W)	205	3	525416 166011
	Nearest Surface Water Feature	A13SW (W)	0	-	525604 166123
5	Pollution Incidents to Controlled Waters Property Type: Not Given Location: SUTTON Authority: Environment Agency, Thames Region Pollutant: Unknown Sewage Note: Confirmed As A Pollution Incident Incident Date: 8th October 1991 Incident Reference: SE910277 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A13SE (N)	0	4	525800 166100
6	Pollution Incidents to Controlled Waters Property Type: Not Given Location: Hurst Court Road Authority: Environment Agency, Thames Region Pollutant: Chemicals - Unknown Note: Confirmed As A Pollution Incident Incident Date: Not Supplied Incident Reference: SE930046 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A8NW (SW)	44	4	525590 165950



Agency & Hydrological

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
7	Pollution Incidents to Controlled Waters Property Type: Not Given Location: SUTTON Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: 30th May 1991 Incident Reference: SE910146 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A7NE (SW)	370	4	525300 165700
8	Pollution Incidents to Controlled Waters Property Type: Not Given Location: Stayton Road Authority: Environment Agency, Thames Region Pollutant: Storm Sewage Note: Not Supplied Incident Date: 26th August 1998 Incident Reference: THSE1998040487 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A3NW (S)	406	4	525500 165300
9	Pollution Incidents to Controlled Waters Property Type: Not Given Location: SUTTON Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: 18th December 1990 Incident Reference: SE900334 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A3NW (S)	497	4	525500 165200
	Water Abstractions Operator: Epsom And St Helier Nhs Trust Licence Number: 28/39/41/0066 Permit Version: 100 Location: St Helier Hospital, Wrythe Lane, Carshalton Authority: Environment Agency, Thames Region Abstraction: Hospitals: General Use (Medium Loss) Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): 209 Yearly Rate (m3): 76328 Details: St Helier Hospital, Wrythe Lane, Carshalton, Surrey Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 10th January 1992 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A14SE (E)	557	4	526500 166100
	Water Abstractions Operator: Epsom And St. Helier University Hospitals Nhs Trust Licence Number: 28/39/41/0066 Permit Version: 101 Location: St Helier Hospital, Wrythe Lane, Carshalton Authority: Environment Agency, Thames Region Abstraction: Hospitals: General Use (Medium Loss) Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: St Helier Hospital, Wrythe Lane, Carshalton, Surrey Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 10th July 2014 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A14SE (E)	640	4	526590 166120
	Groundwater Vulnerability Soil Classification: Soils of High Leaching Potential (U) - Soil information for restored mineral workings and urban areas is based on fewer observations than elsewhere. A worst case vulnerability classification (H) assumed, until proved otherwise Map Sheet: Sheet 39 West London Scale: 1:100,000	A13SE (S)	0	4	525803 166041



Agency & Hydrological

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Groundwater Vulnerability Soil Classification: Not classified Map Sheet: Sheet 39 West London Scale: 1:100,000	A13SE (NE)	0	4	525888 166152
	Drift Deposits None				
	Bedrock Aquifer Designations Aquifer Designation: Unproductive Strata	A13SE (S)	0	2	525803 166041
	Superficial Aquifer Designations Aquifer Designation: Secondary Aquifer - Undifferentiated	A13SE (S)	0	2	525803 166041
10	Source Protection Zones Name: Various Source: Environment Agency, Head Office Reference: Not Supplied Type: Zone II (Outer Protection Zone): Either 25% of the source area or a 400 day travel time whichever is greater.	A8NW (S)	0	4	525795 166014
11	Source Protection Zones Name: Various Source: Environment Agency, Head Office Reference: Not Supplied Type: Zone III (Total Catchment): The total area needed to support the discharge from the protected groundwater source.	A13SE (S)	0	4	525803 166041
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models and Fluvial Events Boundary Accuracy: As Supplied	A8NW (SW)	0	4	525675 165916
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A8NW (W)	0	4	525738 166027
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Events Boundary Accuracy: As Supplied	A8NW (W)	37	4	525587 166000
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A8NW (SW)	37	4	525604 165906
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models and Fluvial Events Boundary Accuracy: As Supplied	A8NW (W)	38	4	525587 165984
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Events Boundary Accuracy: As Supplied	A8NW (W)	38	4	525587 165981
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A13SW (W)	38	4	525571 166093
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A13SW (W)	39	4	525558 166120
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A13SW (W)	43	4	525569 166074
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Events Boundary Accuracy: As Supplied	A13SW (W)	45	4	525567 166082
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Events Boundary Accuracy: As Supplied	A13SW (W)	46	4	525560 166111

Order Number: 63593207_1_1 Date: 16-Jan-2015 rpr_ec_datasheet v49.0 A Landmark Information Group Service Page 3 of 27



Agency & Hydrological

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Events Boundary Accuracy: As Supplied	A13SW (W)	54	4	525558 166055
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A8NW (W)	54	4	525569 166017
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models and Fluvial Events Boundary Accuracy: As Supplied	A13SW (NW)	56	4	525542 166170
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Events Boundary Accuracy: As Supplied	A13SW (W)	64	4	525538 166127
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A13SW (W)	72	4	525531 166127
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Events Boundary Accuracy: As Supplied	A13SW (NW)	74	4	525528 166157
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Events Boundary Accuracy: As Supplied	A13SW (W)	75	4	525528 166117
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A13SW (W)	79	4	525523 166147
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Events Boundary Accuracy: As Supplied	A13SW (W)	82	4	525528 166049
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A13SW (W)	85	4	525519 166117
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Events Boundary Accuracy: As Supplied	A13SW (W)	87	4	525515 166147
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Events Boundary Accuracy: As Supplied	A13SW (NW)	138	4	525506 166287
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A13SW (NW)	143	4	525503 166291
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Events Boundary Accuracy: As Supplied	A13SW (NW)	156	4	525497 166302
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A13SW (NW)	165	4	525462 166277
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A13SW (NW)	173	4	525507 166334

Order Number: 63593207_1_1 Date: 16-Jan-2015 rpr_ec_datasheet v49.0 A Landmark Information Group Service Page 4 of 27



Agency & Hydrological

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models and Fluvial Events Boundary Accuracy: As Supplied	A13SW (NW)	176	4	525508 166338
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Events Boundary Accuracy: As Supplied	A13SW (NW)	176	4	525509 166339
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models and Fluvial Events Boundary Accuracy: As Supplied	A13SW (NW)	180	4	525506 166342
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Events Boundary Accuracy: As Supplied	A13SW (NW)	185	4	525504 166346
	Flooding from Rivers or Sea without Defences Type: Extent of Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A8NE (S)	0	4	525832 165919
	Flooding from Rivers or Sea without Defences Type: Extent of Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A8NE (S)	0	4	525803 165955
	Flooding from Rivers or Sea without Defences Type: Extent of Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A8NW (W)	37	4	525587 165984
	Flooding from Rivers or Sea without Defences Type: Extent of Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A13SW (NW)	55	4	525542 166169
	Flooding from Rivers or Sea without Defences Type: Extent of Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A13SW (NW)	173	4	525507 166334
	Areas Benefiting from Flood Defences None				
	Flood Water Storage Areas None				
	Flood Defences None				
12	Detailed River Network Lines River Type: Extended Culvert (greater than 50m) River Name: Not Supplied Hydrographic Area: D006 River Flow Type: Primary Flow Path River Surface Level: Below Surface Drain Feature: Not a Drain Flood Risk: Currently Undefined Management Status: Not Supplied Water Course: Not Supplied Name: Not Supplied Reference: Not Supplied	A8NW (S)	0	4	525784 165924
13	Detailed River Network Lines River Type: Secondary River River Name: Not Supplied Hydrographic Area: D006 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Not a Drain Flood Risk: Currently Undefined Management Status: Not Supplied Water Course: Not Supplied Name: Not Supplied Reference: Not Supplied	A8NW (S)	0	4	525789 165923



Agency & Hydrological

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
14	Detailed River Network Lines River Type: Secondary River River Name: Not Supplied Hydrographic Area: D006 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Not a Drain Flood Risk: Other Rivers Management Status: Not Supplied Water Course: Not Supplied Name: Not Supplied Reference: Not Supplied	A8NE (SE)	0	4	525894 165914
15	Detailed River Network Lines River Type: Extended Culvert (greater than 50m) River Name: Not Supplied Hydrographic Area: D006 River Flow Type: Primary Flow Path River Surface Level: Below Surface Drain Feature: Not a Drain Flood Risk: Currently Undefined Management Status: Not Supplied Water Course: Pyl Brook (East Branch) Name: 40PE Reference: Not Supplied	A8NE (SE)	0	4	525894 165914
16	Detailed River Network Lines River Type: Primary River River Name: Not Supplied Hydrographic Area: D006 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Not a Drain Flood Risk: Flood Risk Management Indicative/Statutory Main River Management Status: Not Supplied Water Course: Pyl Brook (East Branch) Name: 40PE Reference: Not Supplied	A8NW (SW)	1	4	525639 165915
17	Detailed River Network Lines River Type: Tertiary River River Name: Drain Hydrographic Area: D006 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Drain (ditch, Reen, Rhyne, Drain) Flood Risk: Other Rivers Management Status: Not Supplied Water Course: Not Supplied Name: Not Supplied Reference: Not Supplied	A8NW (SW)	38	4	525602 165905
18	Detailed River Network Lines River Type: Primary River River Name: Not Supplied Hydrographic Area: D006 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Not a Drain Flood Risk: Flood Risk Management Indicative/Statutory Main River Management Status: Not Supplied Water Course: Pyl Brook (East Branch) Name: 40PE Reference: Not Supplied	A8NW (W)	39	4	525587 165983
19	Detailed River Network Lines River Type: Tertiary River River Name: Not Supplied Hydrographic Area: D006 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Not a Drain Flood Risk: Other Rivers Management Status: Not Supplied Water Course: Not Supplied Name: Not Supplied Reference: Not Supplied	A13SW (W)	42	4	525566 166102



Agency & Hydrological

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
20	Detailed River Network Lines River Type: Primary River River Name: Not Supplied Hydrographic Area: D006 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Not a Drain Flood Risk: Flood Risk Management Indicative/Statutory Main River Management Status: Water Course: Pyl Brook (East Branch) Name: Water Course: 40PE Reference:	A13SW (W)	49	4	525558 166105
21	Detailed River Network Lines River Type: Tertiary River River Name: Drain Hydrographic Area: D006 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Currently Undefined Flood Risk: Flood Risk Management Indicative/Statutory Main River Management Status: Water Course: Pyl Brook (East Branch) Name: Water Course: 40PE Reference:	A8NE (SE)	52	4	525952 165915
22	Detailed River Network Lines River Type: Tertiary River River Name: Not Supplied Hydrographic Area: D006 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Not a Drain Flood Risk: Flood Risk Management Indicative/Statutory Main River Management Status: Water Course: Pyl Brook (East Branch) Name: Water Course: 40PE Reference:	A13SW (NW)	63	4	525535 166190
23	Detailed River Network Lines River Type: Tertiary River River Name: Drain Hydrographic Area: D006 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Drain (ditch, Reen, Rhyne, Drain) Flood Risk: Other Rivers Management Status: Water Course: Not Supplied Name: Water Course: Not Supplied Reference:	A8NE (SE)	80	4	525963 165800
24	Detailed River Network Lines River Type: Primary River River Name: Not Supplied Hydrographic Area: D006 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Not a Drain Flood Risk: Flood Risk Management Indicative/Statutory Main River Management Status: Water Course: Pyl Brook (East Branch) Name: Water Course: 40PE Reference:	A13SW (NW)	98	4	525522 166247
25	Detailed River Network Lines River Type: Extended Culvert (greater than 50m) River Name: Not Supplied Hydrographic Area: D006 River Flow Type: Primary Flow Path River Surface Level: Below Surface Drain Feature: Not a Drain Flood Risk: Currently Undefined Management Status: Water Course: Pyl Brook (East Branch) Name: Water Course: 40PE Reference:	A8NE (SE)	180	4	526082 165913



Agency & Hydrological

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
26	Detailed River Network Lines River Type: Extended Culvert (greater than 50m) River Name: Not Supplied Hydrographic Area: D006 River Flow Type: Primary Flow Path River Surface Level: Below Surface Drain Feature: Not a Drain Flood Risk: Currently Undefined Management Status: Water Course: Pyl Brook (East Branch) Name: Water Course: 40PE Reference:	A9NW (SE)	309	4	526203 165855
27	Detailed River Network Lines River Type: Extended Culvert (greater than 50m) River Name: Not Supplied Hydrographic Area: D006 River Flow Type: Primary Flow Path River Surface Level: Below Surface Drain Feature: Not a Drain Flood Risk: Other Rivers Management Status: Water Course: Not Supplied Name: Water Course: Not Supplied Reference:	A9NW (E)	453	4	526353 165883
28	Detailed River Network Offline Drainage River Type: Tertiary River Hydrographic Area: D006	A13SE (NE)	151	4	526123 166269
29	Detailed River Network Offline Drainage River Type: Tertiary River Hydrographic Area: D006	A13SE (E)	159	4	526086 166058
30	Detailed River Network Offline Drainage River Type: Tertiary River Hydrographic Area: D006	A13SE (E)	165	4	526091 166059
31	Detailed River Network Offline Drainage River Type: Tertiary River Hydrographic Area: D006	A9NW (E)	278	4	526188 165963
32	Detailed River Network Offline Drainage River Type: Tertiary River Hydrographic Area: D006	A14SW (E)	376	4	526317 166114
33	Detailed River Network Offline Drainage River Type: Tertiary River Hydrographic Area: D006	A18SW (N)	416	4	525633 166760



Waste

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
34	Historical Landfill Sites Licence Holder: London Borough of Sutton Location: Rosehill, Sutton, London Name: Rosehill Park Operator Location: Not Supplied Boundary Accuracy: As Supplied Provider Reference: EAHLD11312 First Input Date: Not Supplied Last Input Date: 31st December 1950 Specified Waste: Deposited Waste included Industrial, Commercial and Household Waste Type: EA Waste Ref: 0 Regis Ref: Not Supplied WRC Ref: 58700003 BGS Ref: Not Supplied Other Ref: 8SU003, SUT003, 5870/0034	A13SE (S)	0	4	525803 166041
	Local Authority Landfill Coverage Name: London Borough of Sutton - Has supplied landfill data		0	3	525803 166041
	Local Authority Landfill Coverage Name: London Borough of Merton - Has no landfill data to supply		351	8	526157 166711



Geological

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS 1:625,000 Solid Geology Description: London Clay	A13SE (S)	0	2	525803 166041
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: London Arsenic: no data Concentration: no data Cadmium: no data Concentration: no data Chromium: no data Concentration: no data Lead Concentration: no data Nickel: no data Concentration: no data	A8NW (W)	0	5	525580 166000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: London Arsenic: no data Concentration: no data Cadmium: no data Concentration: no data Chromium: no data Concentration: no data Lead Concentration: no data Nickel: no data Concentration: no data	A8NE (S)	0	5	525803 166000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: London Arsenic: no data Concentration: no data Cadmium: no data Concentration: no data Chromium: no data Concentration: no data Lead Concentration: no data Nickel: no data Concentration: no data	A13SE (S)	0	5	525803 166041
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: London Arsenic: no data Concentration: no data Cadmium: no data Concentration: no data Chromium: no data Concentration: no data Lead Concentration: no data Nickel: no data Concentration: no data	A13SE (N)	0	5	525846 166158
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: London Arsenic: no data Concentration: no data Cadmium: no data Concentration: no data Chromium: no data Concentration: no data Lead Concentration: no data Nickel: no data Concentration: no data	A13SE (E)	3	5	526000 166048
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: London Arsenic: no data Concentration: no data Cadmium: no data Concentration: no data Chromium: no data Concentration: no data Lead Concentration: no data Nickel: no data Concentration: no data	A13SW (W)	33	5	525579 166039



Geological

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: London Concentration: no data Cadmium: no data Chromium: no data Lead Concentration: no data Nickel: no data	A13SE (E)	77	5	526000 166041
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: London Concentration: no data Cadmium: no data Chromium: no data Lead Concentration: no data Nickel: no data	A8NE (E)	86	5	526000 166000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: London Concentration: no data Cadmium: no data Chromium: no data Lead Concentration: no data Nickel: no data	A8NE (E)	104	5	526018 166000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: London Concentration: no data Cadmium: no data Chromium: no data Lead Concentration: no data Nickel: no data	A13NW (NW)	250	5	525546 166469
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: London Concentration: no data Cadmium: no data Chromium: no data Lead Concentration: no data Nickel: no data	A7SE (SW)	479	5	525272 165377
35	BGS Recorded Mineral Sites Site Name: Benhilton Brick Field Location: Benhilton, Sutton, Surrey Source: British Geological Survey, National Geoscience Information Service Reference: 164253 Type: Opencast Status: Closed Operator: Unknown Operator Operator Location: Unknown Operator Periodic Type: Palaeogene Geology: London Clay Formation Commodity: Common Clay and Shale Positional Accuracy: Located by supplier to within 10m	A3NE (S)	498	2	525990 165180



Geological

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 525750, 166222 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured: 13.00 mg/kg Concentration: Cadmium Measured: 0.30 mg/kg Chromium Measured: 76.00 mg/kg Concentration: Lead Measured: 133.00 mg/kg Concentration: Nickel Measured: 23.00 mg/kg	A13SW (N)	0	2	525750 166222
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 525748, 165710 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured: 13.00 mg/kg Concentration: Cadmium Measured: 0.30 mg/kg Chromium Measured: 82.00 mg/kg Concentration: Lead Measured: 88.00 mg/kg Concentration: Nickel Measured: 20.00 mg/kg	A8NW (S)	0	2	525748 165710
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 526170, 166200 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured: 19.00 mg/kg Concentration: Cadmium Measured: 0.30 mg/kg Chromium Measured: 111.00 mg/kg Concentration: Lead Measured: 129.00 mg/kg Concentration: Nickel Measured: 29.00 mg/kg	A14SW (NE)	213	2	526170 166200
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 526194, 165756 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured: 14.00 mg/kg Concentration: Cadmium Measured: 0.80 mg/kg Chromium Measured: 72.00 mg/kg Concentration: Lead Measured: 175.00 mg/kg Concentration: Nickel Measured: 29.00 mg/kg	A8NW (SE)	316	2	526194 165756
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 525306, 166312 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured: 17.00 mg/kg Concentration: Cadmium Measured: 1.10 mg/kg Chromium Measured: 80.00 mg/kg Concentration: Lead Measured: 241.00 mg/kg Concentration: Nickel Measured: 27.00 mg/kg	A12SE (NW)	319	2	525306 166312



Geological

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 525753, 166753 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured: 13.00 mg/kg Concentration: Cadmium Measured: 0.30 mg/kg Concentration: Chromium Measured: 57.00 mg/kg Concentration: Lead Measured: 157.00 mg/kg Concentration: Nickel Measured: 20.00 mg/kg Concentration:	A18SW (N)	360	2	525753 166753
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 525254, 165749 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured: 16.00 mg/kg Concentration: Cadmium Measured: 0.80 mg/kg Concentration: Chromium Measured: 75.00 mg/kg Concentration: Lead Measured: 233.00 mg/kg Concentration: Nickel Measured: 35.00 mg/kg Concentration:	A7NE (SW)	408	2	525254 165749
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 525745, 165180 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured: 19.00 mg/kg Concentration: Cadmium Measured: 0.30 mg/kg Concentration: Chromium Measured: 80.00 mg/kg Concentration: Lead Measured: 214.00 mg/kg Concentration: Nickel Measured: 26.00 mg/kg Concentration:	A3NW (S)	482	2	525745 165180
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 526264, 166810 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured: 12.00 mg/kg Concentration: Cadmium Measured: 0.30 mg/kg Concentration: Chromium Measured: 63.00 mg/kg Concentration: Lead Measured: 100.00 mg/kg Concentration: Nickel Measured: 20.00 mg/kg Concentration:	A19SW (NE)	490	2	526264 166810



Geological

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Urban Soil Chemistry Averages Source: British Geological Survey, National Geoscience Information Service Sample Area: London Count Id: 7189 Arsenic Minimum: 1.00 mg/kg Concentration: Arsenic Average: 17.00 mg/kg Concentration: Arsenic Maximum: 161.00 mg/kg Concentration: Cadmium Minimum: 0.30 mg/kg Concentration: Cadmium Average: 0.90 mg/kg Concentration: Cadmium Maximum: 165.20 mg/kg Concentration: Chromium Minimum: 13.00 mg/kg Concentration: Chromium Average: 79.00 mg/kg Concentration: Chromium Maximum: 2094.00 mg/kg Concentration: Lead Minimum: 11.00 mg/kg Concentration: Lead Average: 280.00 mg/kg Concentration: Lead Maximum: 10000.00 mg/kg Concentration: Nickel Minimum: 2.00 mg/kg Concentration: Nickel Average: 28.00 mg/kg Concentration: Nickel Maximum: 506.00 mg/kg Concentration:	A13SE (S)	0	2	525803 166041
	Coal Mining Affected Areas In an area that might not be affected by coal mining				
	Non Coal Mining Areas of Great Britain No Hazard				
	Potential for Collapsible Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13SE (S)	0	2	525803 166041
	Potential for Compressible Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13SE (S)	0	2	525803 166041
	Potential for Compressible Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13SW (W)	0	2	525687 166073
	Potential for Compressible Ground Stability Hazards Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	A8SW (S)	232	2	525663 165433
	Potential for Ground Dissolution Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13SE (S)	0	2	525803 166041
	Potential for Landslide Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13SE (S)	0	2	525803 166041
	Potential for Running Sand Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13SE (S)	0	2	525803 166041
	Potential for Running Sand Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13SE (N)	0	2	525846 166158
	Potential for Running Sand Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13SW (NW)	186	2	525516 166359
	Potential for Running Sand Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A8SW (S)	232	2	525663 165433



Geological

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	A13SE (S)	0	2	525803 166041
	Radon Potential - Radon Protection Measures Protection Measure: No radon protective measures are necessary in the construction of new dwellings or extensions Source: British Geological Survey, National Geoscience Information Service	A13SE (S)	0	2	525803 166041
	Radon Potential - Radon Affected Areas Affected Area: The property is in a lower probability radon area, as less than 1% of homes are above the action level Source: British Geological Survey, National Geoscience Information Service	A13SE (S)	0	2	525803 166041



Industrial Land Use

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
36	Contemporary Trade Directory Entries Name: London Cash Registers Location: Flat 21, Wheatcroft Court, Cleve Way, Sutton, Surrey, SM1 3TT Classification: Cash Registers & Check-Out Equipment Status: Inactive Positional Accuracy: Automatically positioned to the address	A13NE (N)	8	-	525949 166420
37	Contemporary Trade Directory Entries Name: Merton Timber Location: 102, Rose Hill, Sutton, Surrey, SM1 3HB Classification: Builders' Merchants Status: Inactive Positional Accuracy: Automatically positioned to the address	A13SE (NE)	28	-	526020 166369
37	Contemporary Trade Directory Entries Name: Merton Timber Location: 102, Rose Hill, Sutton, Surrey, SM1 3HB Classification: Builders' Merchants Status: Inactive Positional Accuracy: Automatically positioned to the address	A13SE (NE)	28	-	526020 166369
37	Contemporary Trade Directory Entries Name: Merton Timber Location: 102, Rose Hill, Sutton, Surrey, SM1 3HB Classification: Builders' Merchants Status: Inactive Positional Accuracy: Automatically positioned to the address	A13SE (NE)	28	-	526020 166369
37	Contemporary Trade Directory Entries Name: Bp Express Shopping Location: 108, Rose Hill, Sutton, Surrey, SM1 3HB Classification: Petrol Filling Stations - 24 Hour Status: Inactive Positional Accuracy: Automatically positioned to the address	A13NE (NE)	50	-	526047 166391
38	Contemporary Trade Directory Entries Name: Timberwise (UK) Plc Location: 6, Rose Hill, Sutton, Surrey, SM1 3EU Classification: Damp & Dry Rot Control Status: Inactive Positional Accuracy: Automatically positioned to the address	A8NE (S)	31	-	525907 165766
38	Contemporary Trade Directory Entries Name: Rose Hill Park Garage Ltd Location: 2a, Rose Hill, Sutton, Surrey, SM1 3EU Classification: Mot Testing Centres Status: Active Positional Accuracy: Automatically positioned to the address	A8NE (S)	39	-	525910 165737
39	Contemporary Trade Directory Entries Name: Technorizon Systems (UK) Ltd Location: 58, Angel Hill, Sutton, Surrey, SM1 3EW Classification: Car Washing & Polishing Equipment & Supplies Status: Inactive Positional Accuracy: Automatically positioned to the address	A8SE (S)	34	-	525890 165651
40	Contemporary Trade Directory Entries Name: D Parsons Location: 59, The Market, Rosehill, Sutton, Surrey, SM1 3HE Classification: Garage Services Status: Active Positional Accuracy: Automatically positioned to the address	A13NE (NE)	65	-	526039 166449
40	Contemporary Trade Directory Entries Name: C J Autos Location: 55a, The Market, Rosehill, Sutton, Surrey, SM1 3HE Classification: Car Body Repairs Status: Active Positional Accuracy: Automatically positioned to the address	A13NE (NE)	81	-	526044 166466
40	Contemporary Trade Directory Entries Name: Willsons Motors Location: 55a, The Market, Rosehill, Sutton, Surrey, SM1 3HE Classification: Car Body Repairs Status: Active Positional Accuracy: Automatically positioned to the address	A13NE (NE)	81	-	526044 166466
40	Contemporary Trade Directory Entries Name: Willsons Motors Location: 55a, The Market, Rosehill, Sutton, Surrey, SM1 3HE Classification: Car Body Repairs Status: Inactive Positional Accuracy: Automatically positioned to the address	A13NE (NE)	81	-	526044 166466



Industrial Land Use

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
41	Contemporary Trade Directory Entries Name: Jilles Helping Angels Ltd Location: 1, Rose Hill Park West, Sutton, Surrey, SM1 3LA Classification: Cleaning Services - Domestic Status: Inactive Positional Accuracy: Automatically positioned to the address	A13SE (E)	70	-	525999 166080
42	Contemporary Trade Directory Entries Name: Cleaners A Whistle Location: 45, The Market, Rosehill, Sutton, Surrey, SM1 3HE Classification: Dry Cleaners Status: Active Positional Accuracy: Automatically positioned to the address	A13NE (NE)	132	-	526058 166517
43	Contemporary Trade Directory Entries Name: Southside Commercial Location: 54, Sutton Common Road, Sutton, Surrey, SM1 3HY Classification: Commercial Vehicle Dealers Status: Active Positional Accuracy: Automatically positioned to the address	A8SW (S)	144	-	525618 165534
43	Contemporary Trade Directory Entries Name: Owens Garage Ltd Location: 54, Sutton Common Road, Sutton, Surrey, SM1 3HY Classification: Car Dealers Status: Inactive Positional Accuracy: Automatically positioned to the address	A8SW (S)	144	-	525618 165534
44	Contemporary Trade Directory Entries Name: Westwood Folders & Printers Ltd Location: 30, Waverley Avenue, Sutton, Surrey, SM1 3JY Classification: Printers Status: Inactive Positional Accuracy: Automatically positioned to the address	A8SE (SE)	172	-	526016 165594
45	Contemporary Trade Directory Entries Name: M J Offord Location: 18, Rantbury Road, Sutton, Surrey, SM1 3JB Classification: French Polishing Status: Inactive Positional Accuracy: Automatically positioned to the address	A8NW (SW)	184	-	525471 165809
46	Contemporary Trade Directory Entries Name: Sutton Common Engineering Ltd Location: 71-73, Sutton Common Road, Sutton, Surrey, SM1 3HN Classification: Garage Services Status: Inactive Positional Accuracy: Automatically positioned to the address	A8SW (SW)	186	-	525569 165514
47	Contemporary Trade Directory Entries Name: Valco Location: 14, The Market, Wrythe Lane, Carshalton, Surrey, SM5 1AG Classification: Washing Machines - Servicing & Repairs Status: Active Positional Accuracy: Manually positioned to the address or location	A14NW (NE)	202	-	526187 166425
48	Contemporary Trade Directory Entries Name: Star Service Stations Location: 55, Reigate Avenue, Sutton, Surrey, SM1 3JR Classification: Petrol Filling Stations Status: Inactive Positional Accuracy: Manually positioned to the address or location	A7NE (W)	205	-	525416 166011
49	Contemporary Trade Directory Entries Name: Hayden Charles Location: 11, Fairlands Avenue, Sutton, Surrey, SM1 3JE Classification: Carpet, Curtain & Upholstery Cleaners Status: Active Positional Accuracy: Automatically positioned to the address	A7NE (W)	213	-	525425 165910
50	Contemporary Trade Directory Entries Name: Helping Angels Homecare Ltd Location: 50, Rosehill Avenue, Sutton, Surrey, SM1 3HG Classification: Cleaning Services - Domestic Status: Inactive Positional Accuracy: Automatically positioned to the address	A14SW (NE)	215	-	526209 166357
51	Contemporary Trade Directory Entries Name: Bright & Breezy Location: 139, Sutton Common Road, Sutton, Surrey, SM1 3HP Classification: Ironing & Home Laundry Services Status: Inactive Positional Accuracy: Automatically positioned to the address	A7SE (SW)	229	-	525443 165694

Order Number: 63593207_1_1 Date: 16-Jan-2015 rpr_ec_datasheet v49.0 A Landmark Information Group Service Page 17 of 27



Industrial Land Use

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
52	Contemporary Trade Directory Entries Name: Chysab Laundrette Location: 3, The Market, Wrythe Lane, Carshalton, Surrey, SM5 1AG Classification: Laundries & Laundrettes Status: Inactive Positional Accuracy: Automatically positioned to the address	A14SW (NE)	262	-	526259 166375
53	Contemporary Trade Directory Entries Name: Fridge Cool Location: 23, Lynesscote Gardens, Sutton, Surrey, SM1 2PN Classification: Refrigerators & Freezers - Servicing & Repairs Status: Active Positional Accuracy: Automatically positioned to the address	A7SE (SW)	271	-	525412 165612
54	Contemporary Trade Directory Entries Name: Harlequin Motor Co Location: 15-18, Rosehill Court Parade, St. Helier Avenue, Morden, Surrey, SM4 6JS Classification: Car Dealers Status: Active Positional Accuracy: Automatically positioned to the address	A13NE (NE)	276	-	526082 166662
54	Contemporary Trade Directory Entries Name: Ringhart (UK) Ltd Location: 10-12, Rosehill Court Parade, St. Helier Avenue, Morden, Surrey, SM4 6JT Classification: Textile Manufacturing Status: Inactive Positional Accuracy: Manually positioned to the address or location	A13NE (NE)	293	-	526083 166680
54	Contemporary Trade Directory Entries Name: Cleaner Wash Location: 10-12, Rosehill Court Parade, St. Helier Avenue, Morden, Surrey, SM4 6JS Classification: Laundries & Laundrettes Status: Inactive Positional Accuracy: Manually positioned to the address or location	A13NE (NE)	306	-	526087 166692
55	Contemporary Trade Directory Entries Name: Highland Services Location: 44, Halesowen Road, Morden, Surrey, SM4 6NG Classification: Cleaning Services - Commercial Status: Inactive Positional Accuracy: Automatically positioned to the address	A13NW (N)	283	-	525615 166574
55	Contemporary Trade Directory Entries Name: Quassios Ltd Location: 12, Iona Close, Morden, Surrey, SM4 6HR Classification: Art Restoration & Picture Cleaning Status: Inactive Positional Accuracy: Automatically positioned to the address	A13NW (NW)	317	-	525574 166583
56	Contemporary Trade Directory Entries Name: Simon Emmett Location: 33, Stavordale Road, Carshalton, Surrey, SM5 1BJ Classification: Carpet, Curtain & Upholstery Cleaners Status: Active Positional Accuracy: Automatically positioned to the address	A14NW (NE)	300	-	526237 166579
57	Contemporary Trade Directory Entries Name: Danday Services Location: 71, Rosehill Park West, Sutton, Surrey, SM1 3LA Classification: Commercial Cleaning Services Status: Active Positional Accuracy: Automatically positioned to the address	A8NW (E)	329	-	526227 166877
58	Contemporary Trade Directory Entries Name: Tudor Rose Location: 21, Halesowen Road, Morden, Surrey, SM4 6NG Classification: Pest & Vermin Control Status: Inactive Positional Accuracy: Automatically positioned to the address	A13NW (N)	336	-	525614 166644
59	Contemporary Trade Directory Entries Name: Caremaster Location: 240, Sutton Common Road, Sutton, Surrey, SM3 9PW Classification: Carpet, Curtain & Upholstery Cleaners Status: Inactive Positional Accuracy: Automatically positioned to the address	A12SE (W)	338	-	525273 166059
59	Contemporary Trade Directory Entries Name: G & C Concrete Ltd Location: 256, Sutton Common Road, Sutton, Surrey, SM3 9PW Classification: Concrete & Mortar Ready Mixed Status: Active Positional Accuracy: Automatically positioned to the address	A12SE (W)	348	-	525256 166102

Order Number: 63593207_1_1 Date: 16-Jan-2015 rpr_ec_datasheet v49.0 A Landmark Information Group Service Page 18 of 27



Industrial Land Use

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
60	Contemporary Trade Directory Entries Name: First Call Location: 10, Kinross Road, Carshalton, Surrey, SM5 1BH Classification: Pest & Vermin Control Status: Inactive Positional Accuracy: Automatically positioned to the address	A14NW (NE)	342	-	526316 166524
61	Contemporary Trade Directory Entries Name: Sutton Carpetcare Location: 290, Sutton Common Road, Sutton, Surrey, SM3 9PW Classification: Carpet, Curtain & Upholstery Cleaners Status: Inactive Positional Accuracy: Automatically positioned to the address	A12SE (W)	391	-	525206 166200
62	Contemporary Trade Directory Entries Name: The Best Cleaners Location: 47, St. Benets Grove, Carshalton, Surrey, SM5 1AY Classification: Carpet, Curtain & Upholstery Cleaners Status: Active Positional Accuracy: Automatically positioned to the address	A14NW (NE)	418	-	526355 166614
63	Contemporary Trade Directory Entries Name: Sutton Cemetery Location: Alcorn Ct, Sutton, Surrey, SM3 9PX Classification: Cemeteries & Crematoria Status: Active Positional Accuracy: Manually positioned to the address or location	A7NE (W)	473	-	525173 165942
64	Contemporary Trade Directory Entries Name: Queen Mary'S Hospital For Children Location: St. Heller Hospital, Wrythe Lane, Carshalton, Surrey, SM5 1AA Classification: Hospitals Status: Active Positional Accuracy: Manually positioned to the address or location	A14SW (E)	482	-	526420 166087
65	Contemporary Trade Directory Entries Name: All Scrap Location: 307, Sutton Common Road, Sutton, Surrey, SM3 9NH Classification: Scrap Metal Merchants Status: Inactive Positional Accuracy: Automatically positioned to the address	A12SW (W)	494	-	525112 166275
66	Contemporary Trade Directory Entries Name: We-Buy-All-Cars.Com Location: 117a, Love Lane, Morden, Surrey, SM4 6LS Classification: Car Dealers Status: Active Positional Accuracy: Manually positioned to the address or location	A12NE (NW)	499	-	525360 166638
67	Fuel Station Entries Name: Rosehill Filling Station Location: 106 Rosehill Road, Rose Hill Ave, Rosehill, SUTTON, Surrey, SM1 3HB Brand: Obsolete Premises Type: Not Applicable Status: Obsolete Positional Accuracy: Automatically positioned to the address	A13NE (NE)	50	-	526047 166391
68	Fuel Station Entries Name: Star Fairlands Location: 155 Reigate Avenue, Rosehill, SUTTON, Surrey, SM1 3JR Brand: Obsolete Premises Type: Not Applicable Status: Obsolete Positional Accuracy: Manually positioned to the address or location	A7NE (W)	205	-	525416 166011



Sensitive Land Use

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
69	Nitrate Vulnerable Zones Name: Not Supplied Description: Surface Water Source: Department for Environment, Food and Rural Affairs (DEFRA - formerly FRCA)	A13SE (S)	0	7	525803 166041
70	Nitrate Vulnerable Zones Name: Not Supplied Description: Surface Water Source: Department for Environment, Food and Rural Affairs (DEFRA - formerly FRCA)	A13NE (N)	182	7	525900 166600



Data Currency

Agency & Hydrological	Version	Update Cycle
Contaminated Land Register Entries and Notices London Borough of Sutton - Environmental Health Department Royal Borough of Kingston upon Thames - Environmental Health Department Reigate And Banstead Borough Council - Environmental Health Department London Borough of Merton - Environmental Health Department Epsom And Ewell Borough Council - Environmental Health Department	April 2013 April 2013 January 2015 June 2013 May 2014	Annual Rolling Update Annual Rolling Update Annual Rolling Update Annual Rolling Update Annual Rolling Update
Discharge Consents Environment Agency - Thames Region	November 2014	Quarterly
Enforcement and Prohibition Notices Environment Agency - Thames Region	March 2013	As notified
Integrated Pollution Controls Environment Agency - Thames Region	October 2008	Not Applicable
Integrated Pollution Prevention And Control Environment Agency - Thames Region	November 2014	Quarterly
Local Authority Integrated Pollution Prevention And Control Royal Borough of Kingston upon Thames - Environmental Health Department Reigate And Banstead Borough Council - Environmental Health Department Epsom And Ewell Borough Council - Environmental Health Department London Borough of Sutton - Environmental Health Department London Borough of Merton - Environmental Health Department	December 2013 March 2014 October 2014 September 2013 September 2014	Annual Rolling Update Annual Rolling Update Annual Rolling Update Annual Rolling Update Annual Rolling Update
Local Authority Pollution Prevention and Controls Royal Borough of Kingston upon Thames - Environmental Health Department Reigate And Banstead Borough Council - Environmental Health Department Epsom And Ewell Borough Council - Environmental Health Department London Borough of Sutton - Environmental Health Department London Borough of Merton - Environmental Health Department	December 2013 March 2014 October 2014 September 2013 September 2014	Annual Rolling Update Annual Rolling Update Annual Rolling Update Annual Rolling Update Annual Rolling Update
Local Authority Pollution Prevention and Control Enforcements Royal Borough of Kingston upon Thames - Environmental Health Department Reigate And Banstead Borough Council - Environmental Health Department Epsom And Ewell Borough Council - Environmental Health Department London Borough of Sutton - Environmental Health Department London Borough of Merton - Environmental Health Department	December 2013 March 2014 October 2014 September 2013 September 2014	Annual Rolling Update Annual Rolling Update Annual Rolling Update Annual Rolling Update Annual Rolling Update
Nearest Surface Water Feature Ordnance Survey	July 2012	Quarterly
Pollution Incidents to Controlled Waters Environment Agency - Thames Region	September 1999	Not Applicable
Prosecutions Relating to Authorised Processes Environment Agency - Thames Region	March 2013	As notified
Prosecutions Relating to Controlled Waters Environment Agency - Thames Region	March 2013	As notified
Registered Radioactive Substances Environment Agency - Thames Region	November 2014	Quarterly
River Quality Environment Agency - Head Office	November 2001	Not Applicable
River Quality Biology Sampling Points Environment Agency - Head Office	July 2012	Annually
River Quality Chemistry Sampling Points Environment Agency - Head Office	July 2012	Annually
Substantiated Pollution Incident Register Environment Agency - Thames Region - South East Area	November 2014	Quarterly
Water Abstractions Environment Agency - Thames Region	October 2014	Quarterly



Data Currency

Agency & Hydrological	Version	Update Cycle
Water Industry Act Referrals Environment Agency - Thames Region	November 2014	Quarterly
Groundwater Vulnerability Environment Agency - Head Office	January 2011	Not Applicable
Drift Deposits Environment Agency - Head Office	January 1999	Not Applicable
Bedrock Aquifer Designations British Geological Survey - National Geoscience Information Service	October 2012	Annually
Superficial Aquifer Designations British Geological Survey - National Geoscience Information Service	October 2012	Annually
Source Protection Zones Environment Agency - Head Office	December 2014	Quarterly
Extreme Flooding from Rivers or Sea without Defences Environment Agency - Head Office	October 2014	Quarterly
Flooding from Rivers or Sea without Defences Environment Agency - Head Office	October 2014	Quarterly
Areas Benefiting from Flood Defences Environment Agency - Head Office	October 2014	Quarterly
Flood Water Storage Areas Environment Agency - Head Office	October 2014	Quarterly
Flood Defences Environment Agency - Head Office	October 2014	Quarterly
Detailed River Network Lines Environment Agency - Head Office	March 2012	Annually
Detailed River Network Offline Drainage Environment Agency - Head Office	March 2012	Annually



Data Currency

Waste	Version	Update Cycle
BGS Recorded Landfill Sites British Geological Survey - National Geoscience Information Service	June 1996	Not Applicable
Historical Landfill Sites Environment Agency - Thames Region - South East Area	August 2014	Quarterly
Integrated Pollution Control Registered Waste Sites Environment Agency - Thames Region	October 2008	Not Applicable
Licensed Waste Management Facilities (Landfill Boundaries) Environment Agency - Thames Region - South East Area	August 2014	Quarterly
Licensed Waste Management Facilities (Locations) Environment Agency - Thames Region - South East Area	November 2014	Quarterly
Local Authority Landfill Coverage Epsom And Ewell Borough Council - Environmental Health Department London Borough of Merton - Environmental Health Department London Borough of Sutton - Environmental Health Department Reigate And Banstead Borough Council - Environmental Health Department Royal Borough of Kingston upon Thames - Environmental Health Department Surrey County Council	May 2000 May 2000 May 2000 May 2000 May 2000 May 2000	Not Applicable Not Applicable Not Applicable Not Applicable Not Applicable Not Applicable
Local Authority Recorded Landfill Sites Epsom And Ewell Borough Council - Environmental Health Department London Borough of Merton - Environmental Health Department London Borough of Sutton - Environmental Health Department Reigate And Banstead Borough Council - Environmental Health Department Royal Borough of Kingston upon Thames - Environmental Health Department Surrey County Council	May 2000 May 2000 May 2000 May 2000 September 2003 September 2003	Not Applicable Not Applicable Not Applicable Not Applicable Not Applicable Not Applicable
Registered Landfill Sites Environment Agency - Thames Region - South East Area	March 2003	Not Applicable
Registered Waste Transfer Sites Environment Agency - Thames Region - South East Area	March 2003	Not Applicable
Registered Waste Treatment or Disposal Sites Environment Agency - Thames Region - South East Area	March 2003	Not Applicable
Hazardous Substances	Version	Update Cycle
Control of Major Accident Hazards Sites (COMAH) Health and Safety Executive	January 2015	Bi-Annually
Explosive Sites Health and Safety Executive	October 2014	Bi-Annually
Notification of Installations Handling Hazardous Substances (NIHHS) Health and Safety Executive	November 2000	Not Applicable
Planning Hazardous Substance Enforcements London Borough of Merton London Borough of Sutton Surrey County Council Epsom And Ewell Borough Council - Planning Department Royal Borough of Kingston upon Thames Reigate And Banstead Borough Council - Planning Department - Advice Centre	December 2014 December 2014 December 2014 November 2013 November 2014 October 2014	Annual Rolling Update Annual Rolling Update Annual Rolling Update Annual Rolling Update Annual Rolling Update Annual Rolling Update
Planning Hazardous Substance Consents London Borough of Merton London Borough of Sutton Surrey County Council Epsom And Ewell Borough Council - Planning Department Royal Borough of Kingston upon Thames Reigate And Banstead Borough Council - Planning Department - Advice Centre	December 2014 December 2014 December 2014 November 2013 November 2014 October 2014	Annual Rolling Update Annual Rolling Update Annual Rolling Update Annual Rolling Update Annual Rolling Update Annual Rolling Update



Data Currency

Geological	Version	Update Cycle
BGS 1:625,000 Solid Geology British Geological Survey - National Geoscience Information Service	August 1996	Not Applicable
BGS Estimated Soil Chemistry British Geological Survey - National Geoscience Information Service	January 2010	Annually
BGS Recorded Mineral Sites British Geological Survey - National Geoscience Information Service	October 2014	Bi-Annually
BGS Urban Soil Chemistry British Geological Survey - National Geoscience Information Service	June 2011	Annually
BGS Urban Soil Chemistry Averages British Geological Survey - National Geoscience Information Service	June 2011	Annually
Brine Compensation Area Cheshire Brine Subsidence Compensation Board	August 2011	Not Applicable
Coal Mining Affected Areas The Coal Authority - Mining Report Service	December 2013	As notified
Mining Instability Ove Arup & Partners	October 2000	Not Applicable
Non Coal Mining Areas of Great Britain British Geological Survey - National Geoscience Information Service	July 2014	Not Applicable
Potential for Collapsible Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2014	Annually
Potential for Compressible Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2014	Annually
Potential for Ground Dissolution Stability Hazards British Geological Survey - National Geoscience Information Service	June 2014	Annually
Potential for Landslide Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2014	Annually
Potential for Running Sand Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2014	Annually
Potential for Shrinking or Swelling Clay Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2014	Annually
Radon Potential - Radon Affected Areas British Geological Survey - National Geoscience Information Service	July 2011	As notified
Radon Potential - Radon Protection Measures British Geological Survey - National Geoscience Information Service	July 2011	As notified
Industrial Land Use	Version	Update Cycle
Contemporary Trade Directory Entries Thomson Directories	November 2014	Quarterly
Fuel Station Entries Catalist Ltd - Experian	November 2014	Quarterly



Data Currency

Sensitive Land Use	Version	Update Cycle
Areas of Adopted Green Belt Epsom And Ewell Borough Council - Planning Department London Borough of Sutton Reigate And Banstead Borough Council - Planning Department - Advice Centre Royal Borough of Kingston upon Thames	November 2014 November 2014 November 2014 November 2014	As notified As notified As notified As notified
Areas of Unadopted Green Belt Epsom And Ewell Borough Council - Planning Department London Borough of Sutton Reigate And Banstead Borough Council - Planning Department - Advice Centre Royal Borough of Kingston upon Thames	November 2014 November 2014 November 2014 November 2014	As notified As notified As notified As notified
Areas of Outstanding Natural Beauty Natural England	August 2014	Bi-Annually
Environmentally Sensitive Areas Natural England	August 2014	Annually
Forest Parks Forestry Commission	April 1997	Not Applicable
Local Nature Reserves Natural England	October 2014	Bi-Annually
Marine Nature Reserves Natural England	July 2013	Bi-Annually
National Nature Reserves Natural England	September 2014	Bi-Annually
National Parks Natural England	August 2014	Bi-Annually
Nitrate Sensitive Areas Department for Environment, Food and Rural Affairs (DEFRA - formerly FRCA)	February 2012	Not Applicable
Nitrate Vulnerable Zones Department for Environment, Food and Rural Affairs (DEFRA - formerly FRCA)	July 2014	Annually
Ramsar Sites Natural England	March 2014	Bi-Annually
Sites of Special Scientific Interest Natural England	September 2014	Bi-Annually
Special Areas of Conservation Natural England	March 2014	Bi-Annually
Special Protection Areas Natural England	September 2014	Bi-Annually



Data Suppliers

A selection of organisations who provide data within this report

Data Supplier	Data Supplier Logo
Ordnance Survey	
Environment Agency	
Scottish Environment Protection Agency	
The Coal Authority	
British Geological Survey	
Centre for Ecology and Hydrology	
Natural Resources Wales	
Scottish Natural Heritage	
Natural England	
Public Health England	
Ove Arup	
Peter Brett Associates	

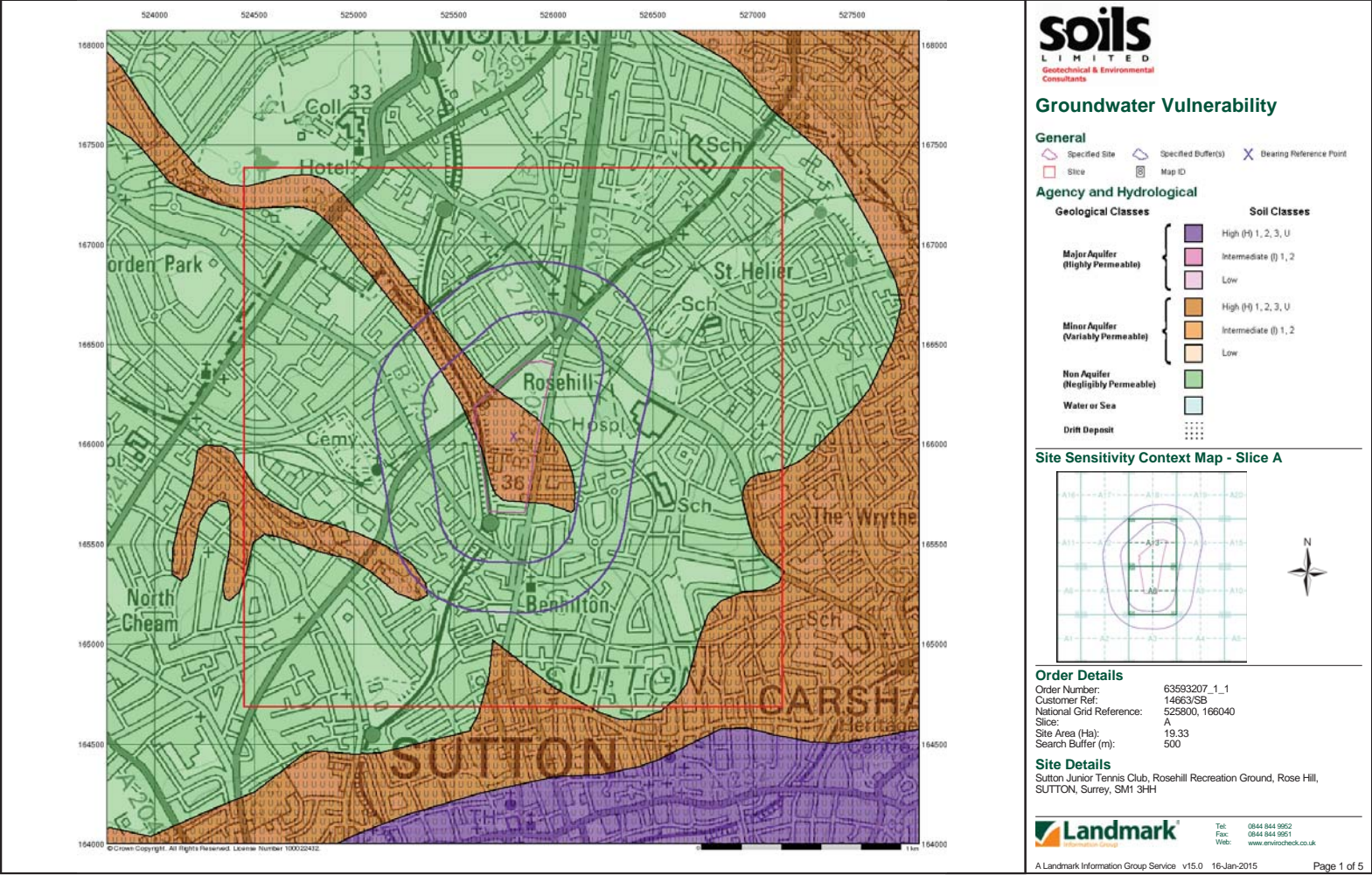


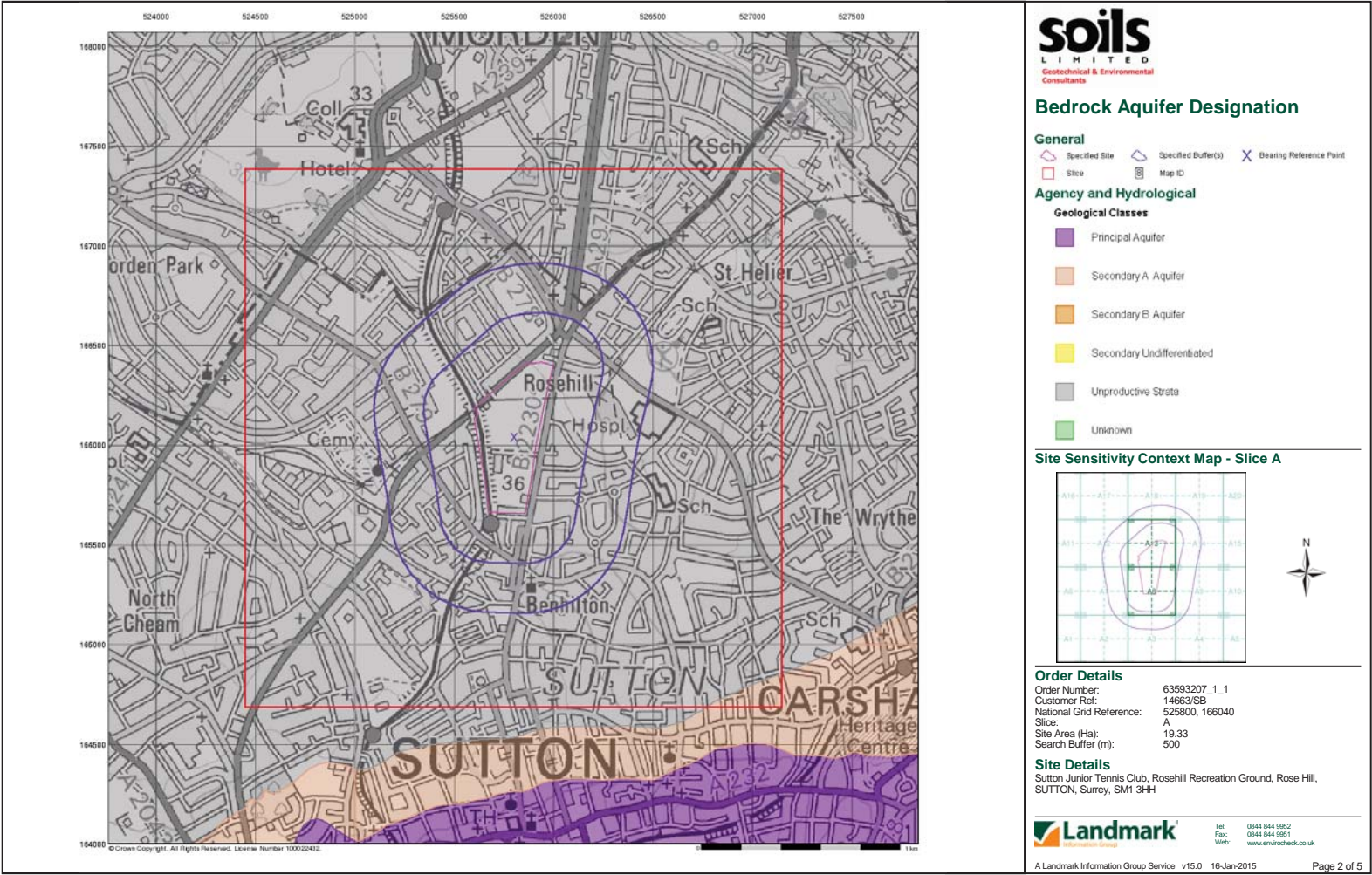
Useful Contacts

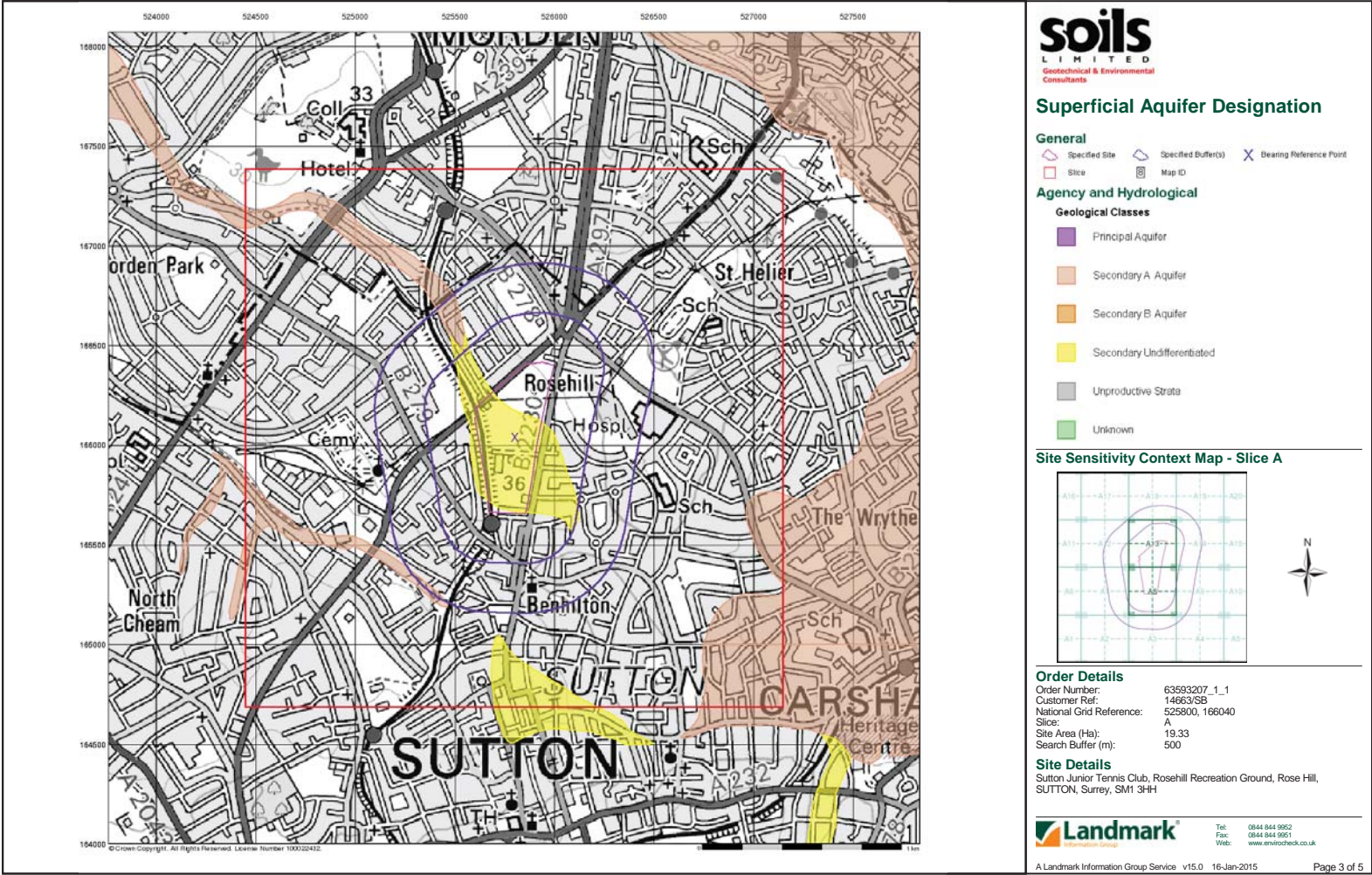
Contact	Name and Address	Contact Details
2	British Geological Survey - Enquiry Service British Geological Survey, Kingsley Dunham Centre, Keyworth, Nottingham, Nottinghamshire, NG12 5GG	Telephone: 0115 936 3143 Fax: 0115 936 3276 Email: enquiries@bgs.ac.uk Website: www.bgs.ac.uk
3	London Borough of Sutton - Environmental Health Department 24 Denmark Road, Carshalton, Surrey, SM5 2JG	Telephone: 020 8770 5527 Fax: 020 8770 5540 Website: www.sutton.gov.uk
4	Environment Agency - National Customer Contact Centre (NCCC) PO Box 544, Templeborough, Rotherham, S60 1BY	Telephone: 08708 506 506 Email: enquiries@environment-agency.gov.uk
5	Landmark Information Group Limited Imperium, Imperial Way, Reading, Berkshire, RG2 0TD	Telephone: 0844 844 9952 Fax: 0844 844 9951 Email: customerservices@landmark.co.uk Website: www.landmark.co.uk
6	Natural England Suite D, Unex House, Bourges Boulevard, Peterborough, Cambridgeshire, PE1 1NG	Telephone: 0845 600 3078 Email: enquiries@naturalengland.org.uk Website: www.naturalengland.org.uk
7	Department for Environment, Food and Rural Affairs (DEFRA - formerly FRCA) Government Buildings, Otley Road, Lawnswood, Leeds, West Yorkshire, LS16 5QT	Telephone: 0113 2613333 Fax: 0113 230 0879
8	London Borough of Merton - Environmental Health Department Merton Civic Centre, London Road, Morden, Surrey, SM4 5DX	Telephone: 020 8543 2222 Fax: 020 8545 4025 Website: www.merton.gov.uk
-	Public Health England - Radon Survey, Centre for Radiation, Chemical and Environmental Hazards Chilton, Didcot, Oxfordshire, OX11 0RQ	Telephone: 01235 822622 Fax: 01235 833891 Email: radon@phe.gov.uk Website: www.ukradon.org
-	Landmark Information Group Limited Imperium, Imperial Way, Reading, Berkshire, RG2 0TD	Telephone: 0844 844 9952 Fax: 0844 844 9951 Email: customerservices@landmarkinfo.co.uk Website: www.landmarkinfo.co.uk

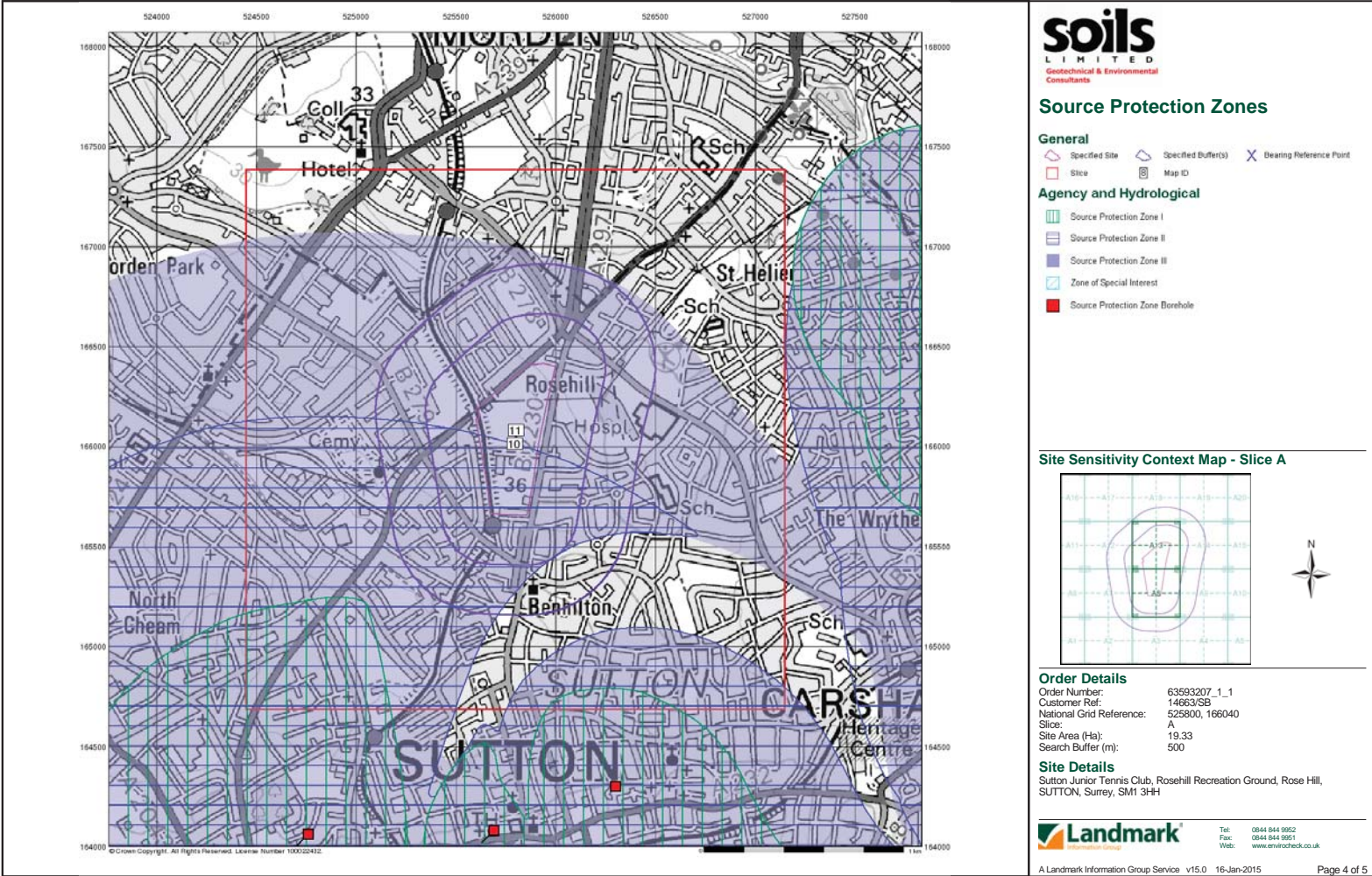
Please note that the Environment Agency / Natural Resources Wales / SEPA have a charging policy in place for enquiries.

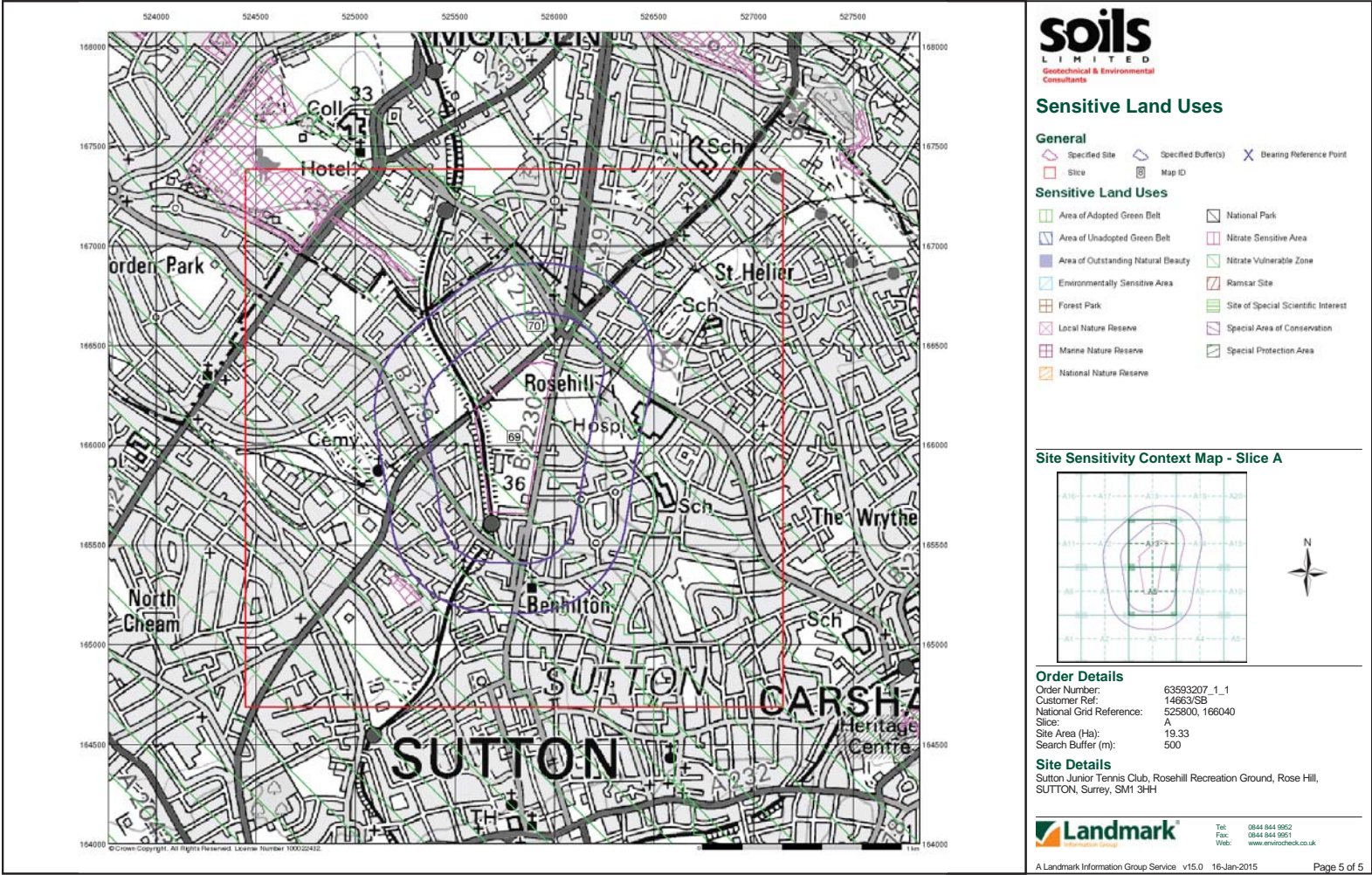
Appendix C - Site Sensitivity Maps

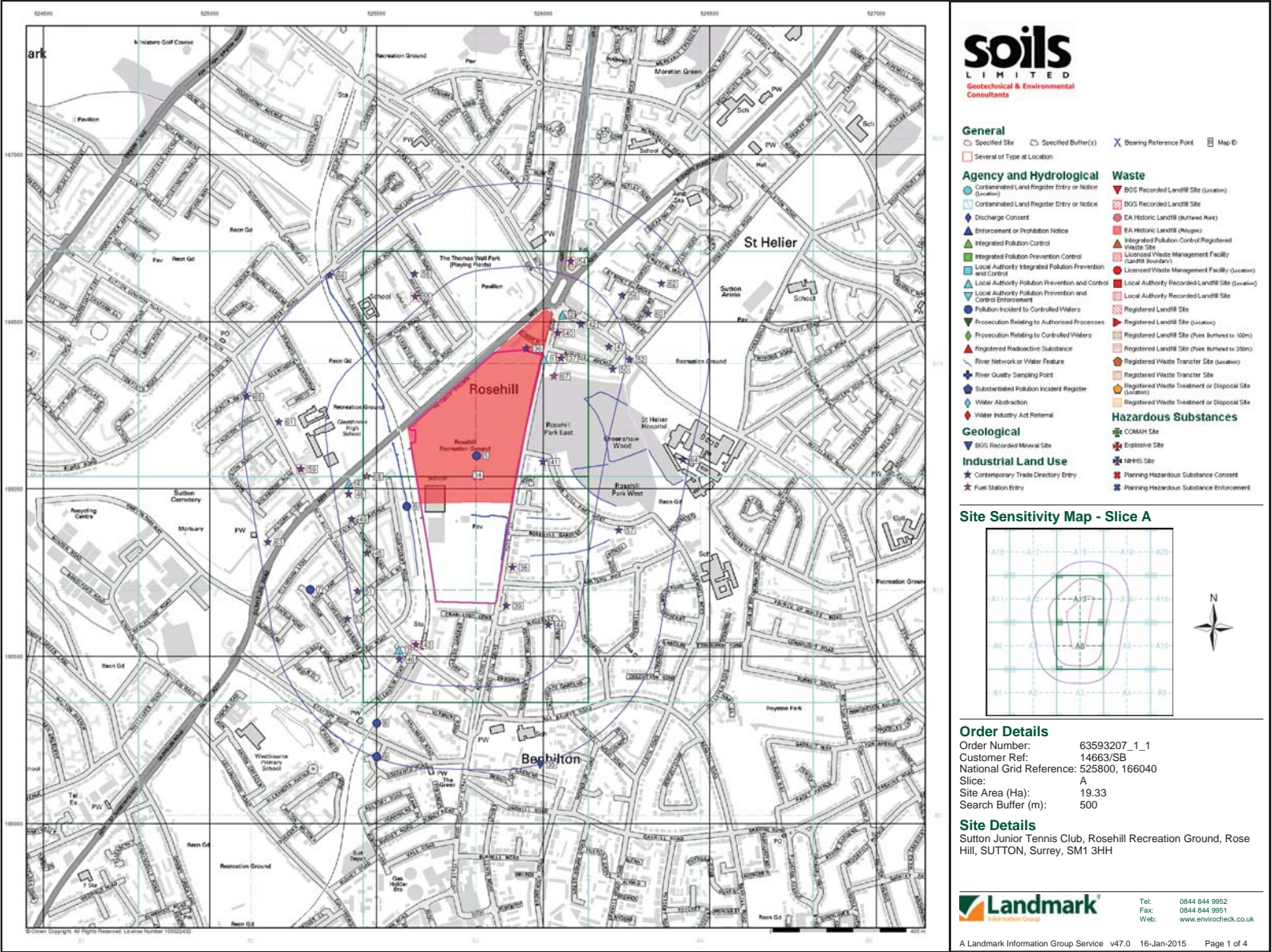




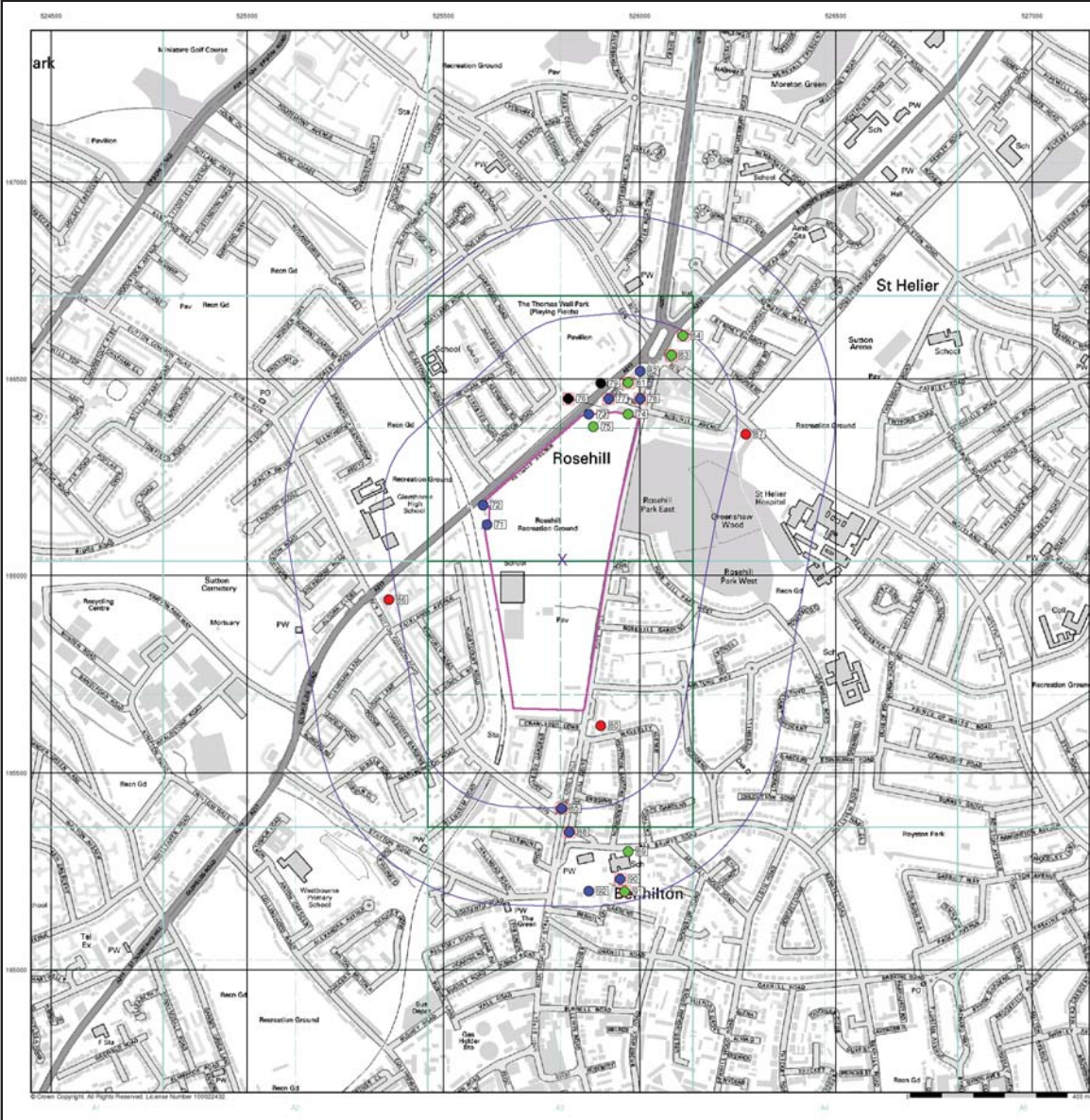












General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Map ID
- Several of Type at Location

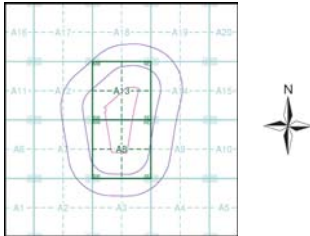
Agency and Hydrological (Boreholes)

- BGS Borehole Depth 0 - 10m
- BGS Borehole Depth 10 - 30m
- BGS Borehole Depth 30m +
- Confidential
- Other

For Borehole information please refer to the Borehole .csv file which accompanied this slice.

A copy of the BGS Borehole Ordering Form is available to download from the Support section of www.envirocheck.co.uk.

Borehole Map - Slice A



Order Details

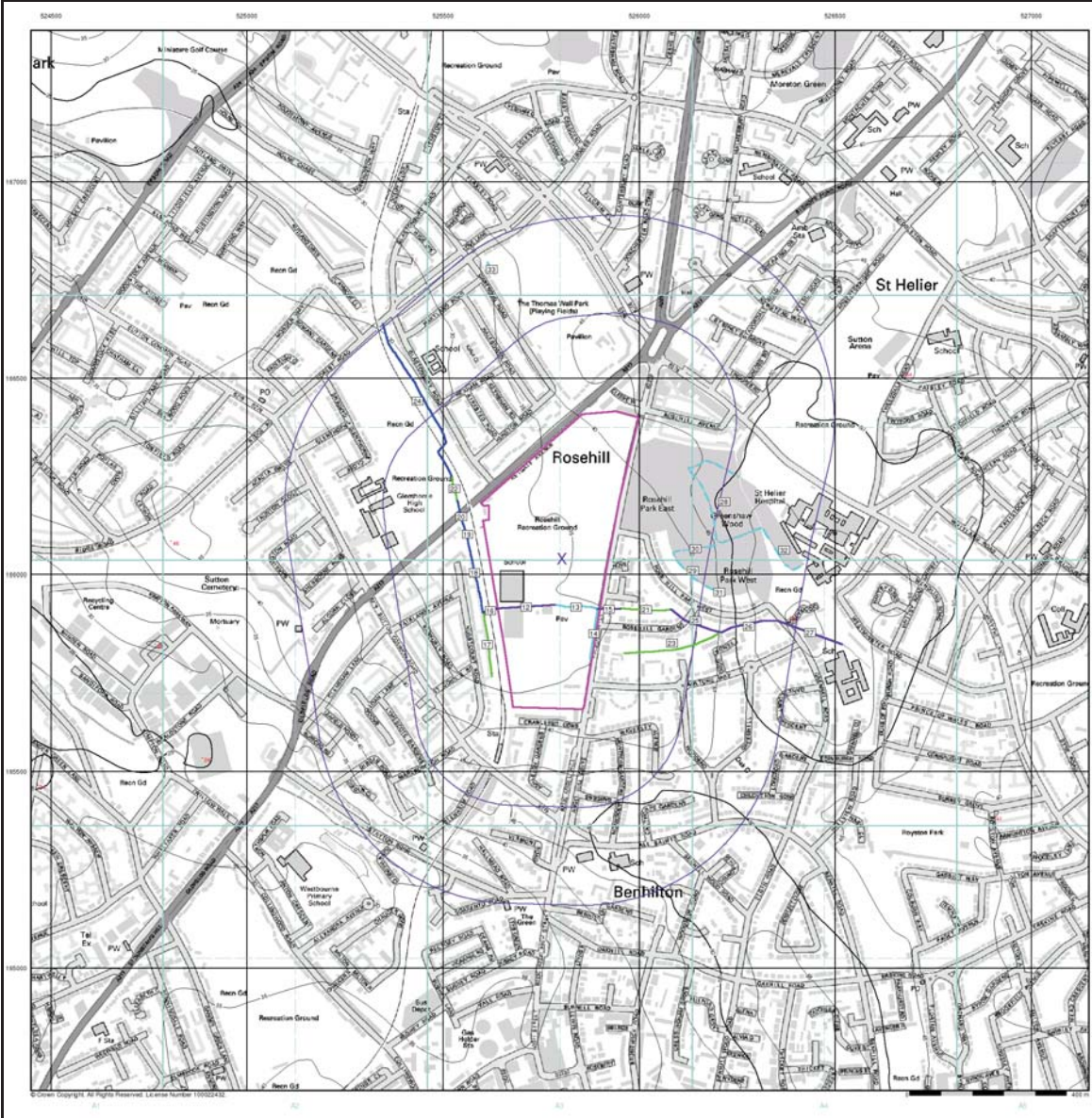
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Customer Ref: 14663/SB
National Grid Reference: 525800, 166040
Slice: A
Site Area (Ha): 19.33
Search Buffer (m): 500

Site Details

Sutton Junior Tennis Club, Rosehill Recreation Ground, Rose Hill, SUTTON, Surrey, SM1 3HH



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



General

- Specified Site
- Specified Buffer(s)
- Deining Reference Point
- Map ID

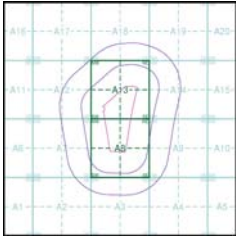
Detailed River Network Data

- Primary River
- Secondary River
- Tertiary River
- Canal
- Canal Tunnel
- Undeined River
- Lake/Reservoir
- Offline Drainage Feature
- Extended Culvert (greater than 50m)
- Underground River (inferred)
- Underground River (local knowledge)
- Downstream of High Water Mark
- Downstream of Seaward Extension
- Not assigned River feature

Contours (height in metres)

- Standard Contour
- Master Contour
- Spot Height
- Mean Low Water
- Mean High Water

EA/NRW Detailed River Network Map - Slice A



Order Details

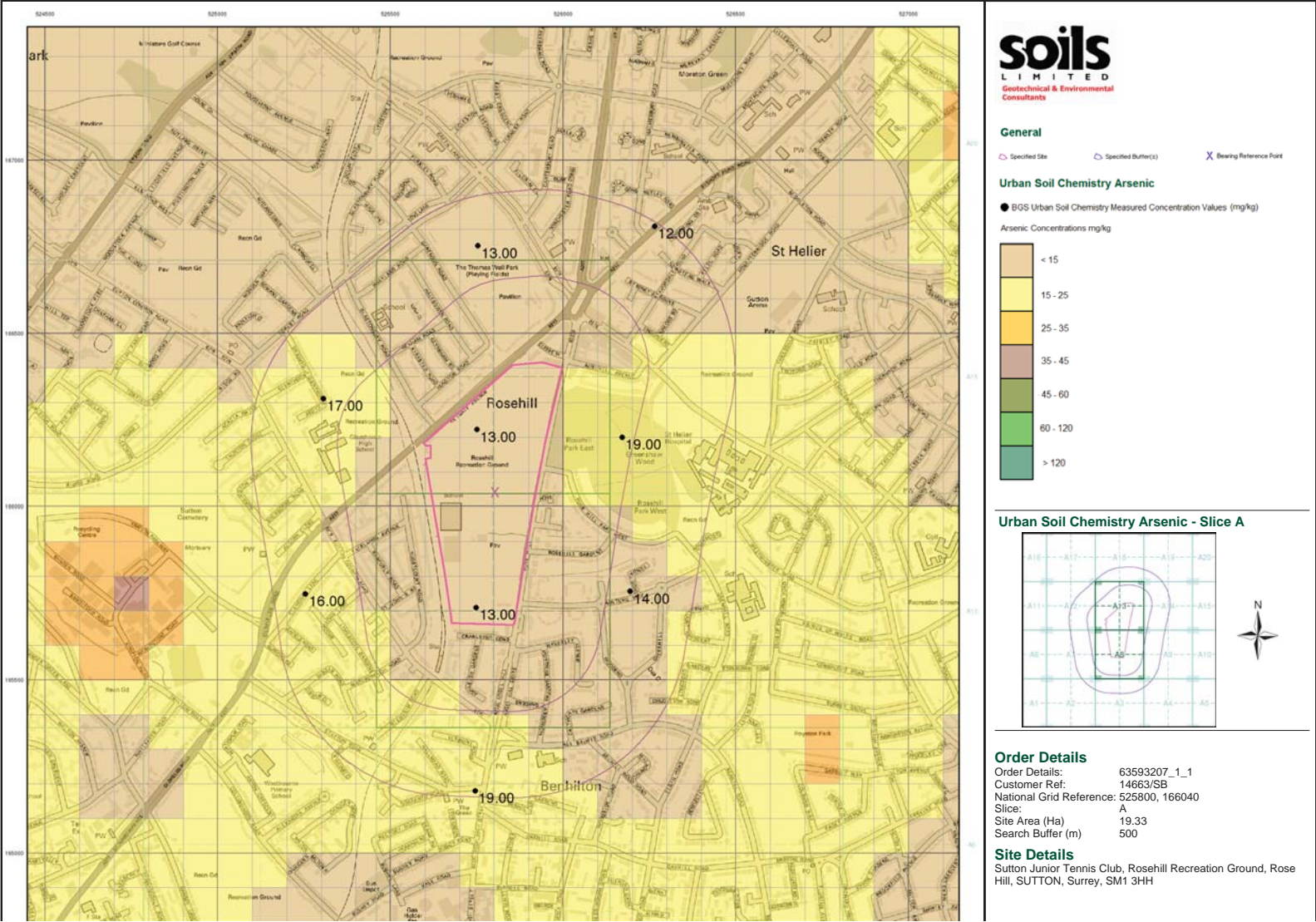
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Search Buffer (m): 500

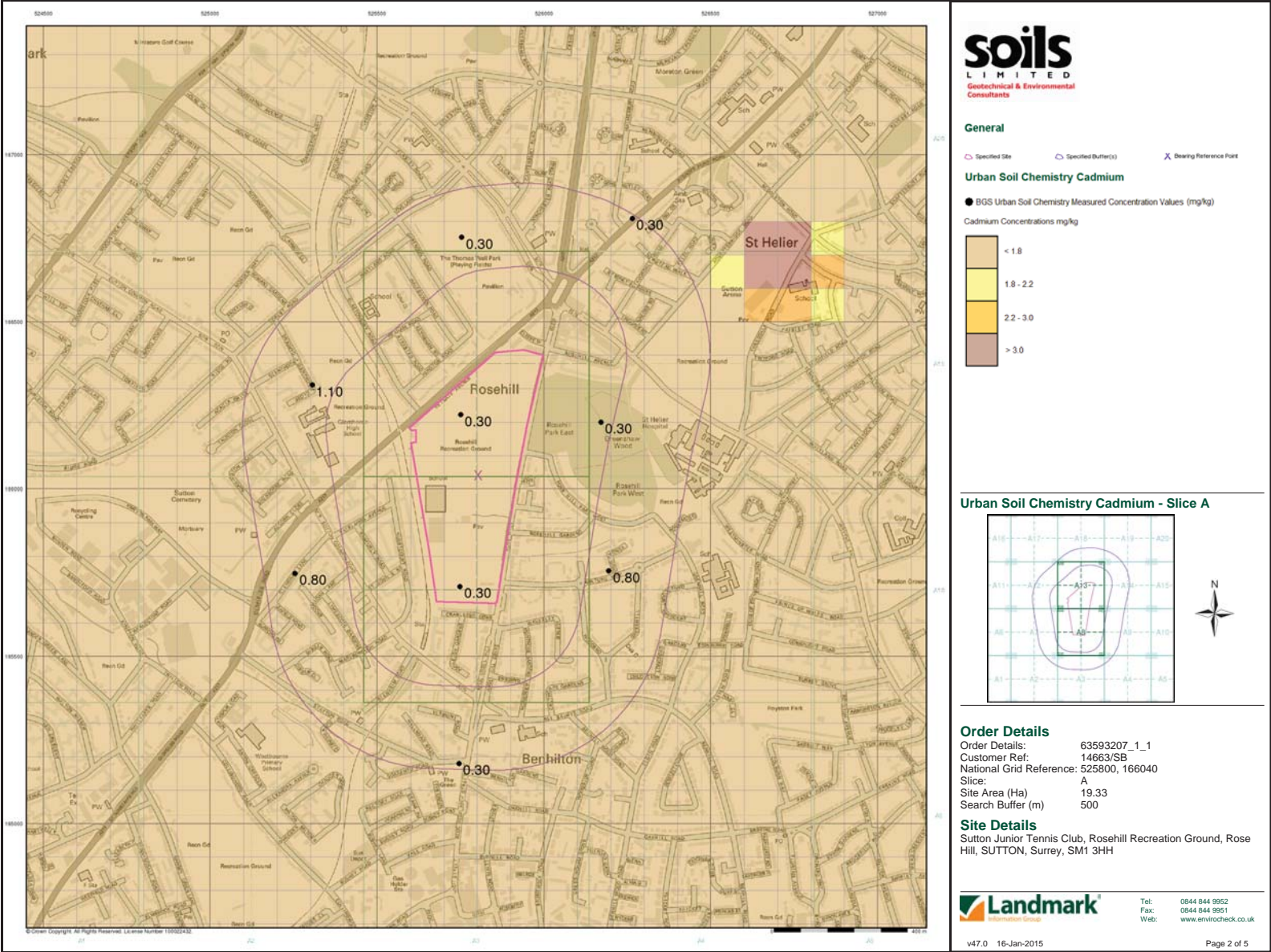
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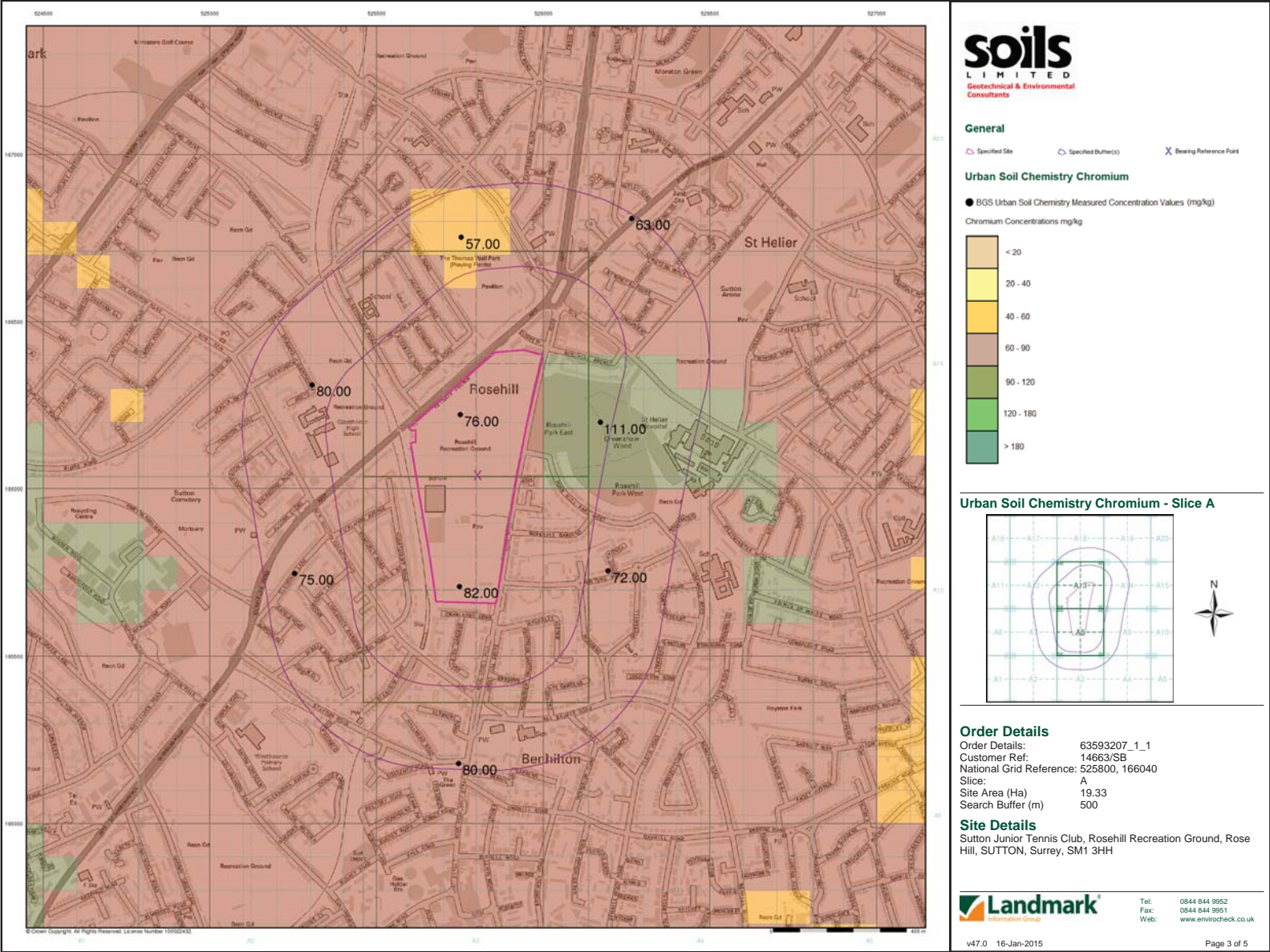
Sutton Junior Tennis Club, Rosehill Recreation Ground, Rose Hill, SUTTON, Surrey, SM1 3HH

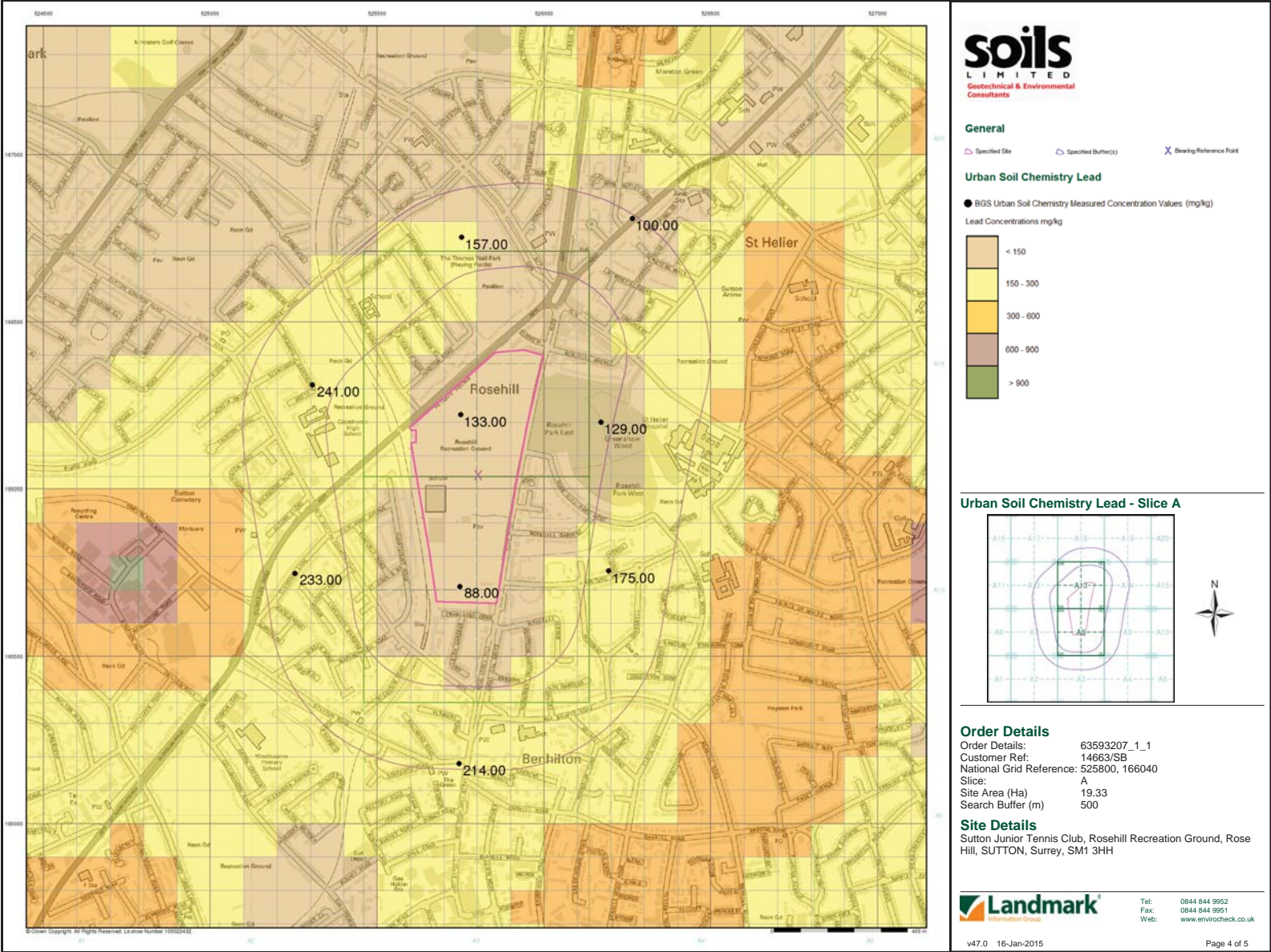


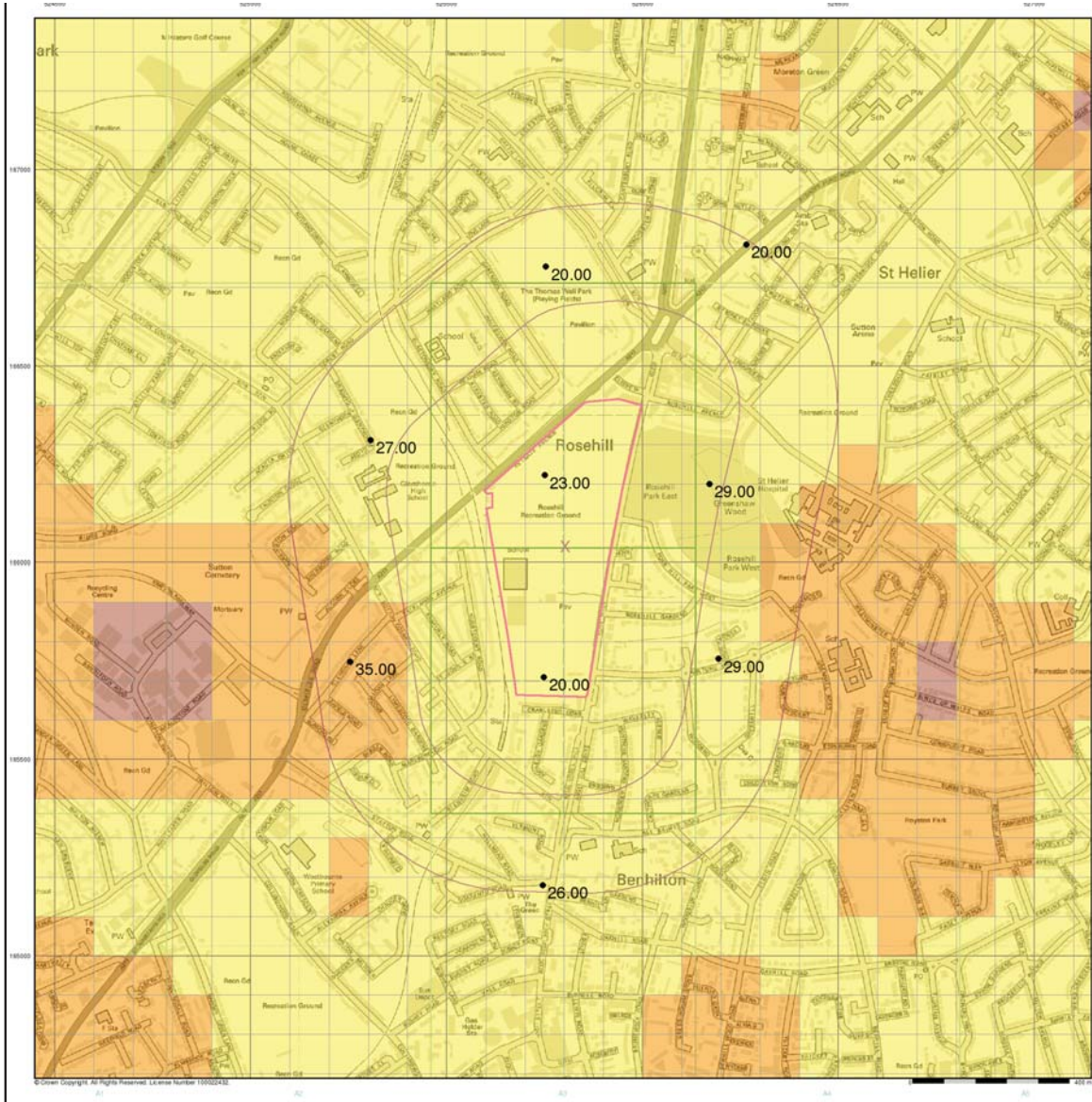
Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk









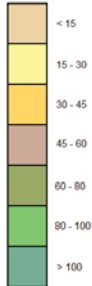


General

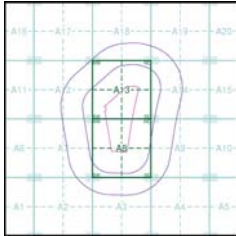
Specified Site Specified Buffer(s) Bearing Reference Point

Urban Soil Chemistry Nickel

BGS Urban Soil Chemistry Measured Concentration Values (mg/kg)
Nickel Concentrations mg/kg



Urban Soil Chemistry Nickel - Slice A



Order Details

Order Details: 63593207_1_1
Customer Ref: 14663/SB
National Grid Reference: 525800, 166040
Slice: A
Site Area (Ha): 19.33
Search Buffer (m): 500

Site Details

Sutton Junior Tennis Club, Rosehill Recreation Ground, Rose Hill, SUTTON, Surrey, SM1 3HH



Tel: 0844 544 9952
Fax: 0844 544 9951
Web: www.envirocheck.co.uk

Appendix D - Site Photographs



Appendix E - Risk Assessment Criteria

The classification presented in Tables A1-A4 below are modified from, 'contaminated land risk assessment: A guide to good practice, 2001, CIRIA C552'.

Table A. 1. Classification Of Consequence	
Classification	Definition
Severe	Short-term (acute) risk to human health likely to result in "significant harm" as defined by the Environmental Protection Act 1990, Part IIA. Short term risk of pollution (note: Water Recourses Act contains no scope for considering significance of pollution) of sensitive water resource. Catastrophic damage to buildings/property. A short-term risk to a particular ecosystem (note: the definitions of ecological systems within the Draft Circular on Contaminated Land, DETR, 2000).
Medium	Chronic damage to Human Health ("significant harm" as defined in DETR, 2000). Pollution of sensitive water resource (note: Water Recourses Act contains no scope for considering significance of pollution). A significant change in a particular ecosystem (note: the definitions of ecological systems within the Draft Circular on Contaminated Land, DETR, 2000).
Mild	Pollution of non-sensitive water resources. Significant damage to crops, buildings, structures and services ("significant harm" as defined in the Draft Circular on Contaminated Land, DETR, 2000).
	Harm, although not necessarily significant harm, which may result in a financial loss, or expenditure to resolve. Non-permanent health effects to human health (easily prevented by means such as personal protective clothing etc).

Table A. 2. Classification Of Probability	
Classification	Definition
High likelihood	There is a pollution linkage and an event that either appears very likely in the short term and almost inevitable over the long term or there is evidence at the receptors of harm or pollution.
Likely	There is a pollution linkage and all the elements are present and in the right place, which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable but possible in the short term and likely over the long term.
Low likelihood	There is a pollution linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a longer period such event would take place and is less likely in the short term.
Unlikely	There is a pollution linkage but circumstances are such that it is improbable that an event would occur even in the long term.

Table A. 3. Comparison Of Consequence Against Probability				
Probability	Consequence			
	Severe	Medium	Mild	
High likelihood	Very high risk	High risk	Moderate risk	Moderate/low risk
Likely	High risk	Moderate risk	Moderate/low risk	Low risk
Low likelihood	Moderate risk	Moderate/low risk	Low risk	Very low risk
Unlikely	Moderate risk	Low risk	Very low risk	Very low risk

Table A. 4. Risk Classifications

Very High	There is a high probability that severe harm could arise to a designated receptor from an identified hazard at the site without remediation action OR there is evidence that severe harm to a designated receptor is already occurring. Realisation of that risk is likely to present a substantial liability to be site owner/or occupier. Investigation is required as a matter of urgency and remediation works likely to follow in the short-term.
High	Harm is likely to arise to a designated receptor from an identified hazard at the site without remediation action. Realisation of the risk is likely to present a substantial liability to the site owner/or occupier. Investigation is required as a matter of urgency to clarify the risk. Remediation works may be necessary in the short-term and are likely over the longer term.
Medium	It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, and if any harm were to occur it is more likely, that the harm would be relatively mild. Further investigative work is normally required to clarify the risk and to determine the potential liability to site owner/occupier. Some remediation works may be required in the longer term.
Low	It is possible that harm could arise to a designated receptor from identified hazard, but it is likely at worst, that this harm if realised would normally be mild. It is unlikely that the site owner/or occupier would face substantial liabilities from such a risk. Further investigative work (which is likely to be limited) to clarify the risk may be required. Any subsequent remediation works are likely to be relatively limited.
Very low	It is a low possibility that harm could arise to a designated receptor, but it is likely at worst, that this harm if realised would normally be mild or .
None	No potential risk if no pollution linkage has been established.

Scoping Investigation



Geotechnical & Environmental Consultants

Interpretive Scoping Report

At

**Rosehill Recreation Ground, Rose Hill, Sutton,
Surrey SM1 3HH**

For

London Borough of Sutton

**Soils Limited
Newton House
Cross Road
Tadworth
Surrey KT20 5SR
☎ 01737 814221**

REPORT 14663/SR

Interpretive Scoping Report

Job Title: Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

Client: London Borough of Sutton

CONTROL DOCUMENT

SOILS LIMITED DOCUMENT REFERENCE NUMBER:
14663/SR

DOCUMENT TYPE:
Interpretive Scoping Report

DOCUMENT STATUS: Final REVISION: 1.00

DATE: March 2015

Note: This is not a valid document for use in the design of the project unless it is titled **Final** in the Document Status box.

	Name	Signature
Prepared by:	S. J. Bevins (sb@soilslimited.co.uk)	
Checked by:	N. J. Lambert	
	R. B. Higginson	

Current regulations and good practice were used in the preparation of this report. The recommendations given in this report must be reviewed by an appropriately qualified person at the time of preparation of the scheme design to ensure that any recommendations given remain valid in light of changes in regulation and practice, or additional information obtained regarding the site.



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Interpretive Scoping Report
At
Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH
For
London Borough of Sutton

Commission

Soils Limited were commissioned by London Borough of Sutton to undertake an Interpretive Scoping Report on land at Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH. The scope of the investigation was outlined in Soils Limited subsequent quotation reference Q15814 dated 4th November 2014.

This document comprises the Interpretive Contamination and Geotechnical Scoping Report and incorporates the results, discussion and conclusions to the intrusive investigation. It comprises in-situ testing, laboratory contamination testing but not laboratory geotechnical testing, as requested by the Client. It must be read in conjunction with the Phase I Desk Study, produced by Soils Limited ref: 14663/DS dated March 2015.

Table of Contents

SECTION 1	GENERAL	4
SECTION 2	GENERAL INTRODUCTION.....	5
2.1	Objective of Investigation	5
2.2	Location.....	5
2.3	Proposed Redevelopment	6
2.4	Limitations and Disclaimers.....	6
SECTION 3	SITE WORKS	8
3.1	Proposed Works.....	8
3.1.1	Works Undertaken	8
3.2	Anticipated Geology	10
3.2.1	Head	10
3.2.2	London Clay Formation.....	10
3.3	Ground Conditions	10
3.3.1	Topsoil / Made Ground	11
3.3.2	Head	12
3.3.3	London Clay Formation.....	12
3.4	Roots.....	12
3.5	Groundwater	13
SECTION 4	DISCUSSION OF GEOTECHNICAL <i>IN SITU</i> TESTING	14
4.1	Dynamic Probe Tests	14
4.2	California Bearing Ratio Tests	15
4.3	Geotechnical Discussion	16
SECTION 5	INTRODUCTION TO CONTAMINATED LAND INVESTIGATION	18
5.1	General.....	18
5.1.1	Objective of Investigation.....	18
5.1.2	Proposed Development.....	18
SECTION 6	CONTAMINATION LAND ASSESSMENT	19
6.1	Preliminary Conceptual Site Model and Risk Assessment Estimation	19
6.2	Anticipated Investigation Methods.....	21
6.2.1	Sampling strategy	21
6.2.2	Risk assessment methods for human health	23
6.2.3	Risk to Controlled Water.....	23
6.2.4	Soil Gas.....	23
SECTION 7	SITE WORK	24
7.1	Work Undertaken.....	24
7.2	Determination of Contaminants of Concern for Soil Samples.....	24
7.2.1	Made Ground (MG)	24
SECTION 8	REVISED CONCEPTUAL SITE MODEL (CSM)	25
8.1	Site Characterisation and Revised CSM	25
SECTION 9	QUANTITATIVE RISK ASSESSMENT	27
9.1	Human health quantitative risk assessment.....	27
9.2	Groundwater quantitative risk assessment	29
9.3	Soil Gas and Quantitative Risk Assessment.....	31
9.3.1	Monitoring Well Construction	31
9.3.2	Soil Gas / VOC Monitoring	31

9.3.3	Soil Gas / VOC Protection	32
9.4	Waste Acceptance Criteria	33
9.5	Conclusions	33
9.6	Revised Conceptual Site Model and recommendations.....	33
9.7	Plausible Sources and Pathways and Remediation option appraisal.....	35
9.11	Excavated Material.....	38
9.11.1	Risk Based Hazard Assessment of Waste	39
9.11.2	Waste Acceptance Criteria Testing	39
9.11.3	Reuse of Excavated Material On-Site.....	40
9.12	Imported Material	41
9.13	Duty of Care.....	41
9.14	Discovery Strategy	41
9.15	Further Works	42

List of Figures

Figure 1. 1. Site Location Map.....	5
Figure 7. 1. Planned Site Investigation Design	Error! Bookmark not defined.
Figure 9. 1. Revised Conceptual Site Model After Site Works, and Risk Assessment Methodology.....	Error! Bookmark not defined.

List of Tables

Table 3.1. Final Depth of Trial Hole	10
Table 3.2. Ground Conditions.....	11
Table 3.3. Depth of Made Ground.....	12
Table 3.4. Root Record.....	12
Table 3.5. Groundwater Records	13
Table 4.1. Relative Density Classification.....	14
Table 4.2. Interpretation Of Equivalent SPT 'N' Blow Counts	15
Table 4.3. Atterberg Limit Test Interpretation.....	Error! Bookmark not defined.
Table 4.4. Grading Analysis Interpretation.....	Error! Bookmark not defined.
Table 7. 1. Preliminary Conceptual Site Model And Anticipated Risk Assessment Methodology	Error! Bookmark not defined.
Table 7. 2. Potential Receptors and Sampling Depths.....	21
Table 10.1. Summary of Chemical Analysis of Soil Samples. Error! Bookmark not defined.	
Table 10.2. Soil Gas and VOC Readings.....	31
Table 10.3. Revised Conceptual Site Model And Risk Assessment Methodology.....	34

List of Appendices

Appendix A- Field Work	44
Appendix B- Laboratory Analysis.....	45
Appendix C- Human Health Assessment Criteria.....	46

Ref: 14663/SR

Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

Section 1 General

The site works were performed in accordance with the methods given in BS 5930+A2:2010 and BS EN ISO 22476-2:2005.

The chemical analyses were undertaken by QTS Environmental Limited in accordance with their UKAS and MCERTS accredited test methods or their documented in-house testing procedures.

This investigation did not comprise an environmental audit of the site or its environs.

This investigation did not include geotechnical laboratory testing.

Trial hole is a generic term used to describe a method of direct investigation. The term trial pit, borehole or window sample borehole implies the specific technique used to produce a trial hole.

Ref: 14663/SR

Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

Section 2 General Introduction

2.1 Objective of Investigation

The overall objective was understood to be to supply the client and their designers with information regarding ground conditions, to provide guidance on a foundation scheme for potential redevelopment that was appropriate to the conditions present on the site.

The investigation was to be undertaken to provide parameters for the design of foundations by means of in-situ testing.

Soil samples were to be taken and tested for a range of potential contaminants based on the Conceptual Site Model (CSM) in the Phase I Desk Study prepared by Soils Limited (Ref: 14663/DS, March 2015) and/or the revised Conceptual Site Model found in this report.

Monitoring wells were to be installed with soil gas monitoring and groundwater sampling carried out after the completion of the site works based on the CSM in the Phase I Desk Study and/or the revised CSM found in this report.

2.2 Location

This site had an area of 19.33ha and was located at land at Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH at O.S. National Grid Reference of TQ 25800, 66040. The site location map is presented in Figure 1.1.



Figure 1.1. Site Location Map (N to top. NTS)

Ref: 14663/SR

Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

2.3 Proposed Redevelopment

The proposed redevelopment at the site was for a new secondary school comprising main school building, games courts, sports pitches, soft landscaping, access roads and parking areas.

In compiling this report reliance was placed on a proposed site layout plan provided as part of 'Sutton Secondary Schools_Presentation-1', dated December 2014 prepared by Atkins and supplied by Gleeds Advisory Ltd. Any change or deviation from the scheme outlined in the drawing could invalidate the recommendations presented within this report. Soils Limited must be notified about any such changes.

At the time of the reporting, March 2015, Soils Limited were not aware of the anticipated foundation loadings.

2.4 Limitations and Disclaimers

This Interpretive Scoping Report relates to the site located on land at Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH and was prepared for the sole benefit of London Borough of Sutton (The "Client") for the brief described in Section 2.1 of this report.

Soils Limited disclaim any responsibility to the Client and others in respect of any matters outside the scope of the above.

This report has been prepared by Soils Limited, with all reasonable skill, care and diligence within the terms of the Contract with the Client, incorporation of our General Conditions of Contact of Business and taking into account the resources devoted to us by agreement with the Client.

The report is personal and confidential to the Client and Soils Limited accept no responsibility of whatever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report wholly at its own risk.

The Client may not assign the benefit of the report or any part to any third party without the written consent of Soils Limited.

The ground is a product of continuing natural and artificial processes. As a result, the ground will exhibit a variety of characteristics that vary from place to place across a site, and also with time. Whilst a ground investigation will mitigate to a greater or lesser degree against the resulting risk from variation, the risks cannot be eliminated.

The investigation, interpretations, and recommendations given in this report were prepared for the sole benefit of the client in accordance with their brief. As such these do not necessarily address all aspects of ground behaviour at the site.

Current regulations and good practice were used in the preparation of this report. An appropriately qualified person must review the recommendations given in this report at the time of preparation of the scheme design to ensure that any recommendations given remain valid in light of changes in regulation and practice, or additional information obtained regarding the site.

The depth to roots and/or of desiccation may vary from that found during the investigation.

Ref: 14663/SR

Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

The client is responsible for establishing the depth to roots and/or of desiccation on a plot by plot basis prior to the construction of foundations. Supplied site surveys may not include substantial shrubs or bushes and is also unlikely to have data on any trees, bushes or shrubs removed prior to or following the site survey.

Where trees are mentioned in the text this means existing trees, substantial bushes or shrubs, recently removed trees (approximately 20 years to full recovery on cohesive soils) and those planned as part of the site landscaping).

Ownership of land brings with it onerous legal liabilities in respect of harm to the environment. "Contaminated Land" is defined in Section 57 of the Environment Act 1995 as *"Land which is in such a condition by reason of substances in, on or under the land that significant harm is being caused or that there is a significant possibility of such harm being caused or that pollution of controlled waters is being, or is likely to be caused"*.

The investigation, analysis or recommendations in respect of contamination are made solely in respect of the prevention of harm to vulnerable receptors, using where possible best practice at the date of preparation of the report. The investigation and report do not address, define or make recommendations in respect of environmental liabilities. A separate environmental audit and liaison with statutory authorities is required to address these issues.

Ownership of copyright of all printed material including reports, laboratory test results, trial pit and borehole log sheets, including drillers log sheets remains with Soils Limited. License is for the sole use of the client and may not be assigned, transferred or given to a third party.

Ref: 14663/SR

Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

Section 3 Site Works

3.1 Proposed Works

The proposed site works to be undertaken comprised the following items:

- The drilling of 10No. windowless sampler boreholes to a depth of 5.00m bgl over two days, at locations selected and set out by Soils Limited;
- The driving of 10No. dynamic probes to a depth of 7.00m bgl over two days, at locations adjacent and prior to the proposed windowless sampler boreholes;
- The installation of 3No. groundwater/gas monitoring wells to a depth of 5.00m bgl and 4No. post site work monitoring visit, as agreed with the client;
- The driving of a number of dynamic cone penetrometer (DCP) CBR tests to a depth of approximately 1.00m bgl, at locations selected and set out by Soils Limited;
- Logging, sampling and in-situ testing as appropriate to the ground conditions encountered in the boreholes.

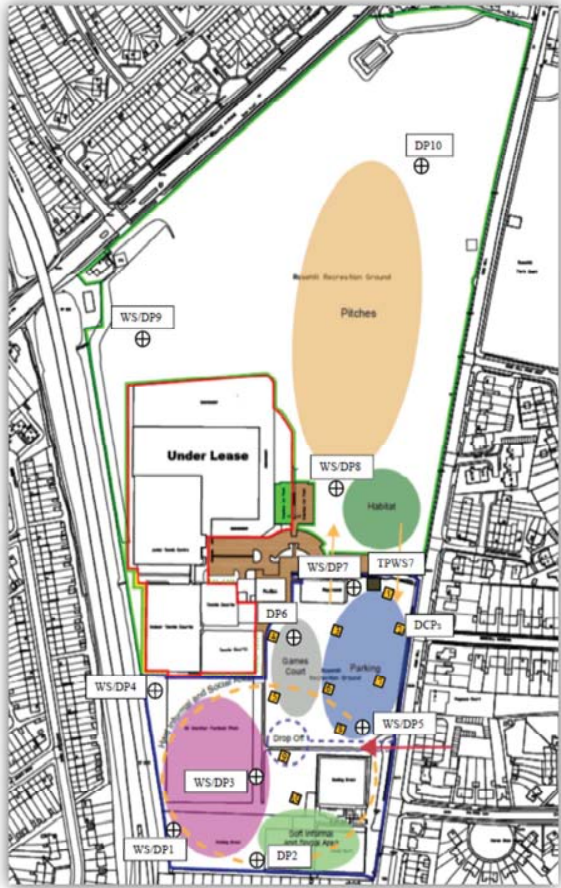
3.1.1 Works Undertaken

The works undertaken comprised the following items, as shown on Figure 3.1:

- The drilling of 7No. windowless sampler boreholes (WS1, WS3 to WS5, WS7 to WS9) to depths of between 3.50m in WS3 and 4.90m bgl in WS9, at locations selected and set out by Soils Limited and where access was gained and clear of services. The number of boreholes was limited by access and time restrictions;
- The driving of 9No. dynamic probes (DP2 to DP10) using a Dynamic Probe "Super Heavy" (DPSH) to depths of 3.30m bgl in DP2 and 7.00m bgl in DP3 to DP6, DP9 and 10 at locations adjacent to the windowless sampler boreholes, where undertaken;
- The installation of 3No. groundwater/gas monitoring wells (WS1, WS7 and WS9) to depths of between 3.90m and 4.90m bgl, and 4No. monitoring visit;
- The driving of 10No. DCP CBR tests (DCP1 to 10) to a depth of approximately 1.00m bgl, at locations selected and set out by Soils Limited;
- The hand excavation of 1No. trial pit (TPWS7) for additional soil samples for contamination testing;
- Logging, sampling and in-situ testing as appropriate to the ground conditions encountered in the boreholes.

Ref: 14663/SR

Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH



Note: Anticipated windowless sampling (WS) to 5m deep and trial pits (TP) to 1.00m deep. DP and DCPs are carried out for geotechnical purposes.

Figure 3.1. Trial Hole Location Plan

Ref: 14663/SR

Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

3.2 Anticipated Geology

The 1:50,000 BGS map showed the site to be located on bedrock of the London Clay Formation with overlying superficial geology of Head recorded across the majority of the site. The southern edge and northern third of the site are shown to not be underlain by Head.

3.2.1 Head

Head Deposits are drifts produced by solifluxion, the downslope movement of debris outwash during the periglacial period, and characteristically comprise poorly sorted soils of local derivation.

3.2.2 London Clay Formation

London Clay comprises stiff grey fissured clay, weathering to brown near surface. Concretions of argillaceous limestone in nodular form (Claystones) occur throughout the formation. Crystals of gypsum (Selenite) are often found within the weathered part of the London Clay, and precautions against sulphate attack to concrete are sometimes required.

The lowest part of the formation is a sandy beds with black rounded gravel and occasional layers of sandstone and is known as the Basement Beds.

3.3 Ground Conditions

On the 19th and 20th January 2015 works comprising 7No. windowless sampler boreholes (WS1, WS3 to WS5 and WS8 to WS9), 9No. dynamic probe holes (DP2 to DP10), 10No. DCPs (DCP1 to 10) were undertaken, as detailed in section 3.1.1. On the 10th February 2015 works comprising 1No. hand excavated trial pit were undertaken, as detailed in section 3.1.1.

A schedule of the investigatory depths is presented in Table 3.1.

Table 3.1. Final Depth of Trial Hole			
Trial Hole	Final Depth (m bgl)	Trial Hole	Final Depth (m bgl)
WS1	3.90	DP4	7.00
WS3	3.50	DP5	7.00
WS4	4.00	DP6	7.00
WS5	3.90	DP7	6.00
WS7	4.00	DP8	6.00
WS8	3.90	DP9	7.00
WS9	4.90	DP10	7.00
DP2	3.30	TPWS7	1.00
DP3	7.00		

Note: WS=windowless sampler borehole, DP= dynamic probe hole, TP=trial pit.

The soil conditions encountered were recorded and soil sampling commensurate with the purposes of the investigation was carried out. The depths given on the borehole logs and quoted in this report were measured from ground level directly adjacent to the boreholes.

The soils encountered from immediately below ground surface have been described in the

Ref: 14663/SR

Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

following manner. Where the soil incorporated an organic content such as either decomposing leaf litter or roots, or has been identified as part of the *in-situ* weathering profile, it has been described as Topsoil both on the logs and within this report. Where the soil has, in general, been found to have the same composition as the 'Topsoil' but also incorporated a minor constituent, e.g. less than an estimated 5%, of possibly non-naturally occurring material, or is of uncertain origin, the soil has been described as Topsoil/Made Ground both on the log and within this report. Where man has clearly either placed the soil, or the composition altered with say greater than an estimated 5% of a non-natural constituent, it has been referred to as Made Ground both on the logs and within this report.

For more complete information about the soils encountered within the general area of the site reference should be made to the detailed records given within Appendix A, but for the purposes of discussion the succession of conditions encountered in the boreholes in descending order can be summarised as in Table 3.2.

**Topsoil / Made Ground (MG)
Head (HEAD)
London Clay Formation (LC)**

The ground conditions encountered in the boreholes are summarised in Table 3.2.

Table 3.2. Ground Conditions					
Strata	Age	Depth Encountered (m bgl)		Average Thickness (m)	Description
		Top	Bottom		
TS/MG	Recent	GL	0.10-3.50	1.80	TS: Soft dark brown SILT with occasional roots and rootlets, locally with chalk gravel. MG: Soft to firm dark to light orangish brown and grey CLAY / clayey SILT, locally with fine to medium gravel and fragments of brick, glass, plastic, wood and bone.
HEAD	Quaternary	0.10-3.00	1.00-4.90*	Not proved	Soft dark green and orangish brown slightly gravelly CLAY. Gravel is fine to medium sub-angular flint.
LC	Ypresian	0.20-1.00	3.90-4.00*	Not Proven	Soft to firm orangish brown becoming grey and dark brown slightly sandy CLAY with selenite crystals.

Note: *Full depth of borehole. **Inferred from dynamic probe hole results.

3.3.1 Topsoil / Made Ground

Topsoil was encountered in WS1, WS3, WS5, WS7, WS9 and TPWS7 to depths of between 0.10m and 0.45m and comprised soft dark brown SILT with occasional roots and rootlets, locally with chalk gravel.

Made Ground was encountered in WS3 and WS9 underlying the Topsoil and WS4 and WS8 from surface, to depths of between 1.00m and 3.00m and comprised soft to firm dark to light orangish brown and grey CLAY / clayey SILT, locally with fine to medium gravel and fragments of brick, glass, plastic, wood and bone. No visual or olfactory indication of contamination was noted. No visual evidence of asbestos was noted.

Ref: 14663/SR

Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

WS3 terminates in this unit; as such the depth of Made Ground around this location has not been proven.

The depths of Topsoil / Made Ground as encountered in the trial holes are given in Table 3.3.

Table 3.3. Depth of Topsoil / Made Ground			
Trial Hole	Depth (m bgl)	Trial Hole	Depth (m bgl)
WS1	0.40*	WS7	0.45*
WS3	0.20*/3.50	WS8	2.50
WS4	1.00	WS9	0.40*/3.00
WS5	0.20*	TPWS7	0.10*

Note: *Topsoil

3.3.2 Head

Soils described as Head were encountered directly beneath the Topsoil / Made Ground to the base of WS1, WS7, WS8, WS9 and TPWS7 at depths of 1.00m and 4.90m and comprised soft dark green and orangish brown slightly gravelly CLAY. Gravel is fine to medium sub-angular flint. No visual or olfactory indication of contamination was noted.

The Head was inferred to depths of between 3.80m and 4.00m from the dynamic probe holes (DP7 to DP9).

3.3.3 London Clay Formation

The soils of the London Clay Formation were encountered directly beneath the Topsoil / Made Ground to the base of WS4 and WS5 at depths of 4.00m and 3.90m, respectively, and comprised soft to firm orangish brown becoming grey and dark brown slightly sandy CLAY with selenite crystals. It was not encountered in the remaining trial holes. No visual or olfactory indication of contamination was noted.

The London Clay Formation was inferred to depths of 7.00m from the dynamic probe holes.

3.4 Roots

Records of the depth of roots observed in the samples recovered from the trial holes are given in Table 3.4.

Table 3.4. Root Record			
Trial Hole	Depth (m bgl)	Trial Hole	Depth (m bgl)
WS1	2.00	WS7	Not observed
WS3	2.50	WS8	1.00
WS4	2.50	WS9	0.40
WS5	2.00	TPWS7	Not observed

Ref: 14663/SR

Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

It must be emphasised that the probability of determining the maximum depth of roots from a narrow diameter borehole was low. Direct observation from trial pits would be necessary to gain a better indication of the maximum root depth.

Roots may be found to greater depth at other locations on the site particularly close to trees and/or trees that have been removed both within the site and its close environs. As noted in the Desk Study undertaken on the site by Soils Limited (Ref: 14663/DS, March 2015) mature trees were noted to boundaries of the site and centrally along the main access road.

3.5 Groundwater

Records of the depth of groundwater observed in the trial holes during the site investigation and subsequent monitoring visits are given in Table 3.5.

Table 3.5. Groundwater Records			
Trial Hole	Depth (m bgl)	Trial Hole	Depth (m bgl)
WS1	None recorded	WS7	1.60
	Dry (02/02/15)		1.54 (02/02/15)
	Dry (09/02/15)		1.27 (09/02/15)
	3.60 (27/02/15)		0.81 (27/02/15)
	Dry (18/03/15)		Not located (18/03/15)
WS3	3.50	WS8	2.60
WS4	None recorded	WS9	1.70
			1.72 (02/02/15)
			1.73 (09/02/15)
			1.69 (27/02/15)
WS5	None recorded	TPWS7	1.74 (18/03/15)

Changes in groundwater level occur for a number of reasons including seasonal effects and variations in drainage. The investigation was conducted in January to March (2015), when groundwater levels should be rising towards their annual maximum elevation (i.e. highest in March).

Isolated pockets of groundwater may be perched within any Made Ground found at other locations around the site.

Ref: 14663/SR

Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

Section 4 Discussion of Geotechnical *In situ* Testing

4.1 Dynamic Probe Tests

Dynamic probing was undertaken at 9No. locations (DP2 to DP10) adjacent and prior to the drilling of the respective windowless sampler boreholes (and additionally at DP2, DP6 and DP10) to depths of between 3.30m in DP2 and 7.00m bgl in DP3 to DP6, DP9 and DP10.

Dynamic probing involves the driving of a metal cone into the ground via a series of steel rods. These rods are driven from the surface by a hammer system that lifts and drops a 63.5kg hammer onto the top of the rods through a set height, thus ensuring a consistent energy input. The number of hammer blows that are required to drive the cone down by each 100mm increment are recorded. These blow counts then provide a comparative assessment from which correlations have been published, based on dynamic energy, which permit engineering parameters to be generated.

The dynamic probe results were converted to equivalent SPT values based on dynamic energy using in-house computer software (Geostru).

Using the suggested relationship by Stroud (1974) the equivalent SPT values derived from the dynamic probe tests were used to infer the undrained cohesive strength. The cohesive soils are classified using Table 4.1 (Ref: Stroud, M. A. 1974, "The Standard Penetration Test – its application and interpretation", Proc. ICE Conf. on Penetration Testing in the UK, Birmingham. Thomas Telford, London.).

Table 4.1 – Cohesive Soil Classification	
Classification	Undrained Cohesive Strength c_u (kPa)
Extremely low	<10
Very low	10 – 20
Low	20 – 40
Medium	40 – 75
High	75 – 150
Very high	150 – 300
Extremely high	> 300

(Ref: EN ISO 14688-2:2004 Clause 5.3.)

Coarse (granular) soils of the London Clay Formation were classified using the relationship as outlined in Table 4.2, using equivalent SPT blow counts derived from the dynamic probe tests.

Table 4.2. Relative Density Classification	
Classification	S.P.T. "N1 (60)" blow count (blows/300mm)
Very loose	0 to 4
Loose	4 to 10
Medium dense	10 to 30
Dense	30 to 50
Very dense	Greater than 50

(Ref: The Standard Penetration Test (SPT): Methods and Use, CIRIA Report 143, 1995)

Ref: 14663/SR

Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

The UK National Annex to Eurocode 7: Geotechnical design – Part 2: Ground investigation and testing, NA 3.7 SPT test, BS EN 1997-2:2007, Annex F states "Relative density descriptions on borehole records should also be based on uncorrected SPT N values, unless significantly disturbed, using the density classification in BS 5930:1999+A1, Table 13.

An interpretation of the equivalent SPT blow counts inferred from the dynamic probe are given in Table 4.2.

Table 4.3. Interpretation Of Equivalent SPT 'N' Blow Counts				
Lithology	Equivalent SPT 'N' Blow Counts	Soil Type		Trial Hole (m bgl)
		Cohesive	Granular	
HEAD (Slightly gravelly CLAY)	0 – 8	Extremely low to low	-	DP7 to DP9 (0.45-4.00, excl. 1.60-1.80(DP7))
LC (Slightly sandy CLAY)	3 – 10	Very low to medium	-	DP4 and DP5 (0.20-4.00, excl. 1.90-2.20 (DP5))
LC / HEAD (Granular band)	20 – 36		Medium dense to dense	DP5 (1.90-2.20) & DP7 (1.60-1.80)
LC (Slightly sandy CLAY)	6 – 29	Low to high	-	DP1 and DP4 to DP8 (4.00-7.00)

Note: *Inferred from dynamic probe
(The Dynamic Probe 'Super Heavy' (DPSH-B) Test was conducted in accordance with BS EN ISO 22476-2:2005).

The test results are presented in Appendix A.

4.2 California Bearing Ratio Tests

In-situ Dynamic Cone Penetrometer (DCP) California Bearing Ratio (CBR) tests were undertaken at 10No. locations across the site area.

Table 3.3 DCP CBR Results	
DCP Test No.	CBR value at 0.50m bgl (%)
1	5
2	5
3	15
4	3
5	12
6	4
7	6
8	12
9	5
10	9

The CBR values range from between 3% and 15% at the likely sub-grade depth of 0.50m bgl. The underlying materials at this depth vary across the site and may comprise Topsoil, Made Ground, Head Deposits and London Clay Formation. Reference should be made to the actual tests data for variance with depth.

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Ref: 14663/SR

Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

As CBR values are highly variable due to changes in moisture content in-situ testing must be undertaken immediately prior to the installation of pavements/roads. Any soft spots at formation level should be dug out and replaced with a suitably compacted granular fill. Prior to construction the formation level should be proof rolled.

Made Ground should be regarded as frost susceptible unless testing proves otherwise.

The cohesive soils of the Superficial Deposits tested would not be frost susceptible where the plasticity index was >15%, although where chalk gravel is present they would be.

The test results are given in Appendix B.

4.3 Geotechnical Discussion

A discussion of the results of the geotechnical aspects of the investigation is presented within this section.

4.3.1 Ground Conditions and In-situ Testing

The ground conditions revealed by the intrusive investigation are quite varied with the thickness of Made Ground ranging from 0.00m to 3.00m, and Topsoil from 0.20m to 0.45m. Head was recorded to the base of WS1, WS7, WS9 and TPWS7 at depths of between 1.00m and 4.90m.

The London Clay Formation was recorded to the base of WS4 and WS5 at 4.00m and 3.90m bgl, respectively (distinguished from the Head by the presence of selenite crystals, sand content and lack of gravel). It was noted encountered in the remaining trial holes.

It is considered reasonable to infer the London Clay Formation to the base of the dynamic probe holes at a maximum depth of 7.00m, based on the results of the dynamic probe tests, which are consistent through the ground profile from 4.00m to 7.00m bgl. The cohesive soil strength generally increases with depth from extremely low to low from ground level to around 3.00m bgl, low to medium between 3.00m and 4.00m and medium to high between 4.00m and 7.00m bgl.

4.3.2 Foundation Considerations

Based on the above in-situ testing and general ground conditions encountered it may be possible to use spread foundations for the proposed school development, depending on the volume change potential of the soils and the vegetation scheme at the site, although low strength soils are recorded as deep as 4.00m in some locations including the area proposed for the main school building. Depending on the proposed loadings a piled foundation solution may be required.

The findings of the Phase I Desk Study indicated that the clay soils on site have a moderate potential for shrinking or swelling. No geotechnical laboratory testing was undertaken, as requested by the Client.

The site walkover established that there was mature vegetation across some areas of the site, mainly to the boundaries, but also along the main access road. It may be necessary to consider a piled foundation solution in these areas if existing vegetation is to be removed or new vegetation added, and depending on the volume change potential of the soils.

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Ref: 14663/SR

Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

4.3.3 Soakaway Potential

The ground conditions encountered are predominately CLAY, which is likely to have low permeability. As such it is considered that the site is unlikely to be suitable for the use of soakaways.

Ref: 14663/SR

Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

Section 5 Introduction to Contaminated Land investigation

5.1 General

The site works were performed in accordance with the methods given in BS 5930+A2:2010 and BS EN ISO 22476-2&3:2005.

The chemical analyses were undertaken by QTS Environmental Limited in accordance with their UKAS and MCERTS accredited test methods or their documented in-house testing procedures. This investigation did not comprise an environmental audit of the site or its environs.

Trial-hole is a generic term used to describe a method of direct investigation. The term trial pit, borehole or window sample borehole implies the specific technique used to produce a trial-hole.

5.1.1 Objective of Investigation

The overall aim of the intrusive investigation was to investigate the infilled ground encountered and assess potential pollutant linkages that may exist for further remediation actions. The objectives were defined as follows:

- I. To investigate the likelihood that the site may have been contaminated as a result of previous use and infilled ground identified during the intrusive site investigation carried out in January 2015.
- II. To assess any soil contamination risk to potential receptors including human health and controlled waters.
- III. To use the result of intrusive site investigations to revise the initial conceptual site model designed by Soils Limited (March 2015) and assess the need for suitable remediation measures.
- IV. To ultimately satisfy any pending conditions on the planning consent associated to the potential development planned.

5.1.2 Proposed Development

The proposed redevelopment at the site was for a new secondary school comprising main school building, games courts, sports pitches, soft landscaping, access roads and parking areas. The proposed building layout plan was presented in Figure 2.2 of Soils Limited DS Report 14663 (March 2015).

Ref: 14663/SR

Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

Section 6 Contamination Land Assessment

6.1 Preliminary Conceptual Site Model and Risk Assessment Estimation

The Made Ground (i.e. as revealed by the intrusive investigation at the site) may contain contaminants that could pose an unacceptable risk to identified receptors, requiring further investigation. It was agreed with the client that the proposed intrusive investigation would provide information to enable an assessment to be made of the nature and extent of contamination and any remedial actions needed.

The groundwater vulnerability maps described the majority of the site as being located on a Secondary A Aquifer with Soils of High Leaching Potential (HU) recorded on site. This aquifer was associated with the Head deposits, which were not present along the southern edge and northern third of the site. Where present, the Soils of High Leaching Potential are soils which readily transmit liquid discharges because they are either shallow, or susceptible to rapid by-pass flow directly to rock, gravel or groundwater. The regional groundwater flowed to the northwest in line with the topography of the surrounding area. Due to the vulnerability of the site, it was considered that controlled water could be at risk of any contaminant that may be present within the soil. Potential contaminants present on the ground surface could potentially leach to the surface water through overland flow (i.e. run off) and groundwater flow.

The former landfill identified in the Desk Study undertaken on the site by Soils Limited (Report Ref: 14663/DS, March 2015) was targeted by the site investigation with boreholes WS7 to WS9 located within or adjacent to the former landfill area. Made Ground was encountered comprising soft to firm dark to light orangish brown and grey CLAY / clayey SILT with fine to medium gravel and fragments of brick, glass and fibrous material.

The development was for a school end-use therefore human health was considered at risk if significant pollutants were encountered in the made ground present at the site.

Table 6.1 presents the preliminary Conceptual Site Model (CSM) used to design the site investigation with all sources and pathways included.

The site investigation was designed, implemented and evaluated as presented in the following Sections.

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Ref: 14663/SR

Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

Table 6.1. Preliminary Conceptual Site Model And Anticipated Risk Assessment Methodology							
Linkage No	Potential Contaminants Identified from previous use	Pathway	Receptor	Risk Assessment Methodology (plus anticipated quantitative risk assessment methods)	Site Specific Settings	Risk Classification: Based on the initial assessment	Pollutant Linkage & Action Required
1	P2, P5, P7 & P9	e.g. Uptake (root and stomata), ingestion, inhalation and dermal absorption (by animal)	Ecological features (i.e. Flora and Fauna)	Presence of SSSI, Museum, Natural reserves and others within 0-250m to the site. Use EA Science Report	No ecological features within 250m of site.	Negligible	No action needed.
2	P2, P5, P7 & P9	e.g. Chemical attack	Building structures/services	Soil testing & use BRE 2005 for risk assessment. Water UK (2014) for pipes. Use Anglian Water trigger for services risk assessment	Proposed foundations and services pipes to be used.	Low	Further action: Phase II intrusive site investigation.
3	P2, P5, P7 & P9	e.g. Inhalation, ingestion and dermal contact	Human health Site residents	Use CLEA for human risk assessment	Residential with Plant Uptake End-use (School Site).	Medium	Further action: Phase II intrusive site investigation.
4	P2, P5, P7 & P9	e.g. Leaching (direct precipitation, overland flow and through flow)	Human Health Workers	Assessment not within the scope of this Desk study (responsibility of building contractor). Ground workers should follow regulations on health and safety during development. (HSE, 1991)	Workers and the general public should follow regulation on health and safety during development (HSE, 1991).	Low	Follow HSE procedures
5	P2, P5, P7 & P9	e.g. Leaching (direct precipitation, overland flow, through and groundwater flow)	Shallow groundwater/ Surface Water	Assess distance from watercourse and direction of flow - Consider use of R&D 20 publication and EA remediation target for risk assessment	Nearest surface water feature is on site.	Medium	Further action: Phase II intrusive site investigation.
6	P13	e.g. Through features, shafts, high permeability strata and infiltration by human	Deep groundwater	Underlie - groundwater - or - leachate - testing depending on site specific ground conditions. - Consider use of R&D 20 publication and EA remediation target for risk assessment if contamination is identified.	Site is located on Secondary Aquifer with high permeability soils (superficial deposits).	Low	Further action: Phase II intrusive site investigation.
6	P13	e.g. Through features, shafts, high permeability strata and infiltration by human	Human and Building Structures	Current or former Landfill sites within 0-250m to the site. Assess nature/size of site for Risk Assessment. Use CLEA, IAP & 665 to assess need for gas protection measures where necessary following ground gas testing	Former landfill site recorded on site.	Medium	Further action: Phase II intrusive site investigation.

Notes: HSE= Health and Safety Executive, SPZ= Source Protection Zone and P=Property, P2=Asbestos, P5=Metals and semi-metals, P7=Organic compounds (e.g. PAHs and TPHs), P9=Polychlorinated Biphenyls, P13=Soil gas.

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Ref: 14663/SR

Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

6.2 Anticipated Investigation Methods

The following sections deal with the Sampling Strategy and Risk Assessment Method.

6.2.1 Sampling strategy

CLR4 (DOE 1994) and EA R&D P5-066/TR were used to inform the decision regarding the number of sampling locations appropriate to the investigation.

A non-targeted sampling strategy is appropriate when there is:

- No adequate information available regarding the likely locations of contamination;
- No sensitive areas where there is a need for a high degree of confidence.

A targeted sampling strategy is appropriate when there is:

- Adequate information available regarding the likely locations of contamination;
- Sensitive areas where there is a need for a high degree of confidence.

Systematic (i.e. non targeted sampling) was adopted to identify the nature and extent of any soil contamination in the Made Ground at the site.

The planned site work (Figure 6.1) comprised the following items:

- **Window samples:** The drilling of 7No. window samples (WS1, WS3 to WS5, WS7 to WS9) to a depth of 5.00m below ground level (bgl), as agreed with the client;
- **Trial Pits:** The excavation of 1No. trial pit (TPWS7) to a depth of 1.00m below ground level (bgl), as agreed with the client;
- **Soil gas monitoring wells:** The installation of 3No windowless sampler boreholes (WS1, WS7 and WS9) to depths of 5.00m bgl for soil gas monitoring;
- **Groundwater monitoring wells:** The installation of monitoring wells within the boreholes for groundwater monitoring was considered warranted if the initial site characterisation revealed soil contamination in the soil samples tested.
- Logging of soils taken from the window samples and trial pit.

Table 7.2 shows the receptors relevant to the planned sampling depths:

Table 7. 1. Potential Receptors and Sampling Depths	
Receptors	Sampling Range (m bgl)
Human health: soils contamination	0.00-1.20
Groundwater	0.20-2.00
Surface Water	0.00-1.00

Ref: 14663/SR

Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH



Note: Anticipated windowless sampling (WS) to 5m deep and trial pits (TP) to 1.00m deep. DP and DCPs are carried out for geotechnical purposes.

Table 6.2. Planned Site Investigation Design

Ref: 14663/SR

Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

6.2.2 Risk assessment methods for human health

Model procedures (CLR 8) recommend a tiered approach to be taken to contaminated land risk assessment. Therefore, the interpretation of the site investigation results used Tier 1 Generic Assessment Criteria (GAC), published Category 4 Screening Levels (C4SL) and Soil Guideline Values (SGVs) for residential end-use, which was used as the most appropriate end-use type for the proposed development.

It was therefore considered that values of contaminants tested were to be compared against Published United Kingdom C4SLs and SGVs where available and CLEA GAC to assess risk to human health generated by third parties (e.g. LQM GAC).

Published C4SLs, SGVs and GAC are used to assess long-term contamination risks to human health and are pre-calculated values derived from a given selection of contaminant pathways that will pose 'no significant threat to health'. The most sensitive exposure route is considered to be the oral route from contaminated soil by ingestion and inhalation. The assessment criteria used to determine risks to human health are derived and explained within Appendix D.

6.2.3 Risk to Controlled Water

Given the amount of Made Ground identified on site, the underlying Secondary A Aquifer on site and the high permeability soils, further assessment of the risk posed to controlled waters is necessary, if contamination is identified in the soils.

Groundwater samples tested will be assessed using a tiered approach as described in R&D 20 publication and EA Remedial Targets (2006). Leachate mean and individual values will be compared against United Kingdom Drinking Water Standards where available and other authoritative guideline (i.e. WHO) where necessary and appropriate.

6.2.4 Soil Gas

The initial assessment established a potential soil gas risk from the former landfill located on site, which required the installation of monitoring boreholes.

The anticipated investigation comprised the installation of wells for combined soil gas and groundwater sampling. It was anticipated that the monitoring will comprised, soil gas flow rate, concentration of carbon dioxide, carbon monoxide, hydrogen sulphate methane (total and LEL), VOCs and oxygen.

The interpretation of planned soil gas results was to use authoritative guidance BS8485.

Ref: 14663/SR

Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

Section 7 Site Work

7.1 Work Undertaken

The following works were carried out in January 2015.

- I. The excavation of trial pit and windowless samplers was carried out as detailed in section 3.1.1.
- II. The soils samples taken were logged and sent to the laboratory for testing as shown in Table 8.1.
- III. The installation of 3No windowless sampler boreholes (WS1, WS7 and WS9) to depths of 3.90m and 4.90m bgl to allow soil gas monitoring in the fill and groundwater sampling.

7.2 Determination of Contaminants of Concern for Soil Samples

The driver for the determination of the analysis suite was the information obtained from the CSM framework.

Table 7.1 presents the schedule of the samples recovered from the site to be analysed.

Table 7.1. Chemical Analysis Samples				
Stratum	Trial Hole	Depth (m bgl)	Soil Suite 1	Soil Suite 2
MG	WS1	0.40	X	
MG	WS3	0.20		X
MG	WS4	0.80	X	
MG	WS5	0.60		X
SS	WS8	0.20	X	
MG	WS9	0.30		X
MG	WS9	1.00	X	
MG	TPWS7	1.00		X

Notes: **Soils Suite 1:** Metals and semi metals and PAH - Speciated (EPA 16). **Soils Suite 2:** Metals and semi metals, PAH - Speciated (EPA 16), Total Petroleum Hydrocarbons and BTEX. MG= Made ground, TS=Topsoil, SS=Sub Soil

The results of the soil chemical testing are discussed in Section 9 of this report.

7.2.1 Made Ground (MG)

Made Ground was encountered in WS3 and WS9 underlying the Topsoil and WS4 and WS8 from surface, to depths of between 1.00m and 3.00m and comprised soft to firm dark to light orangish brown and grey CLAY / clayey SILT, locally with fine to medium gravel and fragments of brick, glass, plastic, wood and bone. No visual or olfactory indication of contamination was noted. No visual evidence of asbestos was noted.

Ref: 14663/SR

Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

Section 8 Revised Conceptual Site Model (CSM)

8.1 Site Characterisation and Revised CSM

The preliminary conceptual site model, including linkages that required further actions were presented in Table 7.1. Pollutant linkages 2-5 for buildings / services, human health and controlled waters were identified as needing further action. The contaminated land site investigation therefore aimed to assess pollutants and made ground risks to human health and controlled waters and also identified receptors at risk from landfill gas (Table 8.1).

Ref: 14663/SR

Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

Table 8.1. Revised Conceptual Site Model After Site Works, and Risk Assessment Methodology							
Linkage No	Potential Contaminant Identified	Pathway	Receptor	Risk Assessment Methodology	Site specific settings	Risk Classification: Based onsite works	Pollutant Linkage & Action Required
1	P1-P3 (Made Ground)	e.g. Uptake (root and stomatal), ingestion, inhalation and dermal absorption by animal	Ecological features (i.e. Flora and Fauna)	Presence of SSGL, Museum, Natural reserves and others within 0-250m to the site. Use EA Science Report	No ecological features within 250m of site.	Negligible	No action needed
2	P1-P3 (Made Ground)	e.g. Chemical attack	Building structures / services	Soil testing & use BRE 2005 for risk assessment. Water UK (2014) for pipes. Use Anglian Water trigger for services risk assessment	Proposed foundations and services pipes to be used.	Low	Further action: Intrusive site investigation to establish if soil is contaminated
3	P1-P3 (Made Ground)	e.g. Inhalation, ingestion and dermal contact	Human health Workers	Use CLEA for human risk assessment Assessment not within the scope of this Desk study (responsibility of building contractor). Ground workers should follow regulations on health and safety during development (HSE, 1991)	Residential with Plant Uptake End-use (School Site). Workers and the general public should follow regulation on health and safety during development (HSE, 1991).	Medium Low	Further action: Intrusive site investigation to establish if soil is contaminated Follow HSE procedures
4	P1-P3 (Made Ground)	e.g. Leaching (direct precipitation, overland flow and through flow)	Shallow groundwater/ surface water	Assessment to be carried out based on distance from watercourse and direction of flow - Consider use of R8D 20 publication and EA Remedial Targets(2006) for risk assessment	Nearest surface water feature is on site.	Medium	Further action: Intrusive site investigation to establish if soil is contaminated
5	P1-P3 (Made Ground)	e.g. Leaching (direct precipitation, overland flow, through and groundwater flow)	Deep groundwater	Undertake groundwater or leachate testing depending on site specific ground conditions. - Consider use of R8D 20 publication and EA Remedial Targets (2006) for risk assessment if contamination is identified.	Site is located on Secondary Aquifer with high permeability soils (superficial deposits).	Low	Further action: Intrusive site investigation to establish if groundwater is contaminated
6	P6 (Made Ground)	e.g. Through fissures, shafts, high permeability strata and inhalation by human	Human and Building Structures	Current or former Landfill sites within 0-250m to the site. Assess nature/size/size of site for Risk Assessment. Use EA Environmental permit guidance SPR 5.02 to assess need for gas protection measures where necessary following soil gas testing	Former landfill site recorded on site. Made Ground recorded to depths of at least 3.50m.	Medium	Further action: Soil gas monitoring

Notes:
P1 = Asbestos
P2 = Metals and semi-metals (e.g. Arsenic, Chromium)
P3 = Organic compounds (e.g. PAHs and TPHs)
P6 = Soil gas

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Ref: 14663/SR

Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

Section 9 Quantitative Risk Assessment

9.1 Human health quantitative risk assessment

The comparison of the representative contaminants concentration for human health receptor to the Category 4 Screening Levels (C4SLs), Soil Guideline Values (SGV) and General Assessment Criteria (GAC) are presented in Table 10.1. These results are assessed against the "Residential" land-use scenario. **Exceedances were identified for Arsenic, Lead, Nickel and Vanadium in one sample (WS9 at 1.00m).** All other contaminants were either below laboratory detection limits or their authoritative soil guidelines (Appendix B).

Ref: 14663/SR

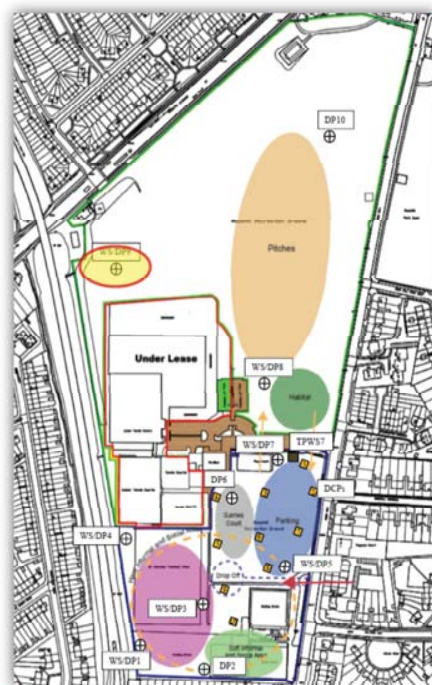
Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

Table 9.1. Summary of Chemical Analysis of Soil Samples											
Analysed	WS1	WS3	WS4	WS5	WS7	WS8	WS9	WS9	Mean	SGV / GAC/DL	
Asbestos Screen	ND	ND	ND	ND	ND	ND	ND	ND		na	
pH	7.7	7.5	7.3	7.5	7	6.8	7.1	7.2	7.26	na	
Total Cyanide	2	2	2	2	2	2	2	2	2.00	na	
Sulphide	5	5	5	5	5	5	5	5	5.00	na	
Organic Matter	1.2	4.9	2	1.5	3.9	4.3	3.7	5.2	3.34	na	
Total Organic Carbon	0.7	2.9	1.2	0.9	2.3	2.5	2.1	3	1.95	na	
Arsenic	5	8	7	9	10	11	14	81	18.00	37.00	
Beryllium	0.5	0.5	0.6	0.7	0.7	0.5	0.8	9.5	1.73	51.00	
Water Soluble Boron	1	1	1	1	1	1	1	3	1.25	291.00	
Cadmium	0.2	0.3	0.2	0.2	0.2	0.5	0.5	4.7	0.98	26.00	
Chromium	31	34	36	39	32	26	42	95	41.88	3000.00	
Hexavalent Chromium	2	2	2	2	2	2	2	2	2.00	21.00	
Copper	9	26	18	16	30	37	38	175	69.63	2330.00	
Lead	20	119	87	35	92	185	105	979	202.75	200.00	
Mercury	1	1	1	1	1	1	1	1	1.00	170.00	
Nickel	12	18	16	19	18	18	24	105	40.38	130.00	
Selenium	3	3	3	3	3	3	3	3	3.00	350.00	
Vanadium	58	64	68	74	62	48	77	151	75.25	140.00	
Zinc	39	74	52	50	71	175	133	865	168.63	3750.00	
Monohydric Phenols	2	2	2	2	2	2	2	2	2.00	280.00	
Naphthalene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.10	1.50	
Acenaphthylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.10	170.00	
Acenaphthene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.10	210.00	
Fluorene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.10	160.00	
Phenanthrene	0.1	0.1	0.1	0.1	0.25	0.57	0.22	0.1	0.19	92.00	
Anthracene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.10	2300.00	
Fluoranthene	0.1	0.1	0.1	0.1	0.69	1.44	0.53	0.1	0.40	260.00	
Pyrene	0.1	0.1	0.1	0.1	0.56	1.2	0.43	0.1	0.34	560.00	
Benzo(a)anthracene	0.1	0.1	0.1	0.1	0.31	0.6	0.2	0.1	0.20	4.75	
Chrysene	0.1	0.1	0.1	0.1	0.35	0.75	0.27	0.1	0.23	8.00	
Benzo(b)fluoranthene	0.1	0.1	0.1	0.1	0.41	0.72	0.25	0.1	0.24	6.50	
Benzo(k)fluoranthene	0.1	0.1	0.1	0.1	0.13	0.37	0.1	0.1	0.14	3.60	
Benzo(a)pyrene	0.1	0.1	0.1	0.1	0.28	0.6	0.17	0.1	0.19	5.00	
Indeno(1,2,3-cd)pyrene	0.1	0.1	0.1	0.1	0.16	0.33	0.1	0.1	0.14	3.20	
Dibenz(a,h)anthracene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.10	0.85	
Benzo(ghi)perylene	0.1	0.1	0.1	0.1	0.14	0.32	0.1	0.1	0.13	44.00	
Total EPA-16 PAHs	1.6	1.6	1.6	1.6	3.3	6.9	2.1	1.6	2.54	none	
Aliphatic >C5 - C6	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	30.00	
Aliphatic >C6 - C8	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	73.00	
Aliphatic >C8 - C10	2	2	2	2	2	2	2	2	2.00	19.00	
Aliphatic >C10 - C12	2	2	2	2	2	2	2	2	2.00	53.00	
Aliphatic >C12 - C16	3	3	3	3	3	3	3	3	3.00	740.00	
Aliphatic >C16 - C21	3	3	3	3	3	3	3	3	3.00	45000.00	
Aliphatic >C21 - C24	10	10	10	10	10	10	10	10	10.00	none	
Aliphatic >C5 - C24	21	21	21	21	21	21	21	21	21.00	none	
Aromatic >C5 - C7	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	65.00	
Aromatic >C7 - C8	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	120.00	
Aromatic >C8 - C10	2	2	2	2	2	2	2	2	2.00	27.00	
Aromatic >C10 - C12	2	2	2	2	2	2	2	2	2.00	69.00	
Aromatic >C12 - C16	2	2	2	2	2	2	2	2	2.00	140.00	
Aromatic >C16 - C21	3	3	3	3	3	3	3	3	3.00	250.00	
Aromatic >C21 - C25	10	10	10	10	10	10	10	10	10.00	890.00	
Aromatic >C5 - C25	21	21	21	21	21	21	21	21	21.00	890.00	
Benzene	2	2	2	2	2	2	2	2	2.00	2.00	
Toluene	5	5	5	5	5	5	5	5	5.00	5.00	
Ethylbenzene	2	2	2	2	2	2	2	2	2.00	10.00	
m, p-xylene	2	2	2	2	2	2	2	2	2.00	10.00	
o-xylene	2	2	2	2	2	2	2	2	2.00	10.00	
MTBE	5	5	5	5	5	5	5	5	5.00	5.00	
	Value exceeds relevant Soil Guideline Value (SGV), Generic Assessment Criteria (GAC) or laboratory Detection Limit (DL)										
	Red	Potentially contaminated samples									

Note: All other relevant contaminants values were below their respective laboratory detection limits

Ref: 14663/SR

Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH



Contaminated Area (Not to scale)

Table 9.2. Plan of Contaminated Areas

9.2 Groundwater quantitative risk assessment

Given the site's environmental and hydrogeological setting, situated on a **Secondary Aquifer** and soils with **high** leaching potential, the groundwater was a potential receptor.

An exceedance was identified for Boron (dissolved) in WS9 at 1.72m bgl. All the other contaminants that were analysed in the groundwater samples were below laboratory detection limits or UK Drinking Water Standards (UKDWS). The results of the groundwater analysis (Table 9.2) suggested that controlled waters may be at risk from contamination.

Ref: 14663/SR

Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

Table 9.2. Summary of the Results of Chemical Testing Compared to EQS or Detection Limit

Determinand	Unit	Trial Pit/ Depth (m bgl)	Water		EQS/DL
			WS7 1.54	WS9 1.72	
pH		NA	7.2	6.9	10
Total Cyanide	ug/l	5	< 5	< 5	
Sulphate as SO4	mg/l	1	3550	703	
Sulphide	mg/l	0.1	< 0.1	< 0.1	
Total Organic Carbon (TOC)	mg/l	0.1	5.3	6.9	
Arsenic (dissolved)	ug/l	10	< 5	7	10
Beryllium (dissolved)	ug/l	1	< 3	< 3	
Boron (dissolved)	ug/l	50	664	1330	1000
Cadmium (dissolved)	ug/l	0.5	< 0.4	< 0.4	5
Chromium (dissolved)	ug/l	5	8	< 5	50
Chromium (hexavalent)	ug/l	5	< 5	< 5	50
Copper (dissolved)	ug/l	10	< 5	< 5	2000
Lead (dissolved)	ug/l	5	< 5	< 5	10
Mercury (dissolved)	ug/l	0.05	< 0.05	< 0.05	1
Nickel (dissolved)	ug/l	7	< 5	< 5	20
Selenium (dissolved)	ug/l	5	< 5	< 5	10
Vanadium (dissolved)	ug/l	5	< 5	< 5	
Zinc (dissolved)	ug/l	5	8	22	5000
Total Phenols	ug/l	0.5	< 0.5	< 0.5	
Naphthalene	ug/l	0.1	< 0.01	< 0.01	0.1
Acenaphthylene	ug/l	0.1	< 0.01	< 0.01	0.1
Acenaphthene	ug/l	0.1	< 0.01	< 0.01	0.1
Fluorene	ug/l	0.1	< 0.01	< 0.01	0.1
Phenanthrene	ug/l	0.1	< 0.01	< 0.01	0.1
Anthracene	ug/l	0.1	< 0.01	< 0.01	0
Fluoranthene	ug/l	0.1	< 0.01	< 0.01	0.1
Pyrene	ug/l	0.1	< 0.01	< 0.01	0
Benzo(a)anthracene	ug/l	0.1	< 0.01	< 0.01	0.1
Chrysene	ug/l	0.1	< 0.01	< 0.01	0.1
Benzo(b)fluoranthene	ug/l	0.1	< 0.01	< 0.01	0.1
Benzo(k)fluoranthene	ug/l	0.1	< 0.01	< 0.01	0.1
Benzo(a)pyrene	ug/l	0.1	< 0.01	< 0.01	0.1
Indeno(1,2,3-cd)pyrene	ug/l	0.1	< 0.01	< 0.01	0.1
Dibenzo(a,h)anthracene	ug/l	0.1	< 0.01	< 0.01	0.1
Benzo(ghi)perylene	ug/l	0.1	< 0.01	< 0.01	0.1
Total EPA-16 PAHs	ug/l	1.6	< 0.01	< 0.01	Na
Aliphatic >C5 - C6	ug/l	10.0	< 10		15000
Aliphatic >C6 - C8	ug/l	10.0	< 10		15000
Aliphatic >C8 - C10	ug/l	10.0	< 10		300
Aliphatic >C10 - C12	ug/l	10.0	< 10		300
Aliphatic >C12 - C16	ug/l	10.0	< 10		300
Aliphatic >C16 - C21	ug/l	10.0	< 10		300
Aliphatic >C21 - C34	ug/l	10.0	< 10		300
Aliphatic (C5 - C34)	ug/l	70.0	< 70		300
Aromatic >C5 - C7	ug/l	10.0	< 10		10
Aromatic >C7 - C8	ug/l	10.0	< 10		700
Aromatic >C8 - C10	ug/l	10.0	< 10		300
Aromatic >C10 - C12	ug/l	10.0	< 10		100
Aromatic >C12 - C16	ug/l	10.0	< 10		100
Aromatic >C16 - C21	ug/l	10.0	< 10		90
Aromatic >C21 - C35	ug/l	10.0	< 10		90
Aromatic (C5 - C35)	ug/l	70.0	< 70		300
Total >C5 - C35	ug/l	140.0	< 140		300
			Exceed EQS or Detection limit		
			No exceedance		
			EQS Environmental Quality Standard		
			DL Detection Limit		

Note: All other relevant contaminants values were below their respective laboratory detection limits

Ref: 14663/SR

Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

9.3 Soil Gas and Quantitative Risk Assessment

The Soils Limited Desk Study (Ref:14663/DS, March 2015) showed that a former landfill was present across the western part of the site. The Soils Limited Intrusive investigation revealed the presence of Made Ground to a depth of 3.5m bgl, although the depth of Made Ground was not proven, so could be greater.

Given the above, gas monitoring was considered necessary to assess the soil gas risk at the site. Four gas monitoring cycles were undertaken as part of this investigation, as agreed with the client. Monitoring with a GFM 435 Gas Analyser was undertaken in the wells to measure the concentrations of oxygen, methane, carbon dioxide, carbon monoxide and hydrogen sulphide as well as flow rates and atmospheric pressure. A Photo Ionisation Detector (PID) was also used to detect for any volatile organic compounds (VOCs) present in the ground.

Groundwater levels were also recorded in the monitoring wells, where present.

9.3.1 Monitoring Well Construction

The installations comprised 25mm ID HPDE pipework installed in boreholes WS1, WS7 and WS9 to depths of between 3.90m and 4.90m bgl. The response zone comprised a slotted pipe with non-calcareous gravel pack surround with a bentonite seal above.

The headworks comprised a single gas tap fitted into an end cap and placed on the end of the pipework just below ground level within a metal stopcock cover set in concrete.

9.3.2 Soil Gas / VOC Monitoring

Field soil gas and VOC monitoring was undertaken on four occasions following completion of the site works, as agreed with the client. The concentrations of the soil gases and VOCs were measured using a portable infrared monitor and the atmospheric pressure and flow rates were measured with a differential manometer and barometer, and are presented below in Table 9.3.

Table 9.3. Soil Gas and VOC Readings												
Date	Barometric Trend	BH	CH ₄ (%)	CO ₂ (%)	O ₂ (%)	H ₂ S (ppm)	CO (ppm)	LEL (%)	aP (mb)	Flow (l/hr)	H ₂ O (m bgl)	VOC
02/02/15	Falling	ATM	0.0	0.0	20.6	0.0	0.0	0.0	1007	n/a	n/a	0.0
		WS1	0.0	1.3	21.1	0.0	0.0	0.0	1007	-0.11	Dry	0.0
		WS7	0.0	0.5	20.0	0.0	0.0	0.0	1007	0.01	1.54	0.0
		WS9	0.0	11.0	4.4	0.0	0.0	0.0	1007	0.01	1.72	0.0
09/02/15	Rising	ATM	0.0	0.0	20.5	0.0	0.0	0.0	1025	n/a	n/a	0.0
		WS1	0.0	0.6	17.3	0.0	0.0	0.0	1025	0.01	Dry	0.0
		WS7	0.0	0.3	20.1	0.0	0.0	0.0	1025	0.0	1.27	0.0
		WS9	0.0	9.8	6.3	0.0	0.0	0.0	1027	0.0	1.73	0.0
27/02/15	Steady	ATM	0.0	0.0	20.7	0.0	0.0	0.0	1013	n/a	n/a	0.0
		WS1	0.0	1.5	8.7	0.0	0.0	0.0	1013	0.01	3.60	0.0
		WS7	0.0	0.6	19.4	0.0	0.0	0.0	1013	0.6	0.81	0.0
		WS9	0.0	7.6	8.1	0.0	0.0	0.0	1013	0.0	1.69	0.0
18/03/15	Steady	ATM	0.0	0.0	21.5	0.0	0.0	0.0	1036	n/a	n/a	0.0
		WS1	0.0	1.2	16.8	0.0	0.0	0.0	1036	0.0	Dry	0.0
		WS7*										
		WS9	0.0	13.0	7.3	0.0	0.0	0.0	1036	0.0	1.74	0.0

Note: *Unable to locate borehole.

Ref: 14663/SR

Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

9.3.3 Soil Gas / VOC Protection

The results of soil gas / VOC monitoring undertaken are summarised below:

- The highest concentration of carbon dioxide (CO₂) was recorded as 13.0% by volume in borehole WS9 on 18/03/15.
- The lowest concentration of oxygen (O₂) was recorded as 4.4% by volume in borehole WS9 on 02/02/15.
- Results showed concentrations of VOCs did not exceed the detection limit of the PID at 0.0ppm, in any of the boreholes across all the visits.
- The maximum flow rate was recorded as 0.6l/hr in borehole WS7 on 27/02/15.
- The ground gas monitoring did not detect any concentrations of hydrogen sulphide, methane or carbon monoxide.

Based on the documentation presented in "BS 8485:2007, Code of practice for the characterization and remediation from ground gas in affected developments", the *hazardous gas flow rate* (Q_{hg}) should be calculated using:

$$Q_{hg} = C_{hg} / 100 \times q$$

Where:

C_{hg} is the measured hazardous gas concentration (in percentage volume-by-volume);

q is the flow rate (in litres per hour) of combined gases found by direct measurement.

The *Site Characteristic hazardous gas flow rate* (Q_{hgs}) was calculated as being 0.078.

BS 8485:2007 stipulates that "individual gas measurements obtained from several monitoring locations over a number of visits should be considered collectively to establish a characteristic hazardous gas flow rate for the site as a whole". Attempts were made to target periods of falling, rising and steady atmospheric pressure.

Based on the data available the *Site Characteristic hazardous gas flow rate* (Q_{hgs}) was calculated as being 0.078. This has been based on evaluating all of the ground gas concentrations detected and having established the potential sources of the gas generation through completion of a Phase I Desk Study and Phase II Ground Investigation for the site.

The *Site Characteristic hazardous gas flow rate* (Q_{hgs}) of 0.078 and the maximum recorded concentration of carbon dioxide of 13.0%, would indicate the site falls into a **Characteristic Situation 'CS2'**, where the hazard potential is considered as 'low', in accordance with BS 8485:2007.

Following this scoping exercise, further gas monitoring may be required if the proposed development is proceeded with. In accordance with BS8485, CIRIA C665 guidance, a minimum of nine visits over a six month period should be undertaken, given the generation potential of the source (historical landfill) is moderate. The findings of the additional monitoring may alter the above assessment significantly.

Ref: 14663/SR

Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

9.4 Waste Acceptance Criteria

All waste going to landfill must be subjected to “basic characterisation”, which includes up to 3 steps as listed below.

The three steps of Basic Characterisation:

1. Initial description and physical/chemical testing of the solids;
2. A risk-based hazard assessment based on the chemical testing;
3. If hazardous, leachability testing to check compliance with Waste Acceptance Criteria (WAC).

Basic characterisation is the responsibility of the waste producer and compliance checking is generally the responsibility of the landfill operator. Therefore landfill operators will be unlikely to accept waste that does not meet the Waste Acceptance Criteria for their class of site.

The initial description of the waste at the landfill site based on the result of this study showed the waste to be Non-Hazardous, with the exception of sample WS9 at 1.00m which is classified as Hazardous Waste due to the concentration of Zinc present (Appendix B).

9.5 Conclusions

The chemical analysis of soil samples from across the site identified an exceedance of Arsenic, Lead, Nickel and Vanadium in WS9 at 1.00m. If the site were to be developed as proposed, remediation would be required in respect of the area around WS9.

The chemical analysis of groundwater identified an exceedance of Boron (dissolved) in WS9 at 1.72m bgl. Given that the underlying ground conditions are predominately clay, and the relatively minor exceedance, the risk to controlled waters is low. Remediation of the soils around the area of WS9 may reduce the residual risk to controlled waters further. On this basis further groundwater monitoring is recommended following the soils remediation around WS9.

Following this scoping exercise, further gas monitoring may be required if the proposed development is to proceed. In accordance with BS8485 and CIRIA C665 guidance, a minimum of nine visits over a six month period should be undertaken, given the generation potential of the source (historical landfill) is moderate.

9.6 Revised Conceptual Site Model and recommendations

The results of the contamination assessment of risk to identified receptors have been used to revise the conceptual model. Based on the results of the chemical laboratory testing, Table 10.3 outlines the Revised Conceptual Site Model.

Ref: 14663/SR

Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

Table 9.3. Revised Conceptual Site Model And Risk Assessment Methodology							
Linkage No	Contaminants Identified	Pathway	Receptor	Risk Assessment Methodology	Site specific settings	Risk Classification: Based on site investigation	Pollutant Linkage & Action Required
2	Arsenic, Lead, Nickel, Vanadium	e.g. Chemical attack	Building structures / services	Soil testing & use BRE 2005 for risk assessment. Water UK (2014) for pipes. Use Anglian Water trigger for services risk assessment	Proposed foundations and services pipes to be used.	Insignificant	No action required
3	Arsenic, Lead, Nickel, Vanadium	e.g. Inhalation, ingestion and dermal contact	Human health	Use CLEA for human risk assessment	Residential with Plant (Landscape End-use)	Low	Further action: Remediation required
4	Boron	e.g. Leaching (direct precipitation, overland flow and through flow)	Human Health Workers	Assessment not within the scope of this Desk study (responsibility of building contractor). Ground workers should follow regulations on health and safety during development (HSE, 1991)	Workers and the general public should follow regulation on health and safety during development (HSE, 1991).	Low	Follow HSE procedures
5	Boron	e.g. Leaching (direct precipitation, overland flow, through and groundwater flow)	Shallow groundwater/ surface water	Assessment to be carried out based on distance from watercourse and direction of flow – Consider use of R&D 20 publication and EA Remedial Targets(2006) for risk assessment	Nearest surface water feature is on site.	Low	Further action: Additional groundwater monitoring
6	P6	e.g. Through fissures, shafts, high permeability strata and inhalation by human	Deep groundwater	Understand groundwater or leachate testing depending on site specific ground conditions. Consider use of R&D 20 publication and EA Remedial Targets (2006) for risk assessment if contamination is identified.	Site is located on Secondary Aquifer with high permeability soils (superficial deposits).	Low	Further action: Additional groundwater monitoring
6	P6	e.g. Through fissures, shafts, high permeability strata and inhalation by human	Human and Building Structures	Current or former Landfill sites within 0-250m to the site. Assess nature/size of site for Risk Assessment. Use EA Environmental permit guidance EPR 5.02 to assess need for gas protection measures where necessary following soil gas testing	Former landfill site recorded on site. Made Ground recorded to depths of at least 3.50m.	Low	Further action: Additional soil gas monitoring if development proceeds

Notes: P6=soil gas

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March 2015

34

Ref: 14663/SR

Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

9.7 Plausible Sources and Pathways and Remediation option appraisal

Re-evaluation of the conceptual site model has revealed that plausible pollutant linkages may remain after the risk assessment and further soils gas monitoring is warranted. Measures should be taken to protect human health for contaminant encountered around WS9.

Elevated concentrations of determinants identified indicated an unacceptable risk to the end-users, and remediation must be undertaken.

9.8 Remedial Objective

The objective of the remediation for the site is to ensure site clean-up removes any unacceptable risk to the identified receptors of demolition/construction workers, service maintenance workers, groundwater, public and future site occupiers i.e. home owners.

The preceding assessment must be achieved using a risk based approach that considered the circumstances of the site, such as its location and intended use, engineering considerations and the need to ensure suitable amenities for any development.

In essence the remedial objective should sever any source-pathway-receptor pollutant linkages that have been established for the site in this report. Once this has been achieved, by whatever means, there can theoretically be no risk.

The advice and recommendations presented in the following Section are made solely on the basis of the chemical analyses results obtained during this intrusive investigation.

In respect to the groundworkers and site operatives, it was understood that in order to minimise the effect of dust inhalation and dermal contact as exposure pathways, employee must follow health and safety procedures.

9.9 Development of a Remediation Scheme

The intrusive investigation revealed that the site may be contaminated contaminants that may pose unacceptable risk to identified receptors.

Table 9.4 presents a brief summary of some options that may be considered in order the broke the pollutant linkages involved. A detailed remediation option appraisal can be prepared if necessary.

Ref: 14663/SR

Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

Table 9.4. Remediation Options

Options	Action	Advantage	Disadvantage
1	Further chemical testing to delineate the extent of contaminated soil for excavation around WS9. Site specific human health risk assessment.	May reduce the volume of contaminated soil for disposal and of clean topsoil imported.	May require more time and more resources for chemical testing and risk assessment.
2	Excavation of top 750mm of soils in impacted areas of soft landscaping and replace with clean topsoil	Could save time and probably money	Validation testing of residual and imported soils.
3	Excavation of current hotspots	Could save time and probably money	May be a long process if validation testing is not achieved.
4	Excavation of all the made ground	Only validation testing of the residual soils could be needed.	High volume of imported clean soil and exported contaminated soils, therefore high cost.
5	Pavement of all the site	No cost involved for importation and exportation of contaminated soils.	No garden areas or areas of soft landscaping. Pending results of gas monitoring.
6	Engineering capping system	Same as above	May be very expensive
7	Other treatments (e.g. physical, thermal and chemical)	Assessment not carried out	Assessment not carried out

Option 1: Further Chemical Testing and Human Health Risk Assessment

Further testing around the impacted trial-holes after the site strip could substantially reduce the amount of remediation required. This assessment may determine that Made Ground can remain under areas of permanent hardstanding and that the only areas requiring remediation are soft landscaped areas within the impacted hotspot. A site specific human health risk assessment could also be undertaken, which may reduce the risk to end-users from the identified contamination.

Option 2: Adoption of Cover System In Soft Landscaped Areas

Further sampling may be recommended after the site strip in areas of proposed soft landscaping, which could minimise the cost of any BRE Cover System required.

The BRE "Cover Systems For Land Regeneration, Thickness Design of Cover Systems for Contaminated Land, BRE, March 2004", allows for the design of cover systems to impacted soils where the concentration of determinands within the ground does not exceed any of the respective SSV, SGV's or GAC's by more than six times. In such a situation a maximum cover thickness of 600mm is given. However, the concentration of determinands within the certified clean soil/topsoil, which comprises the cover system, determines the overall thickness of the system and can reduce the required thickness markedly below 600mm or 750mm.

Where the concentration of determinands within the ground does exceed any of the respective SSV, SGV's or GAC's by more than six then an engineered capping system.

The concentrations of elevated determinands outlined in Table 9.2, show that none of the concentration of the chemical analysed was more than six times its guideline value. Therefore, a cover system may be suitable.

Ref: 14663/SR

Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

Option 3: Excavation of Holes with Impacted Soil

It could be proposed to excavate and stockpile the impacted material on the site in preparation for classification and subsequent disposal off-site to a suitable licensed facility. The excavation could be centred on the trial-hole with the impacted soil and be extended in all directions so that the impacted soils can be 'chased' out. This would be required to be validated if that were to happen.

The stockpiled soils must be placed on an impermeable liner with raised edges. During periods of rainfall, the stockpile must be covered over to minimise leaching and run-off into the underlying soils. Covering of the stockpile may be required to prevent fumes impacting receptors off-site.

Upon completion of the hotspot excavation, a representative number of validation samples from the sides and base of the excavation would need to be recovered and sent off for chemical laboratory analysis as part of the validation process.

Any voids resulting from the removal of impacted soil must be backfilled with a suitable certified clean granular soil.

The remedial works must be inspected and independently validated by a suitable person.

On completion of the development, a Validation and Closure Report must be supplied to both the Local Authority and the NHBC detailing the remediation works undertaken on the site.

The developer/groundworker must be made aware of the possible asbestos, former use of the site and for the potential for sources not identified in the Phase I Desk Study or the Phase II Intrusive Investigation to be found within the site both during demolition and the excavation of trenches for services and foundations.

Option 4: Excavation of all the topsoil and made ground

Topsoil and Made Ground was encountered across the site a maximum depth of 1m bgl. This could be excavated for disposal at an appropriate waste management facility after further categorization as explained for Option 3.

Option 5: Pavement of All the Site and Further Modelling

Paving the entire site could eliminate exposure to contaminated soils through:

- (i) Direct soil and dust ingestion,
- (ii) Consumption of home-grown produce,
- (iii) Dermal contact
- (iv) Inhalation of dust (indoor and outdoor). The pathway involving Inhalation of vapours (indoor and outdoor) will still exist and will require an adequate assessment of the need for a protective membrane in the building structure pending the result of gas monitoring.

Option 6: Engineering capping system

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March 2015

37

Ref: 14663/SR

Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

If an engineering capping system was required it should comprise geotextile and/or mesh underlying a 200mm thick layer of gap graded crushed concrete (5-75mm) or the like with geotextile underlying 450mm thickness of clean certified topsoil.

9.10 Validation Strategy

All remedial works considered must be inspected and independently validated by a suitable person.

All remedial excavations will need to be inspected and photographed. The imported subsoil and/or Topsoil will also need to be verified prior to placement.

9.11 Excavated Material

All waste going to landfill must be subjected to "basic characterisation", which includes up to 3 steps as listed below.

The three steps of Basic Characterisation

- 4. Initial description and physical/chemical testing of the solids,
- 5. A risk-based hazard assessment based on the chemical testing
- 6. If hazardous, leachability testing to check compliance with Waste Acceptance Criteria (WAC).

Basic characterisation is the responsibility of the waste producer and compliance checking is generally the responsibility of the landfill operator. Therefore landfill operators will be unlikely to accept waste that does not meet the Waste Acceptance Criteria for their class of site. The initial description of the soil at the proposed site based on the result of this study showed the waste to be non-Hazardous (HazWasteOnline Report, Appendix D).

There is an obligation to 'treat' all soils destined for landfill, including non-hazardous waste. This treatment must now be documented and presented to the landfill operator or waste may be refused entry. Note that all liquids are banned from landfill. For the purposes of legal compliance, 'treatment' must comprise three things (the 'three-point test'):

- 1. It must be a physical, thermal, chemical or biological process.
- 2. It must change the characteristics of the waste.
- 3. It must do so in order to:
 - (a) reduce its volume, or
 - (b) reduce its hazardous nature, or
 - (c) facilitate its handling, or enhance its recovery.

Any soil, which is to be imported onto the site, must undergo chemical analysis to permit classification prior to its importation and placement in order to ascertain its status with specific regard to contamination, i.e. to prove that it is suitable for the purpose for which it is intended.

Any Made Ground material excavated should either be classified and removed from site to a suitably licensed facility or alternatively, can be used to raise ground levels under areas of permanent hardstanding.

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March 2015

38

Ref: 14663/SR

Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

Made Ground excavated from foundation excavations and service excavations should be dealt with using the same method of disposal or re-use under areas of hardstanding. Service excavations must be over-dug and must be backfilled with certified clean material unless they can be shown to be passing through clean ground.

Excavated Made Ground material must be stockpiled on a waterproof polythene sheet with raised edges to avoid mixing with clean soils and to prevent leachate run-off.

9.11.1 Risk Based Hazard Assessment of Waste

Software such as the HazWasteOnline produced **Hazardous Waste Classification Tool**, enables soils 'total' chemical testing data to be used to identify the classification of waste soils in accordance with Environment Agency guidance. The HazWasteOnline Hazardous Waste Classification Tool was designed primarily for the classification of soil wastes as identified by the European Waste Catalogue (EWC) Chapter 17 - Construction and demolition wastes (including contaminated soils).

The classification of waste as either **hazardous or non-hazardous** must be conducted in accordance with the 2003 Environment Agency publication Interpretation of the Definition and Classification of Hazardous Waste (Technical Guidance WM2). This establishes the regulatory framework and allows classification of wastes based on their various risk phrases. Additional guidance provided by the 2007 Environment Agency publication How To Find Out if Waste Oil and Wastes that Contain Oil are Hazardous (HWR08) provides further clarification on the classification methodology for hydrocarbon contamination.

As part of the **Hazardous Waste Classification** process, contaminant compounds are selected based on historical and contemporary land-use. The inclusion of such data on the input form enables the correct waste classification to be determined. For example, in cases of land associated with former gasworks, the classification of coal-tar contaminated soils can be partially determined using total PAH concentrations as opposed to TPH concentrations as coal-tar may be deemed a "substance". Hazardous (HWR08) provides further clarification on the classification methodology for hydrocarbon contamination.

The analysis results of the chemical laboratory testing undertaken as part of report, prepared by QTS Environmental Ltd were used for the **Hazardous Waste Classification** process.

Full results of the laboratory analysis and hazardous waste classification tool are given in Appendix B.

9.11.2 Waste Acceptance Criteria Testing

Where a risk based hazard assessment shows that the waste is not inert then Waste Acceptance Criteria Testing (WAC 2-stage leachate testing) is required to decide whether contaminated soil either:

Meets WAC limits for hazardous landfill – so is acceptably insoluble/non-degradable and can be disposed therein,

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March 2015

39

Ref: 14663/SR

Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

or

Fails hazardous WAC – is so mobile, or degradable that it would breach the operator's Permit, so cannot even go to hazardous landfill without treatment.

It **must** be mentioned that the WAC results provide an indication for off-site disposal at the suitable landfill however the responsibility regarding the acceptance of waste at a landfill site lies entirely with landfill operator.

Where naturally occurring soils need to be disposed off-site then these soils can be classified as 'listed' **inert** waste.

9.11.3 Reuse of Excavated Material On-Site

The re-use of on-site soils may be undertaken either under the Environmental Permitting Regulations 2007 (EPR), in which case soils other than uncontaminated soils are classed as waste, or under the CL:AIRE Voluntary Code of Practice (CoP) which was published in September 2008 and is accepted as an alternative regime to the EPR.

Under the EPR, material that is contaminated but otherwise suitable for re-use is also classified as waste and its re-use should be in accordance with the Environmental Permitting Regulations 2007 (EPR). Environmental Permit Exemptions (EPE) are for the re-use of non-hazardous or inert waste only; hazardous waste cannot be re-used under a permit exemption. EPE apply only to imported inert waste materials; inert material arising on site and recovered on site is not classified as waste and does not require an exemption. It is possible that materials arising on-site will be classified as inert and would not need an exemption.

Environmental Permit Exemptions are only allowed for certain activities, placing controls on the quantities that can be stored and re-used. The re-use of waste shall be within areas and levels defined in planning applications and permissions for the development. An EPE requires a site specific risk assessment for the receptor site to demonstrate that the materials are suitable for use, i.e. that they will not give rise to harm to human health or pollution of the environment.

Under the CL:AIRE voluntary code of practice (CoP) materials excavated on-site are not deemed contaminated if suitable for re-use at specified locations or generally within the site.

Material that may have been classified as hazardous waste under the EPR may be re-used. The CoP regime requires that a 'Qualified Person' as defined under the CoP reviews the development of the Materials Management Plan, including review of Risk Assessments and Remediation Strategy/Design Statement together with documentation relating to Planning and Regulatory issues, and signs a Declaration which is forwarded to the Environment Agency and which confirms compliance with the CoP.

Should it be necessary to import materials from another site where materials are excavated and which is not material from a quarry or produced under a WRAP protocol, then an EPE

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March 2015

40

Ref: 14663/SR

Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

would be necessary for the imported material whether the work was managed under the CoP or the EPR.

9.12 Imported Material

Any soil which is to be imported onto the site must undergo chemical analysis to permit classification prior to its importation and placement in order to ascertain its status with specific regard to contamination, i.e. to prove that it is suitable for the purpose for which it is intended.

The Topsoil must be fit for purpose and to BS3882:2007 and must either be supplied with traceable chemical laboratory test certificates or be tested, either prior to placing or after placing, to ensure that the human receptor cannot come into contact with any compounds that could be detrimental to human health. The compounds that are to be tested for are those given Assessment Criteria, which can be viewed in Appendix D of this report.

9.13 Duty of Care

Groundworkers must maintain a good standard of personal hygiene including the wearing of overalls, boots, gloves and eye protectors and the use of dust masks during periods of dry weather.

To prevent exposure to airborne dust by both the general public and construction personnel the site should be kept damp during dry weather and at other times when dust were generated as a result of construction activities.

The site should be securely fenced at all times to prevent unauthorised access. Washing facilities should be provided and eating restricted to mess huts.

9.14 Discovery Strategy

There may be areas of contamination not identified during the course of the investigation. Such occurrences may also be discovered during the demolition and construction phases for the redevelopment of the site.

Care should be taken during excavation works especially to investigate any soils, which appear by eye (e.g. such as fibrous materials, large amounts of ash and unusual discolouration), odour (e.g. fuel, oil and chemical type odours or unusual odours such as sweet odours or fishy odours) or wellbeing (e.g. light headedness and/or nausea, burning of nasal passages and blistering or reddening of skin due to contact with soil) to be contaminated or of unusual and/or different character to standard soils or those analysed.

In the event of any discovery of potentially contaminated soils or materials, this discovery should be quarantined and reported to the most senior member of site staff or the designated responsible person at the site for action. The location, type and quantity must be recorded and the Local Authority, and a competent and appropriate third party Engineer/Environmental consultant notified immediately. An approval from the Local authority must be sought prior to implementing any proposed mitigation action.

The discovery strategy must remain on site at all times and must demonstrate a clear allocation of responsibility for reporting and dealing with contamination. A copy of the strategy must be placed on the health and safety notice board and /or displayed in a prominent area where all site

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Ref: 14663/SR

Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

staff are able to take note of and consult the document at any time. Any member of the workforce entering the site to undertake any excavation must be made aware of the potential to discover contamination and the discovery strategy.

9.15 Further Works

If the proposed school development is to proceed on this site, further to this scoping report, additional gas and groundwater monitoring is recommended following the remediation of soils around WS9 at 1.00m, where significant exceedances of several determinands were identified. A site specific human health risk assessment could also be undertaken, which may reduce the risk to end-users from the identified contamination.

Groundwater monitoring should comprise two additional visits, with samples tested for Boron (dissolved). If contamination is identified during the additional monitoring, it may be necessary to undertake a risk assessment in accordance with R&D 20 publication and EA Remedial Targets (2006).

In accordance with BS8485 and CIRIA C665 guidance, a minimum of nine gas monitoring visits over a six month period should be undertaken, given the generation potential of the source (historical landfill) is moderate.

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Ref: 14663/SR **Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH**

The following appendices complete this report:

- Appendix A- Field Work-Logs
- Appendix B- Laboratory Analysis
- Appendix C- Human Health Assessment Criteria

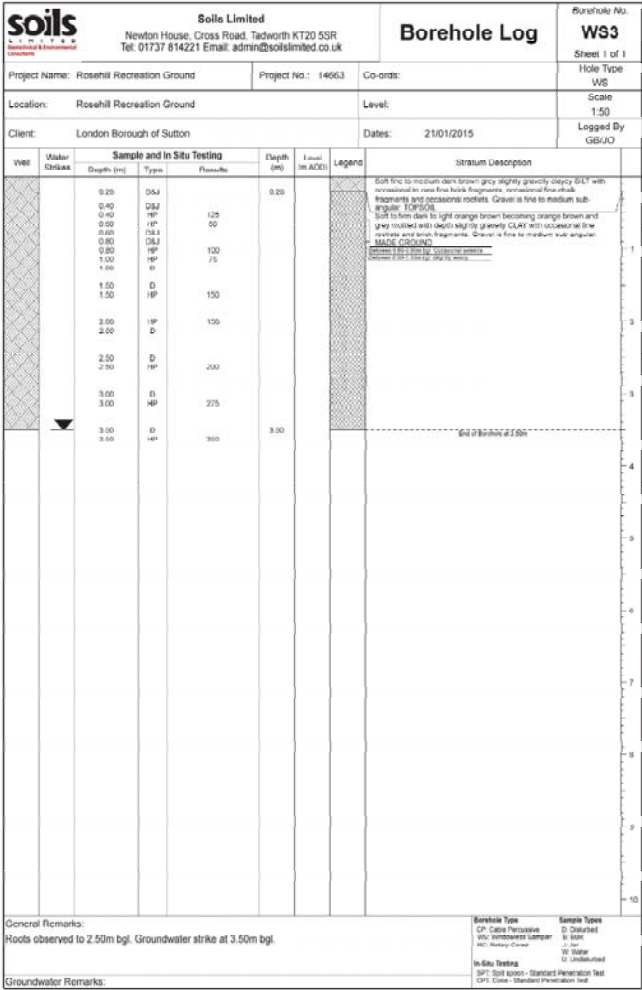
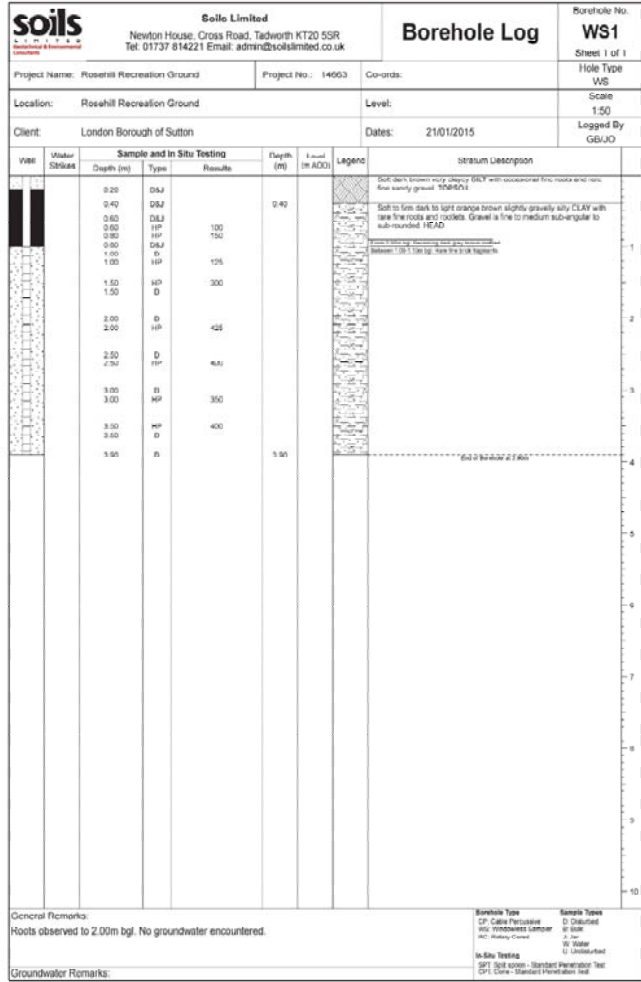
Appendix A- Field Work



S. J. Bevens B.Sc. (Hons), M.Sc. FGS
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Senior Geo-Environmental Engineer



Eur Ing. R. B. Higginson B.Sc., PG. Dip., C.Eng. MICE., FGS.
Geotechnical Advisor



soils
Soil Analysis & Environmental
Investigations

Soils Limited

Newton House, Cross Road, Tadworth KT20 5SR
Tel: 01737 814221 Email: admin@soilslimited.co.uk

Borehole Log

Borehole No.

WS5

Sheet 1 of 1

Project Name: Rosehill Recreation Ground				Project No.: 14663		Co-ords:		Hole Type WS	
Location: Rosehill Recreation Ground				Level:		Scale 1:50		Logged By GJNO	
Client: London Borough of Sutton				Dates: 21/01/2015					
Vibr	Marker Strata	Sample and in Situ Testing			Depth (m)	1 sec (m ACE)	Legends	Stratum Description	
		Depth (m)	Type	Fracture					
		0.25	DL		0.25			Soft dark grey brown slightly gravelly clayey SIL with occasional nodules. Chert in fine to 10mm size. TOSSOL Soft brownish fine dark to light orange brown CLAY with occasional to fine brick fragments and occasional fine selenite crystals. MAZE GROUND	
	0.40	HP		229					
	0.40	DL							
	0.65	DL							
	0.65	HP		905					
	0.80	HP		175					
	0.80	DL							
	1.00	L							
	1.00	HP		810					
	1.50	HP		450					
	1.50	D							
	2.00	D							
	2.00	HP		440					
	2.50	HP		450					
	2.70	L							
		3.00	HP		450			600 0.000 2.000	
	3.00	D							
	3.50	HP		400					
	3.50	D							
	3.90	HP		485					
		3.90	D		3.90				

General Remarks:
Holes observed to 2.00m bgl. No groundwater encountered. Dry at 3.90m bgl.


Groundwater Remarks:

Borehole Type
CP: Cable Perforator
W: Wireline Sampler
M: Rotary Core
SPT: Split spoon - Standard Penetration Test
CPT: Cone - Standard Penetration Test

In-Situ Testing
G: Gravimetric
W: Water
U: Undisturbed


Soils Limited Newton House, Cross Road, Tadworth KT20 5SR Tel: 01737 814221 Email: admin@soilslimited.co.uk						Borehole Log		Borehole No. WS8 Sheet 1 of 1
Project Name: Rosehill Recreation Ground				Project No.: 14663		Co-ords:		Hole Type WS
Location: Rosehill Recreation Ground						Level:		Scale 1:50
Client: London Borough of Sutton						Dates: 21/01/2015		Logged By GB/GJO
WB#	Water Course	Sample and In Situ Testing		Depth (m)	Level in AOD	Stratum Description		
		Depth (m)	Type	Fluctuates				
		0.25	DLJ		0.30	Soil dark brown silty gravelly sandy SILT with occasional pebbles and large fragments, occasional nodules, and rare fine angular brown (black) membrane and detrital wood. Crusts is occasional fine to medium sub-angular to sub-irregularly MAZE CRUSTING Black slightly gravelly SILT with occasional to frequent glass fragments, occasional brick fragments and fibrous material. Gravel is fine to medium sub-angular MPDE GROUND		
		0.40	DLJ					
		0.60	DLJ					
		0.80	DLJ					
		1.00	D					
		1.50	D					
		3.00	D					
		2.50	HP	75	2.50	Soil dark green orange brown slightly gravelly CLAY. Crusts is fine to medium sub-angular to sub-rounded HEAD		
		2.70	D					
		3.00	HP	75				
		3.00	D					
		3.00	D					
		4.00	D		5.00	End of Borehole at 5.0m		

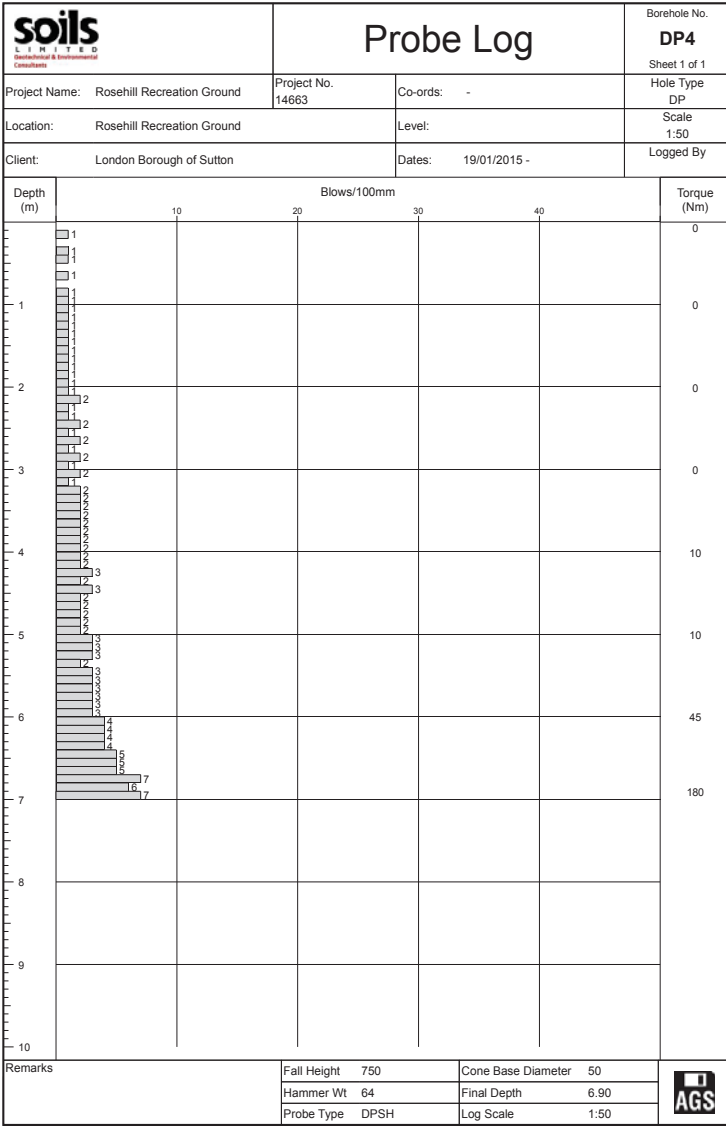
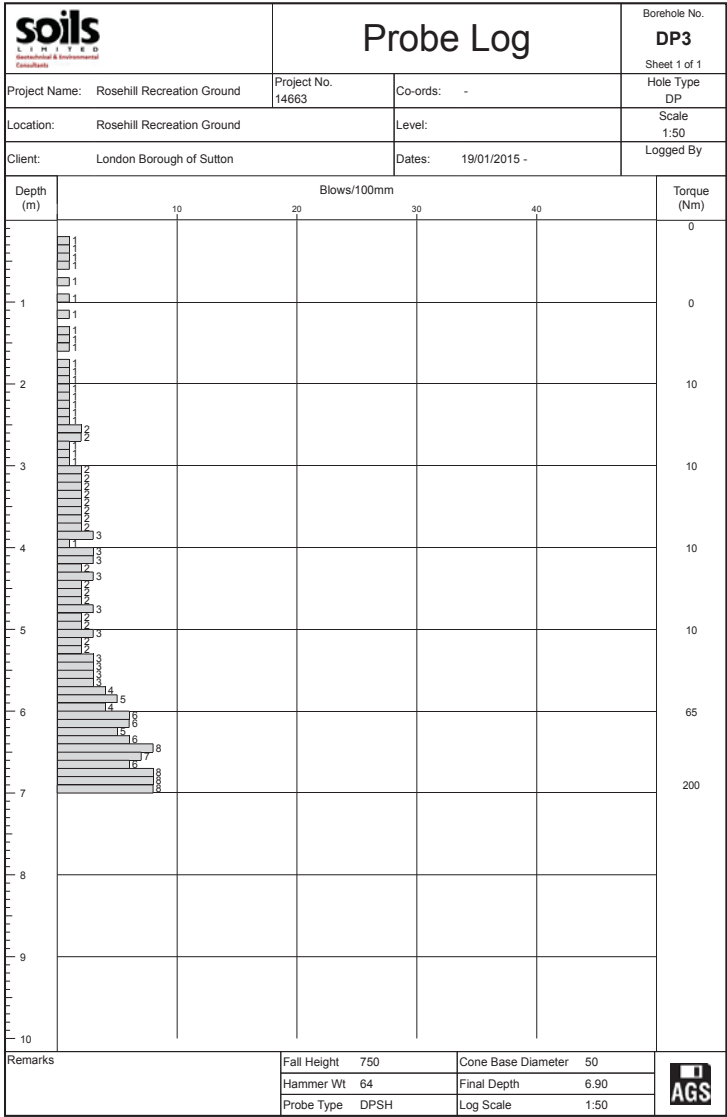
General Remarks: Roots observed to 1.00m bgl. Groundwater standing at 2.60m bgl.		Borehole Type CP: Cable Penetration WIC: Wireline Sampler MC: Rotary Core Sample Type D: Disturbed U: Undisturbed W: Water U: Unfiltered In Situ Testing SPT: Soil apex - Standard Penetration Test CPT: Cone - Standard Penetration Test
Groundwater Remarks:		

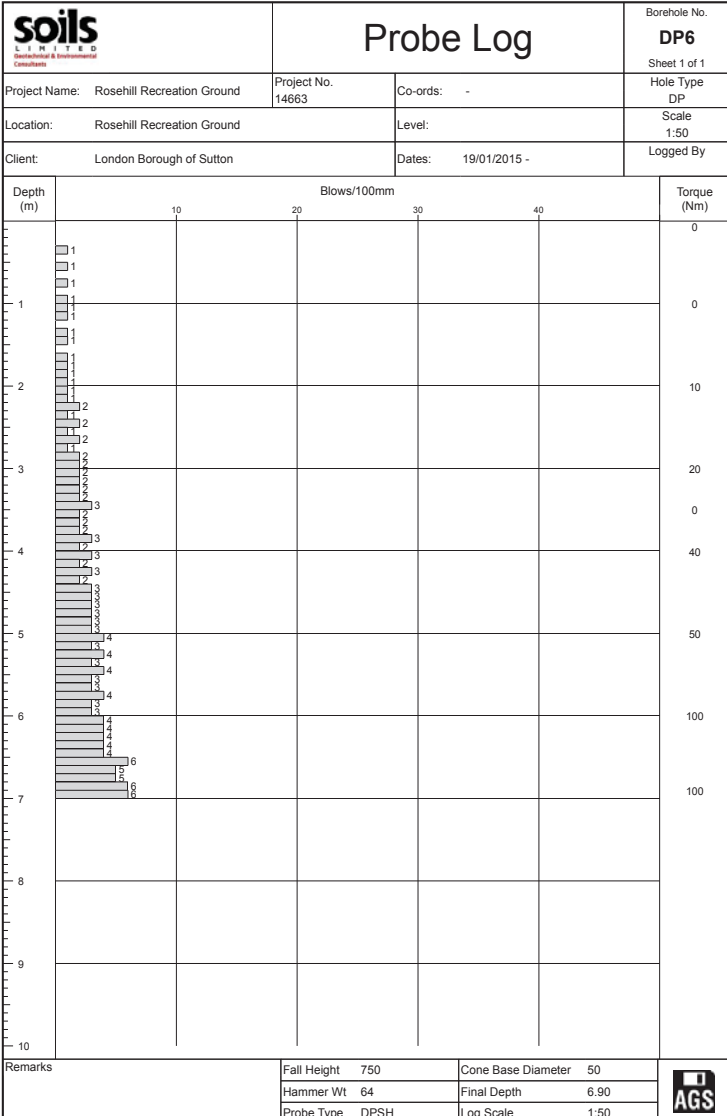
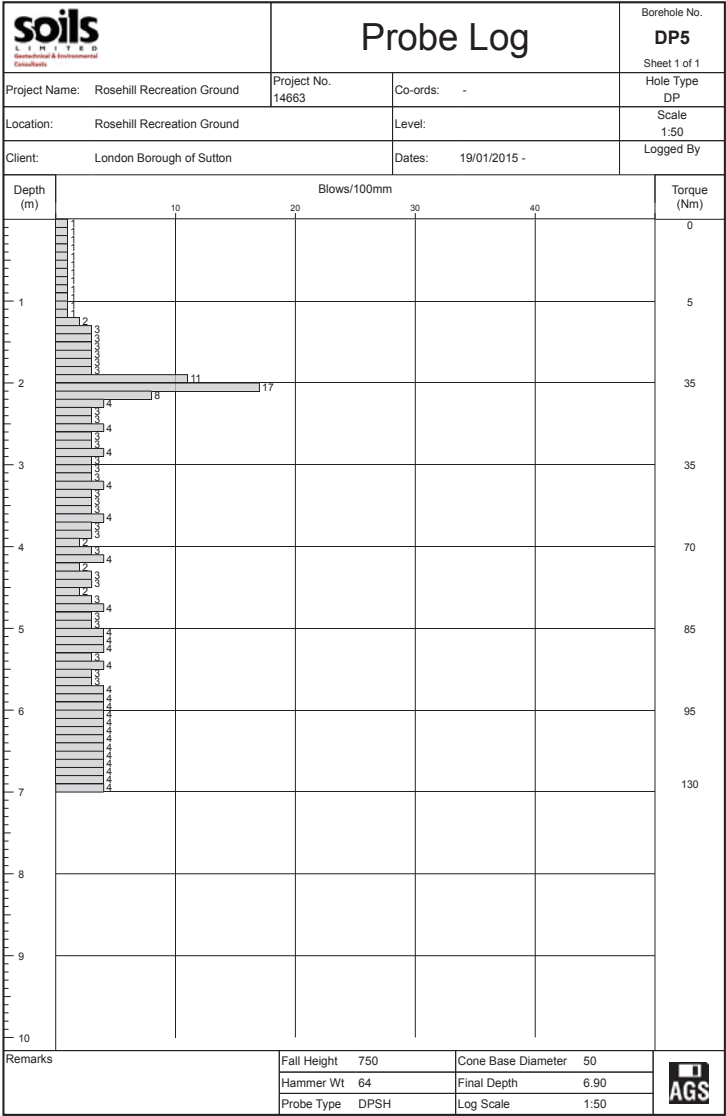
		<h1>Probe Log</h1>		Borehole No. DP2 Sheet 1 of 1	
Project Name: Rosehill Recreation Ground		Project No. 14663		Co-ords: -	
Location: Rosehill Recreation Ground		Level:		Hole Type DP	
Client: London Borough of Sutton		Dates: 19/01/2015 -		Scale 1:50	
				Logged By	

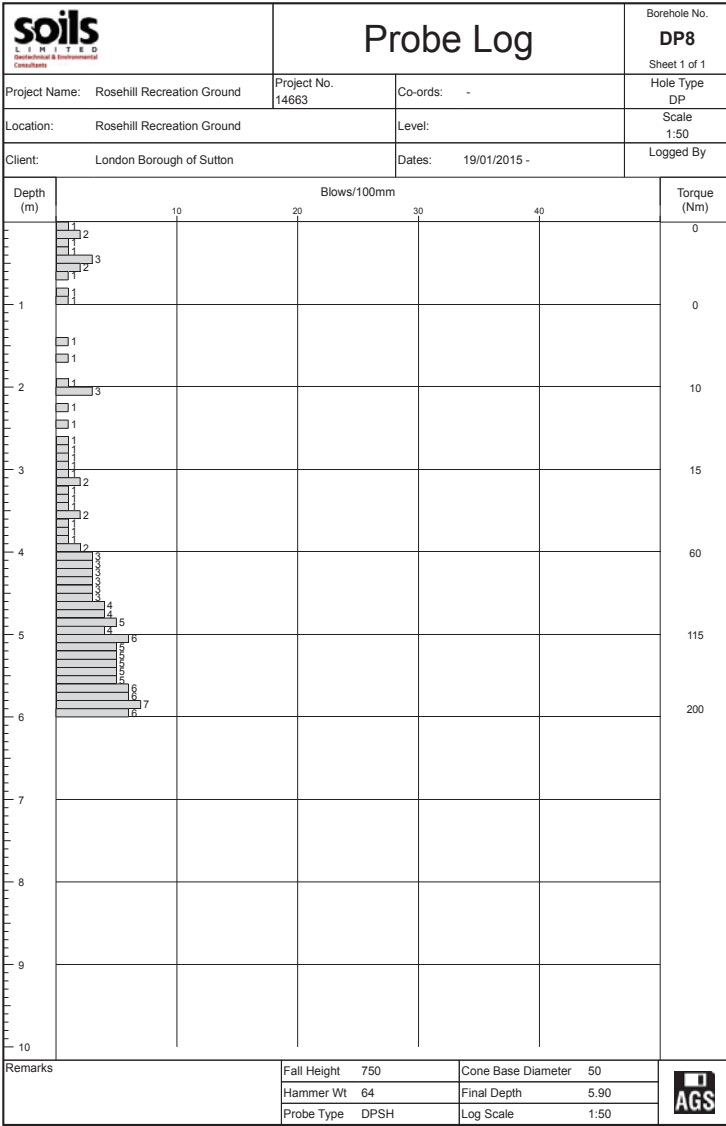
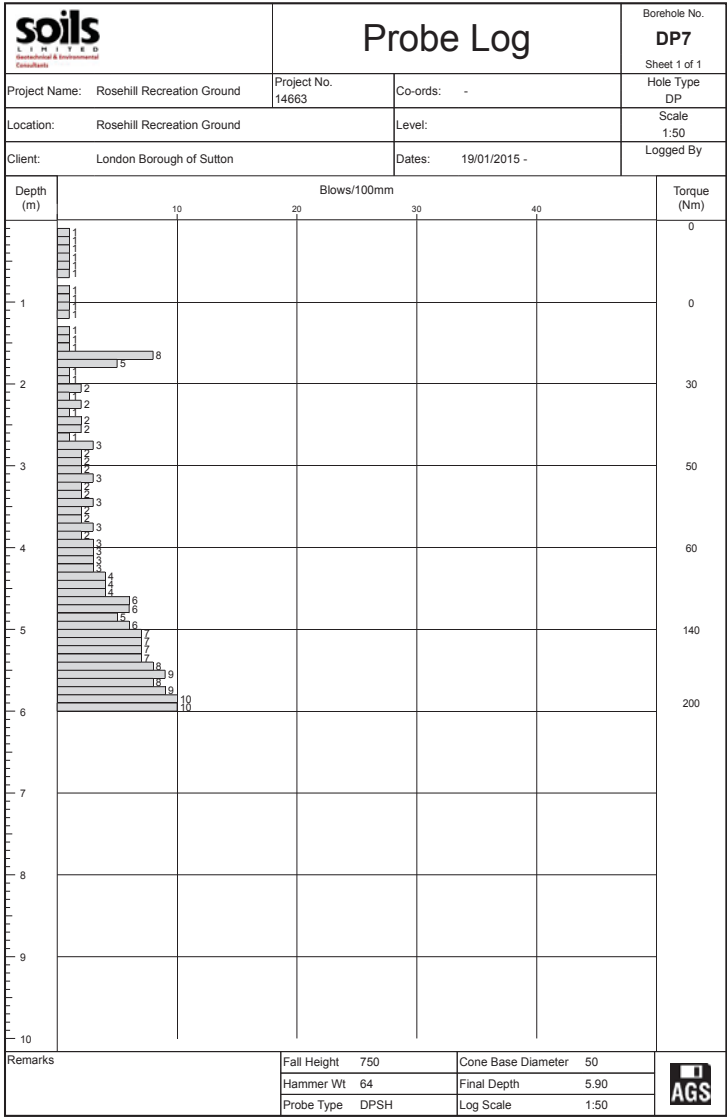
Depth (m)	Blows/100mm				Torque (Nm)
	10	20	30	40	
0					0
1					10
2					5
3					20
4					30
5					
6					
7					
8					
9					
10					

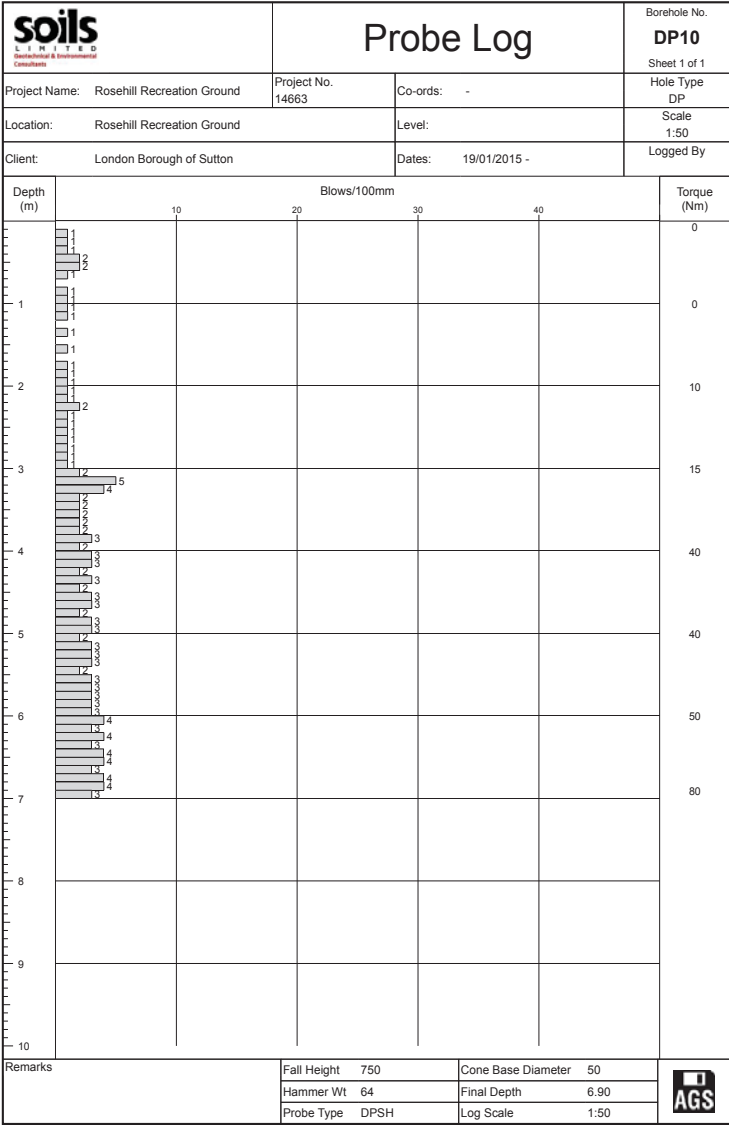
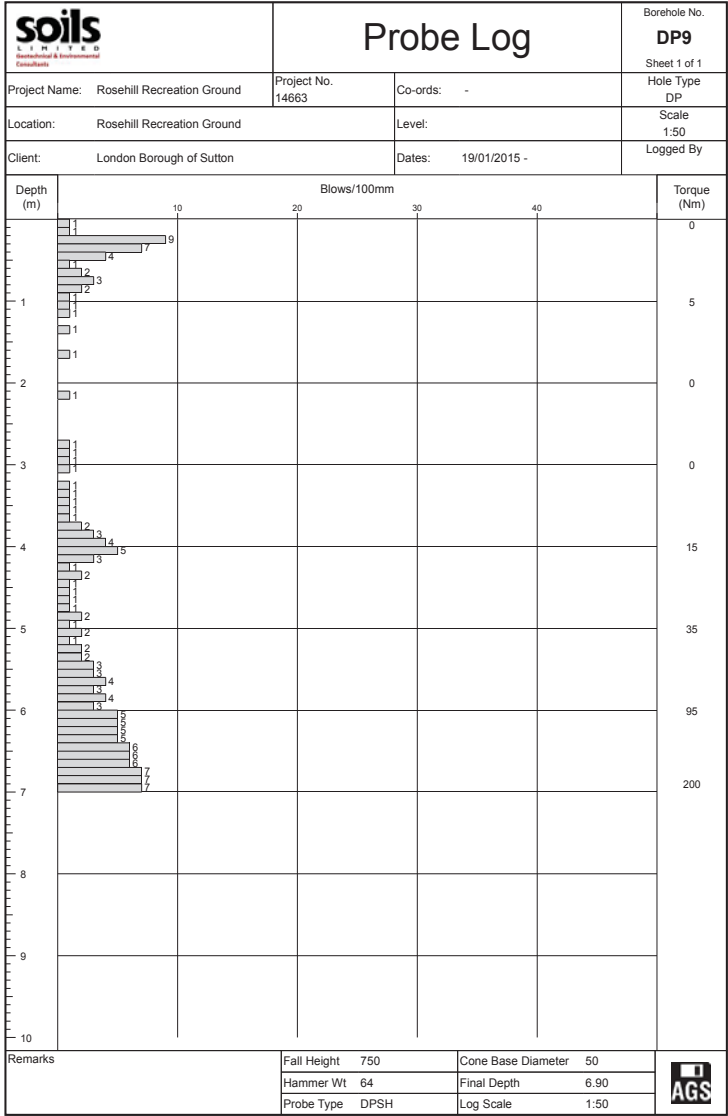
Remarks	Fall Height	750	Cone Base Diameter	50
	Hammer Wt	64	Final Depth	3.20
	Probe Type	DPSH	Log Scale	1:50











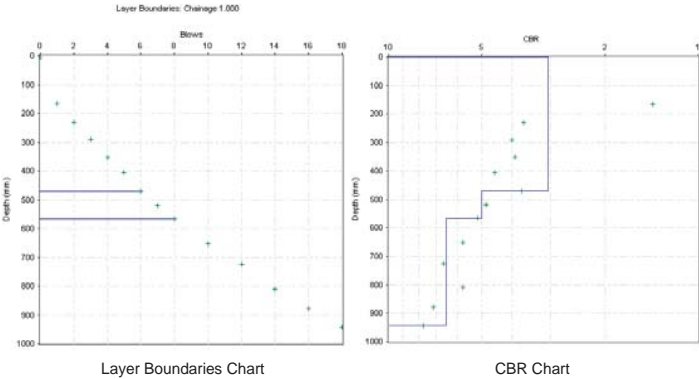
soils <small>LIMITED</small> <small>Geotechnical & Environmental</small>		Trial Pit Log		Trip No TPWS7 Sheet 1 of 1		
Project Name: Rosehill Recreation Ground		Project No: 14663	Co-ords: - Level: -	Date: 10/02/2015		
Location: Rosehill Recreation Ground		Dimensions (m):		Scale: 1:25		
Client: London Borough of Sutton		Depth: 1.00		Logged: JO		
Notes Series	Samples and In Situ Testing		Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results			
	0.25	D		0.10		Mid-brown slightly sandy Silt 1 with frequent rounded to sub rounded, fine to medium chalk fragments.
	0.50	D				Soil mid orangey brown slightly sandy CI 2V with occasional sub rounded to sub-angular fine to medium flint gravel. HEAD
	0.75	D				
	1.00	D		1.00		Boundary at 1.00m
Remarks: No roots observed. No groundwater encountered.						
Stability: Stable						

UK DCP V3.1

DCP Layer Strength Analysis Report
Project Name: 14663 Rosehill Recreation Ground

Chainage (km): 1.000
Direction: Carriageway
Location/Offset: 60 degrees
Cone Angle: 0
Zero Error (mm): 0
Test Date: 16/02/2015

Surface Type: Unpaved
Thickness (mm): 0
Base Type: Thickness (mm):
Surface Moisture: Unknown
Moisture adjustment factor: Not adjusted



Layer Properties

No.	Penetration Rate (mm/blow)	CBR (%)	Thickness (mm)	Depth to layer bottom (mm)
1	77.33	3	469	469
2	48.50	5	97	566
3	37.70	7	377	943

CBR Relationship:
TRL equation: $\log_{10}(\text{CBR}) = 2.48 - 1.057 \times \log_{10}(\text{Strength})$

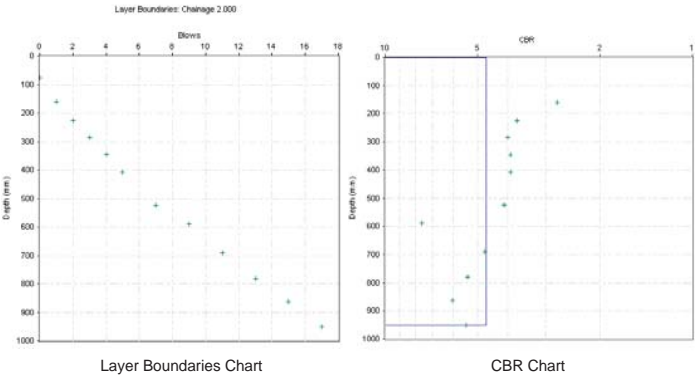
Report produced by

UK DCP V3.1

DCP Layer Strength Analysis Report
Project Name: 14663 Rosehill Recreation Ground

Chainage (km): 2.000
Direction:
Location/Offset: Carriageway
Cone Angle: 60 degrees
Zero Error (mm): 0
Test Date: 16/02/2015

Surface Type: Unpaved
Thickness (mm): 0
Base Type:
Thickness (mm):
Surface Moisture: Unknown
Moisture adjustment factor: Not adjusted



Layer Properties

No.	Penetration Rate (mm/blow)	CBR (%)	Thickness (mm)	Depth to layer bottom (mm)
1	51.47	5	951	951

CBR Relationship:
TRL equation: $\log_{10}(\text{CBR}) = 2.48 - 1.057 \times \log_{10}(\text{Strength})$

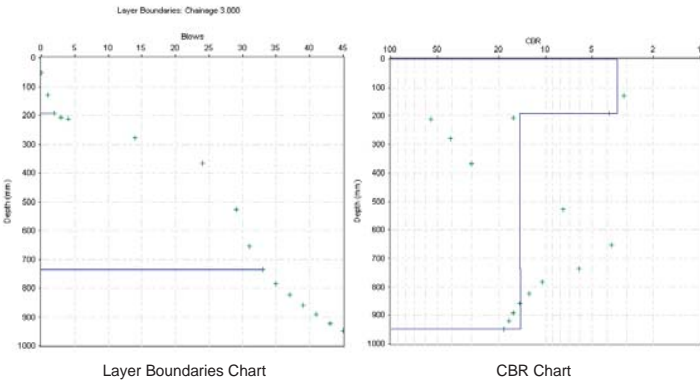
Report produced by

UK DCP V3.1

DCP Layer Strength Analysis Report
Project Name: 14663 Rosehill Recreation Ground

Chainage (km): 3.000
Direction:
Location/Offset: Carriageway
Cone Angle: 60 degrees
Zero Error (mm): 0
Test Date: 16/02/2015

Surface Type: Unpaved
Thickness (mm): 0
Base Type:
Thickness (mm):
Surface Moisture: Unknown
Moisture adjustment factor: Not adjusted



Layer Properties

No.	Penetration Rate (mm/blow)	CBR (%)	Thickness (mm)	Depth to layer bottom (mm)
1	69.00	3	191	191
2	17.58	15	545	736
3	17.75	14	213	949

CBR Relationship:
TRL equation: $\log_{10}(\text{CBR}) = 2.48 - 1.057 \times \log_{10}(\text{Strength})$

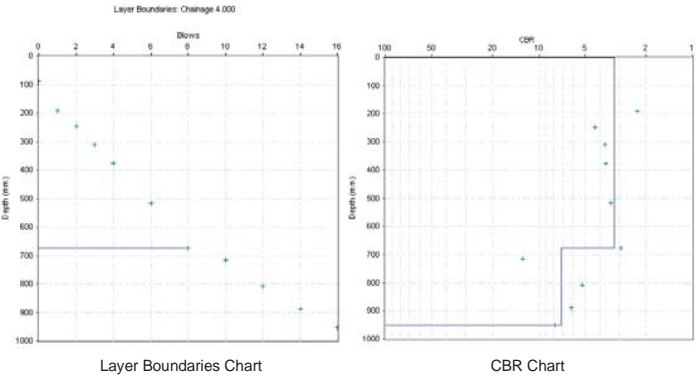
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DCP Layer Strength Analysis Report

Project Name: 14663 Rosehill Recreation Ground

Chainage (km): 4.000 Surface Type: Unpaved
Direction: Thickness (mm): 0
Location/Offset: Carriageway Base Type:
Cone Angle: 60 degrees Thickness (mm):
Zero Error (mm): 0 Surface Moisture: Unknown
Test Date: 16/02/2015 Moisture adjustment factor: Not adjusted



Layer Properties

No.	Penetration Rate (mm/blow)	CBR (%)	Thickness (mm)	Depth to layer bottom (mm)
1	73.38	3	676	676
2	34.50	7	276	952

CBR Relationship:
TRL equation: $\log_{10}(\text{CBR}) = 2.48 - 1.057 \times \log_{10}(\text{Strength})$

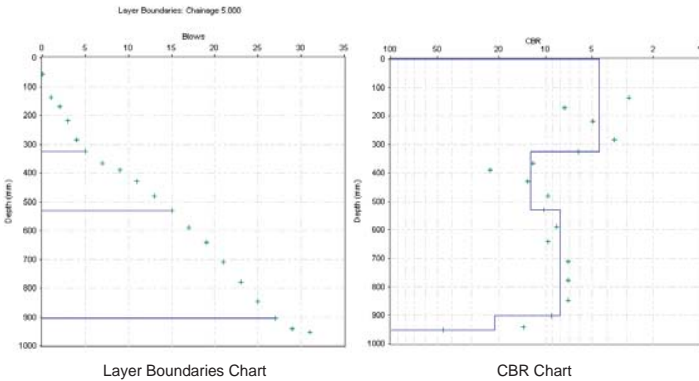
Report produced by

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DCP Layer Strength Analysis Report

Project Name: 14663 Rosehill Recreation Ground

Chainage (km): 5.000 Surface Type: Unpaved
Direction: Thickness (mm): 0
Location/Offset: Carriageway Base Type:
Cone Angle: 60 degrees Thickness (mm):
Zero Error (mm): 0 Surface Moisture: Unknown
Test Date: 16/02/2015 Moisture adjustment factor: Not adjusted



Layer Properties

No.	Penetration Rate (mm/blow)	CBR (%)	Thickness (mm)	Depth to layer bottom (mm)
1	53.80	4	325	325
2	20.50	12	205	530
3	31.08	8	373	903
4	12.25	21	49	952

CBR Relationship:
TRL equation: $\log_{10}(\text{CBR}) = 2.48 - 1.057 \times \log_{10}(\text{Strength})$

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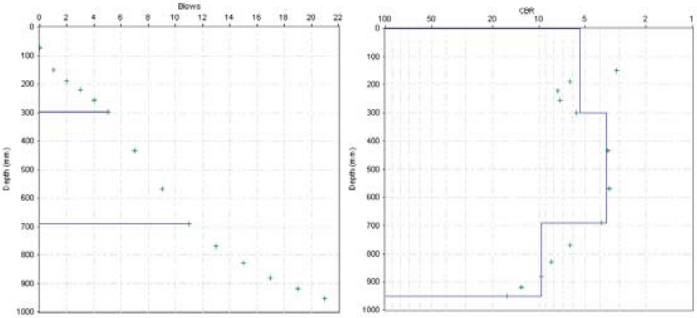
DCP Layer Strength Analysis Report

Project Name: 14663 Rosehill Recreation Ground

Chainage (km): 6.000
Direction:
Location/Offset: Carriageway
Cone Angle: 60 degrees
Zero Error (mm): 0
Test Date: 16/02/2015

Surface Type: Unpaved
Thickness (mm): 0
Base Type:
Thickness (mm):
Surface Moisture: Unknown
Moisture adjustment factor: Not adjusted

Layer Boundaries: Chainage 6.000



Layer Boundaries Chart

CBR Chart

Layer Properties

No.	Penetration Rate (mm/blow)	CBR (%)	Thickness (mm)	Depth to layer bottom (mm)
1	45.00	5	299	299
2	65.33	4	392	691
3	26.10	10	261	952

CBR Relationship:
TRL equation: $\log_{10}(\text{CBR}) = 2.48 - 1.057 \times \log_{10}(\text{Strength})$

Report produced by

UK DCP V3.1

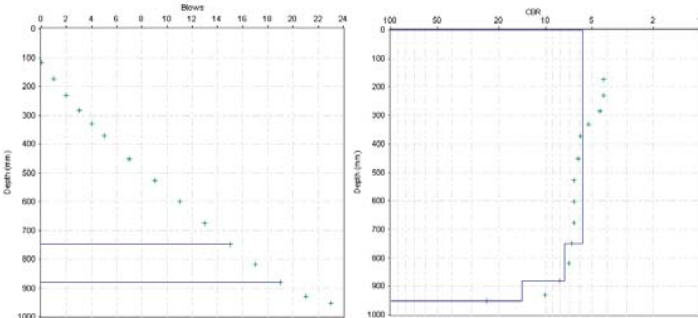
DCP Layer Strength Analysis Report

Project Name: 14663 Rosehill Recreation Ground

Chainage (km): 7.000
Direction:
Location/Offset: Carriageway
Cone Angle: 60 degrees
Zero Error (mm): 0
Test Date: 16/02/2015

Surface Type: Unpaved
Thickness (mm): 0
Base Type:
Thickness (mm):
Surface Moisture: Unknown
Moisture adjustment factor: Not adjusted

Layer Boundaries: Chainage 7.000



Layer Boundaries Chart

CBR Chart

Layer Properties

No.	Penetration Rate (mm/blow)	CBR (%)	Thickness (mm)	Depth to layer bottom (mm)
1	42.20	6	749	749
2	32.75	8	131	880
3	18.00	14	72	952

CBR Relationship:
TRL equation: $\log_{10}(\text{CBR}) = 2.48 - 1.057 \times \log_{10}(\text{Strength})$

Report produced by

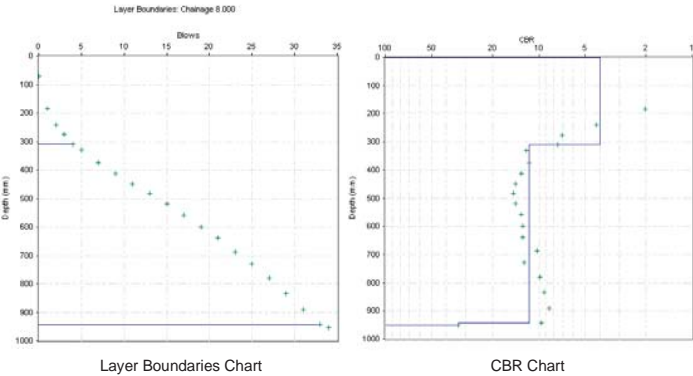
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DCP Layer Strength Analysis Report

Project Name: 14663 Rosehill Recreation Ground

Chainage (km): 8.000
Direction:
Location/Offset: Carriageway
Cone Angle: 60 degrees
Zero Error (mm): 0
Test Date: 16/02/2015

Surface Type: Unpaved
Thickness (mm): 0
Base Type:
Thickness (mm):
Surface Moisture: Unknown
Moisture adjustment factor: Not adjusted



Layer Properties

No.	Penetration Rate (mm/blow)	CBR (%)	Thickness (mm)	Depth to layer bottom (mm)
1	59.75	4	309	309
2	21.90	12	635	944
3	8.00	34	8	952

CBR Relationship:
TRL equation: $\log_{10}(\text{CBR}) = 2.48 - 1.057 \times \log_{10}(\text{Strength})$

Report produced by

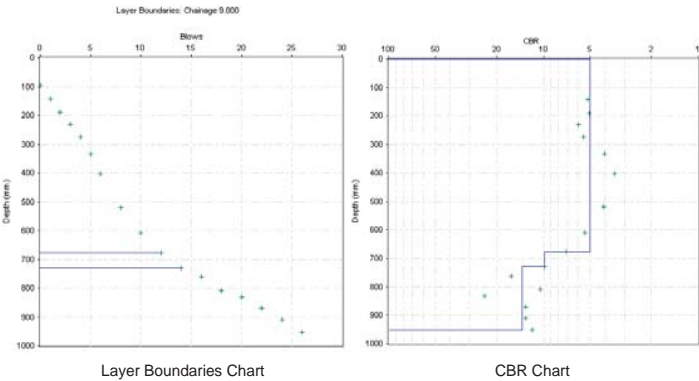
UK DCP V3.1

DCP Layer Strength Analysis Report

Project Name: 14663 Rosehill Recreation Ground

Chainage (km): 9.000
Direction:
Location/Offset: Carriageway
Cone Angle: 60 degrees
Zero Error (mm): 0
Test Date: 16/02/2015

Surface Type: Unpaved
Thickness (mm): 0
Base Type:
Thickness (mm):
Surface Moisture: Unknown
Moisture adjustment factor: Not adjusted



Layer Properties

No.	Penetration Rate (mm/blow)	CBR (%)	Thickness (mm)	Depth to layer bottom (mm)
1	48.58	5	678	678
2	25.50	10	51	729
3	18.58	14	223	952

CBR Relationship:
TRL equation: $\log_{10}(\text{CBR}) = 2.48 - 1.057 \times \log_{10}(\text{Strength})$

Report produced by

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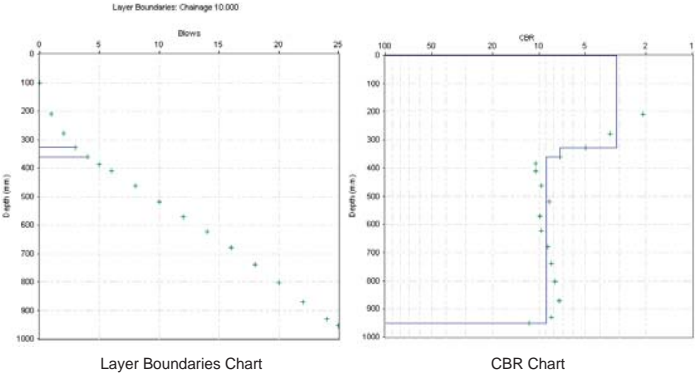
DCP Layer Strength Analysis Report

Project Name: 14663 Rosehill Recreation Ground

Chainage (km): 10.000
Direction:
Location/Offset: Carriageway
Cone Angle: 60 degrees
Zero Error (mm): 0
Test Date: 16/02/2015

Surface Type: Unpaved
Thickness (mm): 0
Base Type:
Thickness (mm):
Surface Moisture: Unknown
Moisture adjustment factor: Not adjusted

Appendix B- Laboratory Analysis



Layer Properties

No.	Penetration Rate (mm/blow)	CBR (%)	Thickness (mm)	Depth to layer bottom (mm)
1	76.00	3	328	328
2	34.00	7	34	362
3	28.10	9	590	952

CBR Relationship:
TRL equation: $\log_{10}(\text{CBR}) = 2.48 - 1.057 \times \log_{10}(\text{Strength})$

Report produced by

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March 2015



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QTS Environmental Report No: 15-28487

Site Reference: Rosehill Recreational Ground

Project / Job Ref: 14663

Order No: 14663/SB

Sample Receipt Date: 05/02/2015

Sample Scheduled Date: 05/02/2015

Report Issue Number: 1

Reporting Date: 12/02/2015

Authorised by:
Russell Jarvis
Director
On behalf of QTS Environmental Ltd

Authorised by:
Kevin Old
Director
On behalf of QTS Environmental Ltd



QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410



Soil Analysis Certificate									
QTS Environmental Report No: 15-28487		Date Sampled	21/01/15	21/01/15	21/01/15	21/01/15	21/01/15	21/01/15	21/01/15
Soils Ltd		Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Rosehill Recreational Ground		TP / BH No	W51	W53	W52	W55	W55	W58	W58
Project / Job Ref: 14663		Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: 14663/SB		Depth (m)	0.40	0.20	0.80	0.60	0.20	0.20	0.20
Reporting Date: 12/02/2015		QTS Sample No	134707	134708	134709	134710	134711	134711	134711
Determinand	Unit	RL	Accreditation	ISO17025	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Asbestos Screen	N/a	N/a	MCERTS	7.7	7.5	7.3	7.5	6.8	6.8
pH	pH Units	N/a	MCERTS	7.7	7.5	7.3	7.5	6.8	6.8
Total Cyanide	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2	< 2
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS	0.03	0.01	0.01	< 0.01	< 0.01	0.01
Sulphide	mg/kg	< 5	NONE	< 5	< 5	< 5	< 5	< 5	< 5
Organic Matter	%	< 0.1	MCERTS	1.2	4.9	2	1.5	4.3	4.3
Total Organic Carbon (TOC)	%	< 0.1	MCERTS	0.7	2.9	1.2	0.9	2.5	2.5
Arsenic (As)	mg/kg	< 2	MCERTS	5	8	7	9	11	11
Beryllium (Be)	mg/kg	< 0.5	NONE	< 0.5	< 0.5	0.6	0.7	< 0.5	< 0.5
W/S Boron	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	< 1	< 1
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2	0.3	< 0.2	< 0.2	0.5	0.5
Chromium (Cr)	mg/kg	< 2	MCERTS	31	34	36	39	26	26
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2	< 2
Copper (Cu)	mg/kg	< 4	MCERTS	9	26	18	16	37	37
Lead (Pb)	mg/kg	< 3	MCERTS	20	119	87	35	185	185
Mercury (Hg)	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	< 1	< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	12	18	16	19	18	18
Selenium (Se)	mg/kg	< 3	NONE	< 3	< 3	< 3	< 3	< 3	< 3
Vanadium (V)	mg/kg	< 2	NONE	58	64	68	74	48	48
Zinc (Zn)	mg/kg	< 3	MCERTS	39	74	52	50	125	125
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2	< 2

Analytical results are expressed on a dry weight basis where samples are dried at less than 30°C
Analysis carried out on the dried sample is corrected for the stone content
The samples have been examined to identify the presence of asbestos-form minerals by polarising light microscopy and dispersion staining technique to In-House Procedures QTS600 Determination of Asbestos in Bulk Materials: Asbestos in Soils/Sediments (fibre screening and identification)
This report refers to samples as received, and QTS Environmental Ltd, takes no responsibility for the accuracy or competence of sampling by others.
The material description shall be regarded as tentative and is not included in our scope of UKAS Accreditation.
Opinions and interpretations expressed herein are outside the scope of UKAS Accreditation.
Asbestos Analyst: Graham Reed
RL: Reporting Limit
Pinch Test: Where pinch test is positive it is reported "Loose Fibres - PT" with type(s).
Subcontracted analysis ^(S)



QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410



Soil Analysis Certificate					
QTS Environmental Report No: 15-28487		Date Sampled	21/01/15	21/01/15	
Soils Ltd		Time Sampled	None Supplied	None Supplied	
Site Reference: Rosehill Recreational Ground		TP / BH No	WS1	WS3	
Project / Job Ref: 14663		Additional Refs	None Supplied	None Supplied	
Order No: 14663/SB		Depth (m)	0.30	1.00	
Reporting Date: 12/02/2015		QTSE Sample No	134712	134713	
Determinand	Unit	RL	Accreditation		
Asbestos Screen	N/A	N/A	ISO17025	Not Detected	Not Detected
pH	pH Units	N/A	MCERTS	7.1	7.2
Total Cyanide	mg/kg	< 2	NONE	< 2	< 2
W/S Sulphate as SO ₄ (2-T)	g/l	< 0.01	MCERTS	0.02	0.08
Sulphide	mg/kg	< 5	NONE	< 5	< 5
Organic Matter	%	< 0.1	MCERTS	3.7	5.2
Total Organic Carbon (TOC)	%	< 0.1	MCERTS	2.1	3
Arsenic (As)	mg/kg	< 2	MCERTS	14	80
Beryllium (Be)	mg/kg	< 0.5	NONE	0.8	9.5
W/S Boron	mg/kg	< 1	NONE	< 1	3
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	0.5	5.7
Chromium (Cr)	mg/kg	< 2	MCERTS	42	95
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2
Copper (Cu)	mg/kg	< 4	MCERTS	38	375
Lead (Pb)	mg/kg	< 2	MCERTS	105	979
Mercury (Hg)	mg/kg	< 1	NONE	< 1	< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	24	198
Selenium (Se)	mg/kg	< 3	NONE	< 3	< 3
Vanadium (V)	mg/kg	< 2	NONE	77	151
Zinc (Zn)	mg/kg	< 3	MCERTS	133	805
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2	< 2

Analytical results are expressed on a dry weight basis where samples are dried at less than 30°C
Analysis carried out on the dried sample is corrected for the stone content
The samples have been examined to identify the presence of asbestos minerals by polarising light microscopy and dispersion staining technique to In-House Procedures QTSE600 Determination of Asbestos in Bulk Materials: Asbestos in Soils/Sediments (fibre screening and identification)
This report refers to samples as received, and QTS Environmental Ltd, takes no responsibility for the accuracy or competence of sampling by others.
The material description shall be regarded as tentative and is not included in our scope of UKAS Accreditation.
Opinions and interpretations expressed herein are outside the scope of UKAS Accreditation.
Asbestos Analyst: Graham Bevel
RL: Reporting Limit
Pinch Test: Where pinch test is positive it is reported "Loose Fibres - PT" with type(s).
Subcontracted analysis ¹⁵



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Soil Analysis Certificate - Speciated PAHs					
QTS Environmental Report No: 15-28487		Date Sampled	21/01/15	21/01/15	21/01/15
Soils Ltd		Time Sampled	None Supplied	None Supplied	None Supplied
Site Reference: Rosehill Recreational Ground		TP / BH No	WS1	WS3	WS4
Project / Job Ref: 14663		Additional Refs	None Supplied	None Supplied	None Supplied
Order No: 14663/SB		Depth (m)	0.40	0.20	0.80
Reporting Date: 12/02/2015		QTSE Sample No	134707	134708	134709
Determinand	Unit	RL	Accreditation		
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1
Fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1
Pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	< 1.6

Analytical results are expressed on a dry weight basis where samples are dried at less than 30°C



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Soil Analysis Certificate - Speciated PAHs					
QTS Environmental Report No: 15-28487		Date Sampled	21/01/15	21/01/15	
Soils Ltd		Time Sampled	None Supplied	None Supplied	
Site Reference: Rosehill Recreational Ground		TP / BH No	WS9	WS9	
Project / Job Ref: 14663		Additional Refs	None Supplied	None Supplied	
Order No: 14663/SB		Depth (m)	0.30	1.00	
Reporting Date: 12/02/2015		QTSE Sample No	134712	134713	

Determinand	Unit	RL	Accreditation			
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	
Phenanthrene	mg/kg	< 0.1	MCERTS	0.22	< 0.1	
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	
Fluoranthene	mg/kg	< 0.1	MCERTS	0.53	< 0.1	
Pyrene	mg/kg	< 0.1	MCERTS	0.43	< 0.1	
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	0.26	< 0.1	
Chrysene	mg/kg	< 0.1	MCERTS	0.27	< 0.1	
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	0.25	< 0.1	
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	0.17	< 0.1	
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	
Dibenzo(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	2.1	< 1.6	

Analytical results are expressed on a dry weight basis where samples are dried at less than 30°C



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Soil Analysis Certificate - TPH CWG Banded					
QTS Environmental Report No: 15-28487		Date Sampled	21/01/15	21/01/15	21/01/15
Soils Ltd		Time Sampled	None Supplied	None Supplied	None Supplied
Site Reference: Rosehill Recreational Ground		TP / BH No	WS3	WS5	WS9
Project / Job Ref: 14663		Additional Refs	None Supplied	None Supplied	None Supplied
Order No: 14663/SB		Depth (m)	0.20	0.60	0.30
Reporting Date: 12/02/2015		QTSE Sample No	134708	134710	134712

Determinand	Unit	RL	Accreditation			
Aliphatic >C5 - C6	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01
Aliphatic >C6 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05
Aliphatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	< 2
Aliphatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	< 2	< 2
Aliphatic >C12 - C16	mg/kg	< 3	MCERTS	< 3	< 3	< 3
Aliphatic >C16 - C21	mg/kg	< 3	MCERTS	< 3	< 3	< 3
Aliphatic >C21 - C34	mg/kg	< 10	MCERTS	< 10	< 10	< 10
Aliphatic (C5 - C34)	mg/kg	< 21	NONE	< 21	< 21	< 21
Aromatic >C5 - C7	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01
Aromatic >C7 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05
Aromatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	< 2
Aromatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	< 2	< 2
Aromatic >C12 - C16	mg/kg	< 2	MCERTS	< 2	< 2	< 2
Aromatic >C16 - C21	mg/kg	< 3	MCERTS	< 3	< 3	< 3
Aromatic >C21 - C35	mg/kg	< 10	MCERTS	< 10	< 10	< 10
Aromatic (C5 - C35)	mg/kg	< 21	NONE	< 21	< 21	< 21
Total >C5 - C35	mg/kg	< 42	NONE	< 42	< 42	< 42

Analytical results are expressed on a dry weight basis where samples are dried at less than 30°C



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Soil Analysis Certificate - BTEX / MTBE						
QTS Environmental Report No: 15-28487	Date Sampled	21/01/15	21/01/15	21/01/15		
Soils Ltd	Time Sampled	None Supplied	None Supplied	None Supplied		
Site Reference: Rosehill Recreational Ground	TP / BH No	WS3	WS5	WS9		
Project / Job Ref: 14663	Additional Refs	None Supplied	None Supplied	None Supplied		
Order No: 14663/58	Depth (m)	0.20	0.60	0.30		
Reporting Date: 12/02/2015	QTSE Sample No	134708	134710	134712		

Determinand	Unit	RL	Accreditation					
Benzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2		
Toluene	ug/kg	< 5	MCERTS	< 5	< 5	< 5		
Ethylbenzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2		
p & m-xylene	ug/kg	< 2	MCERTS	< 2	< 2	< 2		
o-xylene	ug/kg	< 2	MCERTS	< 2	< 2	< 2		
MTBE	ug/kg	< 5	MCERTS	< 5	< 5	< 5		

Analytical results are expressed on a dry weight basis where samples are dried at less than 30°C



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Water Analysis Certificate						
QTS Environmental Report No: 15-28487	Date Sampled	02/02/15	02/02/15			
Soils Ltd	Time Sampled	None Supplied	None Supplied			
Site Reference: Rosehill Recreational Ground	TP / BH No	WS7	WS9			
Project / Job Ref: 14663	Additional Refs	None Supplied	None Supplied			
Order No: 14663/58	Depth (m)	1.54	1.72			
Reporting Date: 12/02/2015	QTSE Sample No	134714	134715			

Determinand	Unit	RL	Accreditation					
pH	pH Units	N/A	ISO17025	7.2	6.9			
Total Cyanide	ug/l	< 5	NONE	< 5	< 5			
Sulphate as SO ₄	mg/l	< 1	ISO17025	3550	703			
Sulphide	mg/l	< 0.1	NONE	< 0.1	< 0.1			
Total Organic Carbon (TOC)	mg/l	< 0.1	NONE	5.3	6.9			
Arsenic (dissolved)	ug/l	< 5	ISO17025	< 5	7			
Beryllium (dissolved)	ug/l	< 3	ISO17025	< 3	< 3			
Boron (dissolved)	ug/l	< 5	ISO17025	664	1330			
Cadmium (dissolved)	ug/l	< 0.4	ISO17025	< 0.4	< 0.4			
Chromium (dissolved)	ug/l	< 5	ISO17025	8	< 5			
Chromium (hexavalent)	ug/l	< 5	NONE	< 5	< 5			
Copper (dissolved)	ug/l	< 5	ISO17025	< 5	< 5			
Lead (dissolved)	ug/l	< 5	ISO17025	< 5	< 5			
Mercury (dissolved)	ug/l	< 0.05	ISO17025	< 0.05	< 0.05			
Nickel (dissolved)	ug/l	< 5	ISO17025	< 5	< 5			
Selenium (dissolved)	ug/l	< 5	ISO17025	< 5	< 5			
Vanadium (dissolved)	ug/l	< 5	ISO17025	< 5	< 5			
Zinc (dissolved)	ug/l	< 2	ISO17025	8	22			
Total Phenols (monohydric)	ug/l	< 0.5	NONE	< 0.5	< 0.5			

Subcontracted analysis¹⁵
Insufficient sample¹⁵
Unsuitable Sample¹⁵



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Water Analysis Certificate - Speciated PAH					
QTS Environmental Report No: 15-28487	Date Sampled	02/02/15	02/02/15		
Soils Ltd	Time Sampled	None Supplied	None Supplied		
Site Reference: Rosehill Recreational Ground	TP / BH No	WS7	WS9		
Project / Job Ref: 14663	Additional Refs	None Supplied	None Supplied		
Order No: 14663/SB	Depth (m)	1.54	1.72		
Reporting Date: 12/02/2015	QTSE Sample No	134714	134715		

Determinand	Unit	RL	Accreditation				
Naphthalene	ug/l	< 0.01	NONE	< 0.01	< 0.01		
Acenaphthylene	ug/l	< 0.01	NONE	< 0.01	< 0.01		
Acenaphthene	ug/l	< 0.01	NONE	< 0.01	< 0.01		
Fluorene	ug/l	< 0.01	NONE	< 0.01	< 0.01		
Phenanthrene	ug/l	< 0.01	NONE	< 0.01	< 0.01		
Anthracene	ug/l	< 0.01	NONE	< 0.01	< 0.01		
Fluoranthene	ug/l	< 0.01	NONE	< 0.01	< 0.01		
Pyrene	ug/l	< 0.01	NONE	< 0.01	< 0.01		
Benzo(a)anthracene	ug/l	< 0.01	NONE	< 0.01	< 0.01		
Chrysene	ug/l	< 0.01	NONE	< 0.01	< 0.01		
Benzo(b)fluoranthene	ug/l	< 0.01	NONE	< 0.01	< 0.01		
Benzo(k)fluoranthene	ug/l	< 0.01	NONE	< 0.01	< 0.01		
Benzo(a)pyrene	ug/l	< 0.01	NONE	< 0.01	< 0.01		
Indeno(1,2,3-cd)pyrene	ug/l	< 0.01	NONE	< 0.01	< 0.01		
Dibenz(a,h)anthracene	ug/l	< 0.01	NONE	< 0.01	< 0.01		
Benzo(ghi)perylene	ug/l	< 0.01	NONE	< 0.01	< 0.01		
Total EPA-16 PAHs	ug/l	< 0.01	NONE	< 0.01	< 0.01		



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Water Analysis Certificate - TPH CWG Banded					
QTS Environmental Report No: 15-28487	Date Sampled	02/02/15			
Soils Ltd	Time Sampled	None Supplied			
Site Reference: Rosehill Recreational Ground	TP / BH No	WS7			
Project / Job Ref: 14663	Additional Refs	None Supplied			
Order No: 14663/SB	Depth (m)	1.54			
Reporting Date: 12/02/2015	QTSE Sample No	134714			

Determinand	Unit	RL	Accreditation				
Aliphatic >C5 - C6	ug/l	< 10	NONE	< 10			
Aliphatic >C6 - C8	ug/l	< 10	NONE	< 10			
Aliphatic >C8 - C10	ug/l	< 10	NONE	< 10			
Aliphatic >C10 - C12	ug/l	< 10	NONE	< 10			
Aliphatic >C12 - C16	ug/l	< 10	NONE	< 10			
Aliphatic >C16 - C21	ug/l	< 10	NONE	< 10			
Aliphatic >C21 - C34	ug/l	< 10	NONE	< 10			
Aliphatic (C5 - C34)	ug/l	< 70	NONE	< 70			
Aromatic >C5 - C7	ug/l	< 10	NONE	< 10			
Aromatic >C7 - C8	ug/l	< 10	NONE	< 10			
Aromatic >C8 - C10	ug/l	< 10	NONE	< 10			
Aromatic >C10 - C12	ug/l	< 10	NONE	< 10			
Aromatic >C12 - C16	ug/l	< 10	NONE	< 10			
Aromatic >C16 - C21	ug/l	< 10	NONE	< 10			
Aromatic >C21 - C35	ug/l	< 10	NONE	< 10			
Aromatic (C5 - C35)	ug/l	< 70	NONE	< 70			
Total >C5 - C35	ug/l	< 140	NONE	< 140			



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Water Analysis Certificate - BTEX / MTBE						
QTS Environmental Report No: 15-28487		Date Sampled	02/02/15			
Soils Ltd		Time Sampled	None Supplied			
Site Reference: Rosehill Recreational Ground		TP / BH No	WS7			
Project / Job Ref: 14663		Additional Refs	None Supplied			
Order No: 14663/SB		Depth (m)	1.54			
Reporting Date: 12/02/2015		QTSE Sample No	134714			

Determinand	Unit	RL	Accreditation			
Benzene	ug/l	< 1	ISO17025	< 1		
Toluene	ug/l	< 5	ISO17025	< 5		
Ethylbenzene	ug/l	< 5	ISO17025	< 5		
p & m-xylene	ug/l	< 10	ISO17025	< 10		
o-xylene	ug/l	< 5	ISO17025	< 5		
MTBE	ug/l	< 10	ISO17025	< 10		



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Soil Analysis Certificate - Sample Descriptions						
QTS Environmental Report No: 15-28487						
Soils Ltd						
Site Reference: Rosehill Recreational Ground						
Project / Job Ref: 14663						
Order No: 14663/SB						
Reporting Date: 12/02/2015						

QTSE Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
S 134707	WS1	None Supplied	0.40	16.9	Light brown clay with chalk
S 134708	WS3	None Supplied	0.20	21.2	Brown clayey loam with vegetation
S 134709	WS4	None Supplied	0.80	19.8	Light brown chalk with chalk
S 134710	WS5	None Supplied	0.60	16.9	Brown clay with chalk
S 134711	WS8	None Supplied	0.20	14.1	Grey clayey loam with stones
S 134712	WS9	None Supplied	0.30	20.5	Grey loamy clay with chalk and vegetation
S 134713	WS9	None Supplied	1.00	27.1	Grey loamy gravel with ash and rubble

Moisture content is part of procedure E003 & is not an accredited test
Insufficient Sample ¹⁵
Unsuitable Sample ¹⁶

3 samples exceeded recommended holding times



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Soil Analysis Certificate - Methodology & Miscellaneous Information	
QTS Environmental Report No: 15-28487	
Soils Ltd	
Site Reference: Rosehill Recreational Ground	
Project / Job Ref: 14663	
Order No: 14663/SB	
Reporting Date: 12/02/2015	

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 - C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450°C	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E003
Soil	AR	Moisture Content	Moisture content: determined gravimetrically	E004
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E001
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	TPH LOM	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6 - C10)	Determination of hydrocarbons C6-C10 by headspace GC-MS	E001

D Dried
AR As Received

Soil Analysis Certificate - Methodology & Miscellaneous Information	
QTS Environmental Report No: 15-28487	
Soils Ltd	
Site Reference: Rosehill Recreational Ground	
Project / Job Ref: 14663	
Order No: 14663/SB	
Reporting Date: 12/02/2015	

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Water	UF	Alkalinity	Determination of alkalinity by titration against hydrochloric acid using bromocresol green as the end point	E103
Water	UF	BTEX	Determination of BTEX by headspace GC-MS	E101
Water	F	Cations	Determination of cations by filtration followed by ICP-MS	E102
Water	UF	Chemical Oxygen Demand (COD)	Determination using a COD reactor followed by colorimetry	E112
Water	F	Chloride	Determination of chloride by filtration & analysed by ion chromatography	E109
Water	F	Chromium - Hexavalent	Determination of hexavalent chromium by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E116
Water	UF	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E115
Water	UF	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through liquid liquid extraction with cyclohexane	E111
Water	F	Diesel Range Organics (C10 - C24)	Determination of liquid liquid extraction with hexane followed by GI-FID	E104
Water	F	Dissolved Organic Content (DOC)	Determination of DOC by filtration followed by low heat with persulphate addition followed by IR detection	E110
Water	UF	Electrical Conductivity	Determination of electrical conductivity by electrometric measurement	E123
Water	F	EPH (C10 - C40)	Determination of liquid liquid extraction with hexane followed by GI-FID	E104
Water	F	EPH TEXAS	Determination of liquid liquid extraction with hexane followed by GI-FID	E104
Water	F	Fluoride	Determination of Fluoride by filtration & analysed by ion chromatography	E109
Water	F	Hardness	Determination of Ca and Mg by ICP-MS followed by calculation	E102
Leachate	F	Leachate Preparation - NRA	Based on National Rivers Authority leaching test 1994	E301
Leachate	F	Leachate Preparation - WAC	Based on BS EN 12457 Pt1, 2, 3	E302
Water	F	Metals	Determination of metals by filtration followed by ICP-MS	E102
Water	F	Mineral Oil (C10 - C40)	Determination of liquid liquid extraction with hexane followed by GI-FID	E104
Water	F	Nitrate	Determination of nitrate by filtration & analysed by ion chromatography	E109
Water	UF	Monohydric Phenol	Determination of phenols by distillation followed by colorimetry	E121
Water	F	PAH - Speciated (EPA 16)	Determination of PAH compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E105
Water	F	PCB - 7 Congeners	Determination of PCB compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E108
Water	UF	Petroleum Ether Extract (PEE)	Gravimetrically determined through liquid liquid extraction with petroleum ether	E111
Water	UF	pH	Determination of pH by electrometric measurement	E107
Water	F	Phosphate	Determination of phosphate by filtration & analysed by ion chromatography	E109
Water	UF	Redox Potential	Determination of redox potential by electrometric measurement	E113
Water	F	Sulphate (as SO4)	Determination of sulphate by filtration & analysed by ion chromatography	E109
Water	UF	Sulphide	Determination of sulphide by distillation followed by colorimetry	E116
Water	F	SVOC	Determination of semi-volatile organic compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E108
Water	UF	Toluene Extractable Matter (TEM)	Gravimetrically determined through liquid liquid extraction with toluene	E111
Water	UF	Total Organic Carbon (TOC)	Low heat with persulphate addition followed by IR detection	E110
Water	F	TPH CWG	Determination of liquid liquid extraction with hexane, fractionating with SPE followed by GC-FID	E104
Water	F	TPH LOM	Determination of liquid liquid extraction with hexane, fractionating with SPE followed by GC-FID	E104
Water	UF	VOCs	Determination of volatile organic compounds by headspace GC-MS	E101
Water	UF	VPH (C6 - C10)	Determination of hydrocarbons C6-C10 by headspace GC-MS	E101

Key

F Filtered
UF Unfiltered



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KT20 5SR



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t: 01622 850410
rusell.jarvis@qtsenvironmental.com

QTS Environmental Report No: 15-28673

Site Reference: Rosehill Recreational Ground

Project / Job Ref: 14663_2

Order No: 14663/SB

Sample Receipt Date: 12/02/2015

Sample Scheduled Date: 12/02/2015

Report Issue Number: 1

Reporting Date: 17/02/2015

Authorised by:
Russell Jarvis
Director
On behalf of QTS Environmental Ltd

Authorised by:
Kevin Old
Director
On behalf of QTS Environmental Ltd



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Tel : 01622 850410



Soil Analysis Certificate - Speciated PAHs							
QTS Environmental Report No: 15-28673		Date Sampled	10/02/15				
Soils Ltd		Time Sampled	None Supplied				
Site Reference: Rosehill Recreational Ground		TP / BH No	W57				
Project / Job Ref: 14663_2		Additional Refs	None Supplied				
Order No: 14663/SB		Depth (m)	0.25				
Reporting Date: 17/02/2015		QTS Sample No	135739				
Determinand	Unit	RL	Accreditation				
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1			
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1			
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1			
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1			
Phenanthrene	mg/kg	< 0.1	MCERTS	0.25			
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1			
Fluoranthene	mg/kg	< 0.1	MCERTS	0.69			
Pyrene	mg/kg	< 0.1	MCERTS	0.56			
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	0.31			
Chrysene	mg/kg	< 0.1	MCERTS	0.35			
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	0.41			
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	0.13			
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	0.28			
Indene(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	0.16			
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1			
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	0.14			
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	3.3			

Analytical results are expressed on a dry weight basis where samples are dried at less than 30°C



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Soil Analysis Certificate - TPH CWG Banded					
QTS Environmental Report No: 15-28673	Date Sampled	10/02/15			
Soils Ltd	Time Sampled	None Supplied			
Site Reference: Rosehill Recreational Ground	TP / BH No	WS7			
Project / Job Ref: 14663_2	Additional Refs	None Supplied			
Order No: 14663/SB	Depth (m)	0.25			
Reporting Date: 17/02/2015	QTSE Sample No	135739			

Determinand	Unit	RL	Accreditation				
Aliphatic >C5 - C6	mg/kg	< 0.01	NONE	< 0.01			
Aliphatic >C6 - C8	mg/kg	< 0.05	NONE	< 0.05			
Aliphatic >C8 - C10	mg/kg	< 2	MCERTS	< 2			
Aliphatic >C10 - C12	mg/kg	< 2	MCERTS	< 2			
Aliphatic >C12 - C16	mg/kg	< 3	MCERTS	< 3			
Aliphatic >C16 - C21	mg/kg	< 3	MCERTS	< 3			
Aliphatic >C21 - C34	mg/kg	< 10	MCERTS	< 10			
Aliphatic (C5 - C34)	mg/kg	< 21	NONE	< 21			
Aromatic >C5 - C7	mg/kg	< 0.01	NONE	< 0.01			
Aromatic >C7 - C8	mg/kg	< 0.05	NONE	< 0.05			
Aromatic >C8 - C10	mg/kg	< 2	MCERTS	< 2			
Aromatic >C10 - C12	mg/kg	< 2	MCERTS	< 2			
Aromatic >C12 - C16	mg/kg	< 2	MCERTS	< 2			
Aromatic >C16 - C21	mg/kg	< 3	MCERTS	< 3			
Aromatic >C21 - C35	mg/kg	< 10	MCERTS	< 10			
Aromatic (C5 - C35)	mg/kg	< 21	NONE	< 21			
Total >C5 - C35	mg/kg	< 42	NONE	< 42			

Analytical results are expressed on a dry weight basis where samples are dried at less than 30°C



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Soil Analysis Certificate - BTEX / MTBE					
QTS Environmental Report No: 15-28673	Date Sampled	10/02/15			
Soils Ltd	Time Sampled	None Supplied			
Site Reference: Rosehill Recreational Ground	TP / BH No	WS7			
Project / Job Ref: 14663_2	Additional Refs	None Supplied			
Order No: 14663/SB	Depth (m)	0.25			
Reporting Date: 17/02/2015	QTSE Sample No	135739			

Determinand	Unit	RL	Accreditation				
Benzene	ug/kg	< 2	MCERTS	< 2			
Toluene	ug/kg	< 5	MCERTS	< 5			
Ethylbenzene	ug/kg	< 2	MCERTS	< 2			
p & m-xylene	ug/kg	< 2	MCERTS	< 2			
o-xylene	ug/kg	< 2	MCERTS	< 2			
MTBE	ug/kg	< 5	MCERTS	< 5			

Analytical results are expressed on a dry weight basis where samples are dried at less than 30°C



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Soil Analysis Certificate - Sample Descriptions				
QTS Environmental Report No: 15-28673				
Soils Ltd				
Site Reference: Rosehill Recreational Ground				
Project / Job Ref: 14663_2				
Order No: 14663/SB				
Reporting Date: 17/02/2015				

QTS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
135737	WS7	None Supplied	0.25	19.6	Brown clayey gravel with vegetation

Moisture content is part of procedure E003 & is not an accredited test
Insufficient Sample ^{US}
Unsuitable Sample ^{US}



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Soil Analysis Certificate - Methodology & Miscellaneous Information				
QTS Environmental Report No: 15-28673				
Soils Ltd				
Site Reference: Rosehill Recreational Ground				
Project / Job Ref: 14663_2				
Order No: 14663/SB				
Reporting Date: 17/02/2015				

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2-1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 - C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450°C	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LOM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried
AR As Received



HazWasteOnline™

Waste Classification Report



F7YNH-9BVD7-UT57A

Job name

14663 -Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

Waste Stream

Default Contaminated Land

Comments

Project

14663

Site

Rosehill Recreation Ground, Rose Hill, Sutton, Surrey SM1 3HH

Classified by

Name:
Wilkinson, Luke
Date:
31/03/2015 08:14
Telephone:
01737 814221

Company:
Soils Ltd
Newton House
Cross Road
KT20 5SR

Report

Created by: Wilkinson, Luke
Created date: 31/03/2015 08:14

Job summary

#	Sample Name	Depth [m]	Classification Result	Hazardous properties	Page
1	WS1/0.4		Non Hazardous		2
2	WS3/0.2		Non Hazardous		4
3	WS4/0.8		Non Hazardous		6
4	WS5/0.6		Non Hazardous		8
5	WS8/0.2		Non Hazardous		10
6	WS9/0.3		Non Hazardous		12
7	WS9/1		Hazardous	H7	14
8	WS7/0.25		Non Hazardous		17

Appendices

	Page
Appendix A: Classifier defined and non CLP determinands	19
Appendix B: Notes	20
Appendix C: Version	21



HazWasteOnline™
Report created by Wilkinson, Luke on 31/03/2015

Classification of sample: WS1/0.4

Non Hazardous Waste
Classified as 17 05 04
in the European Waste Catalogue

Sample details

Sample Name: WS1/0.4	EWC Code: Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth: 0 m	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
Moisture content: 0% (dry weight correction)	

Hazard properties

None identified

Additional: Additional Risk Phrases "This is an additional risk phrase and such a risk phrases alone will not cause a waste to be hazardous."

Risk phrases hit:

R33 "Danger of cumulative effects"

Because of determinand:

Lead chromate: (compound conc.: 0.00312%)

Determinands (Moisture content: 0%, dry weight correction)

Acenaphthene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Acenaphthylene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Anthracene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Arsenic trioxide: (Cation conc. entered: 5 mg/kg, converted to compound conc.:6.602 mg/kg or 0.00066%)
Benzo[a]anthracene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Benzo[a]pyrene: benzo[def]chrysene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Benzo[b]fluoranthene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Benzo[ghi]perylene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Benzo[k]fluoranthene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
beryllium oxide: (Cation conc. entered: <0.5 mg/kg, converted to compound conc.:<1.388 mg/kg or <0.000139%)
IGNORED Because: "<LOD"
Boron tribromide/trichloride/trifluoride (combined risk phrases): (Cation conc. entered: <1 mg/kg, converted to compound conc.:<13.43 mg/kg or <0.00134%) **IGNORED Because: "<LOD"**
Cadmium sulphide: (Cation conc. entered: <0.2 mg/kg, converted to compound conc.:<0.257 mg/kg or <0.0000257%, Note 1 conc.: <0.00002%) **IGNORED Because: "<LOD"**
Chromium(VI) oxide: (Cation conc. entered: <2 mg/kg, converted to compound conc.:<3.846 mg/kg or <0.000385%)
IGNORED Because: "<LOD"
Chrysene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Copper (I) oxide: (Cation conc. entered: 9 mg/kg, converted to compound conc.:10.133 mg/kg or 0.00101%)
Cyanides (with the exception of complex cyanides): (Whole conc. entered as: <2 mg/kg or <0.0002%) **IGNORED Because: "<LOD"**
Dibenz[a,h]anthracene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Fluoranthene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Fluorene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Indeno[123-cd]pyrene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Lead chromate: (Cation conc. entered: 20 mg/kg, converted to compound conc.:31.196 mg/kg or 0.00312%, Note 1 conc.: 0.002%)



Mercury dichloride: (Cation conc. entered: <1 mg/kg, converted to compound conc.:<1.353 mg/kg or <0.000135%)
IGNORED Because: "<LOD"
Naphthalene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Nickel dihydroxide: (Cation conc. entered: 12 mg/kg, converted to compound conc.:18.954 mg/kg or 0.0019%)
pH: (Whole conc. entered as: 7.7 pH, converted to conc.:7.7 pH or 7.7 pH)
Phenanthrene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Phenol: (Whole conc. entered as: <2 mg/kg or <0.0002%) **IGNORED Because: "<LOD"**
Pyrene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Selenium compounds (with the exception of cadmium sulphoselenide and sodium selenite): (Cation conc. entered: <3 mg/kg, converted to compound conc.:<4.5 mg/kg or <0.00045%) **IGNORED Because: "<LOD"**
Zinc chromate: (Cation conc. entered: 39 mg/kg, converted to compound conc.:108.192 mg/kg or 0.0108%)

Notes utilised in assessment

Additional Risk Phrase Comments , used on:

Test: "Additional on R33" for determinand: "Lead chromate"

C14.3: Step 4 , used on:

Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Arsenic trioxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Copper (I) oxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Lead chromate"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Nickel dihydroxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Zinc chromate"

Note 1 , used on:

Test: "H7 on R45" for determinand: "Lead chromate"
Test: "H10 on R60, R61" for determinand: "Lead chromate"
Test: "H10 on R62, R63" for determinand: "Lead chromate"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Lead chromate"

Determinand notes

Note 1 , used on:

determinand: "Lead chromate"

Note A , used on:

determinand: "Zinc chromate"

Note E , used on:

determinand: "Arsenic trioxide"
determinand: "Nickel dihydroxide"
determinand: "Zinc chromate"



Classification of sample: WS3/0.2

Non Hazardous Waste
Classified as 17 05 04
in the European Waste Catalogue

Sample details

Sample Name:	EWC Code:
WS3/0.2	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0 m	Entry:
Moisture content: 0%	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
(dry weight correction)	

Hazard properties

None identified

Additional: Additional Risk Phrases "This is an additional risk phrase and such a risk phrases alone will not cause a waste to be hazardous."

Risk phrases hit:

R33 "Danger of cumulative effects"

Because of determinand:

Lead chromate: (compound conc.: 0.0186%)

Determinands (Moisture content: 0%, dry weight correction)

Acenaphthene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Acenaphthylene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Anthracene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Arsenic trioxide: (Cation conc. entered: 8 mg/kg, converted to compound conc.:10.563 mg/kg or 0.00106%)
Benzene: (Whole conc. entered as: <2 mg/kg or <0.0002%) **IGNORED Because: "<LOD"**
Benzo[a]anthracene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Benzo[a]pyrene; benzo[def]chrysene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Benzo[b]fluoranthene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Benzo[ghi]perylene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Benzo[k]fluoranthene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
beryllium oxide: (Cation conc. entered: <0.5 mg/kg, converted to compound conc.:<1.388 mg/kg or <0.000139%)
IGNORED Because: "<LOD"
Boron tribromide/trichloride/trifluoride (combined risk phrases): (Cation conc. entered: <1 mg/kg, converted to compound conc.:<13.43 mg/kg or <0.00134%) **IGNORED Because: "<LOD"**
Cadmium sulphide: (Cation conc. entered: 0.3 mg/kg, converted to compound conc.:0.386 mg/kg or 0.0000386%, Note 1 conc.: 0.00003%)
Chromium(VI) oxide: (Cation conc. entered: <2 mg/kg, converted to compound conc.:<3.846 mg/kg or <0.000385%)
IGNORED Because: "<LOD"
Chrysene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Copper (I) oxide: (Cation conc. entered: 26 mg/kg, converted to compound conc.:29.273 mg/kg or 0.00293%)
Cyanides (with the exception of complex cyanides): (Whole conc. entered as: <2 mg/kg or <0.0002%) **IGNORED Because: "<LOD"**
Dibenz[a,h]anthracene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
ethylbenzene: (Whole conc. entered as: <2 mg/kg or <0.0002%) **IGNORED Because: "<LOD"**
Fluoranthene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Fluorene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Indeno[123-cd]pyrene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**



Lead chromate: (Cation conc. entered: 119 mg/kg, converted to compound conc.:185.618 mg/kg or 0.0186%, Note 1 conc.: 0.0119%)
Mercury dichloride: (Cation conc. entered: <1 mg/kg, converted to compound conc.:<1.353 mg/kg or <0.000135%)
IGNORED Because: "<LOD"
Naphthalene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Nickel dihydroxide: (Cation conc. entered: 18 mg/kg, converted to compound conc.:28.431 mg/kg or 0.00284%)
pH: (Whole conc. entered as: 7.5 pH, converted to conc.:7.5 pH or 7.5 pH)
Phenanthrene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Phenol: (Whole conc. entered as: <2 mg/kg or <0.0002%) **IGNORED Because: "<LOD"**
Pyrene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Selenium compounds (with the exception of cadmium sulphoselenide and sodium selenite): (Cation conc. entered: <3 mg/kg, converted to compound conc.:<4.5 mg/kg or <0.00045%) **IGNORED Because: "<LOD"**
Toluene: (Whole conc. entered as: <5 mg/kg or <0.0005%) **IGNORED Because: "<LOD"**
Xylene: (Whole conc. entered as: <2 mg/kg or <0.0002%) **IGNORED Because: "<LOD"**
Zinc chromate: (Cation conc. entered: 74 mg/kg, converted to compound conc.:205.287 mg/kg or 0.0205%)

Notes utilised in assessment

Additional Risk Phrase Comments , used on:

Test: "Additional on R33" for determinand: "Lead chromate"

C14.3: Step 4 , used on:

Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Cadmium sulphide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Arsenic trioxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Copper (I) oxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Lead chromate"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Nickel dihydroxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Zinc chromate"

Note 1 , used on:

Test: "H5 on R20, R21, R22, R65" for determinand: "Cadmium sulphide"
Test: "H6 on R23, R24, R25" for determinand: "Cadmium sulphide"
Test: "H11 on R68" for determinand: "Cadmium sulphide"

Determinand notes

Note 1 , used on:

determinand: "Cadmium sulphide"
determinand: "Lead chromate"

Note A , used on:

determinand: "Zinc chromate"

Note E , used on:

determinand: "Arsenic trioxide"
determinand: "Cadmium sulphide"
determinand: "Nickel dihydroxide"
determinand: "Zinc chromate"



Classification of sample: WS4/0.8

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the European Waste Catalogue

Sample details

Sample Name:	EWC Code:	
WS4/0.8	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0 m		
Moisture content: 0% (dry weight correction)		

Hazard properties

None identified

Additional: Additional Risk Phrases "This is an additional risk phrase and such a risk phrases alone will not cause a waste to be hazardous."

Risk phrases hit:

R33 "Danger of cumulative effects"

Because of determinand:

Lead chromate: (compound conc.: 0.0136%)

Determinands (Moisture content: 0%, dry weight correction)

Acenaphthene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Acenaphthylene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Anthracene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Arsenic trioxide: (Cation conc. entered: 7 mg/kg, converted to compound conc.:9.242 mg/kg or 0.000924%)
Benzo[a]anthracene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Benzo[a]pyrene; benzo[def]chrysene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Benzo[b]fluoranthene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Benzo[ghi]perylene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Benzo[k]fluoranthene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
beryllium oxide: (Cation conc. entered: 0.6 mg/kg, converted to compound conc.:1.665 mg/kg or 0.000167%)
Boron tribromide/trichloride/trifluoride (combined risk phrases): (Cation conc. entered: <1 mg/kg, converted to compound conc.:<13.43 mg/kg or <0.00134%) **IGNORED Because: "<LOD"**
Cadmium sulphide: (Cation conc. entered: <0.2 mg/kg, converted to compound conc.:<0.257 mg/kg or <0.0000257%, Note 1 conc.: <0.00002%) **IGNORED Because: "<LOD"**
Chromium(VI) oxide: (Cation conc. entered: <2 mg/kg, converted to compound conc.:<3.846 mg/kg or <0.000385%) **IGNORED Because: "<LOD"**
Chrysene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Copper (I) oxide: (Cation conc. entered: 18 mg/kg, converted to compound conc.:20.266 mg/kg or 0.00203%)
Cyanides (with the exception of complex cyanides): (Whole conc. entered as: <2 mg/kg or <0.0002%) **IGNORED Because: "<LOD"**
Dibenz[a,h]anthracene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Fluoranthene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Fluorene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Indeno[123-cd]pyrene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Lead chromate: (Cation conc. entered: 87 mg/kg, converted to compound conc.:135.704 mg/kg or 0.0136%, Note 1 conc.: 0.0087%)
Mercury dichloride: (Cation conc. entered: <1 mg/kg, converted to compound conc.:<1.353 mg/kg or <0.000135%) **IGNORED Because: "<LOD"**



Naphthalene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Nickel dihydroxide: (Cation conc. entered: 16 mg/kg, converted to compound conc.:25.272 mg/kg or 0.00253%)
pH: (Whole conc. entered as: 7.3 pH, converted to conc.:7.3 pH or 7.3 pH)
Phenanthrene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Phenol: (Whole conc. entered as: <2 mg/kg or <0.0002%) **IGNORED Because: "<LOD"**
Pyrene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Selenium compounds (with the exception of cadmium sulphoselenide and sodium selenite): (Cation conc. entered: <3 mg/kg, converted to compound conc.:<4.5 mg/kg or <0.00045%) **IGNORED Because: "<LOD"**
Zinc chromate: (Cation conc. entered: 52 mg/kg, converted to compound conc.:144.256 mg/kg or 0.0144%)

Notes utilised in assessment

Additional Risk Phrase Comments , used on:

Test: "Additional on R33" for determinand: "Lead chromate"

C14.3: Step 4 , used on:

Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Arsenic trioxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Copper (I) oxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Lead chromate"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Nickel dihydroxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Zinc chromate"

Note 1 , used on:

Test: "H7 on R45" for determinand: "Lead chromate"
Test: "H10 on R60, R61" for determinand: "Lead chromate"
Test: "H10 on R62, R63" for determinand: "Lead chromate"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Lead chromate"

Determinand notes

Note 1 , used on:

determinand: "Lead chromate"

Note A , used on:

determinand: "Zinc chromate"

Note E , used on:

determinand: "Arsenic trioxide"
determinand: "beryllium oxide"
determinand: "Nickel dihydroxide"
determinand: "Zinc chromate"



Classification of sample: WS5/0.6

Non Hazardous Waste
Classified as **17 05 04**
in the European Waste Catalogue

Sample details

Sample Name:	EWC Code:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
WS5/0.6	Chapter:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
Sample Depth:	Entry:	
0 m		
Moisture content: 0% (dry weight correction)		

Hazard properties

None identified

Additional: Additional Risk Phrases "This is an additional risk phrase and such a risk phrases alone will not cause a waste to be hazardous."

Risk phrases hit:

R33 "Danger of cumulative effects"

Because of determinand:

Lead chromate: (compound conc.: 0.00546%)

Determinands (Moisture content: 0%, dry weight correction)

Acenaphthene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Acenaphthylene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Anthracene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Arsenic trioxide: (Cation conc. entered: 9 mg/kg, converted to compound conc.:11.883 mg/kg or 0.00119%)
Benzene: (Whole conc. entered as: <2 mg/kg or <0.0002%) **IGNORED Because: "<LOD"**
Benzo[a]anthracene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Benzo[a]pyrene; benzo[def]chrysene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Benzo[b]fluoranthene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Benzo[ghi]perylene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Benzo[k]fluoranthene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
beryllium oxide: (Cation conc. entered: 0.7 mg/kg, converted to compound conc.:1.943 mg/kg or 0.000194%)
Boron tribromide/trichloride/trifluoride (combined risk phrases): (Cation conc. entered: <1 mg/kg, converted to compound conc.:<13.43 mg/kg or <0.00134%) **IGNORED Because: "<LOD"**
Cadmium sulphide: (Cation conc. entered: <0.2 mg/kg, converted to compound conc.:<0.257 mg/kg or <0.0000257%, Note 1 conc.: <0.00002%) **IGNORED Because: "<LOD"**
Chromium(VI) oxide: (Cation conc. entered: <2 mg/kg, converted to compound conc.:<3.846 mg/kg or <0.000385%) **IGNORED Because: "<LOD"**
Chrysene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Copper (I) oxide: (Cation conc. entered: 16 mg/kg, converted to compound conc.:18.014 mg/kg or 0.0018%)
Cyanides (with the exception of complex cyanides): (Whole conc. entered as: <2 mg/kg or <0.0002%) **IGNORED Because: "<LOD"**
Dibenz[a,h]anthracene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
ethylbenzene: (Whole conc. entered as: <2 mg/kg or <0.0002%) **IGNORED Because: "<LOD"**
Fluoranthene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Fluorene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Indeno[123-cd]pyrene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Lead chromate: (Cation conc. entered: 35 mg/kg, converted to compound conc.:54.594 mg/kg or 0.00546%, Note 1 conc.: 0.0035%)



Mercury dichloride: (Cation conc. entered: <1 mg/kg, converted to compound conc.:<1.353 mg/kg or <0.000135%)
IGNORED Because: "<LOD"
Naphthalene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Nickel dihydroxide: (Cation conc. entered: 19 mg/kg, converted to compound conc.:30.01 mg/kg or 0.003%)
pH: (Whole conc. entered as: 7.5 pH, converted to conc.:7.5 pH or 7.5 pH)
Phenanthrene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Phenol: (Whole conc. entered as: <2 mg/kg or <0.0002%) **IGNORED Because: "<LOD"**
Pyrene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Selenium compounds (with the exception of cadmium sulphoselenide and sodium selenite): (Cation conc. entered: <3 mg/kg, converted to compound conc.:<4.5 mg/kg or <0.00045%) **IGNORED Because: "<LOD"**
Toluene: (Whole conc. entered as: <5 mg/kg or <0.0005%) **IGNORED Because: "<LOD"**
Xylene: (Whole conc. entered as: <2 mg/kg or <0.0002%) **IGNORED Because: "<LOD"**
Zinc chromate: (Cation conc. entered: 50 mg/kg, converted to compound conc.:138.707 mg/kg or 0.0139%)

Notes utilised in assessment

Additional Risk Phrase Comments , used on:

Test: "Additional on R33" for determinand: "Lead chromate"

C14.3: Step 4 , used on:

Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Arsenic trioxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Copper (I) oxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Lead chromate"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Nickel dihydroxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Zinc chromate"

Determinand notes

Note 1 , used on:

determinand: "Lead chromate"

Note A , used on:

determinand: "Zinc chromate"

Note E , used on:

determinand: "Arsenic trioxide"
determinand: "beryllium oxide"
determinand: "Nickel dihydroxide"
determinand: "Zinc chromate"



Classification of sample: WS8/0.2

Non Hazardous Waste
Classified as 17 05 04
in the European Waste Catalogue

Sample details

Sample Name:	EWC Code:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
WS8/0.2	Chapter:	
Sample Depth:	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0 m		
Moisture content: 0% (dry weight correction)		

Hazard properties

None identified

Additional: Additional Risk Phrases "This is an additional risk phrase and such a risk phrases alone will not cause a waste to be hazardous."

Risk phrases hit:

R33 "Danger of cumulative effects"

Because of determinand:

Lead chromate: (compound conc.: 0.0289%)

Determinands (Moisture content: 0%, dry weight correction)

Acenaphthene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Acenaphthylene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Anthracene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Arsenic trioxide: (Cation conc. entered: 11 mg/kg, converted to compound conc.:14.524 mg/kg or 0.00145%)
Benzo[a]anthracene: (Whole conc. entered as: 0.6 mg/kg or 0.00006%)
Benzo[a]pyrene; benzo[def]chrysene: (Whole conc. entered as: 0.6 mg/kg or 0.00006%)
Benzo[b]fluoranthene: (Whole conc. entered as: 0.72 mg/kg or 0.000072%)
Benzo[ghi]perylene: (Whole conc. entered as: 0.32 mg/kg or 0.000032%)
Benzo[k]fluoranthene: (Whole conc. entered as: 0.37 mg/kg or 0.000037%)
beryllium oxide: (Cation conc. entered: <0.5 mg/kg, converted to compound conc.:<1.388 mg/kg or <0.000139%)
IGNORED Because: "<LOD"
Boron tribromide/trichloride/trifluoride (combined risk phrases): (Cation conc. entered: <1 mg/kg, converted to compound conc.:<13.43 mg/kg or <0.00134%) **IGNORED Because: "<LOD"**
Cadmium sulphide: (Cation conc. entered: 0.5 mg/kg, converted to compound conc.:0.643 mg/kg or 0.0000643%, Note 1 conc.: 0.00005%)
Chromium(VI) oxide: (Cation conc. entered: <2 mg/kg, converted to compound conc.:<3.846 mg/kg or <0.000385%)
IGNORED Because: "<LOD"
Chrysene: (Whole conc. entered as: 0.75 mg/kg or 0.000075%)
Copper (I) oxide: (Cation conc. entered: 37 mg/kg, converted to compound conc.:41.658 mg/kg or 0.00417%)
Cyanides (with the exception of complex cyanides): (Whole conc. entered as: <2 mg/kg or <0.0002%) **IGNORED Because: "<LOD"**
Dibenz[a,h]anthracene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Fluoranthene: (Whole conc. entered as: 1.44 mg/kg or 0.000144%)
Fluorene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Indeno[123-cd]pyrene: (Whole conc. entered as: 0.33 mg/kg or 0.000033%)
Lead chromate: (Cation conc. entered: 185 mg/kg, converted to compound conc.:288.566 mg/kg or 0.0289%, Note 1 conc.: 0.0185%)



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Mercury dichloride: (Cation conc. entered: <1 mg/kg, converted to compound conc.:<1.353 mg/kg or <0.000135%)
IGNORED Because: "<LOD"
Naphthalene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Nickel dihydroxide: (Cation conc. entered: 18 mg/kg, converted to compound conc.:28.431 mg/kg or 0.00284%)
pH: (Whole conc. entered as: 6.8 pH, converted to conc.:6.8 pH or 6.8 pH)
Phenanthrene: (Whole conc. entered as: 0.57 mg/kg or 0.000057%)
Phenol: (Whole conc. entered as: <2 mg/kg or <0.0002%) **IGNORED Because: "<LOD"**
Pyrene: (Whole conc. entered as: 1.2 mg/kg or 0.00012%)
Selenium compounds (with the exception of cadmium sulphoselenide and sodium selenite): (Cation conc. entered: <3 mg/kg, converted to compound conc.:<4.5 mg/kg or <0.00045%) **IGNORED Because: "<LOD"**
Zinc chromate: (Cation conc. entered: 125 mg/kg, converted to compound conc.:346.768 mg/kg or 0.0347%)

Notes utilised in assessment

Additional Risk Phrase Comments , used on:

Test: "Additional on R33" for determinand: "Lead chromate"

C14.3: Step 4 , used on:

Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Cadmium sulphide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Arsenic trioxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Benzo[a]anthracene"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Benzo[a]pyrene; benzo[def]chrysene"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Benzo[b]fluoranthene"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Benzo[ghi]perylene"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Benzo[k]fluoranthene"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Chrysene"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Copper (I) oxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Fluoranthene"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Lead chromate"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Nickel dihydroxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Phenanthrene"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Pyrene"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Zinc chromate"

Note 1 , used on:

Test: "H5 on R20, R21, R22, R65" for determinand: "Cadmium sulphide"
Test: "H6 on R23, R24, R25" for determinand: "Cadmium sulphide"
Test: "H7 on R45" for determinand: "Cadmium sulphide"
Test: "H10 on R60, R61" for determinand: "Lead chromate"
Test: "H10 on R62, R63" for determinand: "Cadmium sulphide"
Test: "H11 on R68" for determinand: "Cadmium sulphide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Cadmium sulphide"

Determinand notes

Note 1 , used on:

determinand: "Cadmium sulphide"
determinand: "Lead chromate"

Note A , used on:

determinand: "Zinc chromate"

Note E , used on:

determinand: "Arsenic trioxide"
determinand: "Cadmium sulphide"
determinand: "Nickel dihydroxide"
determinand: "Zinc chromate"



Report created by Wilkinson, Luke on 31/03/2015

Classification of sample: WS9/0.3

Non Hazardous Waste
Classified as 17 05 04
in the European Waste Catalogue

Sample details

Sample Name:	EWC Code:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
WS9/0.3	Chapter:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
Sample Depth:	Entry:	
0 m		
Moisture content: 0% (dry weight correction)		

Hazard properties

None identified

Additional: Additional Risk Phrases "This is an additional risk phrase and such a risk phrases alone will not cause a waste to be hazardous."

Risk phrases hit:

R33 "Danger of cumulative effects"

Because of determinand:

Lead chromate: (compound conc.: 0.0164%)

Determinands (Moisture content: 0%, dry weight correction)

Acenaphthene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Acenaphthylene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Anthracene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Arsenic trioxide: (Cation conc. entered: 14 mg/kg, converted to compound conc.:18.485 mg/kg or 0.00185%)
Benzene: (Whole conc. entered as: <2 mg/kg or <0.0002%) **IGNORED Because: "<LOD"**
Benzo[a]anthracene: (Whole conc. entered as: 0.2 mg/kg or 0.00002%)
Benzo[a]pyrene; benzo[def]chrysene: (Whole conc. entered as: 0.17 mg/kg or 0.000017%)
Benzo[b]fluoranthene: (Whole conc. entered as: 0.25 mg/kg or 0.000025%)
Benzo[ghi]perylene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Benzo[k]fluoranthene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
beryllium oxide: (Cation conc. entered: 0.8 mg/kg, converted to compound conc.:2.22 mg/kg or 0.000222%)
Boron tribromide/trichloride/trifluoride (combined risk phrases): (Cation conc. entered: <1 mg/kg, converted to compound conc.:<13.43 mg/kg or <0.00134%) **IGNORED Because: "<LOD"**
Cadmium sulphide: (Cation conc. entered: 0.5 mg/kg, converted to compound conc.:0.643 mg/kg or 0.0000643%, Note 1 conc.: 0.00005%)
Chromium(VI) oxide: (Cation conc. entered: <2 mg/kg, converted to compound conc.:<3.846 mg/kg or <0.000385%)
IGNORED Because: "<LOD"
Chrysene: (Whole conc. entered as: 0.27 mg/kg or 0.000027%)
Copper (I) oxide: (Cation conc. entered: 38 mg/kg, converted to compound conc.:42.784 mg/kg or 0.00428%)
Cyanides (with the exception of complex cyanides): (Whole conc. entered as: <2 mg/kg or <0.0002%) **IGNORED Because: "<LOD"**
Dibenz[a,h]anthracene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
ethylbenzene: (Whole conc. entered as: <2 mg/kg or <0.0002%) **IGNORED Because: "<LOD"**
Fluoranthene: (Whole conc. entered as: 0.53 mg/kg or 0.000053%)
Fluorene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Indeno[123-cd]pyrene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Lead chromate: (Cation conc. entered: 105 mg/kg, converted to compound conc.:163.781 mg/kg or 0.0164%, Note 1 conc.: 0.0105%)



Mercury dichloride: (Cation conc. entered: <1 mg/kg, converted to compound conc.:<1.353 mg/kg or <0.000135%)
IGNORED Because: "<LOD"
Naphthalene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Nickel dihydroxide: (Cation conc. entered: 24 mg/kg, converted to compound conc.:37.908 mg/kg or 0.00379%)
pH: (Whole conc. entered as: 7.1 pH, converted to conc.:7.1 pH or 7.1 pH)
Phenanthrene: (Whole conc. entered as: 0.22 mg/kg or 0.000022%)
Phenol: (Whole conc. entered as: <2 mg/kg or <0.0002%) **IGNORED Because: "<LOD"**
Pyrene: (Whole conc. entered as: 0.43 mg/kg or 0.000043%)
Selenium compounds (with the exception of cadmium sulphoselenide and sodium selenite): (Cation conc. entered: <3 mg/kg, converted to compound conc.:<4.5 mg/kg or <0.00045%) **IGNORED Because: "<LOD"**
Toluene: (Whole conc. entered as: <5 mg/kg or <0.0005%) **IGNORED Because: "<LOD"**
Xylene: (Whole conc. entered as: <2 mg/kg or <0.0002%) **IGNORED Because: "<LOD"**
Zinc chromate: (Cation conc. entered: 133 mg/kg, converted to compound conc.:368.961 mg/kg or 0.0369%)

Notes utilised in assessment

Additional Risk Phrase Comments , used on:

Test: "Additional on R33" for determinand: "Lead chromate"

C14.3: Step 4 , used on:

Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Cadmium sulphide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Arsenic trioxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Benzo[a]anthracene"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Benzo[a]pyrene; benzo[def]chrysene"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Benzo[b]fluoranthene"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Chrysene"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Copper (I) oxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Fluoranthene"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Lead chromate"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Nickel dihydroxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Phenanthrene"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Pyrene"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Zinc chromate"

Determinand notes

Note 1 , used on:

determinand: "Cadmium sulphide"
determinand: "Lead chromate"

Note A , used on:

determinand: "Zinc chromate"

Note E , used on:

determinand: "Arsenic trioxide"
determinand: "beryllium oxide"
determinand: "Cadmium sulphide"
determinand: "Nickel dihydroxide"
determinand: "Zinc chromate"



Classification of sample: WS9/1

Hazardous Waste
Classified as **17 05 03 ***
in the European Waste Catalogue

Sample details

Sample Name:	EWC Code:	
WS9/1	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry:	17 05 03 * (Soil and stones containing hazardous substances)
0 m		
Moisture content: 0% (dry weight correction)		

Hazard properties

H7: Carcinogenic "substances and preparations which, if they are inhaled or ingested or if they penetrate the skin, may induce cancer or increase its incidence."

Risk phrases hit:

R45 "May cause cancer"

Because of determinand:

Zinc chromate: (compound conc.: 0.223%)

Additional: Additional Risk Phrases "This is an additional risk phrase and such a risk phrases alone will not cause a waste to be hazardous."

Risk phrases hit:

R14 "Reacts violently with water"

Because of determinand:

Boron tribromide/trichloride/trifluoride (combined risk phrases): (compound conc.: 0.00403%)

R33 "Danger of cumulative effects"

Because of determinand:

Lead chromate: (compound conc.: 0.153%)

Determinands (Moisture content: 0%, dry weight correction)

Acenaphthene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Acenaphthylene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Anthracene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Arsenic trioxide: (Cation conc. entered: 80 mg/kg, converted to compound conc.:105.626 mg/kg or 0.0106%)
Benzo[a]anthracene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Benzo[a]pyrene; benzo[def]chrysene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Benzo[b]fluoranthene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Benzo[ghi]perylene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Benzo[k]fluoranthene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
beryllium oxide: (Cation conc. entered: 9.5 mg/kg, converted to compound conc.:26.366 mg/kg or 0.00264%)
Boron tribromide/trichloride/trifluoride (combined risk phrases): (Cation conc. entered: 3 mg/kg, converted to compound conc.:40.29 mg/kg or 0.00403%)
Cadmium sulphide: (Cation conc. entered: 5.7 mg/kg, converted to compound conc.:7.326 mg/kg or 0.000733%, Note 1 conc.: 0.00057%)
Chromium(VI) oxide: (Cation conc. entered: <2 mg/kg, converted to compound conc.:<3.846 mg/kg or <0.000385%)
IGNORED Because: "<LOD"
Chrysene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**



Copper (I) oxide: (Cation conc. entered: 375 mg/kg, converted to compound conc.:422.208 mg/kg or 0.0422%)
Cyanides (with the exception of complex cyanides): (Whole conc. entered as: <2 mg/kg or <0.0002%) **IGNORED**
Because: "<LOD"
Dibenz[a,h]anthracene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Fluoranthene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Fluorene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Indeno[123-cd]pyrene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Lead chromate: (Cation conc. entered: 979 mg/kg, converted to compound conc.:1527.059 mg/kg or 0.153%, Note 1 conc.: 0.0979%)
Mercury dichloride: (Cation conc. entered: <1 mg/kg, converted to compound conc.:<1.353 mg/kg or <0.000135%)
IGNORED Because: "<LOD"
Naphthalene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Nickel dihydroxide: (Cation conc. entered: 198 mg/kg, converted to compound conc.:312.741 mg/kg or 0.0313%)
pH: (Whole conc. entered as: 7.2 pH, converted to conc.:7.2 pH or 7.2 pH)
Phenanthrene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Phenol: (Whole conc. entered as: <2 mg/kg or <0.0002%) **IGNORED Because: "<LOD"**
Pyrene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Selenium compounds (with the exception of cadmium sulphoselenide and sodium selenite): (Cation conc. entered: <3 mg/kg, converted to compound conc.:<4.5 mg/kg or <0.00045%) **IGNORED Because: "<LOD"**
Zinc chromate: (Cation conc. entered: 805 mg/kg, converted to compound conc.:2233.188 mg/kg or 0.223%)

Notes utilised in assessment

Additional Risk Phrase Comments , used on:

Test: "Additional on R14" for determinand: "Boron tribromide/trichloride/trifluoride (combined risk phrases)"
Test: "Additional on R33" for determinand: "Lead chromate"

C14.3: Step 4 , used on:

Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Cadmium sulphide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Arsenic trioxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Copper (I) oxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Lead chromate"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Nickel dihydroxide"

Note 1 , used on:

Test: "H5 on R20, R21, R22, R65" for determinand: "Cadmium sulphide"
Test: "H6 on R23, R24, R25" for determinand: "Cadmium sulphide"
Test: "H7 on R45" for determinand: "Cadmium sulphide"
Test: "H10 on R60, R61" for determinand: "Lead chromate"
Test: "H10 on R62, R63" for determinand: "Cadmium sulphide"
Test: "H11 on R68" for determinand: "Cadmium sulphide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Cadmium sulphide"

Determinand notes

Note 1 , used on:

determinand: "Cadmium sulphide"
determinand: "Lead chromate"

Note A , used on:

determinand: "Zinc chromate"

Note E , used on:


determinand: "Arsenic trioxide"
determinand: "beryllium oxide"
determinand: "Cadmium sulphide"



determinand: "Nickel dihydroxide"
determinand: "Zinc chromate"



Classification of sample: WS7/0.25

 **Non Hazardous Waste**
Classified as **17 05 04**
in the European Waste Catalogue

Sample details

Sample Name:	EWC Code:
WS7/0.25	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0 m	
Moisture content: 0%	
(dry weight correction)	

Hazard properties

None identified

Additional: Additional Risk Phrases "This is an additional risk phrase and such a risk phrases alone will not cause a waste to be hazardous."

Risk phrases hit:

R33 "Danger of cumulative effects"

Because of determinand:

Lead chromate: (compound conc.: 0.0144%)

Determinands (Moisture content: 0%, dry weight correction)

Acenaphthene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Acenaphthylene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Anthracene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Arsenic trioxide: (Cation conc. entered: 10 mg/kg, converted to compound conc.:13.203 mg/kg or 0.00132%)
Benzene: (Whole conc. entered as: <2 mg/kg or <0.0002%) **IGNORED Because: "<LOD"**
Benzo[a]anthracene: (Whole conc. entered as: 0.31 mg/kg or 0.000031%)
Benzo[a]pyrene; benzo[def]chrysene: (Whole conc. entered as: 0.28 mg/kg or 0.000028%)
Benzo[b]fluoranthene: (Whole conc. entered as: 0.41 mg/kg or 0.000041%)
Benzo[ghi]perylene: (Whole conc. entered as: 0.14 mg/kg or 0.000014%)
Benzo[k]fluoranthene: (Whole conc. entered as: 0.13 mg/kg or 0.000013%)
beryllium oxide: (Cation conc. entered: 0.7 mg/kg, converted to compound conc.:1.943 mg/kg or 0.000194%)
Boron tribromide/trichloride/trifluoride (combined risk phrases): (Cation conc. entered: <1 mg/kg, converted to compound conc.:<13.43 mg/kg or <0.00134%) **IGNORED Because: "<LOD"**
Cadmium sulphide: (Cation conc. entered: <0.2 mg/kg, converted to compound conc.:<0.257 mg/kg or <0.0000257%, Note 1 conc.: <0.00002%) **IGNORED Because: "<LOD"**
Chromium(VI) oxide: (Cation conc. entered: <2 mg/kg, converted to compound conc.:<3.846 mg/kg or <0.000385%) **IGNORED Because: "<LOD"**
Chrysene: (Whole conc. entered as: 0.35 mg/kg or 0.000035%)
Copper (I) oxide: (Cation conc. entered: 30 mg/kg, converted to compound conc.:33.777 mg/kg or 0.00338%)
Cyanides (with the exception of complex cyanides): (Whole conc. entered as: <2 mg/kg or <0.0002%) **IGNORED Because: "<LOD"**
Dibenz[a,h]anthracene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
ethylbenzene: (Whole conc. entered as: <2 mg/kg or <0.0002%) **IGNORED Because: "<LOD"**
Fluoranthene: (Whole conc. entered as: 0.69 mg/kg or 0.000069%)
Fluorene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Indeno[123-cd]pyrene: (Whole conc. entered as: 0.16 mg/kg or 0.000016%)
Lead chromate: (Cation conc. entered: 92 mg/kg, converted to compound conc.:143.503 mg/kg or 0.0144%, Note 1 conc.: 0.0092%)



Mercury dichloride: (Cation conc. entered: <1 mg/kg, converted to compound conc.:<1.353 mg/kg or <0.000135%) **IGNORED Because: "<LOD"**
Naphthalene: (Whole conc. entered as: <0.1 mg/kg or <0.00001%) **IGNORED Because: "<LOD"**
Nickel dihydroxide: (Cation conc. entered: 18 mg/kg, converted to compound conc.:28.431 mg/kg or 0.00284%)
pH: (Whole conc. entered as: 7 pH, converted to conc.:7 pH or 7 pH)
Phenanthrene: (Whole conc. entered as: 0.25 mg/kg or 0.000025%)
Phenol: (Whole conc. entered as: <2 mg/kg or <0.0002%) **IGNORED Because: "<LOD"**
Pyrene: (Whole conc. entered as: 0.56 mg/kg or 0.000056%)
Selenium compounds (with the exception of cadmium sulphoselenide and sodium selenite): (Cation conc. entered: <3 mg/kg, converted to compound conc.:<4.5 mg/kg or <0.00045%) **IGNORED Because: "<LOD"**
Toluene: (Whole conc. entered as: <5 mg/kg or <0.0005%) **IGNORED Because: "<LOD"**
Xylene: (Whole conc. entered as: <2 mg/kg or <0.0002%) **IGNORED Because: "<LOD"**
Zinc chromate: (Cation conc. entered: 71 mg/kg, converted to compound conc.:196.964 mg/kg or 0.0197%)

Notes utilised in assessment

Additional Risk Phrase Comments , used on:

Test: "Additional on R33" for determinand: "Lead chromate"

C14.3: Step 4 , used on:

Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Arsenic trioxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Benzo[a]anthracene"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Benzo[a]pyrene; benzo[def]chrysene"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Benzo[b]fluoranthene"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Benzo[ghi]perylene"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Benzo[k]fluoranthene"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Chrysene"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Copper (I) oxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Fluoranthene"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Lead chromate"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Nickel dihydroxide"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Phenanthrene"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Pyrene"
Test: "H14 on R50, R52, R53, R50/53, R51/53, R52/53" for determinand: "Zinc chromate"

Determinand notes

Note 1 , used on:

determinand: "Lead chromate"

Note A , used on:

determinand: "Zinc chromate"

Note E , used on:

determinand: "Arsenic trioxide"
determinand: "beryllium oxide"
determinand: "Nickel dihydroxide"
determinand: "Zinc chromate"



Appendix A: Classifier defined and non CLP determinands

Acenaphthene (CAS Number: 83-32-9)

Comments: Risk phrase data taken from European Chemicals Agency's Classification & Labelling Inventory
Data source:
<http://clp-inventory.echa.europa.eu/SummaryOfClassAndLabelling.aspx?SubstanceID=133563&HarmOnly=no>
Data source date: 16/07/2012
Risk Phrases: N; R50/53, N; R51/53, R36, R37, R38

Acenaphthylene (CAS Number: 208-96-8)

Comments: Risk phrase data taken from European Chemicals Agency's Classification & Labelling Inventory
Data source:
<http://clp-inventory.echa.europa.eu/SummaryOfClassAndLabelling.aspx?SubstanceID=59285&HarmOnly=no>
Data source date: 16/07/2012
Risk Phrases: R22, R26, R27, R36, R37, R38

Anthracene (CAS Number: 120-12-7)

Comments: Risk phrase data taken from European Chemicals Agency's Classification & Labelling Inventory
Data source:
<http://clp-inventory.echa.europa.eu/SummaryOfClassAndLabelling.aspx?SubstanceID=101102&HarmOnly=no>
Data source date: 08/03/2013
Risk Phrases: N; R50/53, R36, R37, R38, R43

Benzo[ghi]perylene (CAS Number: 191-24-2)

Comments: Risk phrase data taken from European Chemicals Agency's Classification & Labelling Inventory
Data source:
<http://clp-inventory.echa.europa.eu/SummaryOfClassAndLabelling.aspx?SubstanceID=15793&HarmOnly=no>
Data source date: 16/07/2012
Risk Phrases: N; R50/53

Boron tribromide/trichloride/trifluoride (combined risk phrases)

Comments: Combines the risk phrases and the average of the conversion factors for Boron tribromide, Boron trichloride and Boron trifluoride
Data source: N/A
Data source date: 10/01/2011
Risk Phrases: T+; R26/28, C; R34, C; R35, R14

Fluoranthene (CAS Number: 206-44-0)

Comments: Risk phrase data taken from European Chemicals Agency's Classification & Labelling Inventory
Data source:
<http://clp-inventory.echa.europa.eu/SummaryOfClassAndLabelling.aspx?SubstanceID=56375&HarmOnly=no>
Data source date: 16/07/2012
Risk Phrases: N; R50/53, R20, R22, R36

Fluorene (CAS Number: 86-73-7)

Comments: Risk phrase data taken from European Chemicals Agency's Classification & Labelling Inventory
Data source:
<http://clp-inventory.echa.europa.eu/SummaryOfClassAndLabelling.aspx?SubstanceID=81845&HarmOnly=no>
Data source date: 16/07/2012
Risk Phrases: N; R50/53, R53

Indeno[123-cd]pyrene (CAS Number: 193-39-5)

Comments: Risk phrase data taken from European Chemicals Agency's Classification & Labelling Inventory
Data source:
<http://clp-inventory.echa.europa.eu/SummaryOfClassAndLabelling.aspx?SubstanceID=128806&HarmOnly=no>
Data source date: 08/03/2013
Risk Phrases: R40



pH

Comments: Appendix C, C4.5
Data source: WM2 - Interpretation of the definition and classification of hazardous waste (Second Edition, version2.2), Environment Agency
Data source date: 30/05/2008
Risk Phrases: None.

Phenanthrene (CAS Number: 85-01-8)

Comments: Risk phrase data taken from European Chemicals Agency's Classification & Labelling Inventory
Data source:
<http://clp-inventory.echa.europa.eu/SummaryOfClassAndLabelling.aspx?SubstanceID=109754&HarmOnly=no>
Data source date: 16/07/2012
Risk Phrases: N; R50/53, R22, R36, R37, R38, R40, R43

Pyrene (CAS Number: 129-00-0)

Comments: Risk phrase data taken from European Chemicals Agency's Classification & Labelling Inventory
Data source:
<http://clp-inventory.echa.europa.eu/SummaryOfClassAndLabelling.aspx?SubstanceID=87484&HarmOnly=no>
Data source date: 16/07/2012
Risk Phrases: N; R50/53, R23

Appendix B: Notes

Additional Risk Phrase Comments

from section: Table 2.2 in the document: "WM2 - Hazardous Waste Technical Guidance"

"This is an additional risk phrase and such a risk phrase alone will not cause a waste to be hazardous."

C14.3: Step 4

from section: C14.3 in the document: "WM2 - Hazardous Waste Technical Guidance"

"Identify whether any individual ecotoxic substance is present below a cut-off value shown in Table C14.1"

Note 1

from section: 1.1.3.2, Annex VI in the document: "CLP Regulations"

"The concentration stated or, in the absence of such concentrations, the generic concentrations of this Regulation (Table 3.1) or the generic concentrations of Directive 1999/45/EC (Table 3.2), are the percentages by weight of the metallic element calculated with reference to the total weight of the mixture."

Note A

from section: 1.1.3.1, Annex VI in the document: "CLP Regulations"

"Without prejudice to Article 17(2), the name of the substance must appear on the label in the form of one of the designations given in Part 3. In Part 3, use is sometimes made of a general description such as '... compounds' or '... salts'. In this case, the supplier is required to state on the label the correct name, due account being taken of section 1.1.1.4."

Note E

from section: 1.1.3.1, Annex VI in the document: "CLP Regulations"

"Substances with specific effects on human health (see Chapter 4 of Annex VI to Directive 67/548/EEC) that are classified as carcinogenic, mutagenic and/or toxic for reproduction in categories 1 or 2 are ascribed Note E if they are also classified as very toxic (T+), toxic (T) or harmful (Xn). For these substances, the risk phrases R20, R21, R22, R23, R24, R25, R26, R27, R28, R39, R68 (harmful), R48 and R65 and all combinations of these risk phrases shall be preceded by the word 'Also'."



Report created by Wilkinson, Luke on 31/03/2015

Appendix C- Human Health Assessment Criteria

Appendix C: Version

Classification utilises the following:

- WM2 - Hazardous Waste Technical Guidance - 3rd Edition (Aug 2013)
Hazardous Waste: Interpretation of the definition and classification of hazardous waste (3rd Edition 2013)
- CLP Regulations - Regulation (EC) No 1272/2008 of 16 December 2008
REGULATION (EC) No 1272/2008 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006
- 1st ATP - Regulation (EC) No 790/2009 of 10 August 2009
COMMISSION REGULATION (EC) No 790/2009 of 10 August 2009 amending, for the purposes of its adaptation to technical and scientific progress, Regulation (EC) No 1272/2008 of the European Parliament and of the Council on classification, labelling and packaging of substances and mixtures
- 2nd ATP - Regulation (EC) No 286/2011 of 10 March 2011
COMMISSION REGULATION (EU) No 286/2011 of 10 March 2011 amending, for the purposes of its adaptation to technical and scientific progress, Regulation (EC) No 1272/2008 of the European Parliament and of the Council on classification, labelling and packaging of substances and mixtures
- 3rd ATP - Regulation (EU) No 618/2012 of 10 July 2012
COMMISSION REGULATION (EU) No 618/2012 of 10 July 2012 amending, for the purposes of its adaptation to technical and scientific progress, Regulation (EC) No 1272/2008 of the European Parliament and of the Council on classification, labelling and packaging of substances and mixtures
- 4th ATP - Regulation (EU) No 487/2013 of 8 May 2013
COMMISSION REGULATION (EU) No 487/2013 of 8 May 2013 amending, for the purposes of its adaptation to technical and scientific progress, Regulation (EC) No 1272/2008 of the European Parliament and of the Council on classification, labelling and packaging of substances and mixtures
- Correction to 1st ATP - Regulation (EU) No 758/2013 of 7 August 2013
COMMISSION REGULATION (EU) No 758/2013 of 7 August 2013 correcting Annex VI to Regulation (EC) No 1272/2008 of the European Parliament and of the Council on classification, labelling and packaging of substances and mixtures
- 5th ATP - Regulation (EU) No 944/2013 of 2 October 2013
COMMISSION REGULATION (EU) No 944/2013 of 2 October 2013 amending, for the purposes of its adaptation to technical and scientific progress, Regulation (EC) No 1272/2008 of the European Parliament and of the Council on classification, labelling and packaging of substances and mixtures
- 6th ATP - Regulation (EU) No 605/2014 of 5 June 2014
COMMISSION REGULATION (EU) No 605/2014 of 5 June 2014 amending, for the purposes of introducing hazard and precautionary statements in the Croatian language and its adaptation to technical and scientific progress, Regulation (EC) No 1272/2008 of the European Parliament and of the Council on classification, labelling and packaging of substances and mixtures

HazWasteOnline Engine: WM2 version 3 (Aug 2013)

HazWasteOnline Engine Version: 1.0.2735.5683 (16 Mar 2015)

HazWasteOnline Database: 1.0.2735.5683 (16 Mar 2015)

Appendix C Soil Guideline Values and General Assessment Criteria

C1 Assessment Criteria

The Contaminated Land Regime reflects the UK Government's stated objectives of achieving sustainable development through the 'suitable for use approach'.

C1.1 Contaminated Land Exposure Assessment Model (CLEA)

Current United Kingdom risk assessment practice is based on the Contaminated Land Exposure Assessment Model (CLEA).

The CLEA Guidance comprises the following documents:

- 1) EA Science Report SC050021/SR2: *Human health toxicological assessment of contaminants in soil.*
- 2) EA Science Report SC050021/SR3: *Updated technical background to the CLEA model.*
- 3) EA CLEA Bulletin (2009).
- 4) CLEA software version 1.04 (2009)
- 5) Toxicological reports and SGV technical notes.

The CLEA guidance and tools:

- do not cover other types of risk to humans, such as fire, suffocation or explosion, or short-term and acute exposures.
- do not cover risks to the environment, such as groundwater, ecosystems or buildings.
- do not provide a definitive test for telling when human health risks are significant.
- are not a legal requirement in assessing land contamination risks. They are not part of the legal regime for Part 2A of the Environmental Protection Act 1990.

The CLEA guidance derives soil concentrations of contaminants above which (in the opinion of the EA) there may be a concern that warrants further investigation. It does not provide a definitive test for establishing that the risk is significant.

A new statutory DEFRA guidance recently (i.e. August 2014) published some SGV/GACs with a more pragmatic (but still strongly precautionary) approach in their derivation called the Category 4 screening levels (C4SLs). These values provide a higher simple test for deciding that land is suitable for use and definitely not contaminated land. They are intended as generic screening values, (ii) they describe a level of risk that whilst above 'minimal' is still 'low' and (iii) they provide a 'higher simple test' for deciding that land is suitable for use and definitely not contaminated. These values were derived for four generic land uses: residential, commercial, allotments, and public open space.

C1.2 Standard Land-use Scenarios

The CLEA model uses a range of standard land-use scenarios to develop conceptual exposure models as follows:

1 Residential

Generic scenario assumes a typical two-storey house built on a ground bearing slab with a private garden having a lawn, flowerbeds and a small fruit and vegetable patch.

- Critical receptor is a young female child (zero to six years old)
- Exposure duration is six years.
- Exposure pathways include direct soil and indoor dust ingestion, consumption of homegrown produce and any adhering soil, skin contact with soils and indoor dust and inhalation of indoor and outdoor dust and vapours.
- Building type is a two-storey small terraced house.

A sub-set of this land-use is residential apartments with communal landscaped gardens where the consumption of home grown vegetables will not occur.

2) Allotments

Provision of open space (about 250sq.m) commonly made available to tenants by the local authority to grow fruit and vegetable for their own consumption. Typically, there are a number of plots to a site which may have a total area of up to 1 hectare. The tenants are assumed to be adults and that young children make occasional accompanied visits.

Although some allotment holders may choose to keep animals including rabbits, hens, and ducks, potential exposure to contaminated meat and eggs is not considered.

- Critical receptor is a young female child (zero to six years old)
- Exposure duration is six years.
- Exposure pathways include direct soil ingestion, consumption of homegrown produce and any adhering soil, skin contact with soils and inhalation of outdoor dust and vapours.
- There is no building.

3) Commercial/Industrial

The generic scenario assumes a typical commercial or light industrial property comprising a three-storey building at which employees spend most time indoors and are involved in office-based or relatively light physical work.

- Critical receptor is a working female adult (aged 16 to 65 years old).
- Exposure duration is a working lifetime of 49 years.
- Exposure pathways include direct soil and indoor dust ingestion, skin contact with soils and dusts and inhalation of dust and vapours.
- Building type is a three-storey office (pre 1970).

4) Public Open Space within Residential Area

The generic scenario refers to any grassed area 0.05 ha and that is close to Housing.

- Grassed area of up to 0.05 ha and a considerable proportion of this (up to 50%) may be bare soil
- Predominantly used by children for playing and may be used for activities such as a football kick about
- Sufficiently close proximity to home for tracking back of soil to occur, thus indoor exposure pathways apply
- older children as the critical receptor on basis that they will use site most frequently (Age class 4-9)
- ingestion rate 75 mg.day⁻¹

5) **Public Open Space Park**

This generic scenario refers to any public park that is more than 0.5ha in area:

- Public park (>0.5 ha), predominantly grassed and may also contain children's play equipment and border areas of soil containing flowers or shrubs (75% cover)
- Female child age classes 1-6
- Soil ingestion rate of 50 mg.day⁻¹
- Occupancy period outdoors = 2 hours.day⁻¹
- Exposure frequency of 170 days.year⁻¹ for age classes 2-18 and 85 days.year⁻¹ for age class 1
- Outdoor exposure pathways only (no tracking back).

C1.3 Soil Guideline Values

The EA are publishing a series of SGV reports for a selection of common contaminants relevant to the assessment of land contamination.

SGV's are generic assessment criteria based on CLEA standard land-uses and can be used to simplify the assessment of human health risks from long-term exposure to chemical contamination in soil. They do not cover short-term exposure (i.e. construction and maintenance workers), acute exposure or other risks such as fire, suffocation or explosion, as might arise from an accumulation of gases such as methane and carbon dioxide, or either odour or aesthetic issues.

SGV's represent 'trigger values', indicators that soil concentrations above the SGV level may pose a possibility of *significant harm* to human health. The converse, where soil concentrations are less than the SGV, is that the long-term human health risks are considered to be tolerable or minimal.

C1.4 Generic Assessment Criteria

If an SGV is not available for a substance identified in the soil then the range of Generic Assessment Criteria published from a collaborative research by Land Quality Management Limited (LQM) and the Chartered Institute of Environmental Health will be used. For derivation of these Generic Assessment Criteria reference must be made to:

Nathanial, P., McCaffrey, C., Ashmore, M., Cheng, Y., Gillet, A., Ogden, R., Scott, D. *The LQM/CIEH Generic Assessment Criteria for Human Health Risk Assessment (2nd edition)*. Land Quality Press. 2009.

In the case of Lead, Category 4 screening levels (C4SLs) have replaced the AtRisk Soil SSV.

C1.5 Detailed Quantitative Risk Assessments (DQRA)

Where the adoption of an SGV/GAC is not appropriate, for instance when the intended land-use is at variance the CLEA standard land-uses, then a DQRA may be undertaken to develop site specific values for relevant soil contaminants.

- ⇒ Establishing the plausibility that generic exposure pathways exist in practice by measurement and observation.
- ⇒ Developing more accurate parameters using site data.

C1.6 Ongoing development of CLEA based guidance

The EA is involved in a programme of publishing SGV's and related toxicity data (the TOX reports). As at July 2009 ten SGV's and matching TOX reports had been published.

Soil Assessment Criteria (SAC's) may be derived using toxicity data from the updated TOX reports, where these are published, or from the original TOX reports. SGV reports also take account of recent updates for plant uptake and other factors.

- ⇒ GAC's developed by CLEA guidance and given in this report will need to be assessed against updated TOX reports and SGV's when these are published.
- ⇒ SGV reports may give values that differ from the GAC's used in this report.
- ⇒ These variations may materially alter the remediation requirement for the site, requiring either an increase or decrease in the extent, type and cost of remediation.

C1.7 Phytotoxicity

CLEA guidance only addresses human health toxicity; assessment of plant toxicity (phytotoxicity) is based on threshold trigger values obtained from the following source:

- ICRL 70/90: *Notes on the restoration and aftercare of metalliferous mining sites for pasture and grazing*.

C1.8 Statistical Tests

DEFRA R&D Publication CLR 7 (DOE 1994) addressed the statistical treatment of test results and their comparison to Soil Guideline Values.

Consideration must be given to the appropriate area of land to be considered termed the critical averaging area.

For a communal open space or commercial land-use, the critical averaging area will depend on the proposed layout. For a residential use with private gardens the averaging area is the individual plot.

It may be appropriate to compare the upper 95th percentile concentration with the Soil Guideline Value, subject to applying a statistical test to establish that the range of concentrations are reasonably consistent and belonging to the same underlying distribution of data.

The DEFRA discussion paper Assessing risks from land contamination – a proportionate approach ('the way forward') (CLAN06/2006) aimed to increase understanding of the role that statistics can play in quantifying the uncertainty attached to the estimates of the mean concentration of contaminants in soil. In direct response CLAIRE/CIEH published a joint report, *Guidance in comparing soil contamination data with a critical concentration* (CLAIRE/CIEH 2008). A software implementation of the statistical techniques given in the report was published by ESI International (2008).

Treatment of Hot-Spots

- ⇒ A statistical test is applied to establish whether the data is a part of a single set, or whether data outliers are present.
- ⇒ Provided that the data is based on random sampling and no distinct contamination source was present at the sampling location, the hot-spot(s) may be excluded and the mean of the remaining data assessed.

C2 Soil Guideline Values and General Acceptance Criteria

Soil Guideline Values and General Acceptance Criteria used in the preparation of this report is tabulated in the following pages:

DEFRA CLEA 1.04 Soil Guideline Values (as at July 2012)

(Sandy Loam, pH 7, SOM 6%)

Contaminant	Residential (mg/kg DW)	Allotments (mg/kg DW)	Commercial (mg/kg DW)
Inorganic			
Mercury			
- Elemental	1.0	26	26
- Inorganic	170	80	3600
- Methyl	11	8	410
Nickel	130	230	1800
Selenium	350	120	13000
Organic			
May not be protective if SOM <6%			
Phenol	420	280	3200 (38,000*)
Benzene	0.33	0.07	95
Toluene	610	120	4400
Ethylbenzene	350	90	2800
Xylenes			
- o-xylene	250	160	2600
- m-xylene	240	180	3500
- p-xylene	230	160	3200
Dioxins			
Sum of PCDDs, PCDFs and dioxin-like PCB's.	8	8	240

* Based on a threshold protective of direct skin contact with phenol (guideline in brackets based on health affects following long term exposure provided for illustration only)

Category 4 screening levels (C4SL) (mg.kg⁻¹) for Metals and PAHs (SGV or GAC shown in brackets for comparison)

Substance	Residential		Allotments	Commercial	Public Open Space (POS)	
	With home-grown produce	without home-grown produce			Residential	Park
Arsenic	37(32)	40	49 (43)	640 (640)	79	168
Cadmium	26 (10)	149	4.9 (1.8)	410 (230)	220	880
Chromium VI	21 (4.3) ^a	21	170 (2.1) ^a	49 (35) ^a	23	250
Lead	200 (450) ^b (342) ^c	310 (450) ^b (383) ^c	80 (450) ^b	2330 (750) ^b (6490) ^c	630 (1590) ^c	1300 (1590) ^c
benzene	0.87 (0.33)	3.3	0.18 (0.07)	98 (95)	140	230
Benzo(a)pyrene (as a surrogate marker for genotoxic PAHs)	5 (1.0) ^a	5.3	5.7 (2.1) ^a	76 (14) ^a	10	21

Notes:

^aGAC from Nathanail *et al.*, 2009

^b Former SGV now withdrawn

^c Atkins AtRisk SSV Guideline Values For Lead

Published C4SL guidelines are for pH 7, SOM 6 %

LQM CIEH General Assessment Criteria (2nd edition) (mg/kg)

Contaminant	Residential	Allotment	Commercial
Metals			
Beryllium	51	55	420
Boron	291	45	192000
Chromium (III)	3000	34600	30400
Copper	2330	524	71700
Vanadium	140	150	4250
Zinc	3750	618	665000

LQM CIEH General Assessment Criteria

General Assessment Criteria For Polycyclic Aromatic Hydrocarbons (PAH's)
(mg/kg)

Determinants		Residential	Allotments	Commercial
Acenaphthene	1.0% SOM	210	34	85,000 (57) ^{sol}
	2.5% SOM	480	85	98,000 (141) ^{sol}
	6.0% SOM	100	200	100,000
Acenaphthylene	1.0% SOM	170	28	84,000 (86) ^{sol}
	2.5% SOM	400	69	97,000 (212) ^{sol}
	6.0% SOM	850	160	100,000
Anthracene	1.0% SOM	2,300	380	530,000
	2.5% SOM	4,900	950	540,000
	6.0% SOM	9,200	2200	540,000
Benzo(a)anthracene	1.0% SOM	3.1	2.5	90
	2.5% SOM	4.7	5.5	95
	6.0% SOM	5.9	10	97
Benzo(b)fluoranthene	1.0% SOM	5.6	3.5	100
	2.5% SOM	6.5	7.4	100
	6.0% SOM	7.0	13	100
Benzo(ghi)perylene	1.0% SOM	44	70	650
	2.5% SOM	46	120	660
	6.0% SOM	47	160	660
Benzo(k)fluoranthene	1.0% SOM	8.5	6.8	140
	2.5% SOM	9.6	14	140
	6.0% SOM	10	23	140
Chrysene	1.0% SOM	6.0	2.6	140
	2.5% SOM	8.0	5.8	140
	6.0% SOM	9.3	12	140
Dibenzo(ah)anthracene	1.0% SOM	0.76	0.76	13
	2.5% SOM	0.86	1.5	13
	6.0% SOM	0.90	2.3	13
Flouranthene	1.0% SOM	260	52	23,000
	2.5% SOM	460	130	23,000
	6.0% SOM	670	290	23,000
Flourene	1.0% SOM	160	27	64,000 (31) ^{sol}
	2.5% SOM	380	67	69,000
	6.0% SOM	780	160	71,000
Indeno(123-cd)pyrene	1.0% SOM	3.2	1.8	60
	2.5% SOM	3.9	3.8	61
	6.0% SOM	4.2	7.1	62
Naphthalene	1.0% SOM	1.5	4.1	200 (76) ^{sol}
	2.5% SOM	3.7	9.9	480 (183) ^{sol}
	6.0% SOM	8.7	23	1100 (432) ^{sol}
Phenanthrene	1.0% SOM	92	16	22,000
	2.5% SOM	200	38	22,000
	6.0% SOM	380	90	23,000
Pyrene	1.0% SOM	560	110	54,000
	2.5% SOM	1,000	270	54,000
	6.0% SOM	1,600	620	54,000

^{vap} – GAC presented exceeds the vapour saturation limit, which is presented in brackets.

^{sol} – GAC presented exceeds the soil saturation limit, which is presented in brackets.

General Assessment Criteria For TPH (mg/kg)				
Determinants		Residential	Allotments	Commercial
Aliphatic				
EC 5-6	1.0% SOM	30	740	3,400 (304) ^{sol}
	2.5% SOM	55	1,700	6,200 (558) ^{sol}
	6.0% SOM	110	3,900	13,000 (1150) ^{sol}
EC >6-8	1.0% SOM	73	2,300	8,300 (144) ^{sol}
	2.5% SOM	160	5,600	18,000 (322) ^{sol}
	6.0% SOM	370	13,000	42,000 (736) ^{sol}
EC >8-10	1.0% SOM	19	320	2,100 (78) ^{sol}
	2.5% SOM	46	770	5,100 (118) ^{vap}
	6.0% SOM	110	1,700	12,000 (451) ^{vap}
EC >10-12	1.0% SOM	93 (48) ^{vap}	2,200	10,000 (48) ^{sol}
	2.5% SOM	230 (118) ^{vap}	4,400	24,000 (118) ^{vap}
	6.0% SOM	540 (283) ^{vap}	7,300	49,000 (283) ^{vap}
EC >12-16	1.0% SOM	740 (24) ^{sol}	11,000	61,000 (24) ^{sol}
	2.5% SOM	1,700 (59) ^{sol}	13,000	83,000 (59) ^{sol}
	6.0% SOM	3,000 (142) ^{sol}	13,000	91,000 (142) ^{sol}
EC >16-35	1.0% SOM	45,000 (8.48) ^{sol}	260,000	1,600,000
	2.5% SOM	64,000 (21) ^{sol}	270,000	1,800,000
	6.0% SOM	76,000	270,000	1,800,000
EC >35-44	1.0% SOM	45,000 (8.48) ^{sol}	260,000	1,600,000
	2.5% SOM	64,000 (21) ^{sol}	270,000	1,800,000
	6.0% SOM	76,000	270,000	1,800,000
Aromatic				
EC 5-7	1.0% SOM	65	13	28,000 (1220) ^{sol}
	2.5% SOM	130	27	49,000 (2260) ^{sol}
	6.0% SOM	280	57	90,000 (4710) ^{sol}
EC >7-8	1.0% SOM	120	22	59,000 (869) ^{vap}
	2.5% SOM	270	51	110,000 (1920) ^{sol}
	6.0% SOM	611	120	190,000 (4360) ^{vap}
EC >8-10	1.0% SOM	27	8.6	3,700 (613) ^{vap}
	2.5% SOM	65	21	8,600 (1500) ^{vap}
	6.0% SOM	151	51	18,000 (3580) ^{vap}
EC >10-12	1.0% SOM	69	13	17,000 (364) ^{sol}
	2.5% SOM	160	31	29,000 (899) ^{sol}
	6.0% SOM	346	74	34,500 (2150) ^{sol}
EC >12-16	1.0% SOM	140	23	36,000 (169) ^{sol}
	2.5% SOM	480	57	37,000
	6.0% SOM	770	130	37,800
EC >16-21	1.0% SOM	250	46	28,000
	2.5% SOM	480	110	28,000
	6.0% SOM	770	260	28,000
EC >21-35	1.0% SOM	890	370	28,000
	2.5% SOM	1,100	820	28,000
	6.0% SOM	1,230	1,600	28,000
EC >35-44	1.0% SOM	890	370	28,000
	2.5% SOM	1,100	820	28,000
	6.0% SOM	1,230	1,600	28,000
Aromatic & Aliphatic				
EC >44 - 70	1.0% SOM	1200	1200	28,000
	2.5% SOM	1300	2100	28,000
	5.0% SOM	1300	3000	28,000

Note: a) SOM = Soil Organic Matter Content (%) b) LQM CIEH GAC not set for Allotment land-use

ICRCL 70/90 Restoration of metalliferous mining areas (mg/kg)

Phytotoxicity (Harmful to Plants) Threshold Trigger Values	
Copper	250
Zinc	1000

Notes: Many cultivars and specifically grasses have a high tolerance and there will be no ill-effect at the threshold trigger values given for neutral or near neutral pH. Site observation of plant vitality may give additional guidance.

LQM CIEH General Assessment Criteria

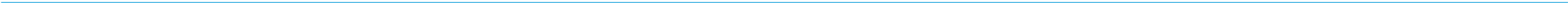
Volatile and Semi-Volatile Organic Compounds (mg/kg)			
Contaminant	Residential	Allotment	Commercial
Chloroalkanes & alkenes			
1,2 Dichloroethane			
1.0% SOM	0.0054	0.0046	0.71
2.5% SOM	0.0080	0.0083	1.00
6.0% SOM	0.014	0.016	1.80
1,1,2,2 Tetrachloroethane			
1.0% SOM	1.4	0.41	290
2.5% SOM	2.9	0.89	580
6.0% SOM	6.3	2.0	1200
1,1,1,2 Tetrachloroethane			
1.0% SOM	0.90	0.79	120
2.5% SOM	2.1	1.9	260
6.0% SOM	4.8	4.4	590
Tetrachloroethene			
1.0% SOM	0.94	1.6	130
2.5% SOM	2.1	3.7	290
6.0% SOM	4.8	8.7	660
1,1,1 Trichloroethane			
1.0% SOM	6.2	48	700
2.5% SOM	13	110	1400
6.0% SOM	28	240	3100
Tetrachloromethene			
1.0% SOM	0.018	0.16	3.0
2.5% SOM	0.039	0.37	6.6
6.0% SOM	0.089	0.85	15
Trichloroethene			
1.0% SOM	0.11	0.43	12
2.5% SOM	0.22	0.95	25
6.0% SOM	0.49	2.2	55
Trichloromethane			
1.0% SOM	0.75	0.36	110
2.5% SOM	1.3	0.70	190
6.0% SOM	2.7	1.5	370
Vinyl Chloride			
1.0% SOM	0.00047	0.00055	0.063
2.5% SOM	0.00064	0.0010	0.081
6.0% SOM	0.00099	0.0018	0.12

Contaminant	Residential	Allotment	Commercial
Explosives			
2,4,6 Trinitrotoluene			
1.0% SOM	1.6	0.24	1000
2.5% SOM	3.7	0.58	1000
6.0% SOM	8.0	1.4	1100
RDX (Hexogen/Cyclonite/1,3,5-trinitro-1,3,5-triazacyclohexane)			
1.0% SOM	3.5	0.52	6400
2.5% SOM	7.4	1.1	6400
6.0% SOM	16	2.5	6400
HMX (Octogen/1,3,5,7-tetrenitro-1,3,5,7-tetrazacyclo-octane)			
1.0% SOM	5.7	0.86	110,000
2.5% SOM	13	1.9	110,000
6.0% SOM	26	3.9	110,000
Atrazine			
1.0% SOM	0.24	0.037	870
2.5% SOM	0.56	0.085	880
6.0% SOM	1.3	0.20	880
Pesticides			
Aldrin			
1.0% SOM	1.7	1.3	54
2.5% SOM	2.0	2.6	54
6.0% SOM	2.1	4.0	54
Dieldrin			
1.0% SOM	0.69	0.13	90
2.5% SOM	1.4	0.32	91
6.0% SOM	2.2	0.73	92
Dichlorvos			
1.0% SOM	0.29	0.044	942
2.5% SOM	0.6	0.091	972
6.0% SOM	1.3	0.2	983
Alpha - Endosulfan			
1.0% SOM	2.9	0.47	2310 (0.003) ^{vap}
2.5% SOM	7.0	1.2	2990 (0.007) ^{vap}
6.0% SOM	16	2.7	3390
Beta - Endosulfan			
1.0% SOM	2.8	0.44	2580 (0.00007) ^{vap}
2.5% SOM	6.6	1.1	3160 (0.0002) ^{vap}
6.0% SOM	15	2.6	3480
Alpha -Hexachlorocyclohexanes			
1.0% SOM	19	3.0	14000
2.5% SOM	46	7.4	14600
6.0% SOM	100	18	14900
Beta -Hexachlorocyclohexanes			
1.0% SOM	1.7	0.26	1120
2.5% SOM	3.9	0.64	1130
6.0% SOM	8.5	1.5	1130
Gamma -Hexachlorocyclohexanes			
1.0% SOM	0.58	0.089	532
2.5% SOM	1.4	0.22	546
6.0% SOM	3.0	0.52	552

Chlorobenzenes			
Chlorobenzene			
1.0% SOM	0.33	5.9	59
2.5% SOM	0.73	14	32
6.0% SOM	59	130	310
1,2-Dichlorobenzene			
1.0% SOM	16	94	2100 (571) ^{sol}
2.5% SOM	39	230	5100 (1370) ^{sol}
6.0% SOM	91	540	12000 (3240) ^{sol}
1,3-Dichlorobenzene			
1.0% SOM	0.29	0.25	32
2.5% SOM	0.70	0.61	77
6.0% SOM	1.7	1.5	180
1,4-Dichlorobenzene			
1.0% SOM	30	15	4500 (224) ^{vap}
2.5% SOM	72	37	10000 (540) ^{vap}
6.0% SOM	167	88	22000 (1280) ^{vap}
1,2,3-Trichlorobenzene			
1.0% SOM	1.0	4.7	110
2.5% SOM	2.6	12	270
6.0% SOM	6.1	28	620
1,2,4-Trichlorobenzene			
1.0% SOM	1.8	31	230
2.5% SOM	4.5	75	560
6.0% SOM	11	180	1300
1,3,5-Trichlorobenzene			
1.0% SOM	0.23	4.7	24
2.5% SOM	0.57	12	57.8
6.0% SOM	1.3	28	140
1,2,3,4-Tetrachlorobenzene			
1.0% SOM	12	4.4	1800 (122) ^{vap}
2.5% SOM	4.5	75	3200 (304) ^{vap}
6.0% SOM	11	180	4500 (728) ^{vap}
1,2,3,5-Tetrachlorobenzene			
1.0% SOM	0.49	0.38	52 (39.4) ^{vap}
2.5% SOM	1.2	0.94	120 (98.1) ^{vap}
6.0% SOM	2.8	2.2	250 (235) ^{vap}
1,2,4,5-Tetrachlorobenzene			
1.0% SOM	0.30	0.064	44 (19.7) ^{sol}
2.5% SOM	0.68	0.16	73 (49.1) ^{sol}
6.0% SOM	1.4	0.37	97
Pentachlorobenzene			
1.0% SOM	5.2	1.2	650 (43.0) ^{sol}
2.5% SOM	10	3.1	770 (107) ^{sol}
6.0% SOM	17	7.1	830
Hexachlorobenzene			
1.0% SOM	0.59 (0.20) ^{vap}	0.18	48 (0.20) ^{vap}
2.5% SOM	1.0 (0.50) ^{vap}	0.42	53
6.0% SOM	1.4	0.92	55
Phenols & Chlorophenols			
Chlorophenols (4 Congeners)			
1.0% SOM	0.87	0.13	3500
2.5% SOM	2.0	0.30	4000
6.0% SOM	4.4	0.70	4200
Pentachlorophenols			
1.0% SOM	0.55	0.084	1200
2.5% SOM	1.3	0.21	0.49
6.0% SOM	1200	1300	1400

Others			
Carbon Disulphide			
1.0% SOM	0.10	4.8	12
2.5% SOM	0.20	10	23
6.0% SOM	0.44	23	50
Hexachloro-1,3-Butadiene			
1.0% SOM	0.21	0.25	32
2.5% SOM	0.51	0.61	69
6.0% SOM	1.2	1.4	120

^{vap} – GAC presented exceeds the vapour saturation limit, which is presented in brackets.
^{sol} – GAC presented exceeds the soil saturation limit, which is presented in brackets.



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