WS102 @ 0.3m	Lead	200	1400
WS104 @ 0.3m	Lead	200	510
WS105 @ 0.35m	Lead	200	320

9.7 No other exceedances were recorded.

Controlled Waters

9.8 Risk to groundwater resources is dismissed due to the absence of any significant source of mobile contamination.

9.9 The risk to surface waters risk has been dismissed within the Initial Conceptual Model. No new risks are identified.

Ground Gas

9.10 Following the guidance provided in Section 3 of CIRIA C665 an initial assessment is undertaken to determine if there are any significant sources of potential ground gas. Such sources include landfills, organic clays and made ground incorporating putrescible materials such as rags, paper and wood. Where no significant source is identified no further assessment is necessary.

9.11 This approach is further supported by supplementary guidance given in RB17, published by CL:AIRE which confirms that gas monitoring is not generally required on sites where Made Ground is less than 5m thick and with low organic matter content or on natural soils such as alluvial clays and Chalk as the ground gas sources are not considered significant. The supplementary guidance given in RB17 also takes account of the current requirements for sealing of floor slabs and substructures to meet air tightness requirements under Part L of the Building Regulations which were not considered in CIRIA C665. The advice given in RB17 is consistent with CIRIA C665 and the Local Authority Guide to Ground Gas published by CIEH.

9.12 Where significant potential risk from ground gas is identified from the Initial Conceptual Model and the intrusive ground investigation works ground gas monitoring is undertaken and the results of the monitoring are compared against the Gas Screening Values given in CIRIA Report 665. From this the Characteristic Situation is identified and remedial measures proposed.

9.13 When assessing the risk and type of remedial measures appropriate consideration is given to the likely construction of the development, the nature of the gas posing a risk and the nature of the likely source. The use of engineering judgement when determining risk from

ground gas is consistent with the recommendations given in CIRIA C665 using a pollutant linkage model.

9.14 Gas monitoring was undertaken during return visits which has not recorded elevated concentrations of Methane and no flow. Based on the gas monitoring undertake the Gas Screening Value is less than 0.07l/hr and therefore falls within Characteristic Situation 1 (CS1).

9.15 Additional monitoring is being undertaken.

Revised Conceptual Model

9.16 The Initial Conceptual Model presented in Section 6 has been revised based on the findings of the ground investigation and the revised Conceptual Model is presented below:

Source	Location	Exposure Pathway	Potential Receptor	Probability of Exposure	Details
Human Health					
Asbestos, Hydrocarbon and metals.	Made Ground.	Ingestion dermal and inhalation.	Construction Workers.	Low	Management procedures proposed.
			Site users.	Low	Remediation proposed.
Asbestos, Hydrocarbon and metals.	Unforeseen Contamination.	Ingestion dermal and inhalation.	Construction Workers.	Dismissed.	Normal PPE will address risk.
			Site users.	Negligible.	No source identified.
Hydrocarbon and metals.	Potential migration from off-site source.	Ingestion dermal and inhalation.	Construction Workers.	Dismissed.	No source and no exceedance of GAC.
			Site users.		
Ground Gas.	Historic Landfill.	Inhalation & Explosive.	Construction Workers.	Dismissed.	No significant source identified and no significant ground gas measured.
			Site users.		
	Potential Made Ground.	Inhalation & Explosive.	Construction Workers.		
			Site users.		
Groundwater					
Hydrocarbon and metals.	Potential spillage on site	Vertical Migration.	Groundwater	Dismissed.	No mobile source identified.
Surface Water					
Hydrocarbon and metals.	Potential spillage on site	Horizontal Migration.	River Network	Dismissed.	No source or credible receptor.
Environmental Receptors					
On site contaminants		Ingestion dermal and inhalation.	Ecology.	Dismissed.	No sensitive ecology designation.
		Direct.	Archaeology.	Dismissed.	None present.
		Direct.	Geology.	Dismissed.	No sensitive receptor present.
		Phytotoxic.	Woodland.	Dismissed.	None present.
		Phytotoxic.	Crops.	Dismissed.	No source identified.
		Ingestion dermal and inhalation.	Livestock.	Dismissed.	No source identified.
Building Services					
On site contaminants		Direct.	Historic Buildings.	Dismissed.	None present.
		Direct.	Proposed Buildings.	Dismissed.	No source identified.
		Permeate into pipework.	Water Pipes.	Dismissed.	No significant source identified.

9.17 Elevated Lead, Arsenic and PAH have been identified and it is recommended that remediation is undertaken.

9.18 Within areas of buildings and pavements the use of hardstanding will provide remediation by breaking the potential pollutant linkage. Within proposed soft landscape areas it is

recommended that clean cover soils are provided comprising 600mm in domestic garden areas and 400mm in communal areas over a geotextile no dig layer. Validation of the cover soils should be undertaken using hand pits with testing of cover soils.

9.19 Asbestos contaminated material has been identified during the ground investigation and it is possible that further material could be encountered during construction works. The use of clean cover soils discussed above will provide remediation to protect future site users. Measures should to be incorporated in to the Contractors Construction Stage Health and Safety Plan and asbestos management plan as required under the Construction Design and Management (CDM) Regulations to mitigate risk to construction works. Measures may include:

- Designing temporary works to minimise disturbance of the Back fill material;
- Separating material and disposal of soils containing asbestos;
- Wetting down during excavation;
- Sheeting of stockpiles where asbestos is suspected;
- Testing of soils and off-site disposal of any soils found or suspected of containing asbestos;
- Preventing access to the construction site by members of the public;
- Use of good hygiene measures, including washing down of plant; and
- Use of appropriate PPE, including face masks..

9.20 If unforeseen contamination is encountered during construction works such as localised spillage outside the areas investigated an Environmental consultant will be available on a 'call out' basis to undertake an assessment of risk. If 'unforeseen contamination' is encountered such as hydrocarbon contamination or solvent odours the discovery strategy will be to remove the source as it is likely to be very limited in extent or encapsulate it on site as appropriate and the Local Planning Authority advised.

9.21 As part of this discovery strategy it is recommended that additional investigation by trial pits is undertaken in areas of existing hardstanding where access can not currently be obtained to identify potential areas of contamination. This supplementary investigation is best undertaken following demolition works where safe access can be gained.

Waste Classification

9.22 Two part WAC test has been undertaken, the results of which are included in Appendix C. These show no exceedances above the inert threshold values PAH, TPH or TOC. Exceedance above leachable thresholds for Inert Waste by Antimony and Lead were recorded. In addition, asbestos above 0.1% has been recorded.

9.23 The Waste Management paper 2 has been updated to version 3 which states that sites which previously could be considered 'uncontaminated land' surplus soils if they did not exceed the GAC values now requires the landfill to make an appropriate assessment of the waste classification. As such final assessment, will be undertaken by the receiving landfill based on the requirements of their permit.

9.24 Based on the results received it is considered that Made Ground is likely to be classified as Stable Non Reactive Waste.

10.0 GEOTECHNICAL ASSESSMENT

Proposed Development

10.1 This document is a report of this survey and has been produced to support a planning submission for the site which seeks the demolition of the existing buildings on-site and phased mixed-use development comprising 452 residential homes (Class C3) up to six storeys, a Community/Leisure Facility (Class F2) of up to three storeys in height, a "MakersLab" (sui generis) of up to two storeys together with basement car parking and site wide landscaping.

10.2 It is considered that the scheme meets the criteria of Geotechnical Category 1 of Eurocode 7.

Ground Conditions

10.3 Ground Conditions comprise Made Ground over firm clay and loose becoming dense with depth sand and gravel. This is underlain by London Clay comprising stiff clay.

10.4 Additional groundwater monitoring is being undertaken shortly pre-planning application and that the basement will be designed accordingly with the groundwater flood risk in mind.

Site Preparation

10.5 The site should be cleared and any vegetation below areas of proposed development stripped in accordance with Series 200 of the Specification for Highway Works. This should include:

- Any redundant services should be sealed off and grubbed out and replaced with suitable compacted engineered fill; and
- Any tree roots should be grubbed out.

Foundations

10.6 It is considered that conventional strip foundations should be suitable for low rise buildings with wall loadings of 75kN/m or les assuming an allowable bearing capacity of 100kN/m^2 for natural soils at depths of 1.5m bgl. Within the natural firm clay or medium dense sand and gravel. An assessment of likely settlements has been undertaken and these are estimated to be less than 25mm.

10.7 Foundations may need to be stepped down locally where Made Ground is deeper. Foundations may also need to be deepened in accordance with NHBC requirements for building near trees. Foundations should be designed assuming soils of moderate shrinkage potential. It is recommended that foundations are reinforced to allow them to span both clay and granular soils.

10.8 No evidence of desiccation was noted.

10.9 It is likely that apartment blocks and structures with wall loadings above 75kN per m will require piled foundations.

10.10 For preliminary purposes and an initial pile assessment has been undertaken using the following assumptions:

- Upper 1.5m is ignored.
- Soil properties have been taken from the ground investigation and laboratory testing.
- A global factor of safety of 2.5 has been used, together with factors of 1.5 on shaft resistance and 3 on base resistance.

10.11 The following preliminary pile working loads have been calculated:

Pile depth (m bgl)	Working Load kN					
	200mm	250mm	300mm	350mm	450mm	600mm
10	80	100	125	150	200	300
15	150	180	235	280	370	530
20	220	290	350	420	560	770
25	320	400	500	590	780	1080

10.12 Final design should be undertaken by a specialist piling contractor who ca use case studies to negotiate more economic pile designs.

Ground Floor Slab

10.13 Based on thickness of Made Ground suspended floor slabs are recommended.

Pavement Construction

10.14 An assessment of the likely California Bearing Ratio (CBR) has been assessed from the following sources:

- Description of the materials encountered in the exploratory holes; and

- Guidance given in HD25/94.

10.15 Based on the above it is considered that an equilibrium CBR of 3% is suitable.

10.16 It is recommended that the sub-formation is proof rolled with any soft materials being excavated and replaced with suitable compacted capping.

10.17 Soils are not considered to be frost susceptible.

Drainage

10.18 Soakaway testing identified poor soil infiltration rates due to the clay content of the sand and gravel deposits. Soakaway drainage is not considered feasible.

10.19 Chemical results should be provided to the water authority to confirm the design of potable water supply pipes.

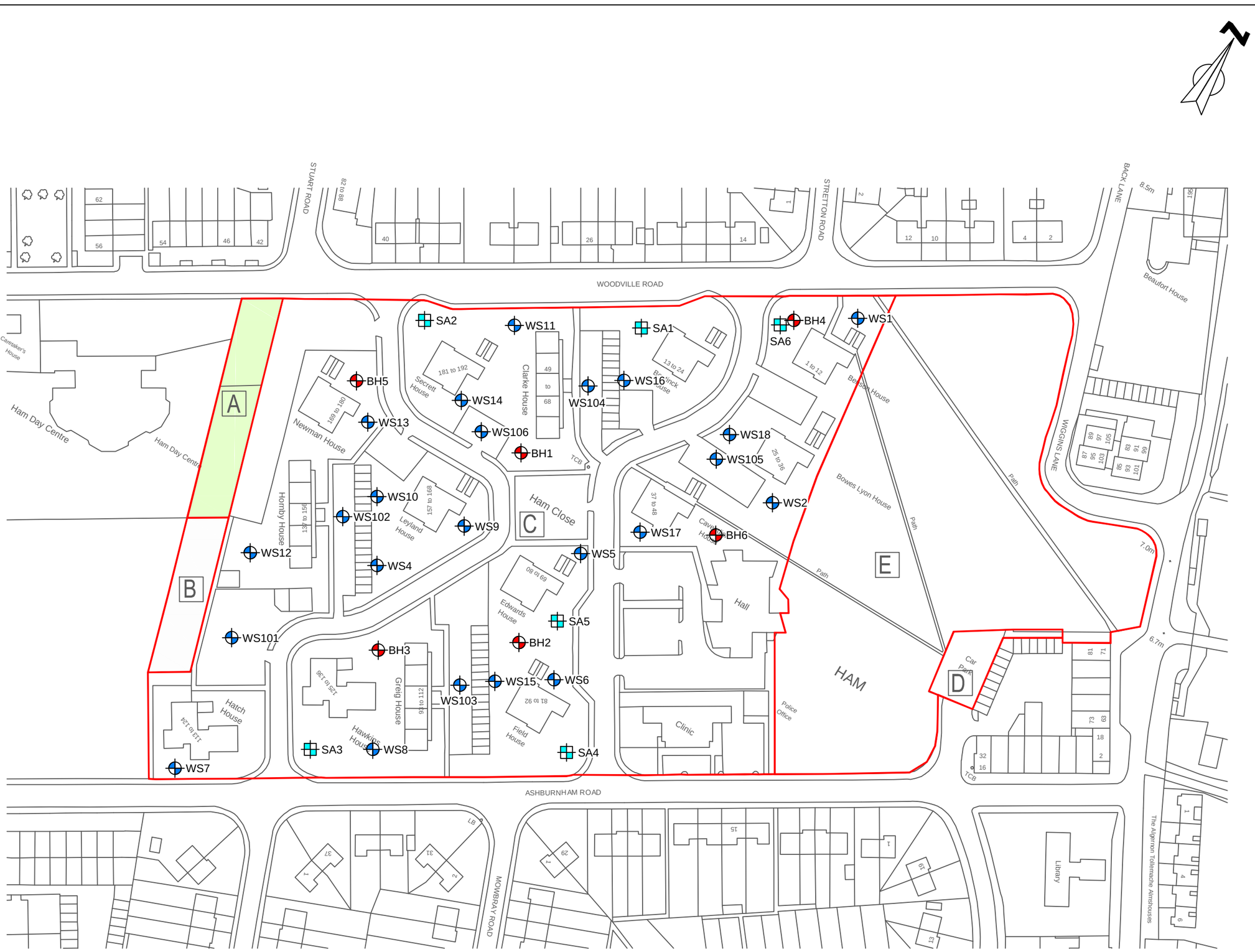
Buried Concrete

10.20 Results of the sulphate and pH testing indicate that shallow soils have soluble sulphate concentrations are generally less than 0.5 g/l consistent with DS1 Conditions. Samples from the London Clay below 6m bgl recorded a concentration above 0.5 g/l within the London Clay at 25m bgl but the soils have a neutral pH. Taking account of pH and sulphate concentrations it is considered that shallow buried concrete can be deigned to Class AC1-s.

Excavation and Materials Re-Use

10.21 Site observations indicated that excavations should be feasible in the near surface. Where access is required the excavations should be designed in accordance with CIRIA RR97.

10.22 Significant dewatering of excavations is not likely to be required.



Key

- Site Boundary
- Window Sampler Locations (WS)
- Borehole Locations (BH)
- Soakaway Locations (SA)

enzygo environmental consultants
Samuel House, 5 Fox Valley Way, Stocksbridge, Sheffield, S36 2AA

CLIENT: Hill Partnership

SCALE: 1:1000@A3

PROJECT REF: CRM.1027.087

DRAWN: VR

CHECKED: MG

DATE: October 2021

PROJECT: Richmond

TITLE: Site Plan

DRAWING NO: CRM.1027.087.GE.D.001.B

Chelmer
Consultancy Services
'Groundbreaking Services'

Desk Top Study Report

Site	Ham Close
	Richmond Upon Thames
	London
	TW10 7PG
Client	Richmond Housing Partnership
Date	11th August 2017
Our Ref	DTS/9324

Chelmer Site Investigation Laboratories Ltd
Unit 15 East Hanningfield Industrial Estate, Old Church Road, East Hanningfield, Essex CM3 8AB
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PHASE 1 ENVIRONMENTAL REPORT
of a site at
HAM CLOSE, RICHMOND UPON THAMES, LONDON, TW10 7PG
for
RICHMOND HOUSING PARTNERSHIP

Project No 9324
Report ref: 9324-P1E-1
Issued: 11 August 2017
Revision:

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CONTENTS

1 EXECUTIVE SUMMARY

Details	Summary	
Proposed Development	Residential with soft landscaping	
Current Site Use	Residential and commercial	
Site History	Historical mapping shows site initially used as farm land later developed for residential and commercial use	
Surrounding Area	Residential	
Environmental Setting	Geology	Superficial: Kempton Park Gravel Formation Bedrock: London Clay Formation
	Hydrogeology	Superficial: Secondary A Aquifer Bedrock: Unproductive Strata
		Source Protection Zone: SPZ NA
Potential Contamination Sources	The site walkover, historical mapping and environmental searches have identified the following potential sources of contamination. • Car park, lock up garages, electricity substations on site • Demolition debris & imported hard core • Nearby commercial activity • Naturally occurring contaminants • Unknown nature of fill material on-site & off site	
Risk Assessment Findings	Risk ratings of moderate or greater indicate potentially complete source-pathway-receptor linkages that can require further investigation and remedial measures. The following moderate or greater risks have been identified at the site. • Migration, build up in buildings and explosion of hazardous gases • Site users in contact with contaminated soil • Site users inhaling contaminated dust • Proposed buildings in contact with contaminated soil • Site users and workers inhaling fibres (asbestos)	
Recommendations	Some preliminary intrusive environmental site investigation is recommended to determine if either contamination and, or, landfill gas are present on the property. It is not considered that an upgraded water supply pipe is required, however it is recommended that this report is provided to the water supplier with a request for the testing, if any, that they require. It is considered that provided the recommendations of this report are implemented there is no increased risk to human health from redevelopment of the site for the proposed use.	

Risk Summary

Very Low	Low	Moderate / Low	Moderate	High

		Receptors					
		Residents & Site Users	Construction & Maintenance Operatives	Neighbours	Proposed Building	Aquifer	Watercourse
Sources	Car park, lock up garages, electricity substations, demolition debris & imported hard core on site						
	Demolition debris & imported hard core (asbestos)						
	Unknown nature of fill material on-site & off site						
	Nearby commercial activity						
	Nursery (off site)						
	Naturally occurring contaminants						

2 BRIEF

Mr Alec Thomson of Pellings requested a phase 1 environmental desk top study for a site at Ham Close, Richmond upon Thames, London, TW10 7PG on behalf of Richmond Housing Partnership.

The purpose of this report is to assess the risks to sensitive receptors both on and off-site due to soil and groundwater contamination as a result of the proposed development. It is based upon information provided by the client, a site visit, walk over and a Landmark Envirocheck, historical aerial photographs and maps.

This report is based upon available factual data for the site obtained only from the sources described in the text and related to the site on the basis of the location information provided by the Client. The desk study information is not necessarily exhaustive and further information relevant to the site may be available from other sources.

3 SITE VISIT

The site was visited on 21 July 2017. The weather was dry and sunny. Access was available to all external areas of the site, except for the school playing field and the Ham Day Centre and a visual inspection was undertaken. A photographic record was made during the visit and this is contained in appendix B.

The client's confidentiality was maintained at all times during discussion with third parties.

4 SITE LOCATION

The site is situated in the area of Ham, in the London borough of Richmond upon Thames. Refer to Figure 1.

The National Grid Reference for the approximate site centre is 517160, 172360.

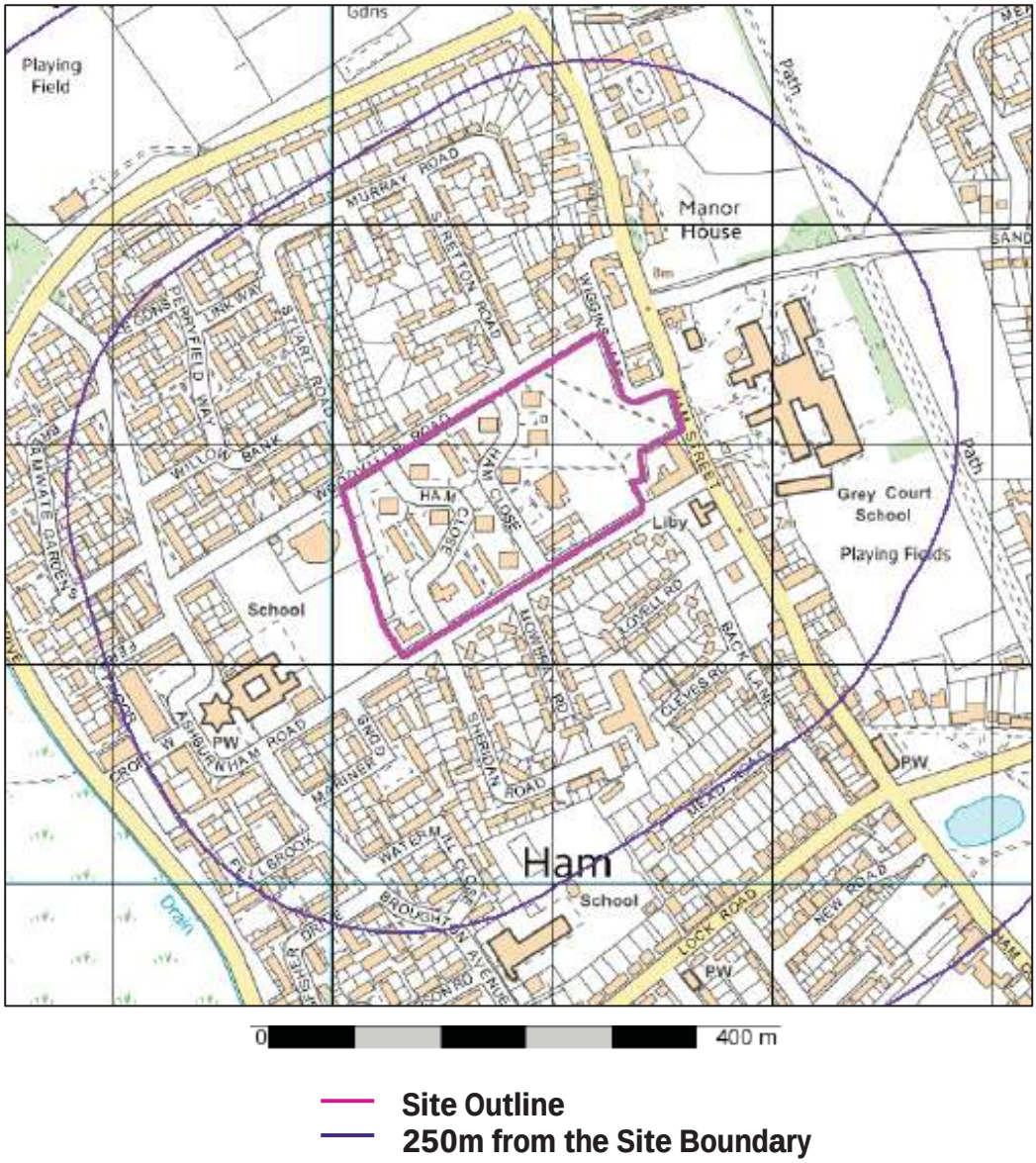


Figure 1: Site Location Plan

5 SITE DESCRIPTION

The site is very approximately rectangular shaped in plan and occupies 4.58ha. The north boundary is defined by Woodville Road. The eastern boundary at the southern end is defined by the estate boundary wall, the boundary then runs north-northeast across the school playing field and the Ham Day Centre. The southern boundary is defined by Ashburnham Road. The western boundary is formed by Wiggins Lane and Ham Street and in the southeast corner by the service yard and shops fronting onto Ham Street and Ashburnham Road.

Photograph 1: View of the site from the east

The east end of the site is grassed communal open space with an asphalt surfaced car park in the southeast corner. There is an electricity sub-station in the service yard, immediately next to the southeast corner of the site.

The greater part of the remainder of the site comprises a residential estate, with three, four and five storey blocks, three runs of lock-up garages, small enclosed individual storage areas, asphalt surfaced car parks, a Community Hall, a Clinic the Ham Friends Club building and associated asphalt surfaced estate roads. Areas between the blocks are laid to grass with some trees and bushes. There is an electricity sub-station on site near the west boundary.

There is a school to the east of the site, a school playing field and the Ham Day Centre to the west of the site and a terrace of small shops with a service yard and electricity sub-station to the southeast of the site. Other than the above the surrounding area appears to be residential.

6 GROUND CONDITIONS

6.1 Geology

Reference to the geological survey of Great Britain indicates that beneath made ground, the area generally is underlain by superficial deposits comprising sand and gravel which is described as Kempton Park Gravel Formation.

The superficial deposits are underlain by bedrock comprising clay and silt described as London Clay Formation.

6.2 Hydrogeology

The Environment Agency maps show the site to be located over a Secondary A Aquifer in the superficial or drift deposits, in the bedrock they show the site to be over an Unproductive Strata.

Secondary A Aquifers comprise permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.

The soils overlying the aquifers are assumed to have a high leaching potential (U) and a worst case vulnerability classification (H) is assumed due to a lack of data available for restored workings and urban areas.

The Environment Agency maps show the site is not located within a source protection zone of a borehole abstraction point.

The Environment Agency define a zone according to how the groundwater behaves in that area. From this a model of the groundwater environment is developed on which to define the zones.

Groundwater source catchments are divided into three zones:

SPZ1 – Inner protection zone

Defined as the 50 day travel time from any point below the water table to the source. This zone has a minimum radius of 50 metres.

SPZ2 – Outer protection zone

Defined by a 400 day travel time from a point below the water table. This zone has a minimum radius of 250 or 500 metres around the source, depending on the size of the abstraction.

SPZ3 – Source catchment protection zone

Defined as the area around a source within which all groundwater recharge is presumed to be discharged at the source. In confined aquifers, the source catchment may be displaced some distance from the source. For heavily exploited aquifers, the final Source Catchment Protection Zone can be defined as the whole aquifer recharge area where the ratio of groundwater abstraction to aquifer recharge (average recharge multiplied by outcrop area) is >0.75.

6.3 Hydrology

The nearest water course to the site would appear to be a drain which is approximately 295 metres to the southwest at the nearest point. This is considered to be too distant to be significantly impacted by the site

The Environment Agency maps show the site is not located within a flood zone.

The British Geological Society data shows the site lies in an area with potential for groundwater flooding of property situated below ground level and potential for groundwater flooding to occur at surface.

Copy of extracts from the Landmark report are contained in appendix C.

6.4 Ground Stability Hazards

Infilled ground has been identified 41 to the south west, worked ground (Undivided) has been identified 361 to the west and 320 to the south east.

The ground beneath the site has been identified as having a very low risk of potential ground instability due to collapsible ground, landslide ground, running sand ground. These risks would be expected to manifest themselves as excessive settlement in the buildings on the site. However, the risks identified are considered unlikely to be of concern to any new buildings, as the foundation design will be based upon geotechnical information obtained from a site-specific intrusive investigation.

6.5 Mining Activities

Reference to the Coal Authority data indicates that the site is not within an area of known coal mining. There is no other known mining in the area.

6.6 Radon Gas

The Landmark Envirocheck Data also advises that the site lies within an area where less than 1% of properties are above the action level and that no protection measures are required in the construction of new properties.

6.7 Sensitive Land Use

Environmentally Sensitive Areas include Nitrate Sensitive Areas, Sites of Special Scientific Interest (SSSI's), Areas of Outstanding Natural Beauty (AONB), National Parks, National Nature Reserves, Special Areas of Conservation, Special Protection Areas and RAMSAR sites. According to the Landmark Envirocheck Data, the Site is not located on or close to any such Environmentally Sensitive Areas.

7 SITE HISTORY

Copies of the Historical Ordnance Survey maps that have been obtained from The Landmark information group are contained in appendix D.

The maps have been reviewed and items of interest and potential sources of contamination, both on the site and within the surrounding area up to 500 metres from the site boundary are noted hereunder.

Site Usage

From	To	Description
1850	1868	Site appears to be occupied by open land with a path way across the south and east part of the site.
1868	1896	Site appears to be occupied by buildings in the eastern part of the site and the site is labelled as a farm.
1896	1947	Site appears to have change of buildings in the eastern part of the site.
1947	1959	Site appears to now be a residential area with some open grass space.
1959	1969	There appears to be a ruin in the east part of the site.
1969	1983	Ruin appears to no longer be onsite. The site appears to no longer have any residential buildings in the east part of the site and a development of residential housing in the west part of the site. The west part of the site overlays part of a school adjacent to the site. Appears to be a clinic in the southern part of the site.
1983	2017	A car park shown in the south-eastern part of the site.

Surrounding Area

From	To	Name	Direction	Distance (m)
1868	1959	Pit	E	206
1871	-	Pond	SE	403
1913	1934	Smithy	SE	250
1913	1959	Gravel Pit	W	527
1913	1959	Sewage Works	S	155
1913	-	Riffle Range	NW	323

From	To	Name	Direction	Distance (m)
1933	1960	Cedar Nursery	N	107
1934	1959	Sand and Gravel Works	W	542
1934	1960	Sand and Ballast Works	SW	340
1959	1969	Lake	NW	111
1933	1971	Tanks/Disused Works	S	212
1959	-	Plant Nursery	N	296
1973	-	Pumping Station	S	202
1973	-	Tank	S	195

8 PROPOSED DEVELOPMENT

Plan details for the proposed redevelopment is not available. Proposed development will be residential dwellings with private and communal gardens and non-residential buildings.

9 POTENTIAL CONTAMINATION

9.1 General

From observations made during the site visit and review of the historical maps and the Landmark information, potential sources of on-site contamination and off-site contamination have been identified.

No significant potential sources of contamination have been identified beyond a 250 metre boundary which are considered likely to have any impact on the site. Where there are similar industries and activities in the same direction, only the nearest has been listed.

Copies of the relevant extracts are contained in appendix C.

The legislative framework for the regulation of contaminated land is embodied in Part IIA of the Environmental Protection Act 1990, implemented in the Contaminated Land (England) Regulations 2000. This legislation allows for the identification and remediation of land where contamination is causing unacceptable risks to human health or the wider environment. The approach adopted by UK contaminated land policy is that of "suitability for use" which implies that the land should be suitable for its current use and made suitable for any proposed future use.

In this preliminary contamination assessment, the site has been modelled using the Source-Pathway-Receptor approach to produce a site specific conceptual model.

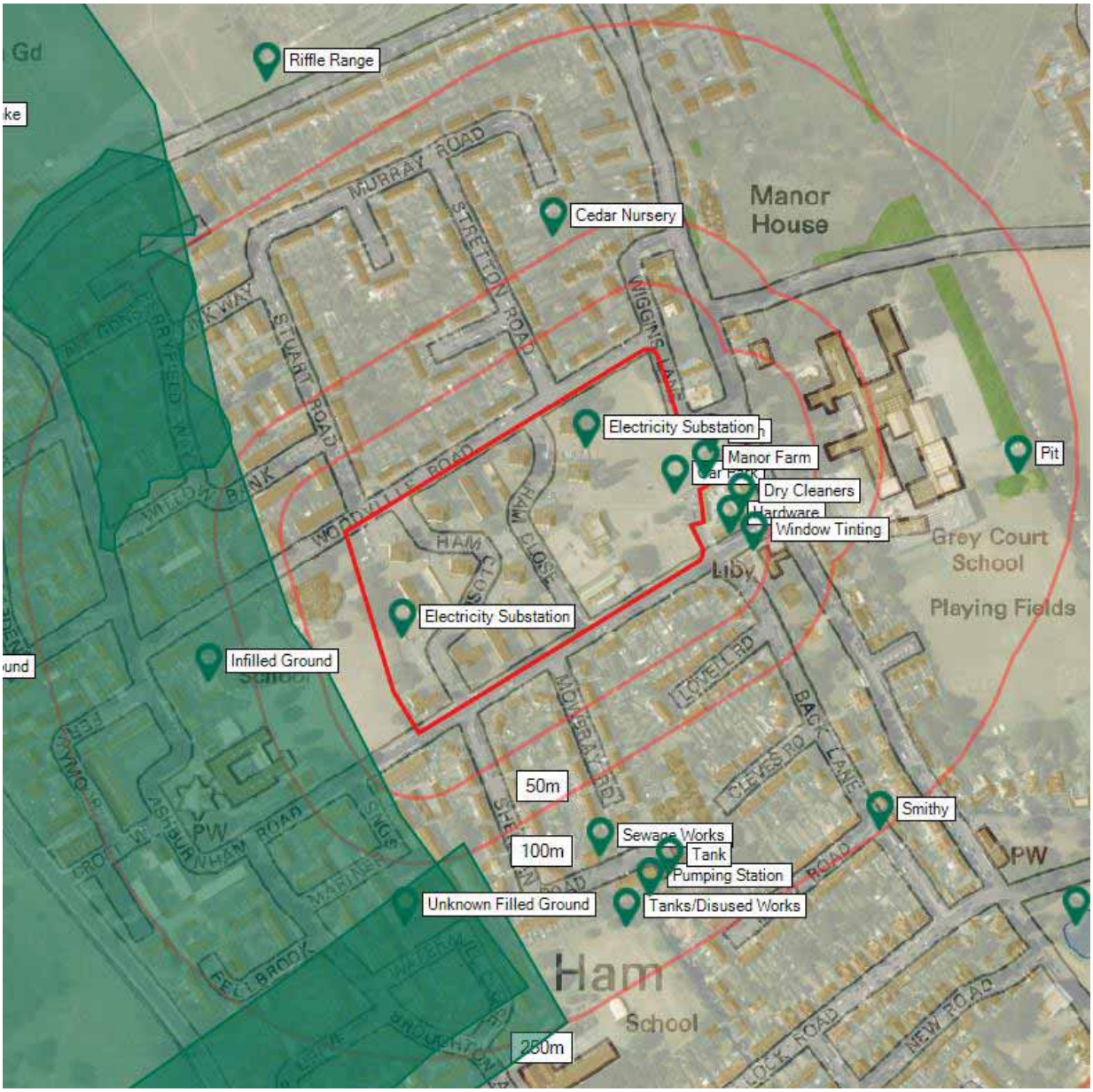
- **Source** - substances or potential contaminants which may cause harm
- **Pathway** - a linkage or route between a source and receptor
- **Receptor** - humans, plant life, groundwater etc., which could be harmed by a contaminant

Geological records indicate that the site is underlain by an aquifer in the superficial stratum and therefore there is a potential for contaminants to be transported both to and from site in the groundwater.

9.2 Off Site Contamination

Description	Direction	Distance (m)
Discharge Consents:		
Sewage Discharge to Tidal Thames from 1989 to 2010 – Status: Surrendered	SE	214
Sewage Discharge to Tidal Thames from 2010 to 2015 – Status: Temporary Consents	SE	214
Local Authority Pollution Prevention & Controls:		
PG6/46 Dry Cleaning - Permitted	E	19
Category 1 and 2 Pollution Incidents to Controlled Waters:		

Description	Direction	Distance (m)
None identified.	-	-
Prosecutions Relating to Authorised Processes:		
None identified.	-	-
Substantiated Category 1 and 2 Pollution Incidents:		
None identified.	-	-
Control of Major Accident Hazards Sites (COMAH) & Planning Hazardous Substance Consents		
None identified.	-	-
Landfill and Other Waste Sites:		
Unknown Filled Ground (Pit, Quarry etc) - 1992	S	92
Historical and Current Land Uses:		
Dry Cleaners	E	19
Hardware	E	20
Dry Cleaners	E	20
Window Tinting	E	26
Blast Cleaning	S	138
Laboratory Equipment, Instruments & Supplies	SW	155
Photo & Digital Imaging Bureaus	SW	158
Cinema Equipment	W	160
Office Furniture & Equipment	SE	194
Cleaning Services - Domestic	SW	199
Washing Machines - Servicing & Repairs	SW	241
Artificial Ground and Made Ground:		
Infilled Ground	SW	41



Potentially contaminating commercial activities have been identified in the vicinity, the general topography falls to the south, southwest and west towards River Thames this is assumed to be the general direction of the hydraulic gradient, sources to the north, northeast and east are therefore considered to have the potential to impact the site.

Potential sources identified on the historical maps and data sheet include: dry cleaners 19m and 20m, east; hardware 20m, east; window tinting 26 m, east and cedar nursery 107 m, north of the site. A potential source of contamination may also include the electricity sub-station in the service yard, immediately next to the southeast corner of the site.

Credible pathways for ground gas exist from an area of *Unknown Filled Ground*–92m south, Infilled ground 41m southwest and a pit 206m east from the site. These risks are considered further within the risk assessment.

9.3 On Site Contamination

There is potential contamination of the site from its use as a car park, lock up garages and electricity substations present on the site.

Review of the historic maps show the site has undergone redevelopment. Demolition debris may be present at the site and may comprise a potential source of contamination, including asbestos. Any hardcore below ground slabs or paved areas may also comprise a potential source of contamination.

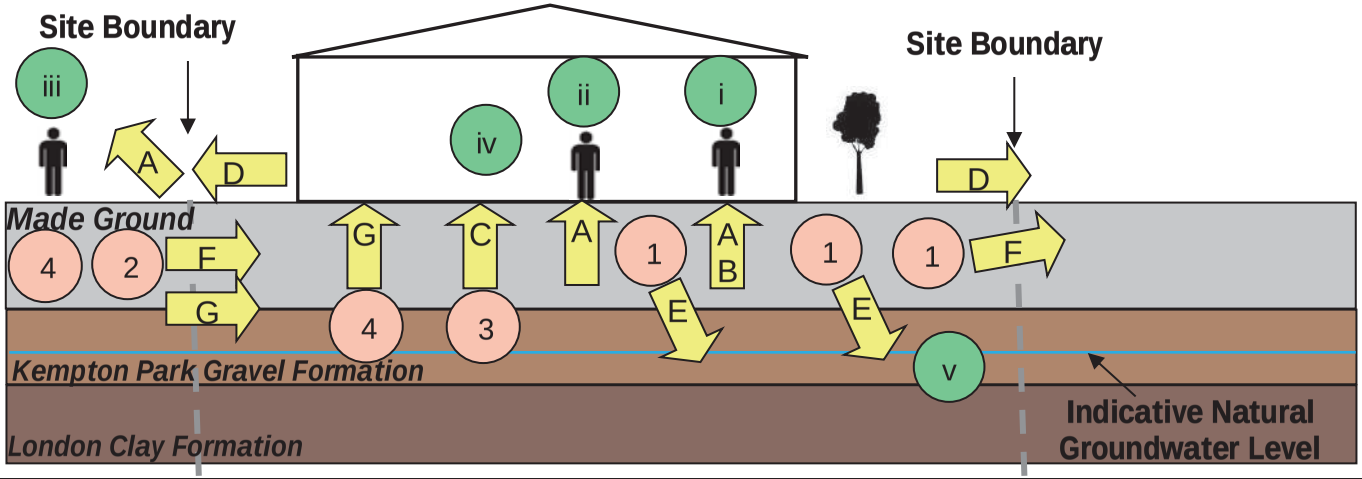
From review of the historical maps, the site would appear to have undergone major redevelopment. It is therefore considered there may potentially be a significant depth of fill material beneath the site, this is considered a potential on-site source of ground gas.

Richmond Upon Thames was subjected to bombing runs during World War II. In accordance with CIRIA C681 a non-specialist UXO assessment of the site has been undertaken. Several records of high explosive bombs have been identified within the site on The Bomb Sight project web-mapping tool, recorded locations are shown on middle section of the site parallel to Woodville Road and Ashburnham Road. It is considered that as the area has since undergone redevelopment, any bombs would have been identified at the time and dealt with during construction. However, those working on the site should be made aware of the potential for unexploded ordnance and given appropriate guidance. Information to be contained in site Health & Safety Plan.

9.4 Preliminary Conceptual Model

		Potential pathways											
		Inhalation of contaminated vapour	Inhalation of contaminated dust	Direct Soil Ingestion	Direct dermal contact	Inhalation of asbestos	Drinking contaminated water supply	Direct contact of soil with building materials	Surface water run-off	Surface water percolation to groundwater	Migration via groundwater	Build-up of ground gas	Comments on discounted pathways
Receptors	Site Users / Residents	Y	Y	Y	Y	Y	Y					Y	
	Construction / Maintenance Operatives	Y	Y	Y	Y	Y						Y	
	Neighbours	Y	Y			Y			Y		Y	Y	
	Proposed Building							Y				Y	
	Watercourse								N		N		Nearest water course too far to be impacted by site.
	Aquifer									Y			

Schematic Conceptual Model



(Not to Scale)

Sources		Pathways		Receptors	
1	Car park, lock up garages, electricity substations, demolition debris & imported hard core (On Site)	A	Inhalation, ingestion, dermal contact, vapours	i	Residents & Site User
2	Nearby commercial activity (Off Site)	B	Drinking contaminated water supply	ii	Construction & Maintenance Operatives
3	Naturally occurring contaminants	C	Direct contact of soil with building materials	iii	Neighbours
4	Unknown nature of fill material on-site & off site	D	Surface water run-off	iv	Proposed Building
		E	Surface water percolation to groundwater	v	Groundwater (Secondary A Aquifer)
		F	Migration via groundwater		
		G	Vertical and lateral migration of soil gases		

10 RISK ASSESSMENT

The level of information provided by the Landmark report and historic Ordnance Survey maps, together with the other information within the report is considered suitable to provide the data for a satisfactory risk assessment for the site. While there will always be uncertainties due to known or unknown gaps in information it is considered that sufficient information is available to reduce those uncertainties to within acceptable limits for the nature of the site under review.

An asbestos survey of existing structures and infrastructure (as defined under Section 5(a) of the Control of Asbestos Regulations 2012) was beyond the brief of this report. The risk assessment has been undertaken on the basis that should asbestos be identified within buildings or infrastructure, these materials will be removed appropriately by licensed contractors and asbestos materials disposed of in accordance with legal requirements prior to demolition or other works in order to avoid contaminating soils at the site.

Sources	Potential pollutant	Receptor	Pathway	Hazard severity	Likelihood of occurrence	Risk / Significance	Comment & control measures
Car park, lock up garages, electricity substations, demolition debris & imported hard core	Metals Hydrocarbons PAHs, PCB	Residents & Site Users	Dermal contact	Medium	Likely	Moderate risk	Contamination testing
			Inhalation of vapours, indoors and outdoors	Mild	Low likelihood	Low risk	
			Soil Ingestion	Medium	Likely	Moderate risk	
			Inhalation of contaminated dust	Medium	Likely	Moderate risk	
			Drinking of water from supply impacted by contaminated soil	Mild	Low likelihood	Low risk	It is not considered that an upgraded water supply pipe is required, however it is recommended that this report is provided to the water supplier for their comment.

Sources	Potential pollutant	Receptor	Pathway	Hazard severity	Likelihood of occurrence	Risk / Significance	Comment & control measures
Car park, lock up garages, electricity substations, demolition debris & imported hard core	Metals Hydrocarbons PAHs, PCB	Construction operatives	Dermal contact	Mild	Likely	Moderate/Low risk	Information to be contained in site Health & Safety Plan. Use of appropriate ppe and normal good hygiene measures. Appropriate dust control measures during construction.
			Inhalation of vapours, indoors and outdoors	Minor	Low likelihood	Very low risk	
			Soil Ingestion	Mild	Likely	Moderate/Low risk	
			Inhalation of contaminated dust	Mild	Likely	Moderate/Low risk	
		Maintenance Operatives	Dermal contact	Mild	Low likelihood	Low risk	Information to be contained in site Health & Safety Plan.
			Inhalation of vapours, indoors and outdoors	Minor	Low likelihood	Very low risk	
			Soil Ingestion	Mild	Low likelihood	Low risk	
			Inhalation of contaminated dust	Mild	Low likelihood	Low risk	

Sources	Potential pollutant	Receptor	Pathway	Hazard severity	Likelihood of occurrence	Risk / Significance	Comment & control measures
Car park, lock up garages, electricity substations, demolition debris & imported hard core	Metals Hydrocarbons PAHs, PCB	Neighbours	Inhalation of vapours, indoors and outdoors	Minor	Unlikely	Very low risk	No further action required
			Inhalation of contaminated dust	Mild	Likely	Moderate/Low risk	Appropriate dust control measures during construction.
			Inhalation of contaminated dust (post construction)	Mild	Low likelihood	Low risk	Contamination testing
			Surface water run-off	Mild	Likely	Moderate/Low risk	
			Migration via groundwater	Mild	Likely	Moderate/Low risk	

Sources	Potential pollutant	Receptor	Pathway	Hazard severity	Likelihood of occurrence	Risk / Significance	Comment & control measures
Car park, lock up garages, electricity substations, demolition debris & imported hard core	Metals Hydrocarbons PAHs, PCB	Aquifer	Vertical percolation to groundwater via Foundations & Drainage	Mild	Likely	Moderate/Low risk	Foundations and drainage should be designed in such a way that they do not create a pathway for surface water percolation.
			Vertical percolation to groundwater via soft landscaped and permeable areas	Mild	Likely	Moderate/Low risk	Contamination testing

Sources	Potential pollutant	Receptor	Pathway	Hazard severity	Likelihood of occurrence	Risk / Significance	Comment & control measures
Unknown nature of fill material on-site & off site	Methane & carbon dioxide	Structures & other confined spaces	Migration via permeable strata & build up in buildings & other confined spaces	Severe	Likely	High risk	Ground gas monitoring to be undertaken. Gas protection measures installed if required. Information to be contained in site Health & Safety Plan.
		Construction & Maintenance Operatives		Severe	Low likelihood	Moderate risk	
		Residents & Site Users		Severe	Likely	High risk	
		Neighbours		Severe	Low likelihood	Moderate risk	
Demolition debris & imported hard core	Asbestos	Residents & Site Users	Inhalation (during construction)	Severe	Low likelihood	Moderate risk	Any debris from earlier demolition found during site strip is to be inspected for asbestos by a suitably experienced contractor.
		Construction operatives		Severe	Low likelihood	Moderate risk	
		Maintenance Operatives		Severe	Unlikely	Moderate/Low risk	Information to be contained in site Health & Safety Plan.
		Neighbours		Severe	Unlikely	Moderate/Low risk	Dust control during any ground works

Sources	Potential pollutant	Receptor	Pathway	Hazard severity	Likelihood of occurrence	Risk / Significance	Comment & control measures
Demolition debris & imported hard core	Asbestos	Residents & Site Users	Inhalation of contaminated dust (post construction)	Severe	Low likelihood	Moderate risk	Contamination testing
		Neighbours		Severe	Unlikely	Moderate/Low risk	
Naturally occurring contaminants, Car park, lock up garages, electricity substations, demolition debris & imported hard core	Sulphates, pH	Proposed Building	Direct contact of soil with building materials	Medium	Likely	Moderate risk	As the protection of concrete is normally resolved in the building design process, the designer of the foundations should determine the requirement to undertake any investigation.

Sources	Potential pollutant	Receptor	Pathway	Hazard severity	Likelihood of occurrence	Risk / Significance	Comment & control measures
Nearby commercial activity (Off Site)	Metals Hydrocarbons PAHs, PCB	Residents & Site Users	Lateral migration of groundwater transporting contaminants to soil/made ground on site	Medium	Low likelihood	Moderate/low risk	Contamination testing
		Construction & Maintenance Operatives		Mild	Low likelihood	Low risk	Information to be contained in site Health & Safety Plan.
		Residents & Site Users	Drinking water supply impacted by groundwater transporting contaminants to site	Medium	Low likelihood	Moderate/low risk	It is not considered that an upgraded water supply pipe is required, however it is recommended that this report is provided to the water supplier for their comment.

Sources	Potential pollutant	Receptor	Pathway	Hazard severity	Likelihood of occurrence	Risk / Significance	Comment & control measures
Nursery (offsite)	Pesticides	Residents & Site Users	Lateral migration of groundwater transporting contaminants to soil/made ground on site	Mild	Low likelihood	Low risk	No further action required
		Construction & Maintenance Operatives		Mild	Unlikely	Very Low risk	
		Residents & Site Users	Drinking water supply impacted by groundwater transporting contaminants to site	Mild	Low likelihood	Low risk	

Any visual or olfactory evidence of contamination noted during works should be investigated by a suitably qualified person and their recommendations implemented.

11 SITE WORK

11.1 Investigations

11.1.1 In order to determine if the current or former usage of the property is a potential cause of contamination it is recommended that some site investigation should be undertaken based upon the requirements of BS 10175: 2001 which is the code of practice for the investigation of potentially contaminated sites. It is proposed that soil samples be taken from representative locations around the site and tested for a typical range of determinands, comprising asbestos, heavy metals, pH, speciated aromatic and aliphatic hydrocarbons and speciated PAHs and PCBs.

11.1.2 Due to the unknown nature of fill material on-site & off site monitoring for ground gas should be undertaken, in accordance with BS 8576, in order to determine if gas has migrated to the property. Furthermore, if the site has been filled in the past monitoring will determine if ground gas is being generated by the fill material.

11.2 Site Preparation

During the works a watching brief should be maintained by an experienced person. Should any visual or olfactory evidence of contamination be noted during the Chelmer Site Investigation Laboratories Ltd and the local authority Environmental Health Officer (EHO) should be contacted. Chelmer Site Investigation Laboratories Ltd shall assess if further intrusive investigation and remediation is required. Proposals will be issued to the EHO for comment prior to undertaking the additional investigation or implementing the remediation strategy.

The form of investigation proposed in 11.1.1 will indicate if there is any contamination present and if it is necessary will enable remedial works to be formulated.

If any potentially contaminated spoil is to be removed from site, the Waste Acceptance Criteria (WAC) testing should be agreed with the facility to which the spoil is being transported. It is recommended that consideration is given to this testing as part of the phase 2 investigation. Guidance can be obtained from Environment Agency document *Waste Sampling and Testing for Disposal to Landfill*.

11.3External Works

In regard to water supply reference should be made to the UK Water Industry Research (UKWIR) publication *"Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites"* (Ref 10/WM/03/21; the *'UKWIR Guidance')*. This document provides guidance to ensure that water quality is safeguarded by identifying suitable pipe materials and components to be used below ground in potentially contaminated sites. It is not considered that an upgraded water supply pipe is required, however it is recommended that this report is provided to the water supplier for their comment.

12 SITE DEVELOPMENT CONSIDERATIONS

During the course of the site visit and preparation of this report the following items, whilst not within the scope of this report, have come to our attention and should be considered. This is not necessarily an exhaustive list.

12.1 An intrusive geotechnical investigation may be required to provide detailed information about the engineering nature of the ground, in order to allow the most suitable foundations in terms of economy and performance to be designed. This should follow the recommendations of BS 5930, the Code of Practice for site investigations with tests carried out to satisfy the requirements of BS 1377, the Code of Practice for methods of tests for soils for civil engineering purposes. It is recommended that this includes testing for sulphates.

12.2 As redevelopment of the property is proposed it is recommended that a full topographical survey is undertaken, if one is not available. This should identify all relevant features, boundaries and levels relating to the site and should also include ground levels on the adjacent properties and roads.

12.3 If it is proposed to make use of the existing drainage system, or any existing connections to the mains sewers. A CCTV survey should be considered in order to determine both the general condition and suitability for the proposed use.

12.4 If any excavation works are proposed, it is recommended that all the relevant utility companies are contacted to ascertain what pipes, cables, wires, lines and other apparatus exist close to where the work is to take place.

12.5 An asbestos survey of existing structures and infrastructure (as defined under Section 5(a) of the Control of Asbestos Regulations 2012) was beyond the brief of this report. Advice should be sought regarding the potential presence and management of asbestos within existing structures and infrastructure.

13 CONCLUSIONS

Based upon the information currently available, there would in principle, appear to be some significant contamination issues associated with the site, however, the following should be considered at this stage. It is considered that provided the recommendations of this report are implemented there is no increased risk to human health from redevelopment of the site for the proposed residential and commercial use.

13.1 There is potential contamination of the site from its uses as a car park, lock up garages and electricity substations and from demolition debris and imported hard core below ground slabs and paved areas.

13.2 It is recommended that some preliminary intrusive environmental site investigation is undertaken to determine if contamination is present on the property.

13.3 Study of the historical maps indicate that there is potential for the site to have been impacted by nearby commercial activities.

13.4 Due to the unknown nature of fill material on-site & off site, monitoring of potential ground gases, over a suitable period of time, will be required in order to determinate the requirements for gas mitigation measures. Information to be contained in Health & Safety Plan.

13.5 It is not considered that an upgraded water supply pipe is required, however it is recommended that this report is provided to the water supplier for their comment.

13.6 Should any visual or olfactory evidence of contamination be noted during the works this should be investigated by a suitably qualified person and their recommendations implemented.

13.7 If any potentially contaminated spoil is to be removed from site, the Waste Acceptance Criteria (WAC) testing should be agreed with the facility to which the spoil is being transported.

14 REFERENCES

Card, G. B., Wilson, S., & Mortimer, S. (2012). *A Pragmatic Approach to Ground Gas Risk Assessment*. London, UK: Contaminated Land: Applications in Real Environments.

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Health and Safety Executive in the United Kingdom. (2012). *The Control of Asbestos Regulations 2012.*

NHBC and Environment Agency. (2008). *Guidance for the Safe Development of Housing on Land Affected by Contamination.* NHBC and Environment Agency.

UK Water Industry Research Ltd. (2010). *Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites.* UKWIR.

Wilson, S., Oliver, S., Mallet, H., Hutchings, H., & Card, G. (2007). *CIRIA Report C665. Assessing risks posed by hazardous gases to buildings.* London, UK: Construction Industry Research and Information Association.

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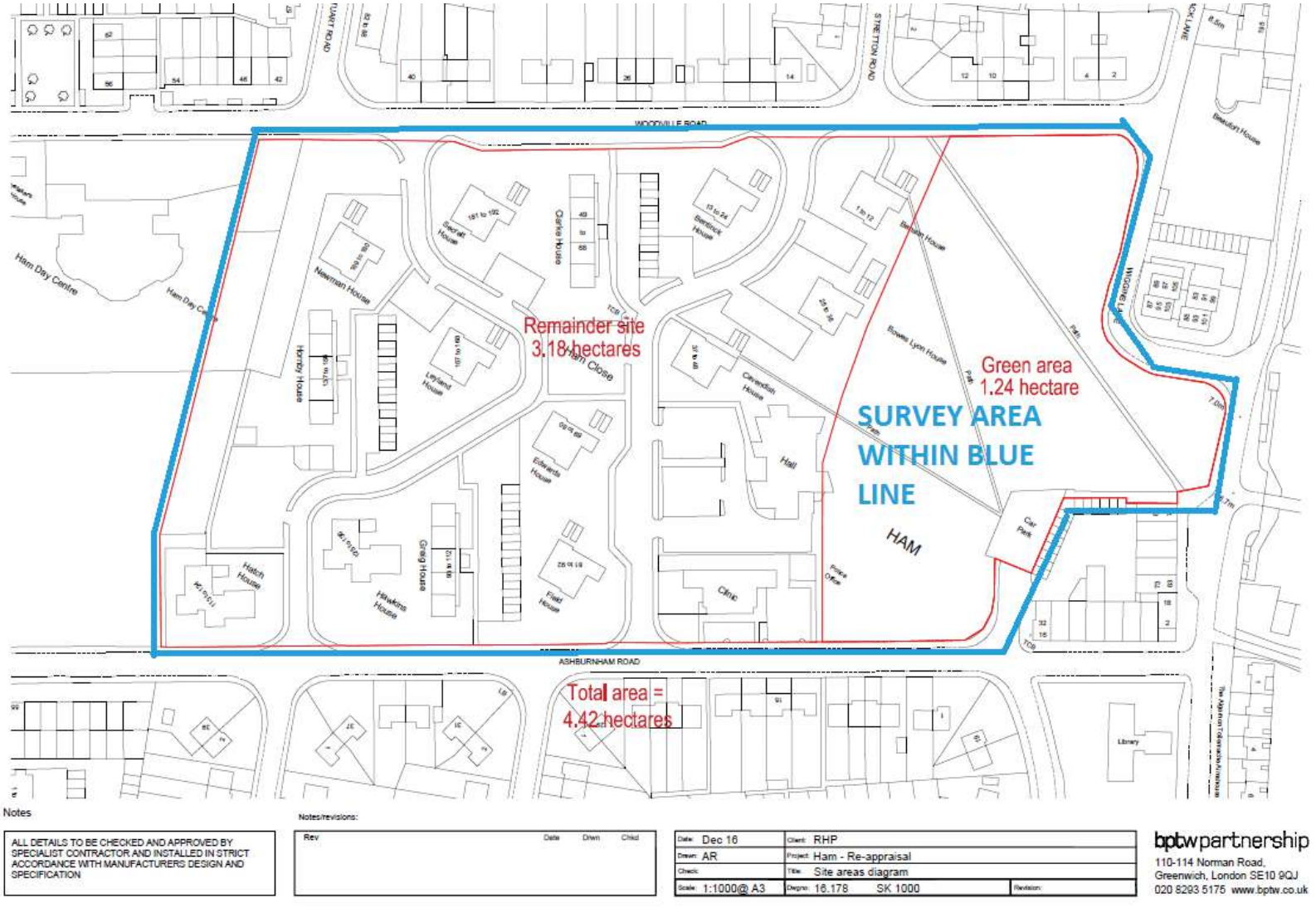
Appendix A – Site Location Plan



Notes

ALL DETAILS TO BE CHECKED AND APPROVED BY SPECIALIST CONTRACTOR AND INSTALLED IN STRICT ACCORDANCE WITH MANUFACTURERS DESIGN AND SPECIFICATION

Notes/revisions:

Rev	Date	Drwn	Chkd

Date: Dec 16	Client: RHP		
Drwn: AR	Project: Ham - Re-appraisal		
Chkd:	Title: Site areas diagram		
Scale: 1:1000@ A3	Dwgno: 16.178 SK 1000	Revision:	

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9324-P1E-1: Ham Close, Richmond Upon Thames
Richmond Housing Partnership

Appendix B – Photographs

View across site from northwest corner

View across site from the east

Appendix C – Landmark Report Extracts

Where the overview indicates that no data has been found the relevant detail report sections may have been omitted.

Agency & Hydrological

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A13NW (W)	0	1	517160 172357
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A13SE (SE)	0	1	517200 172300
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A13NE (E)	88	1	517400 172450
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A8NW (S)	257	1	517050 171950
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A12NE (W)	322	1	516700 172450
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A14NW (E)	431	1	517750 172400
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A12NE (NW)	475	1	516600 172600
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A12NE (W)	480	1	516550 172500
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A14SW (E)	482	1	517750 172200
1	**Discharge Consents** Operator: Thames Water Utilities Ltd Property Type: PUMPING STATION ON SEWERAGE NETWORK (WATER COMPANY) Location: Ham Authority: Environment Agency, Thames Region Catchment Area: Not Supplied Reference: Temp 1082 Permit Version: 2 Effective Date: 3rd September 2010 Issued Date: 3rd September 2010 Revocation Date: 13th October 2015 Discharge Type: Sewage Discharges - Pumping Station - Water Company Discharge Environment: Saline Estuary Receiving Water: Tidal Thames **Status: Surrendered under EPR 2010** Positional Accuracy: Located by supplier to within 100m	A13SE (SE)	214	2	517300 172100
1	**Discharge Consents** Operator: Thames Water Utilities Ltd Property Type: PUMPING STATION ON SEWERAGE NETWORK (WATER COMPANY) Location: Ham Authority: Environment Agency, Thames Region Catchment Area: Not Supplied Reference: Temp 1082 Permit Version: 1 Effective Date: 2nd November 1989 Issued Date: 2nd November 1989 Revocation Date: 2nd September 2010 Discharge Type: Sewage Discharges - Pumping Station - Water Company Discharge Environment: Saline Estuary Receiving Water: Tidal Thames **Status: Temporary Consents (Water Act 1989, Section 113)** Positional Accuracy: Located by supplier to within 100m	A13SE (SE)	214	2	517300 172100

Agency & Hydrological

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
2	**Discharge Consents** Operator: Environment Agency Property Type: DOMESTIC PROPERTY (SINGLE) (INCL FARM HOUSE) Location: Teddington Lockteddingtonmiddlesex Authority: Environment Agency, Thames Region Catchment Area: Thames-Teddington/Beverley Brook Reference: Casm 1384 Permit Version: 1 Effective Date: 21st March 2006 Issued Date: 3rd May 2006 Revocation Date: Not Supplied Discharge Type: Sewage Discharges - Final/Treated Effluent - Not Water Company Discharge Environment: Land/Soakaway Receiving Water: Into Land **Status: New Consent, by Application, granted by Secretary of State** Positional Accuracy: Located by supplier to within 10m	A7SE (SW)	768	2	516620 171580
3	**Discharge Consents** Operator: British Aerospace Plc Property Type: MAKING OF OTHER TRANSPORT EQUIP/SHIPS/TRAINS/BIKES Location: British Aerospace Plc, Kingstonupon Thames, Surrey Authority: Environment Agency, Thames Region Catchment Area: Not Supplied Reference: Ctcr 1987 Permit Version: 1 Effective Date: 25th April 1983 Issued Date: 25th April 1983 Revocation Date: 17th June 1993 Discharge Type: Trade Effluent Discharge Environment: Freshwater Stream/River Receiving Water: Thames **Status: Authorisation revokedRevoked** Positional Accuracy: Located by supplier to within 100m	A3NE (S)	966	2	517400 171300
4	**Discharge Consents** Operator: J E Perry Property Type: DOMESTIC PROPERTY (SINGLE) (INCL FARM HOUSE) Location: Palm Beach, Eel Pie Island, Twickenham, London Authority: Environment Agency, Thames Region Catchment Area: Not Supplied Reference: Ctwc.0573 Permit Version: 1 Effective Date: 20th December 1985 Issued Date: 20th December 1985 Revocation Date: 16th April 1991 Discharge Type: Unknown Discharge Environment: Saline Estuary Receiving Water: River Thames **Status: Authorisation revokedRevoked** Positional Accuracy: Located by supplier to within 100m	A17NE (NW)	983	2	516500 173200
5	**Local Authority Pollution Prevention and Controls** Name: Ks Dry Cleaners Location: 65 Ham Street, Richmond, Tw10 7hw Authority: London Borough of Richmond upon Thames, Environmental Health Department Permit Reference: LBRUT/DC/29 Dated: 29th March 2007 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 (E)	19	3	517314 172389
6	**Local Authority Pollution Prevention and Controls** Name: Divine Dry Cleaners Location: 424 Richmond Road, Ham, Kt2 5pu Authority: London Borough of Richmond upon Thames, Environmental Health Department Permit Reference: LBRUT/DC/08 Dated: 1st April 2007 Process Type: Local Authority Pollution Prevention and Control Description: PG6/46 Dry cleaning **Status: Permitted** Positional Accuracy: Manually positioned to the address or location	A9SW (SE)	935	3	517805 171565

Agency & Hydrological

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
7	**Local Authority Pollution Prevention and Controls** Name: Ham Cross Service Station Location: 297 Richmond Road, KINGSTON UPON THAMES, Surrey, KT2 5QU Authority: London Borough of Richmond upon Thames, Environmental Health Department Permit Reference: 16/PVR Dated: 31st December 1998 Process Type: Local Authority Pollution Prevention and Control Description: PG1/14 Petrol filling station **Status: Permitted** Positional Accuracy: Automatically positioned to the address	A9SW (SE)	935	3	517745 171527
	Nearest Surface Water Feature	A12SE (SW)	295	-	516804 172060
8	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: Richmond, EEL PIE ISLAND Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed incident Incident Date: 19th February 1999 Incident Reference: THSE1999042077 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 10m	A13NE (E)	182	2	517500 172400
9	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: TEDDINGTON Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: 25th May 1993 Incident Reference: SE930143 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	A8SW (S)	628	2	516900 171600
10	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: TEDDINGTON Authority: Environment Agency, Thames Region Pollutant: Unknown Note: Not Supplied Incident Date: 3rd February 1996 Incident Reference: SE960049 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)	687	2	516600 171700
11	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: Teddinton Lock Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: Not Supplied Incident Reference: SE950308 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	A7SE (SW)	708	2	516700 171600

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
12	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: TEDDINGTON Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: 15th October 1990 Incident Reference: SE900296 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	A8SW (S)	709	2	517000 171500
12	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: Richmond Upon, TEDDINGTON Authority: Environment Agency, Thames Region Pollutant: Miscellaneous - Natural Note: Confirmed incident Incident Date: 30th April 1999 Incident Reference: THSE1999042983 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 10m	A8SW (S)	714	2	517000 171495
13	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: HAM Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Not Supplied Incident Date: 22nd March 1996 Incident Reference: SE960127 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	A18NW (N)	715	2	517100 173200
14	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: TEDDINGTON Authority: Environment Agency, Thames Region Pollutant: Miscellaneous - Unknown Note: Confirmed As A Pollution Incident Incident Date: 26th February 1990 Incident Reference: SE900046 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	A7NW (SW)	729	2	516400 171900
15	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: TEDDINGTON Authority: Environment Agency, Thames Region Pollutant: Chemicals - Unknown Note: Not Supplied Incident Date: 27th March 1996 Incident Reference: SE960135 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	A7SE (SW)	754	2	516800 171500
16	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: Ferry Road, TEDDINGTON Authority: Environment Agency, Thames Region Pollutant: Chemicals - Unknown Note: Confirmed As A Pollution Incident Incident Date: 10th May 1990 Incident Reference: SE900141 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	A7SE (SW)	795	2	516700 171500

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
17	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: Broom Road Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: 7th August 1989 Incident Reference: N1890418 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	A8SW (S)	807	2	517100 171400
18	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: Teddington Lock Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Yes Incident Date: 17th July 1992 Incident Reference: SE920227 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	A8SW (S)	809	2	517000 171400
19	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: TWICKENHAM Authority: Environment Agency, Thames Region Pollutant: Unknown Sewage Note: Confirmed As A Pollution Incident Incident Date: 17th May 1991 Incident Reference: SE910115 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 2 - Significant Incident Positional Accuracy: Located by supplier to within 100m	A12NW (W)	821	2	516200 172500
20	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: Riverside, TWICKENHAM Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: 7th August 1990 Incident Reference: SE900241 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	A17NE (NW)	827	2	516800 173200
21	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: TEDDINGTON Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: 22nd September 1990 Incident Reference: SE900286 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	A7SE (SW)	846	2	516600 171500
22	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: River Thames At, TEDDINGTON Authority: Environment Agency, Thames Region Pollutant: Unknown Sewage Note: Not Supplied Incident Date: 11th June 1997 Incident Reference: THSE1997032324 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	A7SE (S)	847	2	516805 171400

Agency & Hydrological

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
22	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: TEDDINGTON Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: 6th October 1990 Incident Reference: SE900292 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	A7SE (S)	849	2	516800 171400
22	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: TEDDINGTON Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Not Supplied Incident Date: 2nd February 1996 Incident Reference: SE960075 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	A7SE (S)	852	2	516805 171395
22	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: Lensburyclub Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: 26th July 1991 Incident Reference: SE910214 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	A7SE (S)	853	2	516800 171395
23	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: Ferry Road, TEDDINGTON Authority: Environment Agency, Thames Region Pollutant: Miscellaneous - Natural Note: No Pollution Found Incident Date: 17th November 1998 Incident Reference: THSE1998041140 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	A7SE (SW)	885	2	516700 171400
24	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: RICHMOND Authority: Environment Agency, Thames Region Pollutant: Unknown Sewage Note: Not Supplied Incident Date: 26th June 1997 Incident Reference: THSE1997032339 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	A7SW (SW)	900	2	516400 171600
25	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: Marble Hill Park Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: 17th November 1991 Incident Reference: SE910330 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	A23SE (N)	903	2	517300 173400

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Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
26	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: TEDDINGTON Authority: Environment Agency, Thames Region Pollutant: Unknown Sewage Note: Confirmed As A Pollution Incident Incident Date: 19th September 1989 Incident Reference: S1890460 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)	909	2	517000 171300
27	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: TWICKENHAM Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Not Supplied Incident Date: 9th April 1998 Incident Reference: 38469 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	A11NE (W)	910	2	516100 172395
27	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: Swanisland, TWICKENHAM Authority: Environment Agency, Thames Region Pollutant: Unknown Sewage Note: Not Supplied Incident Date: 17th February 1997 Incident Reference: THSE1997031884 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	A11NE (W)	910	2	516100 172400
28	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: 1 Strawberry Vale Authority: Environment Agency, Thames Region Pollutant: Unknown Sewage Note: Confirmed As A Pollution Incident Incident Date: 8th March 1989 Incident Reference: SE890072 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	A7NW (SW)	911	2	516200 171900
29	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: British Aerospace Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: 18th August 1993 Incident Reference: SE930248 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	A7NW (SW)	917	2	516300 171700
29	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: British Aerospace Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: 1st September 1993 Incident Reference: SE930262 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	A7NW (SW)	920	2	516300 171695

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Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
30	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: Swan Island Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: 12th December 1989 Incident Reference: SE890431 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	A11NE (W)	920	2	516100 172500
31	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: TEDDINGTON Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: 20th August 1993 Incident Reference: SE930250 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	A3NE (S)	966	2	517400 171300
31	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: TEDDINGTON Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Not Supplied Incident Date: 24th February 1996 Incident Reference: S1960079 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	A3NE (S)	968	2	517405 171300
31	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: British Aerospace Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: Not Supplied Incident Reference: SE930192 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	A3NE (S)	971	2	517400 171295
31	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: British Aerospace Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Yes Incident Date: Not Supplied Incident Reference: SE940332 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 2 - Significant Incident Positional Accuracy: Located by supplier to within 100m	A3NE (S)	973	2	517405 171295
32	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: KINGSTON Authority: Environment Agency, Thames Region Pollutant: Miscellaneous - Unknown Note: Confirmed As A Pollution Incident Incident Date: 8th February 1991 Incident Reference: SE910033 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	A9SW (SE)	967	2	517600 171400

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Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
33	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: STRAWBERRY HILL Authority: Environment Agency, Thames Region Pollutant: Miscellaneous - Unknown Note: Confirmed As A Pollution Incident Incident Date: 11th August 1992 Incident Reference: SE920269 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	A11NE (W)	973	2	516040 172450
34	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: Swan Island Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: 26th May 1992 Incident Reference: SE920170 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	A11NE (W)	991	2	516030 172510
	River Quality Name: Not Supplied GQA Grade: Unclassified Tidal River Reach: Not Supplied Estimated Distance (km): Not Supplied Flow Rate: Not Supplied Flow Type: Not Supplied Year: 1995	A18NW (N)	750	2	516857 173164
	River Quality Name: Thames GQA Grade: River Quality B Reach: Hogsmill - Teddington Estimated Distance (km): 2.7 Flow Rate: Flow less than 80 cumecs Flow Type: River Year: 2000	A8SW (S)	844	2	516915 171375

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
35	**River Quality Chemistry Sampling Points** Name: Thames Reach: Hogsmill To Teddington Estimated Distance: 2.70 Objective: Not Supplied Positional Accuracy: Located by supplier to within 10m Year: 1990 GQA Grade: River Quality Chemistry GQA Grade C - Fairly Good Compliance: Not Supplied Year: 1993 GQA Grade: River Quality Chemistry GQA Grade C - Fairly Good Compliance: Not Supplied Year: 1994 GQA Grade: River Quality Chemistry GQA Grade C - Fairly Good Compliance: Not Supplied Year: 1995 GQA Grade: River Quality Chemistry GQA Grade C - Fairly Good Compliance: Not Supplied Year: 1996 GQA Grade: River Quality Chemistry GQA Grade C - Fairly Good Compliance: Not Supplied Year: 1997 GQA Grade: River Quality Chemistry GQA Grade C - Fairly Good Compliance: Not Supplied Year: 1998 GQA Grade: River Quality Chemistry GQA Grade B - Good Compliance: Not Supplied Year: 1999 GQA Grade: River Quality Chemistry GQA Grade B - Good Compliance: Not Supplied Year: 2000 GQA Grade: River Quality Chemistry GQA Grade B - Good Compliance: Not Supplied Year: 2001 GQA Grade: River Quality Chemistry GQA Grade B - Good Compliance: Not Supplied Year: 2002 GQA Grade: River Quality Chemistry GQA Grade A - Very Good Compliance: Not Supplied Year: 2003 GQA Grade: River Quality Chemistry GQA Grade B - Good Compliance: Not Supplied Year: 2004 GQA Grade: River Quality Chemistry GQA Grade A - Very Good Compliance: Not Supplied Year: 2005 GQA Grade: River Quality Chemistry GQA Grade A - Very Good Compliance: Not Supplied Year: 2006 GQA Grade: River Quality Chemistry GQA Grade A - Very Good Compliance: Not Supplied Year: 2007 GQA Grade: River Quality Chemistry GQA Grade B - Good Compliance: Not Supplied Year: 2008 GQA Grade: River Quality Chemistry GQA Grade B - Good Compliance: Not Supplied Year: 2009 GQA Grade: River Quality Chemistry GQA Grade B - Good Compliance: Not Supplied	A8SW (S)	837	2	517020 171370
36	**Substantiated Pollution Incident Register** Authority: Environment Agency - Thames Region, South East Area Incident Date: 11th March 2002 Incident Reference: 63255 Water Impact: Category 2 - Significant Incident Air Impact: Category 4 - No Impact Land Impact: Category 4 - No Impact Positional Accuracy: Located by supplier to within 10m Pollutant: Oils - Diesel (Including Agricultural)	A7SE (SW)	714	2	516740 171570

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Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Water Abstractions Operator: D.G.Tilles & R.H.Tilles Licence Number: 28/39/34/0008 Permit Version: 102 Location: Borehole At The Exiles Ground, Twickenham Authority: Environment Agency, Thames Region Abstraction: Sports Grounds/Facilities: Spray Irrigation - Direct Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: The Exiles Ground, Twickenham Authorised Start: 01 October Authorised End: 30 September Permit Start Date: 14th September 2001 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A24NE (NE)	1487	2	517840 173860
	Water Abstractions Operator: Threadneedle Property Part. Licence Number: 28/39/34/0008 Permit Version: 101 Location: Borehole At The Exiles Ground, Twickenham Authority: Environment Agency, Thames Region Abstraction: Sports Grounds/Facilities: Spray Irrigation - Direct Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: The Exiles Ground, Twickenham Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 31st March 2000 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A24NE (NE)	1487	2	517840 173860
	Water Abstractions Operator: Cable & Wireless (Meadowbank) Ltd Licence Number: 28/39/34/0008 Permit Version: 100 Location: Borehole At The Exiles Ground, Twickenham Authority: Environment Agency, Thames Region Abstraction: Sports Grounds/Facilities: Spray Irrigation - Direct Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): 56 Yearly Rate (m3): 5300 Details: The Exiles Ground, Twickenham Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 15th October 1996 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A24NE (NE)	1487	2	517840 173860
	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	A13NW (W)	0	2	517160 172357
	Drift Deposits None				
	Bedrock Aquifer Designations Aquifer Designation: Unproductive Strata	A13NW (W)	0	1	517160 172357
	Superficial Aquifer Designations Aquifer Designation: Secondary Aquifer - A	A13NW (W)	0	1	517160 172357
	Extreme Flooding from Rivers or Sea without Defences None				
	Flooding from Rivers or Sea without Defences None				
	Areas Benefiting from Flood Defences None				
	Flood Water Storage Areas None				

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Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Flood Defences None				
41	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 379.3 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Thames Primacy: 1	A12SE (SW)	295	4	516804 172060
42	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 300.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Thames Primacy: 1	A12SE (SW)	309	4	516768 172102
43	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 15.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Thames Primacy: 1	A12NE (W)	339	4	516671 172391
44	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 125.4 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Thames Primacy: 1	A14NE (E)	711	4	518001 172613
45	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 162.9 Watercourse Level: Not Supplied Permanent: True Watercourse Name: Not Supplied Catchment Name: Thames Primacy: 1	A14NE (E)	721	4	518023 172568
46	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 424.2 Watercourse Level: On ground surface Permanent: True Watercourse Name: River Thames Catchment Name: Thames Primacy: 2	A7SE (SW)	726	4	516785 171536
47	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 239.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: River Thames Catchment Name: Thames Primacy: 2	A7SE (SW)	731	4	516643 171609
48	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 21.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: River Thames Catchment Name: Thames Primacy: 2	A7SE (SW)	745	4	516681 171568
49	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 873.4 Watercourse Level: Not Supplied Permanent: True Watercourse Name: Not Supplied Catchment Name: Thames Primacy: 1	A14NE (E)	750	4	518020 172685

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Local Authority Landfill Coverage Name: London Borough of Richmond Upon Thames - Has no landfill data to supply		0	5	517160 172357
	Local Authority Landfill Coverage Name: Royal Borough of Kingston Upon Thames - Has supplied landfill data		667	6	517531 171710
77	**Potentially Infilled Land (Non-Water)** Bearing Ref: S Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1992	A13SW (S)	92	-	517100 172121
78	**Potentially Infilled Land (Non-Water)** Bearing Ref: NW Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1992	A13NW (NW)	329	-	516880 172668

Geological

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS 1:625,000 Solid Geology Description: Thames Group	A13NW (W)	0	1	517160 172357
	BGS Estimated Soil Chemistry No data available				
79	**BGS Recorded Mineral Sites** Site Name: Ham Location: , Ham, Richmond, Surrey Source: British Geological Survey, National Geoscience Information Service Reference: 19674 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Quaternary Geology: Kempton Park Gravel Formation Commodity: Sand and Gravel Positional Accuracy: Located by supplier to within 10m	A12NE (NW)	457	1	516620 172600
80	**BGS Recorded Mineral Sites** Site Name: Ham Location: , Ham, Richmond, Surrey Source: British Geological Survey, National Geoscience Information Service Reference: 19676 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Quaternary Geology: Kempton Park Gravel Formation Commodity: Sand and Gravel Positional Accuracy: Located by supplier to within 10m	A7NE (SW)	480	1	516825 171790
81	**BGS Recorded Mineral Sites** Site Name: Ham Location: , Ham, Richmond, Surrey Source: British Geological Survey, National Geoscience Information Service Reference: 19675 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Quaternary Geology: Kempton Park Gravel Formation Commodity: Sand and Gravel Positional Accuracy: Located by supplier to within 10m	A12SE (SW)	577	1	516500 172050
82	**BGS Recorded Mineral Sites** Site Name: Ham Gravel Pit Location: , Ham, Richmond, Surrey Source: British Geological Survey, National Geoscience Information Service Reference: 164161 Type: Opencast **Status: Ceased** Operator: Not Supplied Operator Location: Not Supplied Periodic Type: Quaternary, Devensian Geology: Kempton Park Gravel Formation Commodity: Sand and Gravel Positional Accuracy: Located by supplier to within 10m	A12SW (W)	611	1	516417 172208
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 517196, 172203 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 18.90 mg/kg Cadmium Measured Concentration: 0.60 mg/kg Chromium Measured Concentration: 89.60 mg/kg Lead Measured Concentration: 246.20 mg/kg Nickel Measured Concentration: 25.70 mg/kg	A13SE (S)	71	1	517196 172203

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: 516775, 172208 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 15.30 mg/kg Cadmium Measured Concentration: 0.50 mg/kg Chromium Measured Concentration: 68.70 mg/kg Lead Measured Concentration: 160.00 mg/kg Nickel Measured Concentration: 27.70 mg/kg	A12SE (W)	268	1	516775 172208
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 517162, 172797 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 35.90 mg/kg Cadmium Measured Concentration: 0.30 mg/kg Chromium Measured Concentration: 59.80 mg/kg Lead Measured Concentration: 418.30 mg/kg Nickel Measured Concentration: 41.40 mg/kg	A18SW (N)	308	1	517162 172797
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 517224, 171792 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 16.20 mg/kg Cadmium Measured Concentration: 0.40 mg/kg Chromium Measured Concentration: 61.20 mg/kg Lead Measured Concentration: 239.30 mg/kg Nickel Measured Concentration: 20.90 mg/kg	A8NE (S)	444	1	517224 171792
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 516653, 172693 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 16.30 mg/kg Cadmium Measured Concentration: 0.30 mg/kg Chromium Measured Concentration: 70.90 mg/kg Lead Measured Concentration: 79.80 mg/kg Nickel Measured Concentration: 22.10 mg/kg	A17SE (NW)	488	1	516653 172693
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 516754, 171749 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 16.10 mg/kg Cadmium Measured Concentration: 0.40 mg/kg Chromium Measured Concentration: 61.40 mg/kg Lead Measured Concentration: 208.10 mg/kg Nickel Measured Concentration: 25.30 mg/kg	A7NE (SW)	553	1	516754 171749

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: 517870, 172143 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 17.80 mg/kg Cadmium Measured Concentration: 0.60 mg/kg Chromium Measured Concentration: 53.80 mg/kg Lead Measured Concentration: 81.50 mg/kg Nickel Measured Concentration: 15.50 mg/kg	A14SE (E)	614	1	517870 172143
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 517880, 172804 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 13.90 mg/kg Cadmium Measured Concentration: 0.30 mg/kg Chromium Measured Concentration: 44.00 mg/kg Lead Measured Concentration: 161.70 mg/kg Nickel Measured Concentration: 17.70 mg/kg	A19SE (NE)	674	1	517880 172804
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 517228, 173180 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 18.30 mg/kg Cadmium Measured Concentration: 0.50 mg/kg Chromium Measured Concentration: 61.50 mg/kg Lead Measured Concentration: 75.40 mg/kg Nickel Measured Concentration: 20.70 mg/kg	A18NE (N)	681	1	517228 173180
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 516303, 172232 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 28.10 mg/kg Cadmium Measured Concentration: 0.60 mg/kg Chromium Measured Concentration: 49.80 mg/kg Lead Measured Concentration: 98.50 mg/kg Nickel Measured Concentration: 27.70 mg/kg	A12SW (W)	718	1	516303 172232
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 517788, 171803 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 14.30 mg/kg Cadmium Measured Concentration: 0.40 mg/kg Chromium Measured Concentration: 51.60 mg/kg Lead Measured Concentration: 85.20 mg/kg Nickel Measured Concentration: 14.20 mg/kg	A9NW (SE)	738	1	517788 171803

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: 516264, 172716 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 22.90 mg/kg Cadmium Measured Concentration: 0.40 mg/kg Chromium Measured Concentration: 60.00 mg/kg Lead Measured Concentration: 89.90 mg/kg Nickel Measured Concentration: 30.20 mg/kg	A17SW (W)	826	1	516264 172716
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 517785, 173299 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 22.20 mg/kg Cadmium Measured Concentration: 0.30 mg/kg Chromium Measured Concentration: 71.00 mg/kg Lead Measured Concentration: 203.80 mg/kg Nickel Measured Concentration: 30.40 mg/kg	A19NW (NE)	967	1	517785 173299
	BGS Measured Urban Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Grid: 518303, 172289 Soil Sample Type: Topsoil Sample Area: London Arsenic Measured Concentration: 22.20 mg/kg Cadmium Measured Concentration: 0.30 mg/kg Chromium Measured Concentration: 61.00 mg/kg Lead Measured Concentration: 134.70 mg/kg Nickel Measured Concentration: 18.70 mg/kg	A15SW (E)	992	1	518303 172289
	BGS Urban Soil Chemistry Averages Source: British Geological Survey, National Geoscience Information Service Sample Area: London Count Id: 7209 Arsenic Minimum Concentration: 1.00 mg/kg Arsenic Average Concentration: 17.00 mg/kg Arsenic Maximum Concentration: 161.00 mg/kg Cadmium Minimum Concentration: 0.10 mg/kg Cadmium Average Concentration: 0.90 mg/kg Cadmium Maximum Concentration: 165.20 mg/kg Chromium Minimum Concentration: 13.00 mg/kg Chromium Average Concentration: 79.00 mg/kg Chromium Maximum Concentration: 2094.00 mg/kg Lead Minimum Concentration: 11.00 mg/kg Lead Average Concentration: 280.00 mg/kg Lead Maximum Concentration: 10000.00 mg/kg Nickel Minimum Concentration: 2.00 mg/kg Nickel Average Concentration: 28.00 mg/kg Nickel Maximum Concentration: 506.00 mg/kg	A13NW (W)	0	1	517160 172357

Geological

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	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	A13NW (W)	0	1	517160 172357
	Potential for Compressible Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13NW (W)	0	1	517160 172357
	Potential for Compressible Ground Stability Hazards Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	A13SW (SW)	41	1	516986 172263
	Potential for Ground Dissolution Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13NW (W)	0	1	517160 172357
	Potential for Landslide Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13NW (W)	0	1	517160 172357
	Potential for Running Sand Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13NW (W)	0	1	517160 172357
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13NW (W)	0	1	517160 172357
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	A13SE (SE)	78	1	517300 172260
	Radon Potential - Radon Affected Areas Affected Area: The property is in a Lower probability radon area (less than 1% of homes are estimated to be at or above the Action Level). Source: British Geological Survey, National Geoscience Information Service	A13NW (W)	0	1	517160 172357
	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	A13NW (W)	0	1	517160 172357

Industrial Land Use

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
83	**Contemporary Trade Directory Entries** Name: K S Dry Cleaners Ltd Location: 65, Ham Street, Richmond, TW10 7HW Classification: Dry Cleaners **Status:** Active Positional Accuracy: Automatically positioned to the address	A13NE (E)	19	-	517311 172387
83	**Contemporary Trade Directory Entries** Name: Peter'S Cleaners Location: 65, Ham Street, Richmond, Surrey, TW10 7HW Classification: Dry Cleaners **Status:** Inactive Positional Accuracy: Automatically positioned to the address	A13NE (E)	20	-	517312 172387
83	**Contemporary Trade Directory Entries** Name: Mica Hardware Location: 12, Ashburnham Road, Richmond, Surrey, TW10 7NF Classification: Hardware **Status:** Inactive Positional Accuracy: Automatically positioned to the address	A13NE (E)	20	-	517302 172362
83	**Contemporary Trade Directory Entries** Name: Peels Of London Ltd Location: 63, Ham Street, Richmond, Surrey, TW10 7HW Classification: Window Tinting **Status:** Inactive Positional Accuracy: Automatically positioned to the address	A13NE (E)	26	-	517315 172382
84	**Contemporary Trade Directory Entries** Name: Www.Enviro-Blast-Clean.Com Location: 32, Mowbray Road, Richmond, Surrey, TW10 7NQ Classification: Blast Cleaning **Status:** Inactive Positional Accuracy: Automatically positioned to the address	A13SE (S)	138	-	517212 172135
85	**Contemporary Trade Directory Entries** Name: Star Optical Location: 202, Ashburnham Road, Richmond, Surrey, TW10 7NL Classification: Laboratory Equipment, Instruments & Supplies **Status:** Inactive Positional Accuracy: Automatically positioned to the address	A13SW (SW)	155	-	516888 172223
85	**Contemporary Trade Directory Entries** Name: Mercury Multimedia Ltd Location: 206, Ashburnham Road, RICHMOND, Surrey, TW10 7NL Classification: Photo & Digital Imaging Bureaus **Status:** Inactive Positional Accuracy: Automatically positioned to the address	A13SW (SW)	158	-	516882 172233
85	**Contemporary Trade Directory Entries** Name: Express Installers Location: 89, Woodville Road, Richmond, TW10 7QW Classification: Cinema Equipment **Status:** Active Positional Accuracy: Automatically positioned to the address	A13SW (W)	160	-	516873 172258
86	**Contemporary Trade Directory Entries** Name: Intech Marketing (Uk) Ltd Location: 32, Back Lane, Richmond, Surrey, TW10 7LF Classification: Office Furniture & Equipment **Status:** Inactive Positional Accuracy: Automatically positioned to the address	A13SE (SE)	194	-	517400 172186
87	**Contemporary Trade Directory Entries** Name: Sparkles Location: 89, Ashburnham Road, Richmond, Surrey, TW10 7NN Classification: Cleaning Services - Domestic **Status:** Inactive Positional Accuracy: Automatically positioned to the address	A13SW (SW)	199	-	516907 172085
87	**Contemporary Trade Directory Entries** Name: G T Harris Location: 26, Fellbrook, Richmond, Surrey, TW10 7UW Classification: Washing Machines - Servicing & Repairs **Status:** Inactive Positional Accuracy: Automatically positioned to the address	A13SW (SW)	241	-	516889 172041
88	**Contemporary Trade Directory Entries** Name: A S Motors Location: Central Garage,Croft Way,Off Dukes Av, Ham, Richmond, Surrey, TW10 7NP Classification: Mot Testing Centres **Status:** Inactive Positional Accuracy: Manually positioned to the road within the address or location	A13SW (SW)	251	-	516828 172112

Industrial Land Use

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
89	**Contemporary Trade Directory Entries** Name: Designer Carpets Location: 2, Ham Street, Richmond, Surrey, TW10 7HT Classification: Carpets & Rugs - Manufacturers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13SE (SE)	273	-	517480 172153
89	**Contemporary Trade Directory Entries** Name: M W Carpets Ltd Location: 2, Ham Street, Richmond, Surrey, TW10 7HT Classification: Carpets & Rugs - Manufacturers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13SE (SE)	273	-	517480 172153
90	**Contemporary Trade Directory Entries** Name: Lifetime Shutters & Blinds Ltd Location: 63, Perryfield Way, Richmond, Surrey, TW10 7SL Classification: Shutters - Internal **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13NW (NW)	278	-	516905 172622
91	**Contemporary Trade Directory Entries** Name: B & S Car Disposal Service Location: 29, Meadlands Drive, Richmond, Surrey, TW10 7EF Classification: Car Breakers & Dismantlers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A19SW (NE)	388	-	517566 172737
92	**Contemporary Trade Directory Entries** Name: Key Cleaning Location: Flat 1, 200, Riverside Drive, Richmond, Surrey, TW10 7RP Classification: Commercial Cleaning Services **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A8NW (S)	415	-	517006 171795
93	**Contemporary Trade Directory Entries** Name: M K B Enterprise Ltd Location: 5, Broughton Avenue, Richmond, Surrey, TW10 7TT Classification: Electronic Component Manufacturers & Distributors **Status: Active** Positional Accuracy: Automatically positioned to the address	A8NE (S)	433	-	517194 171793
94	**Contemporary Trade Directory Entries** Name: Az Clean Ltd Location: 10, Mornington Walk, Richmond, Surrey, TW10 7LY Classification: Commercial Cleaning Services **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A8NE (SE)	445	-	517469 171932
95	**Contemporary Trade Directory Entries** Name: Surrey Auto Services Location: 156, Dukes Avenue, Richmond, TW10 7YL Classification: Garage Services **Status: Active** Positional Accuracy: Automatically positioned to the address	A8NE (S)	498	-	517289 171762
96	**Contemporary Trade Directory Entries** Name: Airs & Graces Location: 4, Beaufort Road, Richmond, Surrey, TW10 7XS Classification: Cleaning Services - Domestic **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A8NE (S)	525	-	517189 171696
97	**Contemporary Trade Directory Entries** Name: M J W Print Ltd Location: 7, Lauderdale Drive, Richmond, Surrey, TW10 7BS Classification: Printers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A14NE (E)	570	-	517872 172550
98	**Contemporary Trade Directory Entries** Name: London Cleaning Service Location: 64, Beaufort Court, Beaufort Road, Richmond, Surrey, TW10 7YQ Classification: Cleaning Services - Domestic **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A8SW (S)	573	-	517129 171637
99	**Contemporary Trade Directory Entries** Name: Oscar Pet Foods Location: 28, Buckingham Road, Richmond, Surrey, TW10 7EQ Classification: Pet Foods & Animal Feeds **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A19SW (NE)	597	-	517788 172803

Industrial Land Use

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
120	**Contemporary Trade Directory Entries** Name: B 'N' S Salvage Location: Flat 26, Cranmer Court, Richmond Road, Kingston upon Thames, Surrey, KT2 5PY Classification: Car Breakers & Dismantlers **Status:** Inactive Positional Accuracy: Automatically positioned to the address	A9SW (SE)	987	-	517819 171512
121	**Contemporary Trade Directory Entries** Name: Smart Fleet Location: 47, Northweald Lane, Kingston upon Thames, Surrey, KT2 5GN Classification: Car Dealers **Status:** Inactive Positional Accuracy: Automatically positioned to the address	A4NW (S)	987	-	517518 171330
122	**Contemporary Trade Directory Entries** Name: Kemetyl Location: Broom Road, Teddington, Middlesex, TW11 9NU Classification: Chemical Manufacturers **Status:** Inactive Positional Accuracy: Manually positioned within the geographical locality	A3NW (S)	990	-	516967 171221
123	**Fuel Station Entries** Name: A S Motors Of Ham Location: Croftway, Riverside Drive, Ham, RICHMOND, Surrey, TW10 7NP Brand: Obsolete Premises Type: Not Applicable **Status:** Obsolete Positional Accuracy: Manually positioned to the address or location	A12SE (SW)	260	-	516810 172129
124	**Fuel Station Entries** Name: Ham Cross Service Station Location: 297, Richmond Road, Kingston upon Thames, Surrey, KT2 5QU Brand: Texaco Premises Type: Petrol Station **Status:** Open Positional Accuracy: Automatically positioned to the address	A9SW (SE)	935	-	517745 171527
125	**Points of Interest - Commercial Services** Name: Tooth Removals Sarl Location: 10 Watermill Close, Richmond, TW10 7UH Category: Transport, Storage and Delivery Class Code: Distribution and Haulage Positional Accuracy: Positioned to address or location	A13SW (S)	189	7	517099 172020
126	**Points of Interest - Commercial Services** Name: Crown Ltd Location: 297 Richmond Road, Kingston upon Thames, KT2 5QU Category: Repair and Servicing Class Code: Vehicle Repair, Testing and Servicing Positional Accuracy: Positioned to address or location	A9SW (SE)	935	7	517745 171527
126	**Points of Interest - Commercial Services** Name: Crown Motorcycles Location: 297 Richmond Road, Kingston upon Thames, KT2 5QU Category: Repair and Servicing Class Code: Vehicle Repair, Testing and Servicing Positional Accuracy: Positioned to address or location	A9SW (SE)	935	7	517745 171527
126	**Points of Interest - Commercial Services** Name: Vetech Motor Services Location: 297 Richmond Road, Kingston upon Thames, KT2 5QU Category: Repair and Servicing Class Code: Vehicle Repair, Testing and Servicing Positional Accuracy: Positioned to address or location	A9SW (SE)	935	7	517745 171527
126	**Points of Interest - Commercial Services** Name: Crown Garage Kingston Ltd Location: 297 Richmond Road, Kingston upon Thames, KT2 5QU Category: Repair and Servicing Class Code: Vehicle Repair, Testing and Servicing Positional Accuracy: Positioned to address or location	A9SW (SE)	935	7	517745 171527
126	**Points of Interest - Commercial Services** Name: Ham Cross Garage Location: 297 Richmond Road, Kingston upon Thames, KT2 5QU Category: Repair and Servicing Class Code: Vehicle Repair, Testing and Servicing Positional Accuracy: Positioned to address or location	A9SW (SE)	935	7	517745 171527

Industrial Land Use

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
126	**Points of Interest - Commercial Services** Name: Vetech Motor Services Location: 297 Richmond Road, Kingston upon Thames, KT2 5QU Category: Repair and Servicing Class Code: Vehicle Repair, Testing and Servicing Positional Accuracy: Positioned to address or location	A9SW (SE)	936	7	517745 171526
126	**Points of Interest - Commercial Services** Name: Crown Garages Kingston Ltd Location: 297 Richmond Road, Kingston upon Thames, KT2 5QU Category: Repair and Servicing Class Code: Vehicle Repair, Testing and Servicing Positional Accuracy: Positioned to address or location	A9SW (SE)	936	7	517745 171526
127	**Points of Interest - Commercial Services** Name: L J Motorcycle Repairs Location: Unit D1 1, Strawberry Vale, Twickenham, TW1 4RP Category: Repair and Servicing Class Code: Vehicle Repair, Testing and Servicing Positional Accuracy: Positioned to address or location	A11NE (W)	980	7	516036 172478
128	**Points of Interest - Education and Health** Name: Cassel Hospital Location: 1 Ham Common, Richmond, TW10 7JF Category: Health Practitioners and Establishments Class Code: Hospitals Positional Accuracy: Positioned to address or location	A9NW (SE)	695	7	517708 171791
129	**Points of Interest - Manufacturing and Production** Name: Tank Location: TW10 Category: Industrial Features Class Code: Tanks (Generic) Positional Accuracy: Positioned to an adjacent address or location	A13SE (S)	201	7	517267 172095
130	**Points of Interest - Manufacturing and Production** Name: Works Location: Not Supplied Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A9NW (SE)	768	7	517822 171795
131	**Points of Interest - Manufacturing and Production** Name: Works Location: Not Supplied Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A11NE (W)	914	7	516100 172454
131	**Points of Interest - Manufacturing and Production** Name: Works Location: TW1 Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A11NE (W)	918	7	516096 172454
131	**Points of Interest - Manufacturing and Production** Name: Works Location: TW1 Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A11NE (W)	985	7	516030 172468
131	**Points of Interest - Manufacturing and Production** Name: Works Location: Not Supplied Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A11NE (W)	989	7	516026 172469
132	**Points of Interest - Manufacturing and Production** Name: Works Location: Not Supplied Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A17NE (NW)	935	7	516573 173189
133	**Points of Interest - Manufacturing and Production** Name: Works Location: Not Supplied Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A17NW (NW)	963	7	516452 173145

Industrial Land Use

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
133	**Points of Interest - Manufacturing and Production** Name: Works Location: Not Supplied Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A17NW (NW)	978	7	516428 173146
133	**Points of Interest - Manufacturing and Production** Name: Works Location: Not Supplied Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A17NW (NW)	979	7	516443 173158
133	**Points of Interest - Manufacturing and Production** Name: Works Location: TW1 Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A17NW (NW)	979	7	516428 173147
133	**Points of Interest - Manufacturing and Production** Name: Works Location: TW1 Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A17NW (NW)	980	7	516443 173159
134	**Points of Interest - Public Infrastructure** Name: Metropolitan Police Service Location: 18 Ashburnham Road, Richmond, TW10 7NF Category: Central and Local Government Class Code: Police Stations Positional Accuracy: Positioned to address or location	A13NE (E)	33	7	517324 172379
134	**Points of Interest - Public Infrastructure** Name: Metropolitan Police Service Location: 18 Ashburnham Road, Richmond, TW10 7NF Category: Central and Local Government Class Code: Police Stations Positional Accuracy: Positioned to address or location	A13NE (E)	33	7	517324 172379
135	**Points of Interest - Public Infrastructure** Name: Tesco Petrol Filling Station Location: 185 Ashburnham Road, Richmond, TW10 7NR Category: Road And Rail Class Code: Petrol and Fuel Stations Positional Accuracy: Positioned to address or location	A12SE (SW)	235	7	516818 172182
136	**Points of Interest - Public Infrastructure** Name: Outfall Location: TW10 Category: Infrastructure and Facilities Class Code: Waste Storage, Processing and Disposal Positional Accuracy: Positioned to an adjacent address or location	A12SW (W)	725	7	516340 172066
137	**Points of Interest - Public Infrastructure** Name: Sluices Location: TW10 Category: Water Class Code: Weirs, Sluices and Dams Positional Accuracy: Positioned to an adjacent address or location	A8SW (S)	752	7	516893 171474
137	**Points of Interest - Public Infrastructure** Name: Sluice Location: TW10 Category: Water Class Code: Weirs, Sluices and Dams Positional Accuracy: Positioned to an adjacent address or location	A8SW (S)	767	7	516957 171447
138	**Points of Interest - Public Infrastructure** Name: Sluices Location: TW11 Category: Water Class Code: Weirs, Sluices and Dams Positional Accuracy: Positioned to an adjacent address or location	A8SW (S)	797	7	517008 171411
138	**Points of Interest - Public Infrastructure** Name: Sluices Location: TW11 Category: Water Class Code: Weirs, Sluices and Dams Positional Accuracy: Positioned to an adjacent address or location	A8SW (S)	819	7	517019 171389

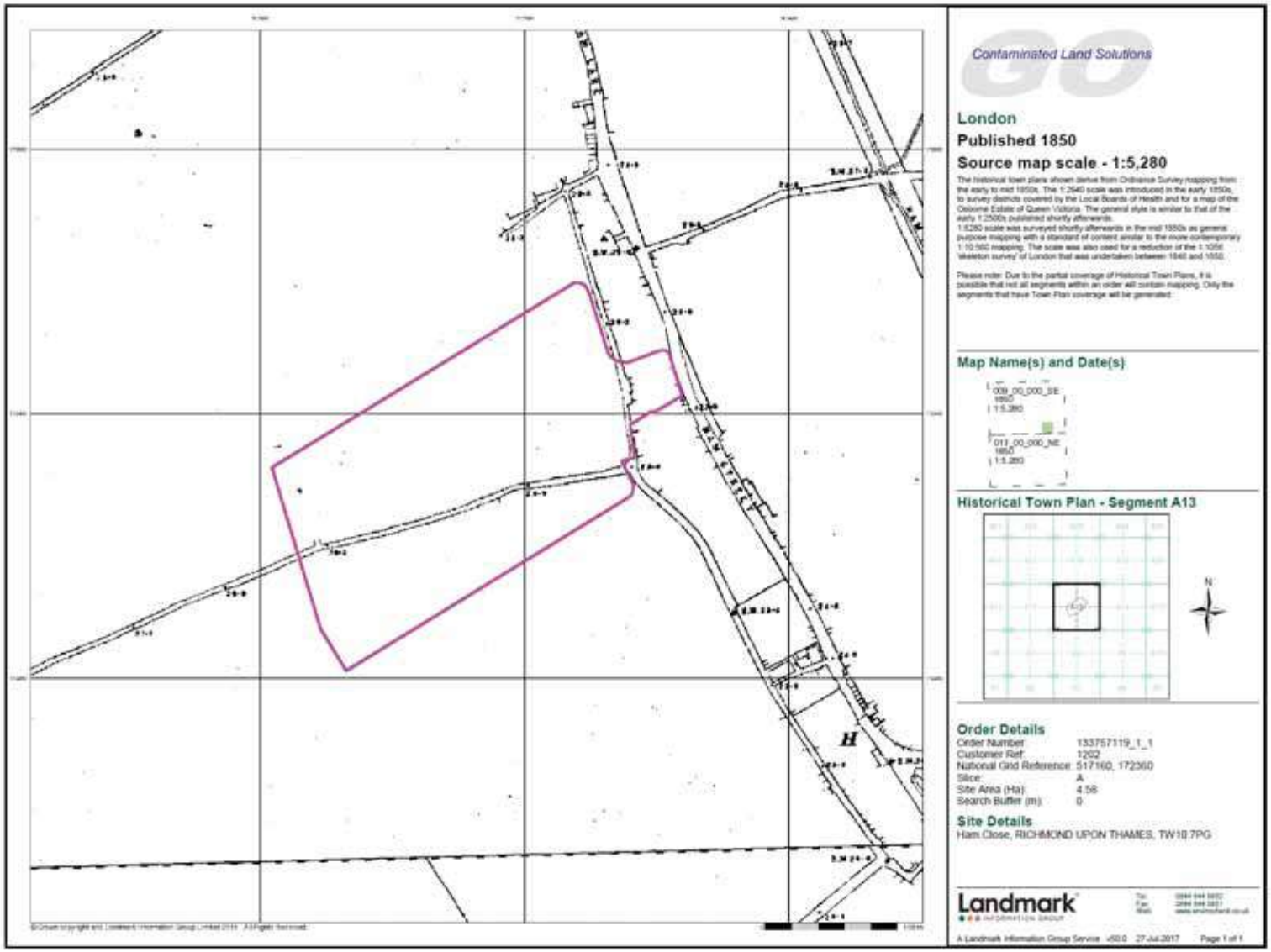
Industrial Land Use

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
138	**Points of Interest - Public Infrastructure** Name: Teddington Weir Location: TW11 Category: Water Class Code: Weirs, Sluices and Dams Positional Accuracy: Positioned to an adjacent address or location	A8SW (S)	826	7	517021 171381
139	**Points of Interest - Public Infrastructure** Name: Cemetery Location: TW10 Category: Infrastructure and Facilities Class Code: Cemeteries and Crematoria Positional Accuracy: Positioned to an adjacent address or location	A9NE (SE)	867	7	517983 171831
139	**Points of Interest - Public Infrastructure** Name: Cemetery Location: Not Supplied Category: Infrastructure and Facilities Class Code: Cemeteries and Crematoria Positional Accuracy: Positioned to an adjacent address or location	A9NE (SE)	871	7	517988 171832
140	**Points of Interest - Public Infrastructure** Name: Hamcross Self Serve Location: 297 Richmond Road, Kingston upon Thames, KT2 5QU Category: Road And Rail Class Code: Petrol and Fuel Stations Positional Accuracy: Positioned to address or location	A9SW (SE)	935	7	517745 171527
140	**Points of Interest - Public Infrastructure** Name: Ham Cross Service Station Location: 297 Richmond Road, Kingston upon Thames, KT2 5QU Category: Road And Rail Class Code: Petrol and Fuel Stations Positional Accuracy: Positioned to address or location	A9SW (SE)	935	7	517745 171527
140	**Points of Interest - Public Infrastructure** Name: Ham Cross Service Station Location: 297 Richmond Road, Kingston upon Thames, KT2 5QU Category: Road And Rail Class Code: Petrol and Fuel Stations Positional Accuracy: Positioned to address or location	A9SW (SE)	935	7	517745 171527
140	**Points of Interest - Public Infrastructure** Name: Ham Cross Service Station Location: 297 Richmond Road, Kingston upon Thames, KT2 5QU Category: Road And Rail Class Code: Petrol and Fuel Stations Positional Accuracy: Positioned to address or location	A9SW (SE)	935	7	517745 171527
140	**Points of Interest - Public Infrastructure** Name: Texaco Location: 297 Richmond Road, Kingston upon Thames, KT2 5QU Category: Road And Rail Class Code: Petrol and Fuel Stations Positional Accuracy: Positioned to address or location	A9SW (SE)	936	7	517745 171526
141	**Points of Interest - Recreational and Environmental** Name: Playground Location: Not Supplied Category: Recreational Class Code: Playgrounds Positional Accuracy: Positioned to an adjacent address or location	A18SW (N)	323	7	517035 172754
141	**Points of Interest - Recreational and Environmental** Name: Playground Location: Riverside Drive, TW10 Category: Recreational Class Code: Playgrounds Positional Accuracy: Positioned to an adjacent address or location	A18SW (N)	323	7	517035 172754
142	**Points of Interest - Recreational and Environmental** Name: Playground Location: Not Supplied Category: Recreational Class Code: Playgrounds Positional Accuracy: Positioned to an adjacent address or location	A8SW (S)	650	7	517049 171556
142	**Points of Interest - Recreational and Environmental** Name: Playground Location: Fisherman Close, TW10 Category: Recreational Class Code: Playgrounds Positional Accuracy: Positioned to an adjacent address or location	A8SW (S)	650	7	517049 171556

Sensitive Land Use

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
145	**Local Nature Reserves** Name: Ham Lands Multiple Area: Y Area (m2): 600138.24 Source: Natural England Designation Date: 1st January 1992	A12SE (SW)	290	8	516809 172060
146	**Local Nature Reserves** Name: Ham Common, Richmond, London Multiple Area: N Area (m2): 402691.94 Source: Natural England Designation Date: 1st January 2001	A14SE (E)	671	8	517897 172074

Appendix D – Historical Maps



Contaminated Land Solutions

London

Published 1850

Source map scale - 1:5,280

The historical town plans shown derive from Ordnance Survey mapping from the early to mid 1950s. The 1:2640 scale was introduced in the early 1850s to survey districts covered by the Local Boards of Health and for a map of the Osborne Estate of Queen Victoria. The general style is similar to that of the early 1:2500s published shortly afterwards.
1:5280 scale was surveyed shortly afterwards in the mid 1850s as general purpose mapping with a standard of content similar to the more contemporary 1:10,560 mapping. The scale was also used for a reduction of the 1:1056 'skeleton survey' of London that was undertaken between 1840 and 1850.

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

Map Name(s) and Date(s)

009_00_000_SE
1850
1:5,280

013_00_000_NE
1850
1:5,280

Historical Town Plan - Segment A13

Order Details

Order Number:	133757119_1_1
Customer Ref:	1202
National Grid Reference:	517160, 172360
Slice:	A
Site Area (Ha):	4.58
Search Buffer (m):	0

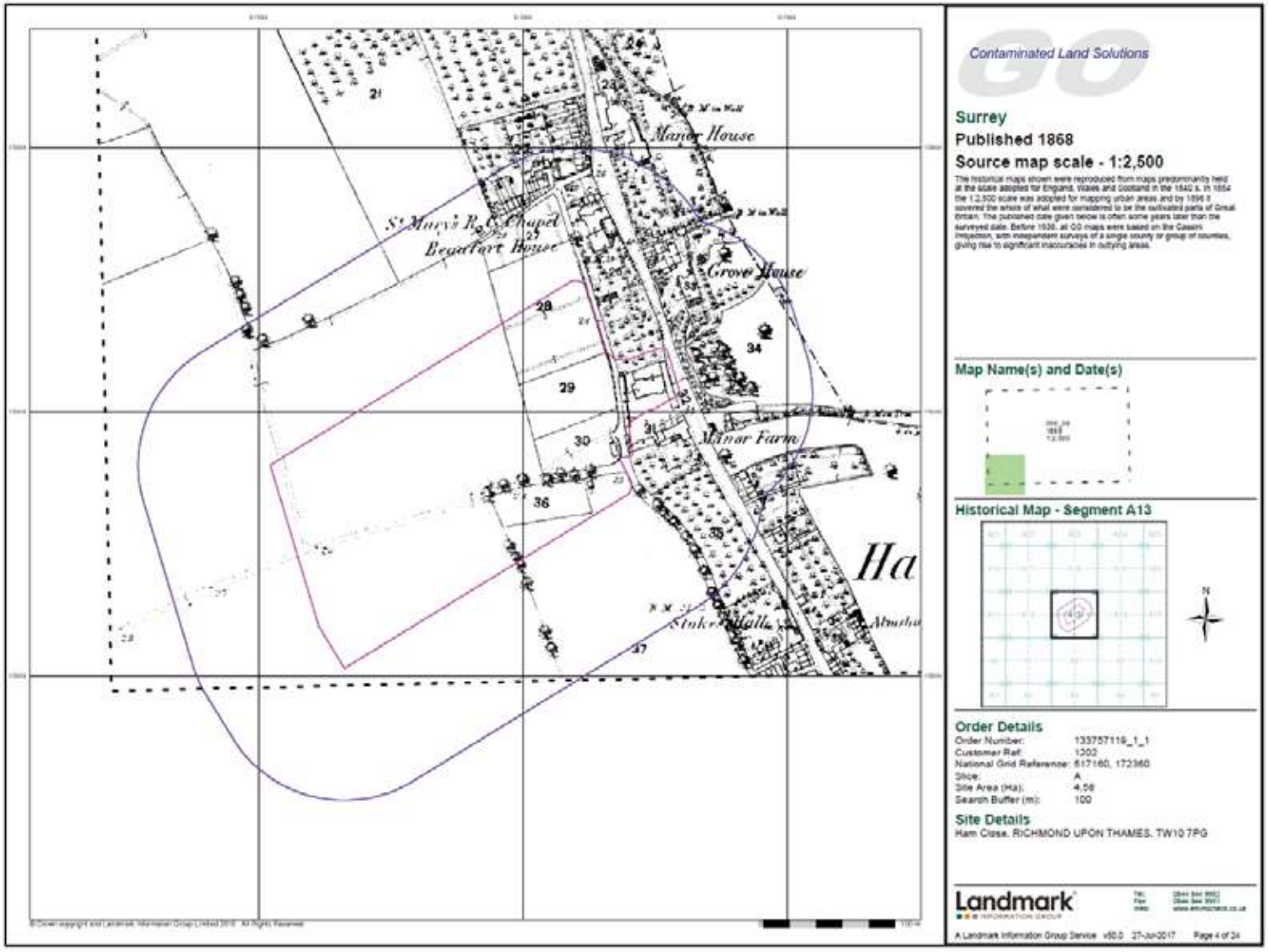
Site Details

Ham Close, RICHMOND UPON THAMES, TW10 7PG

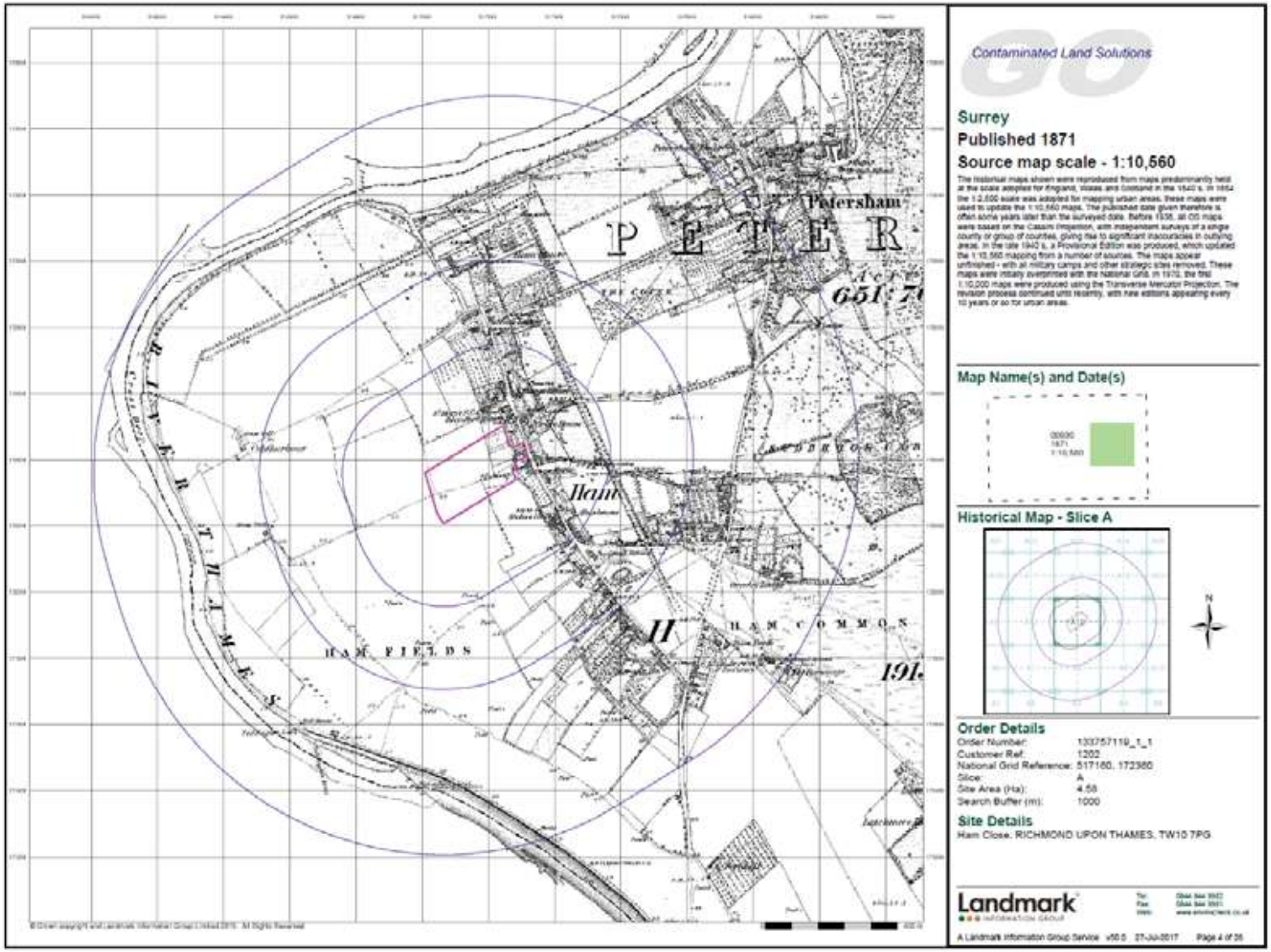
Landmark

A Landmark Information Group Service v50.0 27-Jul-2017 Page 1 of 1

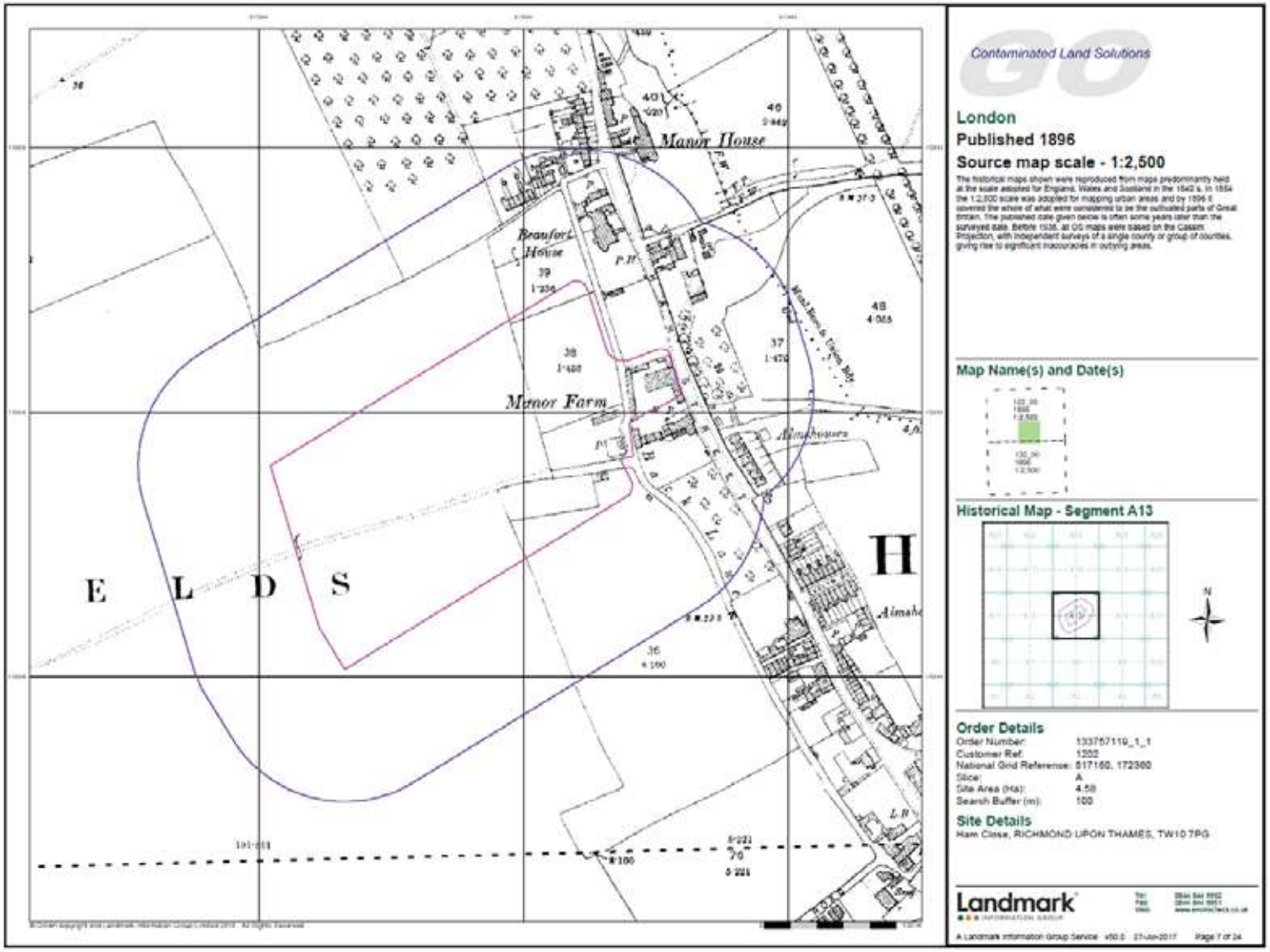
9324-P1E-1: Ham Close, Richmond Upon Thames
Richmond Housing Partnership



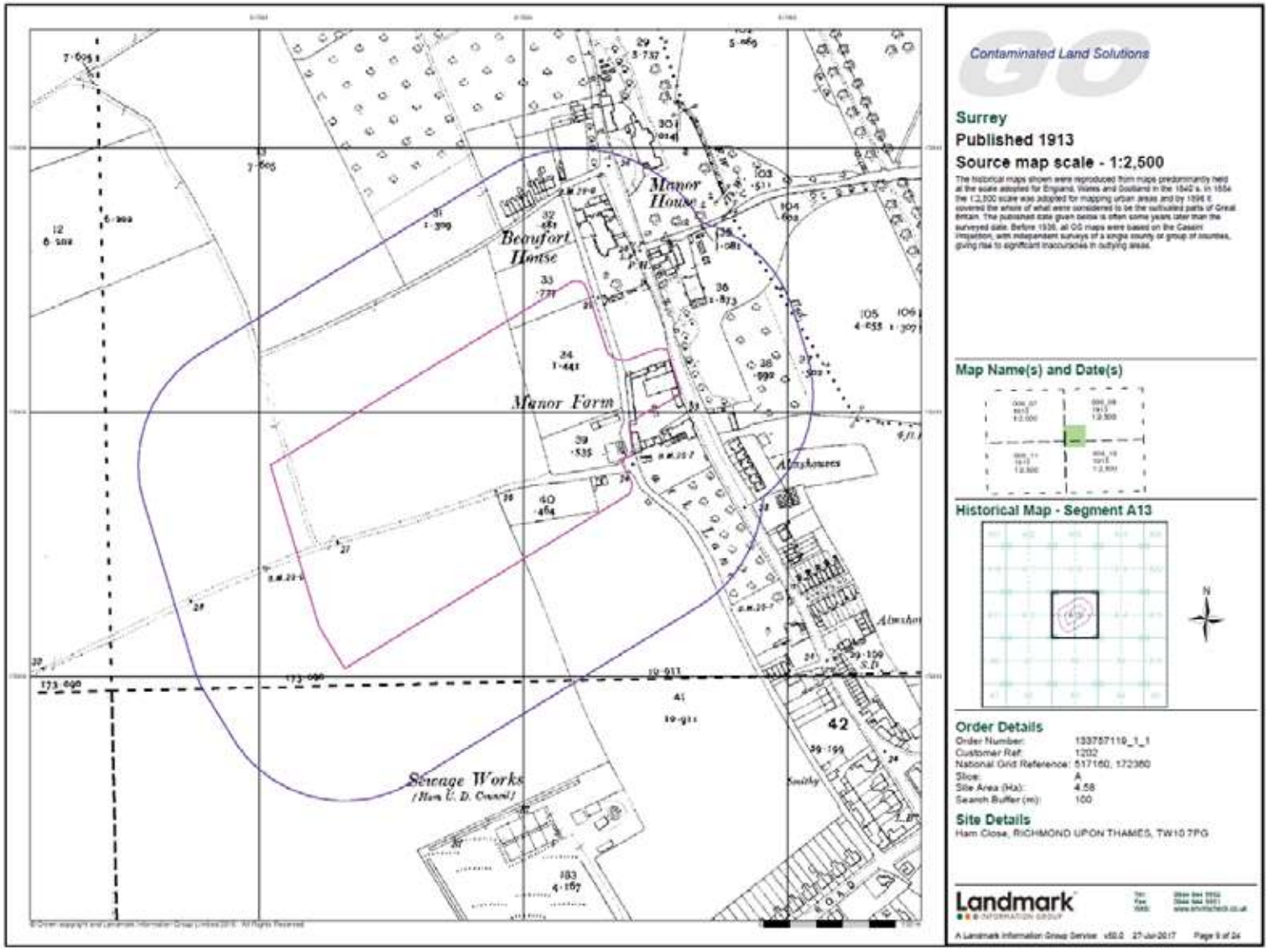
9324-P1E-1: Ham Close, Richmond Upon Thames
Richmond Housing Partnership



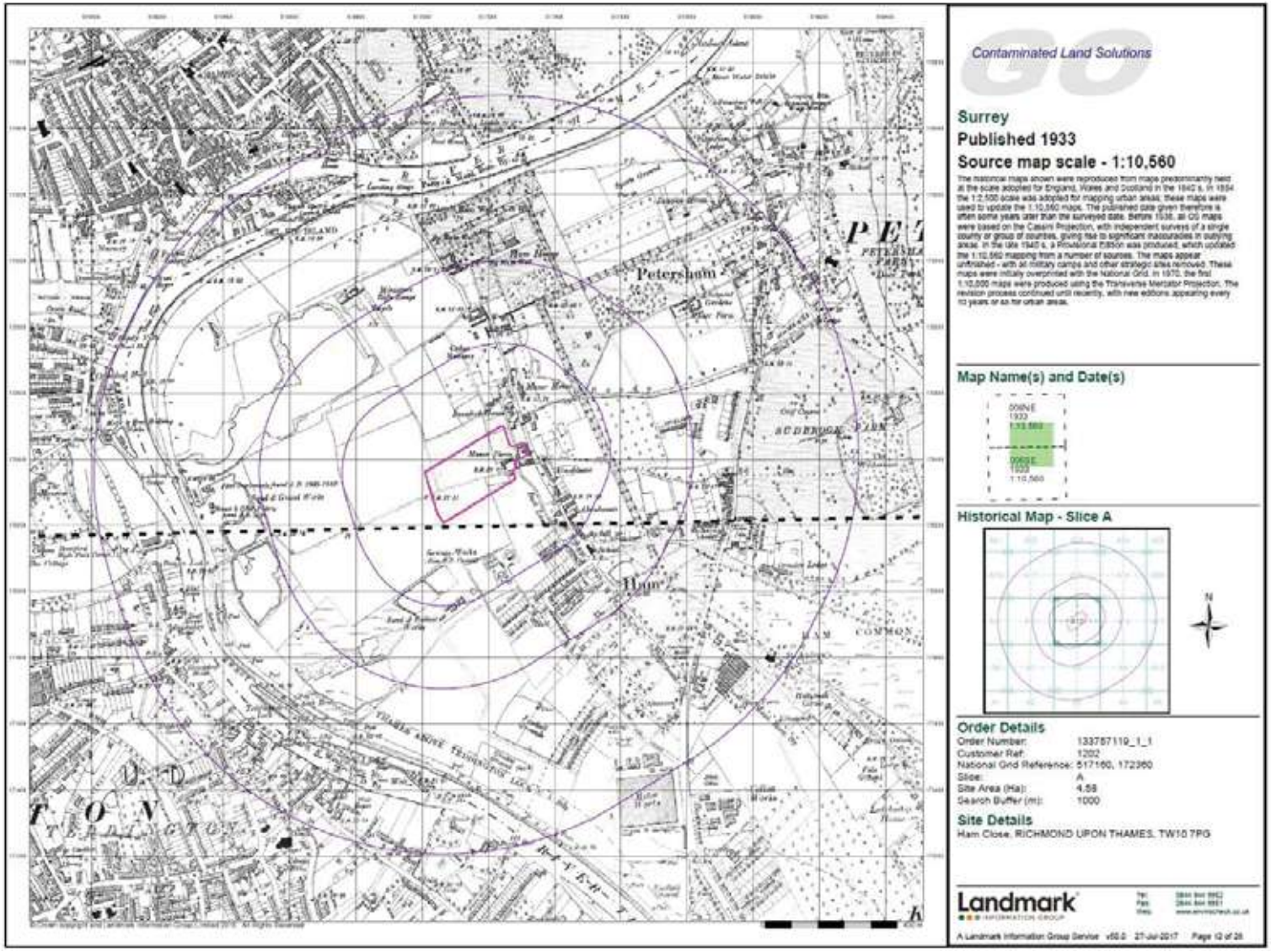
9324-P1E-1: Ham Close, Richmond Upon Thames
Richmond Housing Partnership



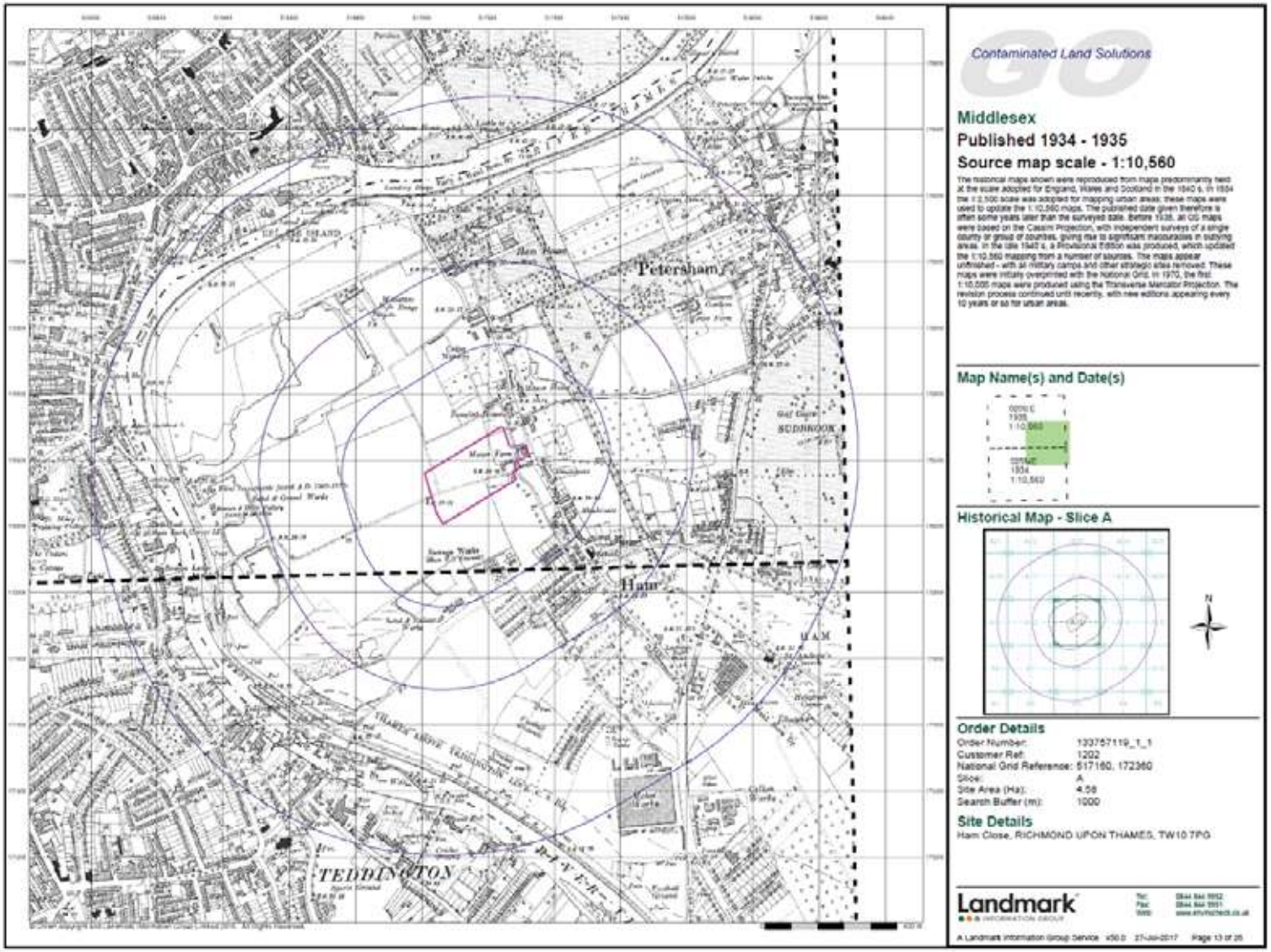
9324-P1E-1: Ham Close, Richmond Upon Thames
Richmond Housing Partnership



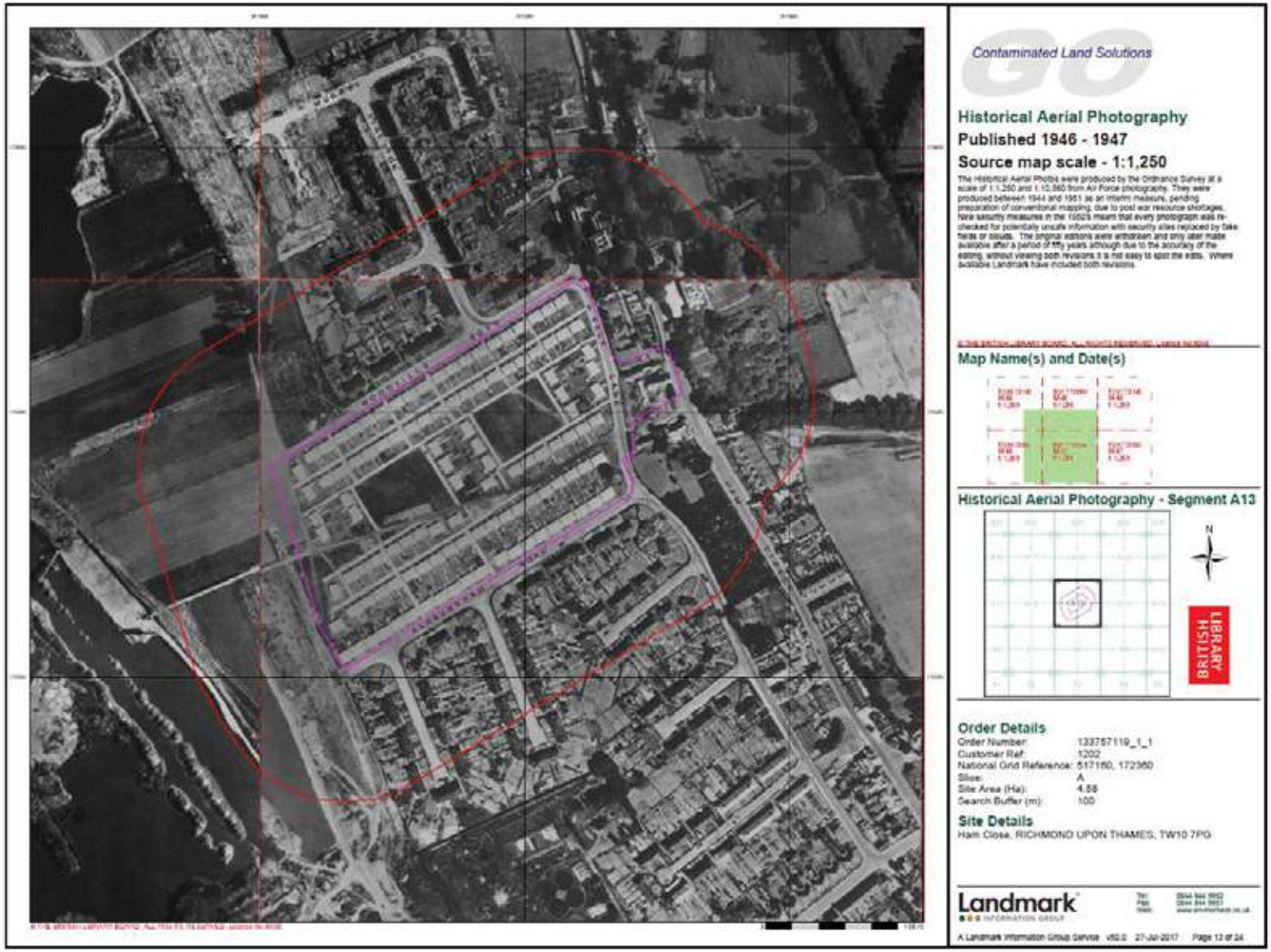
9324-P1E-1: Ham Close, Richmond Upon Thames
Richmond Housing Partnership



9324-P1E-1: Ham Close, Richmond Upon Thames
Richmond Housing Partnership



9324-P1E-1: Ham Close, Richmond Upon Thames
Richmond Housing Partnership



Contaminated Land Solutions

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.

Map Name(s) and Date(s)

Historical Aerial Photography - Segment A13

Order Details

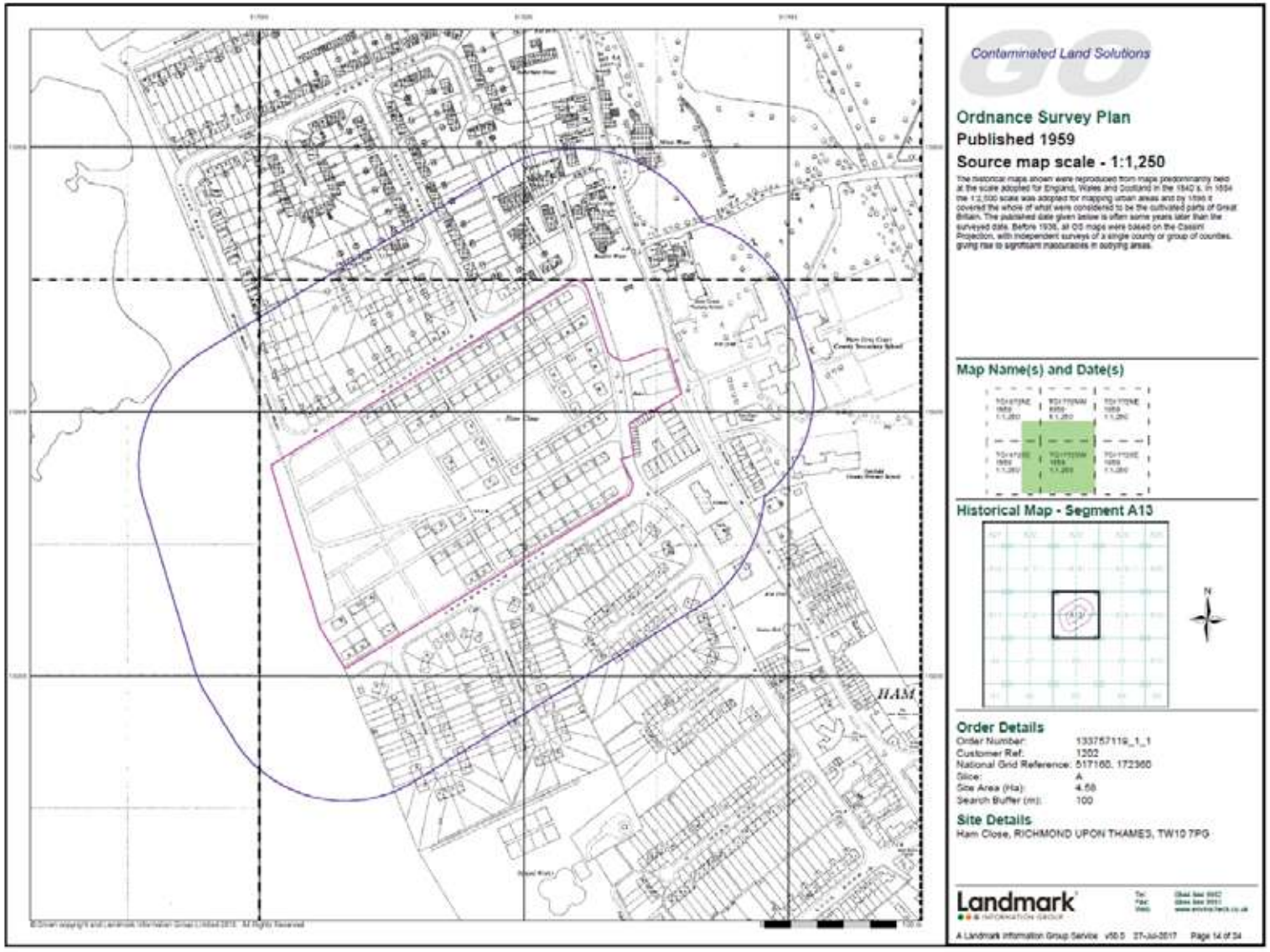
Order Number:	132757119_1_1
Customer Ref:	1202
National Grid Reference:	517160, 172360
Slice:	A
Site Area (Ha):	4.88
Search Buffer (m):	100

Site Details

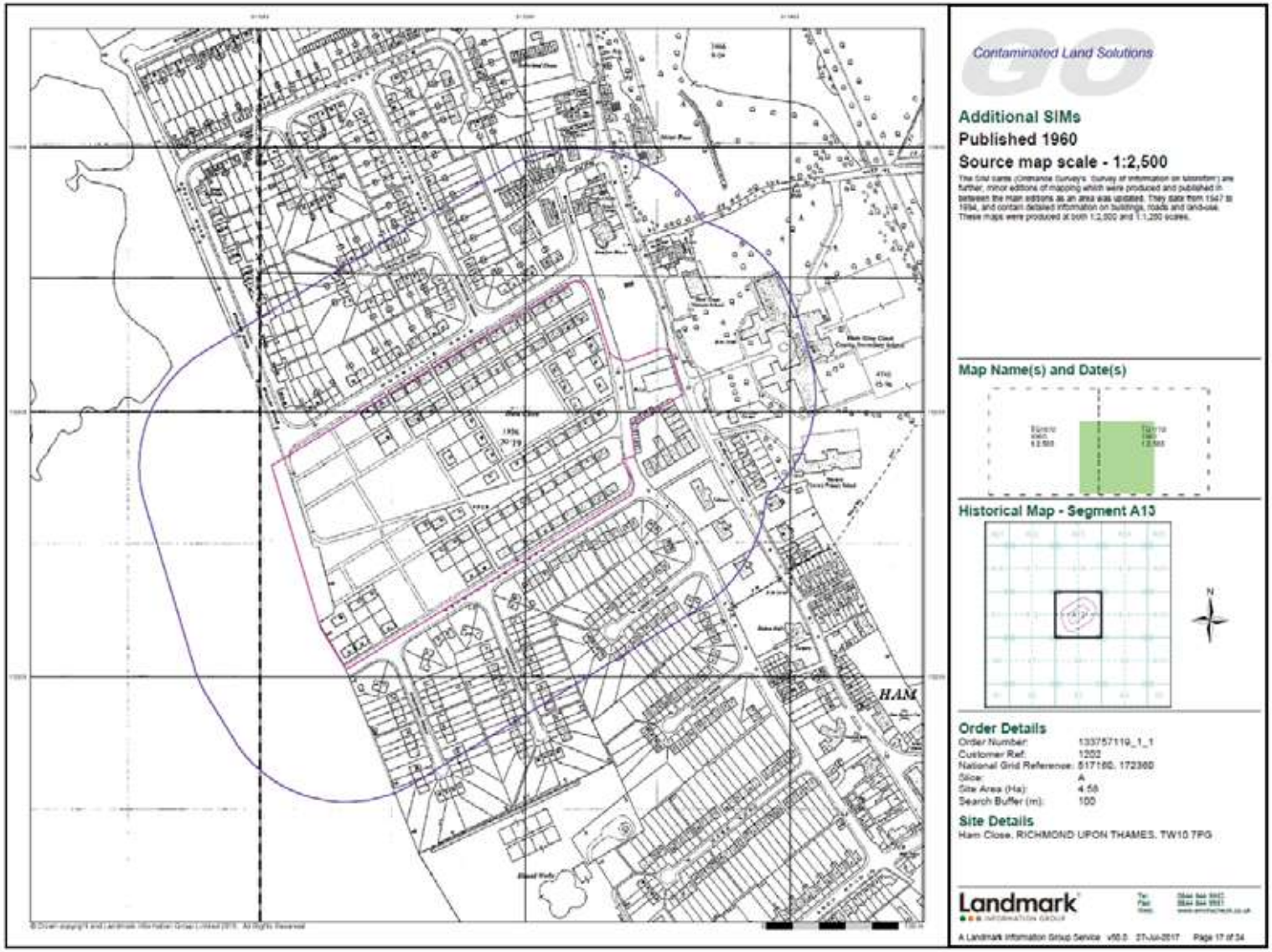
Ham Close, RICHMOND UPON THAMES, TW10 7PG

Landmark INFORMATION GROUP

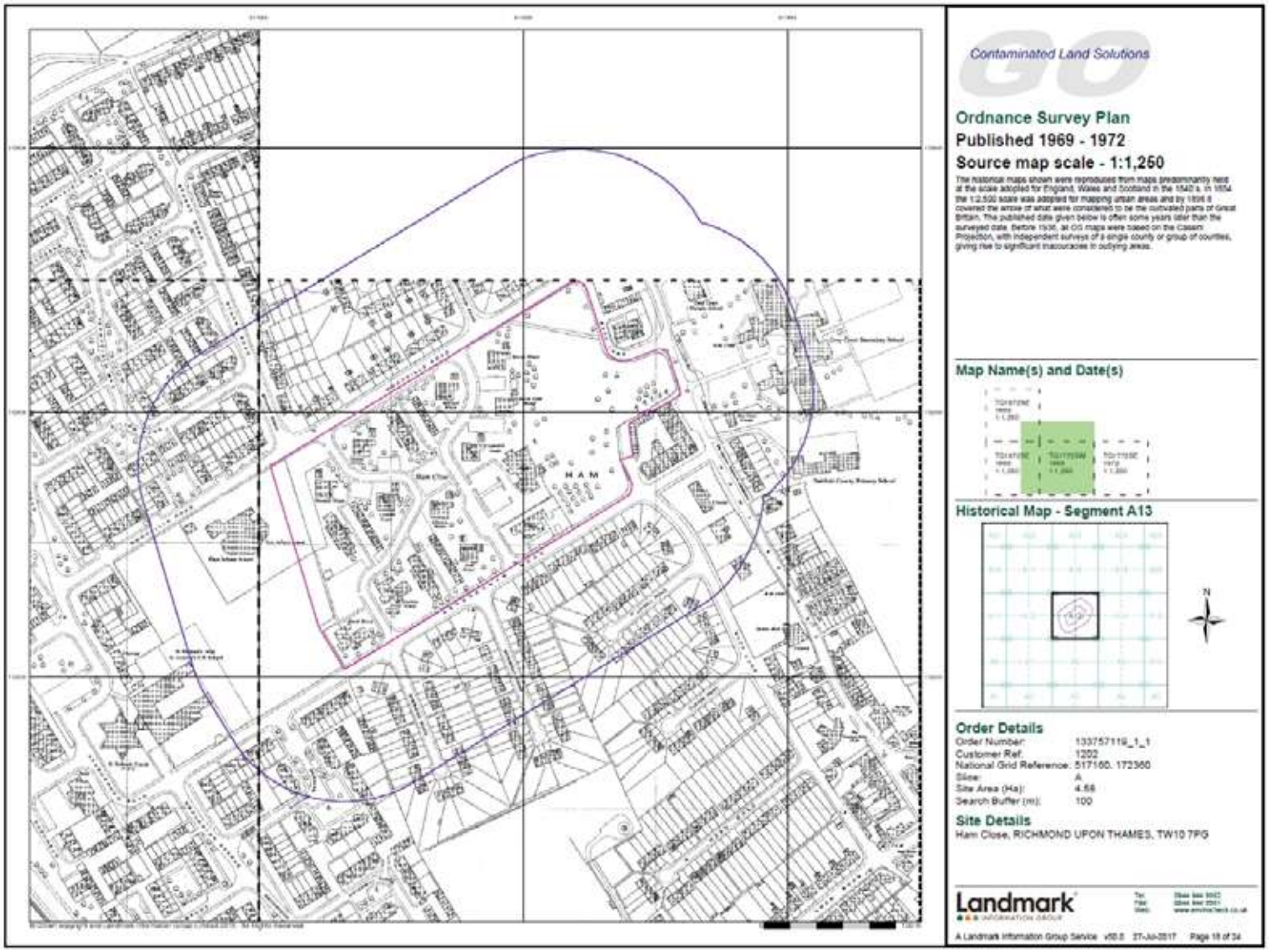
9324-P1E-1: Ham Close, Richmond Upon Thames
Richmond Housing Partnership



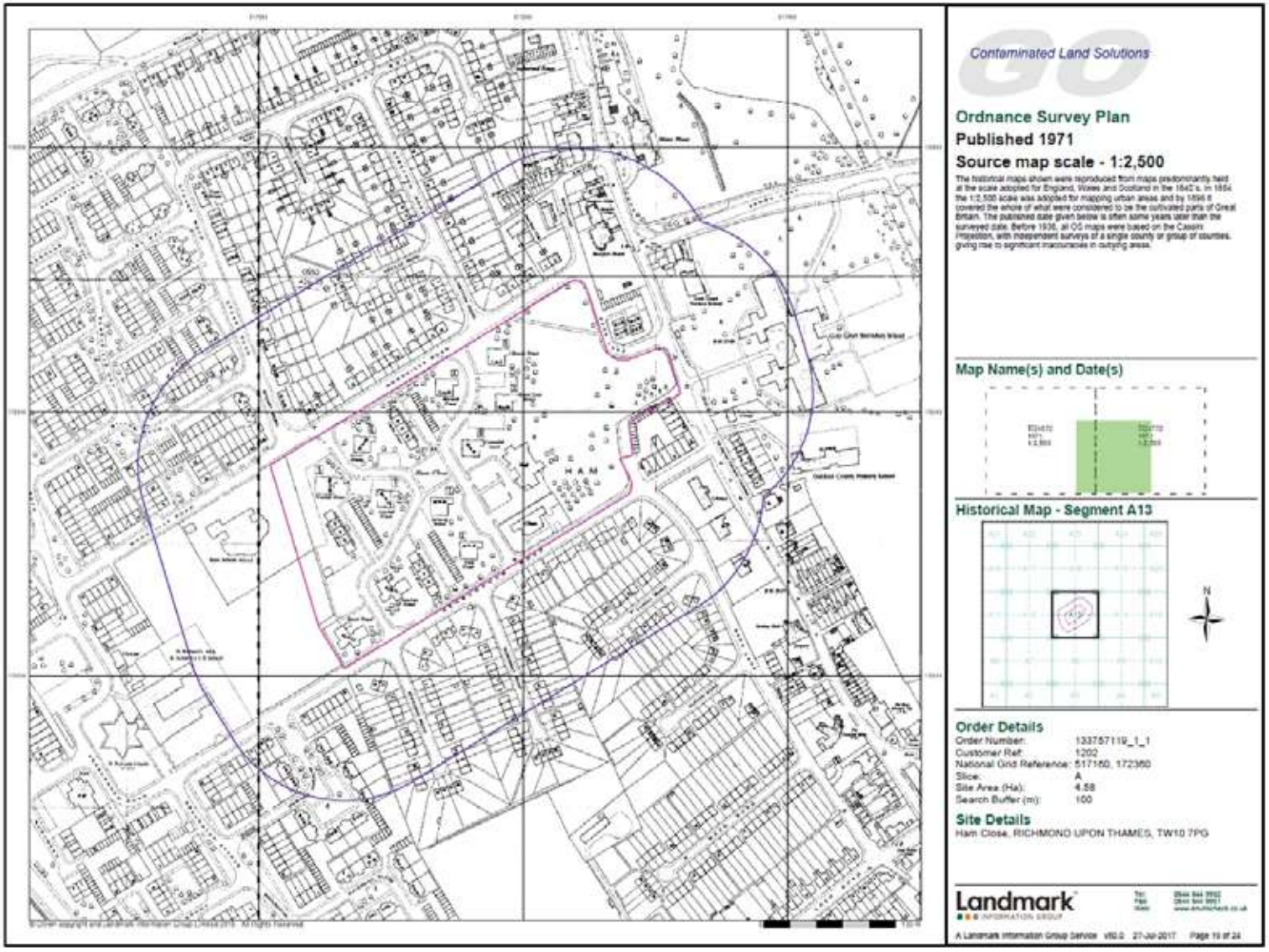
9324-P1E-1: Ham Close, Richmond Upon Thames
Richmond Housing Partnership



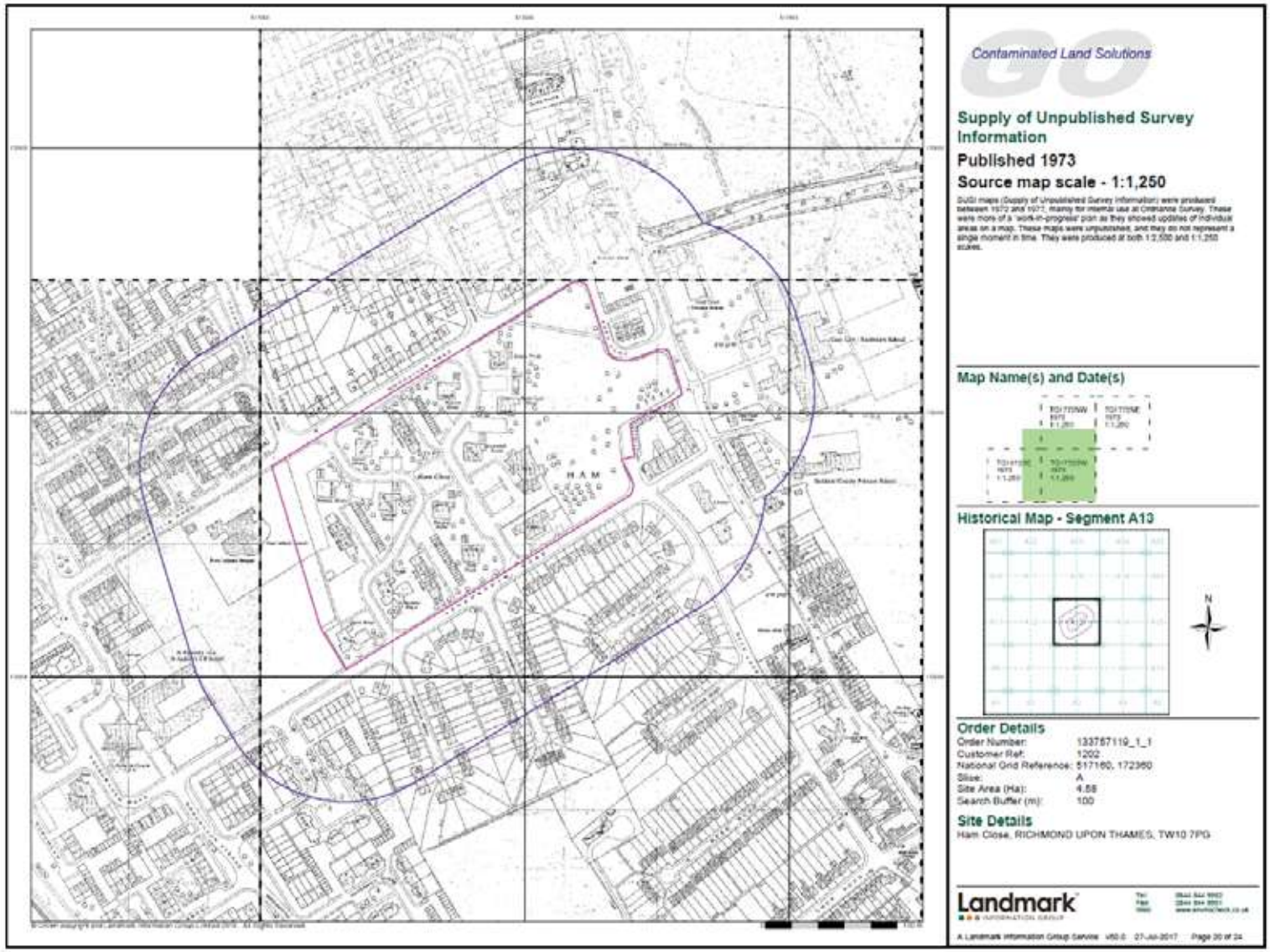
9324-P1E-1: Ham Close, Richmond Upon Thames
Richmond Housing Partnership



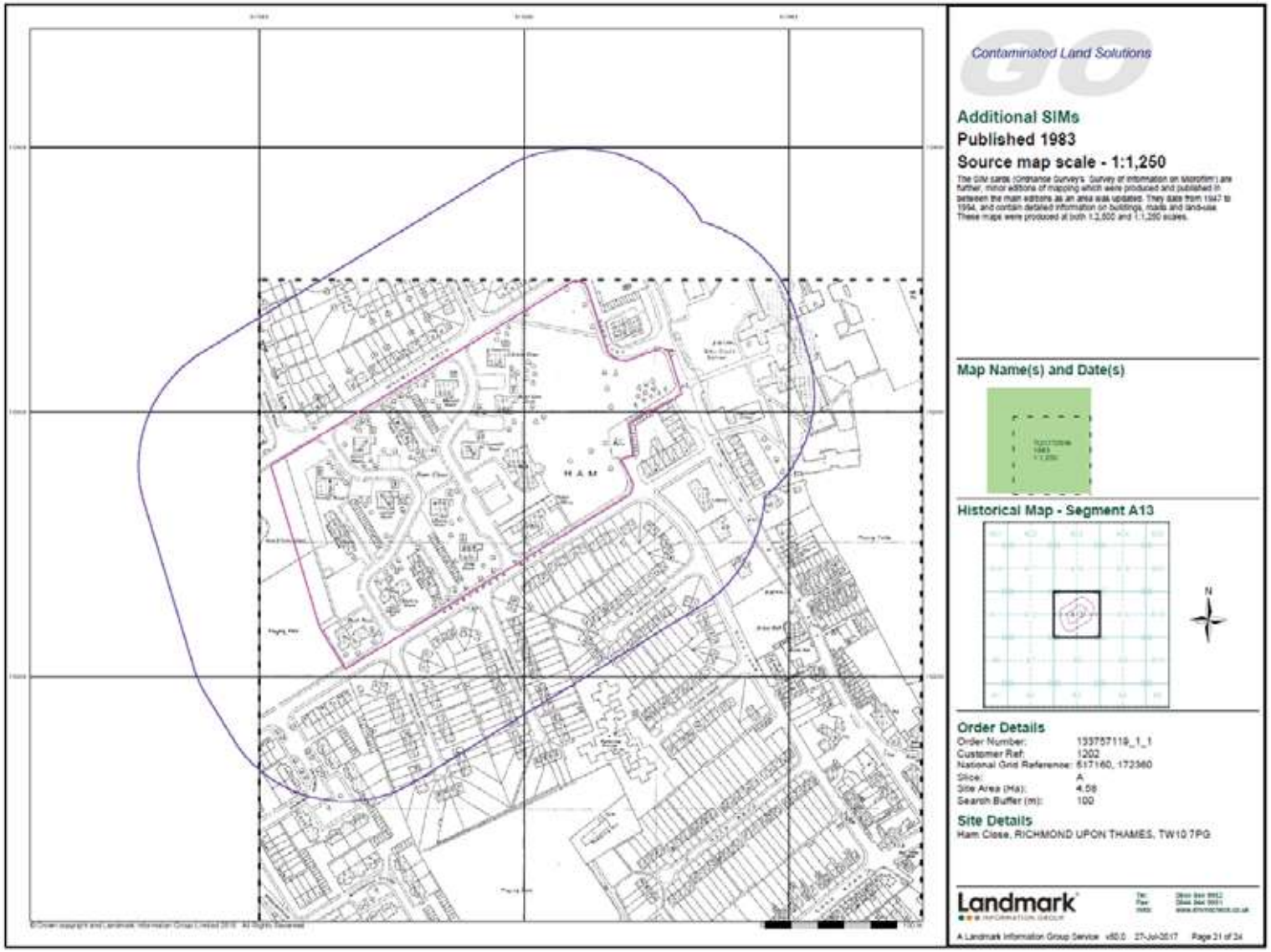
9324-P1E-1: Ham Close, Richmond Upon Thames
Richmond Housing Partnership



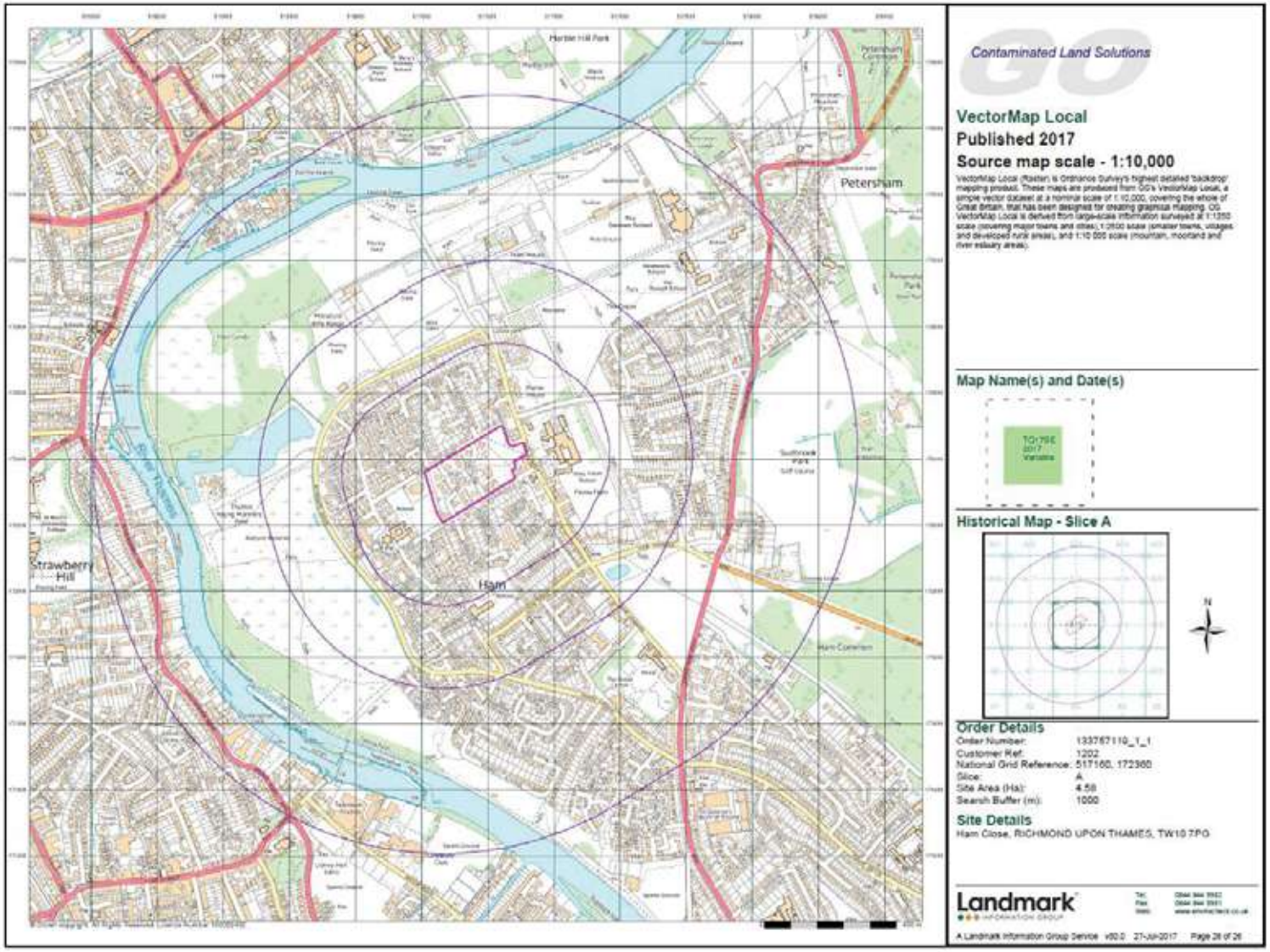
9324-P1E-1: Ham Close, Richmond Upon Thames
Richmond Housing Partnership



9324-P1E-1: Ham Close, Richmond Upon Thames
Richmond Housing Partnership



9324-P1E-1: Ham Close, Richmond Upon Thames
Richmond Housing Partnership



9324-P1E-1: Ham Close, Richmond Upon Thames
Richmond Housing Partnership

Appendix E – Owner's Questionnaire

Questionnaire, for completion by current or previous owner or manager, please enter Not Known where you are unable to provide an answer.

Ham Close, Richmond upon Thames, TW10 7PG

I have owned/managed* the above site from .2000..... to .....current.....
*(*delete as appropriate)*

Existing site & property details:

Site use:	Mainly residential Youth club/ clinic/ dentist
Number of Buildings:	14 residential blocks
Building 'A', Nature of Use: (insert lines as required)	residential
Date of Construction	1960's
Land Area (ha):	
Current Tenants:	192 units
Any asbestos containing materials?	Likely due to age of construction
Asbestos Survey available?	no
Any archaeological, geotechnical or environmental reports?	no

Current site utilities:

Commercial/Household Waste Disposal	
Sewage Discharge and Disposal	*to main drainage, yes/no, if other please specify*
Surface Water Drainage	*to main drainage/soakaway, if other please specify*
Source of heating and cooling	*Individual mains gas/electric*
Wells?	no
Septic System?	no

Historical site activities (if answered 'yes', please provide details):

Are you aware of any other past use of the site?	no
Are you aware of any other past use of adjacent areas?	Not to our knowledge
Has anything been buried on or within 250m of the site?	Not to our knowledge
Have any chemicals been stored on or within 250m of the site?	Not to our knowledge
Have any potentially contaminating processes been undertaken either on or within 250m of the site?	Not to our knowledge
Has there been any oil or fuel storage on or within 250m of the site?	Not to our knowledge
Has any fill material been deposited on or within 250m of the site?	Not to our knowledge
Have any animals been kept on site?	Maybe, as originally farmland (approx. 100 years ago)

Signed..... Date.....01 Aug 2017.....

Name...Tracey Elliott.....

Company....RHP.....

Appendix F – Contacts

Local Authority	Environmental Health London Borough of Richmond upon Thames 4 Waldegrave Road, Teddington, Middlesex, TW11 8EN	www.richmond.gov.uk Simon.makoni@richmond.gov.uk
Environment Agency	National Customer Contact Centre PO Box 544 Rotherham S60 1BY	08708 506 506 enquiries@environment-agency.gov.uk
Coal Authority	Mining Reports Office 200 Lichfield Lane Berry Hill, Mansfield Notts, HG18 4RG	www.coalminingreports.co.uk
Health Protection Agency, Radiation Protection Division	Chilton Didcot Oxon, OX11 0RQ	01235 822622 radon@hpa.org.uk www.hpa.org.uk/radiation

a) This report has been prepared for the purpose of providing advice to the client pursuant to its appointment of Chelmer Site Investigation Laboratories Limited (CSI) to act as a consultant.
b) Save for the client no duty is undertaken or warranty or representation made to any party in respect of the opinions, advice, recommendations or conclusions herein set out.
c) All work carried out in preparing this report has used, and is based upon, our professional knowledge and understanding of the current relevant English and European Community standards, approved codes of practice, technology and legislation.
d) Changes in the above may cause the opinion, advice, recommendations or conclusions set out in this report to become inappropriate or incorrect. However, in giving its opinions, advice, recommendations and conclusions, CSI has considered pending changes to environmental legislation and regulations of which it is currently aware. Following delivery of this report, we will have no obligation to advise the client of any such changes, or of their repercussions.
e) CSI acknowledges that it is being retained, in part, because of its knowledge and experience with respect to environmental matters. CSI will consider and analyse all information provided to it in the context of our knowledge and experience and all other relevant information known to us. To the extent that the information provided to us is not inconsistent or incompatible therewith, CSI shall be entitled to rely upon and assume, without independent verification, the accuracy and completeness of such information.
f) The content of this report represents the professional opinion of experienced environmental consultants. CSI does not provide specialist legal advice and the advice of lawyers may be required.
g) In the Summary and Recommendations sections of this report, CSI has set out our key findings and provided a summary and overview of our advice, opinions and recommendations. However, other parts of this report will often indicate the limitations of the information obtained by CSI and therefore any advice, opinions or recommendations set out in the Executive Summary, Summary and Recommendations sections ought not to be relied upon unless they are considered in the context of the whole report.
h) The assessments made in this report are based on the ground conditions as revealed by walkover survey and/or intrusive investigations, together with the results of any field or laboratory testing or chemical analysis undertaken and other relevant data, which may have been obtained including previous site investigations. In any event, ground contamination often exists as small discrete areas of contamination (hot spots) and there can be no certainty that any or all such areas have been located and/or sampled.
i) There may be special conditions appertaining to the site, which have not been taken into account in the report. The assessment may be subject to amendment in light of additional information becoming available.
j) Where any data supplied by the client or from other sources, including that from previous site investigations, have been used it has been assumed that the information is correct. No responsibility can be accepted by CSI for inaccuracies within the data supplied by other parties.
k) Whilst the report may express an opinion on possible ground conditions between or beyond trial pit or borehole locations, or on the possible presence of features based on either visual, verbal or published evidence this is for guidance only and no liability can be accepted for the accuracy thereof.
l) Comments on groundwater conditions are based on observations made at the time of the investigation unless otherwise stated. Groundwater conditions may vary due to seasonal or other effects.
m) This report is prepared and written in the context of the agreed scope of work and should not be used in a different context. Furthermore, new information, improved practices and changes in legislation may necessitate a reinterpretation of the report in whole or part after its original submission.
n) The copyright in the written materials shall remain the property of the CSI but with a royalty-free perpetual license to the client deemed to be granted on payment in full to CSI by the client of the outstanding amounts.
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p) This report is issued on the condition that CSI will under no circumstances be liable for any loss arising directly or indirectly from subsequent information arising but not presented or discussed within the current Report.
q) In addition CSI will not be liable for any loss whatsoever arising directly or indirectly from any opinion within this report.

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Fax: 01454 269760
Web: www.enzygo.com

Site				
Richmond				**WS1**
Job No: CRM.1027.087	Dates: Start 28-04-21, Finish 28-04-21	Ground Level (m)	Co-Ordinates	
Client: Hill Partnership				Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		0.20 - 0.40	ES					MADE GROUND: Grass over multicoloured (brown to light brown and light black) clayey to very clayey occasionally gravelly fine SAND. Gravel is subangular and subrounded, fine to coarse flint, tarmac, brick and ash.
					0.45			
								Brown sandy CLAY. Sand is fine.
					0.70			
								Brown clayey fine to medium SAND.
		0.90 - 1.00	D					
		1.00 - 1.45	SPT	C 7				1.00 - 1.45 Loose.
					1.30			
								Light brown slightly clayey fine to medium SAND.
		1.90 - 2.00	D					
		2.00 - 2.45	SPT	C 11				
					2.20			
								Brown to light brown very sandy CLAY. Sand is fine.
					2.60			
								Light brown slightly clayey gravelly fine to medium SAND. Gravel is angular medium flint.
		2.90 - 3.00	D					
		3.00 - 3.45	SPT	C 56	3.00			
								Light brown slightly clayey gravelly fine to medium SAND. Gravel is angular medium flint.
								3.00 - 3.45 Very dense, refused.
					3.45			
								Borehole completed at 3.45m.
					{4.00}			

0 1 2 3 4

General Remarks

EQUIPMENT: Archway compact window sampling tracked rig.
METHOD: Hand dug inspection pit 0.00m-1.00m begl. Dynamic sampled 1.00m-3.00m begl.
CASING: Not used.
GROUNDWATER: Groundwater not encountered.
BACKFILL: On completion, the borehole was backfilled with arisings.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:25

Logged By: KC

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Site				
Richmond				**WS2**
Job No: CRM.1027.087	Dates: Start 27-04-21, Finish 27-04-21	Ground Level (m)	Co-Ordinates	
Client: Hill Partnership				Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		0.20 - 0.40	ES		0.20			MADE GROUND: Grass over multicoloured (brown to light brown and light black) clayey to very clayey very gravelly fine SAND. Gravel is subangular and subrounded, fine to coarse flint, ash and brick. 0.00 - 1.80 With roots.
					0.45			MADE GROUND: Brown to black clayey very gravelly fine SAND. Gravel is angular fine to coarse flint, ash and clinker.
		0.90 - 1.00	D					Brown sandy CLAY. Sand is fine.
		1.00 - 1.45	SPT	C 14				
					1.40			Brown clayey fine SAND.
					1.80			
		1.90 - 2.00	D					Multicoloured (light brown to light grey and very light orange) clayey to locally slightly clayey, occasionally gravelly fine to coarse SAND. Gravel is rounded and subrounded fine flint. 2.00 - 2.45 Medium dense.
		2.00 - 2.45	SPT	C 29				
		2.90 - 3.00	D					
		3.00 - 3.45	SPT	C 53	3.00			Multicoloured (light brown to light grey and very light orange) clayey to locally slightly clayey, occasionally gravelly fine to coarse SAND. Gravel is rounded and subrounded fine flint. 3.00 - 3.45 Very dense, refused.
					3.45			Borehole completed at 3.45m.
					{4.00}			

0 1 2 3 4

General Remarks

EQUIPMENT: Archway compact window sampling tracked rig.
METHOD: Hand dug inspection pit 0.00m-1.00m begl. Dynamic sampled 1.00m-3.00m begl.
CASING: Not used.
GROUNDWATER: Groundwater not encountered.
BACKFILL: On completion, the borehole was backfilled with arisngs.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:25

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Site: Richmond

WS4

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 27-04-21 Finish 27-04-21		

Client: Hill Partnership

Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		0.20 - 0.40	ES					MADE GROUND: Grass over multicoloured (brown to light brown and light black) clayey to very clayey occasionally gravelly fine SAND. Gravel is subangular and subrounded, fine to coarse flint, brick and ash.
					0.70			Brown CLAY.
		0.90 - 1.00	D					
		1.00 - 1.45	SPT	C 22				1.00 - 1.45 Stiff, high strength.
					1.50			Multicoloured (light orange brown to light grey) gravelly fine to coarse SAND. Gravel is angular coarse flint.
		1.90 - 2.00	D					
		2.00 - 2.45	SPT	C 50	2.00			Multicoloured (light orange brown to light grey) gravelly fine to coarse SAND. Gravel is angular coarse flint.
								2.00 - 2.45 Very dense. Refused at 2.45m begl.
					2.45			Borehole completed at 2.45m.
					{4.00}			

0 1 2 3 4

General Remarks

EQUIPMENT: Archway compact window sampling tracked rig.
METHOD: Hand dug inspection pit 0.00m-1.00m begl. Dynamic sampled 1.00m-2.00m begl.
CASING: Not used.
GROUNDWATER: Groundwater not encountered.
BACKFILL: On completion, the borehole was backfilled with arisings.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:25

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Site				WS5
Richmond				
Job No: CRM.1027.087	Dates: Start 27-04-21, Finish 27-04-21	Ground Level (m)	Co-Ordinates	
Client: Hill Partnership				Sheet: 1 of 2

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		0.20 - 0.40	ES		0.20			MADE GROUND: Grass over multicoloured (brown to light brown and light black) clayey to very clayey very gravelly fine SAND. Gravel is subangular and subrounded, fine to coarse flint, ash and brick.
					0.45			MADE GROUND: Brown to black clayey very gravelly fine SAND. Gravel is angular fine to coarse flint, ash and clinker.
		0.90 - 1.00	D					Brown to light brown clayey very occasionally gravelly fine SAND. Gravel is subrounded fine flint.
		1.00 - 1.45	SPT	C 8				1.00 - 1.45 Loose.
					1.60			Multicoloured (light brown to light grey and very light orange) clayey to locally slightly clayey, occasionally gravelly fine to coarse SAND. Gravel is rounded and subrounded fine flint.
		1.90 - 2.00	D					
		2.00 - 2.45	SPT	C 24				2.00 - 2.45 Medium dense.
	▽							
		2.90 - 3.00	D					
		3.00 - 3.45	SPT	C 24				3.00 - 3.45 Medium dense.
		3.90 - 4.00	D					
		4.00 - 4.45	SPT	C 51	4.00 {4.00}			Continued next sheet

0 1 2 3 4

General Remarks

EQUIPMENT: Archway compact window sampling tracked rig.
METHOD: Hand dug inspection pit 0.00m-1.00m begl. Dynamic sampled 1.00m-4.00m begl.
CASING: Not used.
GROUNDWATER: Groundwater encountered at 2.20m begl.
BACKFILL: On completion, a slotted pipe (50mm) was installed to 3.50m begl, granular response zone (3.50m-0.50m), bentonite seal 0.50m-0.10m, flush steel cover 0.10m-0.00m.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)
27/04/21	2.20		

All dimensions in metres
Scale 1:25

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Site				
Richmond				**WS5**
Job No: CRM.1027.087	Dates: Start 27-04-21, Finish 27-04-21	Ground Level (m)	Co-Ordinates	
Client: Hill Partnership				Sheet: 2 of 2

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
								Multicoloured (light brown to light grey and very light orange) clayey to locally slightly clayey, occasionally gravelly fine to coarse SAND. Gravel is rounded and subrounded fine flint.
								4.00 - 4.45 Very dense, refused.
					4.45			Borehole completed at 4.45m.
					{8.00}			

General Remarks

EQUIPMENT: Archway compact window sampling tracked rig.
METHOD: Hand dug inspection pit 0.00m-1.00m begl. Dynamic sampled 1.00m-4.00m begl.
CASING: Not used.
GROUNDWATER: Groundwater encountered at 2.20m begl.
BACKFILL: On completion, a slotted pipe (50mm) was installed to 3.50m begl, granular response zone (3.50m-0.50m), bentonite seal 0.50m-0.10m, flush steel cover 0.10m-0.00m.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:25

Logged By: KC

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Site				
Richmond				**WS6**
Job No: CRM.1027.087	Dates: Start 27-04-21, Finish 27-04-21	Ground Level (m)	Co-Ordinates	
Client: Hill Partnership				Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		0.20 - 0.40	ES		0.15			MADE GROUND: Grass over multicoloured (brown to light brown and light black) clayey to very clayey very gravelly fine SAND. Gravel is subangular and subrounded, fine to coarse flint and brick.
								MADE GROUND: Multicoloured (brown to light brown and light black) clayey to very clayey very gravelly fine SAND with asbestos fibres and cast iron pieces. Gravel is subangular and subrounded, fine to coarse flint and ash.
					0.60			Brown to light brown occasionally gravelly sand CLAY. Gravel is subrounded fine flint. Sand is fine.
		0.90 - 1.00	D					
		1.00 - 1.45	SPT	C 9				1.00 - 1.45 Firm, low strength.
					1.70			Pale orange yellow slightly gravelly fine to coarse SAND, mostly fine. Gravel is subangular and subrounded fine flint.
		1.90 - 2.00	D					
		2.00 - 2.45	SPT	C 34				2.00 - 2.45 Dense.
		2.50 - 2.60	D					
		2.60 - 2.98	SPT	C 53	2.60			2.60 Sampler barrel refused.
								2.60 - 2.98 Very dense, refused. Pale orange yellow slightly gravelly fine to coarse SAND, mostly fine. Gravel is subangular and subrounded fine flint.
					2.98			Borehole completed at 2.98m.
					{4.00}			

0 1 2 3 4

General Remarks

EQUIPMENT: Archway compact window sampling tracked rig.
METHOD: Hand dug inspection pit 0.00m-1.00m begl. Dynamic sampled 1.00m-2.60m begl.
CASING: Not used.
GROUNDWATER: Groundwater not encountered.
BACKFILL: On completion, a slotted pipe (50mm) was installed to 2.50m begl, granular response zone (2.50m-0.50m), bentonite seal 0.50m-0.10m, flush steel cover 0.10m-0.00m.

Groundwater	Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres Scale 1:25		Logged By KC

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Site: Richmond

WS7

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 27-04-21 Finish 27-04-21		

Client: Hill Partnership

Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		0.20 - 0.40	ES					MADE GROUND: Grass over multicoloured (brown to light brown and light black) occasionally gravelly clayey to very clayey fine SAND with glass fragments. Gravel is subangular and subrounded, fine to coarse flint, brick and ash.
					0.55			Dark brown to brown occasionally gravelly CLAY. Gravel is subangular medium flint.
		0.90 - 1.00	D					
		1.00 - 1.45	SPT	C 16	1.00			1.00 - 1.45 Medium dense. Brown to light grey brown clayey very gravelly fine SAND. Gravel is angular and subrounded, fine to medium flint.
					1.70			Very light green to very light brown very slightly clayey fine SAND.
		1.90 - 2.00	D					
		2.00 - 2.45	SPT	C 53	2.00			Very light green to very light brown very slightly clayey fine SAND. 2.00 - 2.45 Very dense, refused.
					2.45			Borehole completed at 2.45m.
					{4.00}			

0 1 2 3 4

General Remarks

EQUIPMENT: Archway compact window sampling tracked rig.
METHOD: Hand dug inspection pit 0.00m-1.00m begl. Dynamic sampled 1.00m-2.00m begl.
CASING: Not used.
GROUNDWATER: Groundwater not encountered.
BACKFILL: On completion, a slotted pipe (50mm) was installed to 2.00m begl, granular response zone (2.00m-0.50m), bentonite seal 0.50m-0.10m, flush steel cover 0.10m-0.00m.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:25

Logged By: KC

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Site: Richmond

WS8

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 27-04-21 Finish 27-04-21		

Client: Hill Partnership

Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		0.20 - 0.40	D ES		0.15			MADE GROUND: Grass over multicoloured (brown to light brown and light black) clayey to very clayey very gravelly fine SAND. Gravel is subangular and subrounded, fine to coarse flint and brick.
					0.40			MADE GROUND: Multicoloured (brown to light brown and light black) clayey to very clayey very gravelly fine SAND with asbestos fibres. Gravel is subangular and subrounded, fine to coarse flint, ash, and brick.
								Brown to light grey brown clayey fine SAND.
		0.90 - 1.00	D					
		1.00 - 1.45	SPT	C 9				1.00 - 1.45 Loose.
					1.70			Very light green to very light brown very slightly clayey occasionally gravelly fine SAND. Gravel is subrounded fine flint.
		1.90 - 2.00	D					
		2.00 - 2.45	SPT	C 51	2.00			Very light green to very light brown very slightly clayey occasionally gravelly fine SAND. Gravel is subrounded fine flint.
								2.00 - 2.45 Very dense, refused.
					2.45			Borehole completed at 2.45m.
					{4.00}			

0 1 2 3 4

General Remarks

EQUIPMENT: Archway compact window sampling tracked rig.
METHOD: Hand dug inspection pit 0.00m-1.00m begl. Dynamic sampled 1.00m-2.00m begl.
CASING: Not used.
GROUNDWATER: Groundwater not encountered.
BACKFILL: On completion, the borehole was backfilled with arisings.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:25

Logged By: KC

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Web: www.enzygo.com

Site: Richmond

WS9

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 28-04-21 Finish 28-04-21		

Client: Hill Partnership

Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		0.20 - 0.40	ES					MADE GROUND: Grass over multicoloured (brown to light brown and light black) clayey to very clayey occasionally gravelly fine SAND. Gravel is subangular and subrounded, fine to coarse flint, brick and ash.
					0.40			Brown CLAY.
		0.90 - 1.00	D		0.90			Brown very clayey fine SAND.
		1.00 - 1.45	SPT	C 12				1.00 - 1.45 Medium dense.
					1.50			Multicoloured (light brown to light grey and very light orange) clayey to locally slightly clayey occasionally gravelly fine to coarse SAND. Gravel is rounded and subrounded fine flint.
		1.90 - 2.00	D					
		2.00 - 2.45	SPT	C 51	2.00			Multicoloured (light brown to light grey and very light orange) clayey to locally slightly clayey occasionally gravelly fine to coarse SAND. Gravel is rounded and subrounded fine flint. 2.00 - 2.45 Very dense, refused.
					2.45			Borehole completed at 2.45m.
					{4.00}			

0 1 2 3 4

General Remarks

EQUIPMENT: Archway compact window sampling tracked rig.
METHOD: Hand dug inspection pit 0.00m-1.00m begl. Dynamic sampled 1.00m-2.00m begl.
CASING: Not used.
GROUNDWATER: Groundwater not encountered.
BACKFILL: On completion, a slotted pipe (50mm) was installed to 2.00m begl, granular response zone (2.00m-0.50m), bentonite seal 0.50m-0.10m, flush steel cover 0.10m-0.00m.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:25

Logged By: KC

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Site: Richmond

WS10

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 29-04-21 Finish 29-04-21		

Client: Hill Partnership

Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		0.20 - 0.40	B ES		0.15			MADE GROUND: Grass over multicoloured (brown to light brown and light black) clayey to very clayey very occasionally gravelly fine SAND. Gravel is subangular and subrounded, fine to coarse flint, brick and ash.
								MADE GROUND: Multicolored (brown to red to light grey) sandy gravelly CLAY. Gravel is angular, fine to coarse flint, brick, concrete and ash. Sand is fine.
					0.60			Brown CLAY.
		0.90 - 1.00	D					
		1.00 - 1.45	SPT	C 28				
					1.10			Multicoloured (light orange brown to light grey) gravelly fine to coarse SAND. Gravel is angular coarse flint.
		1.50 - 1.60	D					
		1.60 - 2.05	SPT	C 52	1.60			1.60 Sampler barrel refused.
								1.60 - 2.05 Very dense, refused. Multicoloured (light orange brown to light grey) gravelly fine to coarse SAND. Gravel is angular coarse flint.
					2.05			Borehole completed at 2.05m.
					{4.00}			

0 1 2 3 4

General Remarks

EQUIPMENT: Archway compact window sampling tracked rig.
METHOD: Hand dug inspection pit 0.00m-1.00m begl. Dynamic sampled 1.00m-1.60m begl.
CASING: Not used.
GROUNDWATER: Groundwater not encountered.
BACKFILL: On completion, the borehole was backfilled with arisings.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:25

Logged By: KC

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Site: Richmond

WS11

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 28-04-21 Finish 28-04-21		

Client: Hill Partnership

Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		0.20 - 0.40	ES					MADE GROUND: Grass over multicoloured (brown to light brown and light black) clayey to very clayey occasionally gravelly fine SAND. Gravel is subangular and subrounded, fine to coarse flint, brick and ash.
					0.50			Brown sandy CLAY. Sand is fine.
		0.90 - 1.00	D					
		1.00 - 1.45	SPT	C 12				
					1.20			Brown clayey fine to medium SAND.
					1.70			Multicoloured (light brown to light grey and very light orange) clayey to locally slightly clayey occasionally gravelly fine to coarse SAND. Gravel is rounded and subrounded fine flint.
		1.90 - 2.00	D					
		2.00 - 2.45	SPT	C 50	2.00			Multicoloured (light brown to light grey and very light orange) clayey to locally slightly clayey occasionally gravelly fine to coarse SAND. Gravel is rounded and subrounded fine flint. 2.00 - 2.45 Very dense. Refused at 2.45m begl.
					2.45			Borehole completed at 2.45m.
					{4.00}			

0 1 2 3 4

General Remarks

EQUIPMENT: Archway compact window sampling tracked rig.
METHOD: Hand dug inspection pit 0.00m-1.00m begl. Dynamic sampled 1.00m-2.00m begl.
CASING: Not used.
GROUNDWATER: Groundwater not encountered.
BACKFILL: On completion, the borehole was backfilled with arisings.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:25

Logged By: KC

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Site				
Richmond				**WS12**
Job No: CRM.1027.087	Dates: Start 29-04-21, Finish 29-04-21	Ground Level (m)	Co-Ordinates	
Client: Hill Partnership				Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		0.20 - 0.40	ES		0.20			MADE GROUND: Grass over multicoloured (brown to light brown and light black) very clayey very occasionally gravelly fine SAND. Gravel is subangular and subrounded, fine to coarse flint, brick and ash.
					0.60			MADE GROUND: Multicolored (brown to red to light grey) sandy gravelly CLAY. Gravel is angular, fine to coarse flint, brick, concrete and ash. Sand is fine.
		0.90 - 1.00	D					Brown CLAY.
		1.00 - 1.45	SPT	C 12				1.00 - 1.45 Firm, medium strength.
					1.50			Multicoloured (light orange brown to light grey) gravelly fine to coarse SAND. Gravel is angular coarse flint.
		1.90 - 2.00	D					
		2.00 - 2.45	SPT	C 15				2.00 - 2.45 Medium dense.
								2.70 - 3.00 Becoming very gravelly.
		2.90 - 3.00	D					
		3.00 - 3.45	SPT	C 53	3.00			Multicoloured (light orange brown to light grey) gravelly fine to coarse SAND. Gravel is angular coarse flint.
								3.00 - 3.45 Very dense, refused.
					3.45			Borehole completed at 3.45m.
					{4.00}			

0 1 2 3 4

General Remarks

EQUIPMENT: Archway compact window sampling tracked rig.
METHOD: Hand dug inspection pit 0.00m-1.00m begl. Dynamic sampled 1.00m-3.00m begl.
CASING: Not used.
GROUNDWATER: Groundwater not encountered.
BACKFILL: On completion, the borehole was backfilled with arisngs.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:25

Logged By: KC

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Site: Richmond

WS13

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 29-04-21 Finish 29-04-21		

Client: Hill Partnership

Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		0.20 - 0.40	ES		0.20			MADE GROUND: Grass over multicoloured (brown to light brown and light black) very clayey very occasionally gravelly fine SAND. Gravel is subangular and subrounded, fine to coarse flint, brick and ash.
								MADE GROUND: Multicolored (brown to red to light grey) sandy gravelly CLAY. Gravel is angular, fine to coarse flint, brick, concrete and ash. Sand is fine.
					0.65			Brown CLAY.
		0.90 - 1.00	D					
		1.00 - 1.45	SPT	C 50	1.00			Brown CLAY. 1.00 - 1.45 Very stiff, very high strength. Refused at 1.45m begl.
					1.45			Borehole completed at 1.45m.
					{4.00}			

0 1 2 3 4

General Remarks

EQUIPMENT: Archway compact window sampling tracked rig.
METHOD: Hand dug inspection pit 0.00m-1.00m begl.
CASING: Not used.
GROUNDWATER: Groundwater not encountered.
BACKFILL: On completion, the borehole was backfilled with arisings.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:25

Logged By: KC

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Site: Richmond

WS14

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 28-04-21 Finish 28-04-21		

Client: Hill Partnership

Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		0.20 - 0.40	ES					MADE GROUND: Grass over multicoloured (brown to light brown and light black) clayey to very clayey occasionally gravelly fine SAND. Gravel is subangular and subrounded, fine to coarse flint, brick and ash.
					0.50			Brown sandy CLAY. Sand is fine.
		0.90 - 1.00	D					
		1.00 - 1.45	SPT	C 10				
					1.20			Brown clayey fine to medium SAND.
					1.70			Multicoloured (light brown occasionally Light green to cream) clayey gravelly fine SAND. Gravel is subangular fine flint.
		1.90 - 2.00	D					
		2.00 - 2.45	SPT	C 50	2.00			Multicoloured (light brown occasionally Light green to cream) clayey gravelly fine SAND. Gravel is subangular fine flint. 2.00 - 2.45 Very dense. Refused at 2.45m begl.
					2.45			Borehole completed at 2.45m.
					{4.00}			

0 1 2 3 4

General Remarks

EQUIPMENT: Archway compact window sampling tracked rig.
METHOD: Hand dug inspection pit 0.00m-1.00m begl. Dynamic sampled 1.00m-2.00m begl.
CASING: Not used.
GROUNDWATER: Groundwater not encountered.
BACKFILL: On completion, a slotted pipe (50mm) was installed to 2.00m begl, granular response zone (2.00m-0.50m), bentonite seal 0.50m-0.10m, flush steel cover 0.10m-0.00m.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:25

Logged By: KC

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Site: Richmond

WS15

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 27-04-21 Finish 27-04-21		

Client: Hill Partnership

Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		0.20 - 0.40	ES		0.15			MADE GROUND: Grass over multicoloured (brown to light brown and light black) clayey to very clayey very gravelly fine SAND. Gravel is subangular and subrounded, fine to coarse flint and brick.
					0.40			MADE GROUND: Multicoloured (brown to light brown and light black) clayey to very clayey occasionally cobbly very gravelly fine SAND. Gravel is subangular and subrounded, fine to coarse flint, ash, brick, and occasional cobble of brick.
					0.70			MADE GROUND: Brown very clayey fine SAND with occasional coarse sand-sized brick and ash.
		0.90 - 1.00	D					Brown to light grey brown clayey very gravelly fine SAND. Gravel is angular and subrounded, fine to medium flint.
		1.00 - 1.45	SPT	C 9				1.00 - 1.45 Loose.
					1.70			Very light green to very light brown very slightly clayey occasionally gravelly fine SAND. Gravel is subrounded fine flint.
		1.90 - 2.00	D					
		2.00 - 2.45	SPT	C 55	2.00			Very light green to very light brown very slightly clayey occasionally gravelly fine SAND. Gravel is subrounded fine flint.
								2.00 - 2.45 Very dense, refused.
					2.45			Borehole completed at 2.45m.
					{4.00}			

0 1 2 3 4

General Remarks

EQUIPMENT: Archway compact window sampling tracked rig.
METHOD: Hand dug inspection pit 0.00m-1.00m begl. Dynamic sampled 1.00m-2.00m begl.
CASING: Not used.
GROUNDWATER: Groundwater not encountered.
BACKFILL: On completion, the borehole was backfilled with arisings.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:25

Logged By: KC

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Site				
Richmond				**WS16**
Job No: CRM.1027.087	Dates: Start 28-04-21, Finish 28-04-21	Ground Level (m)	Co-Ordinates	
Client: Hill Partnership				Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		0.20 - 0.40	ES					MADE GROUND: Grass over multicoloured (brown to light brown and light black) clayey to very clayey occasionally gravelly fine SAND. Gravel is subangular and subrounded, fine to coarse flint, brick and ash.
					0.50			
								Brown sandy CLAY. Sand is fine.
					0.80			
		0.90 - 1.00	D					Brown clayey fine to medium SAND.
		1.00 - 1.45	SPT	C 8				1.00 - 1.45 Loose.
					1.70			
		1.90 - 2.00	D					Light brown to very light green very slightly clayey very occasionally gravelly fine SAND. Gravel is subangular fine flint.
		2.00 - 2.45	SPT	C 29				2.00 - 2.45 Medium dense.
					2.20			
								Multicoloured (light brown to light grey and very light orange) clayey to locally slightly clayey occasionally gravelly fine to coarse SAND. Gravel is rounded and subrounded fine flint.
		2.90 - 3.00	D					
		3.00 - 3.45	SPT	C 50	3.00			
								Multicoloured (light brown to light grey and very light orange) clayey to locally slightly clayey occasionally gravelly fine to coarse SAND. Gravel is rounded and subrounded fine flint.
								3.00 - 3.45 Very dense. Refused at 3.45m begl.
					3.45			
								Borehole completed at 3.45m.
					{4.00}			

0 1 2 3 4

General Remarks

EQUIPMENT: Archway compact window sampling tracked rig.
METHOD: Hand dug inspection pit 0.00m-1.00m begl. Dynamic sampled 1.00m-3.00m begl.
CASING: Not used.
GROUNDWATER: Groundwater not encountered.
BACKFILL: On completion, a slotted pipe (50mm) was installed to 3.00m begl, granular response zone (3.00m-1.00m), bentonite seal 1.00m-0.10m, flush steel cover 0.10m-0.00m.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:25

Logged By: KC

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Site: Richmond

WS17

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 27-04-21 Finish 27-04-21		

Client: Hill Partnership

Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		0.20 - 0.40	ES					MADE GROUND: Grass over multicoloured (brown to light brown and light black) clayey to very clayey very gravelly fine SAND. Gravel is subangular and subrounded, fine to coarse flint, ash and brick.
					0.40			MADE GROUND: Multicoloured (brown to light brown occasionally light grey) occasionally gravelly slightly to very sandy CLAY with sewer pipe fragments. Gravel is subangular and subrounded medium flint, brick, and ash, Sand is fine.
		0.90 - 1.00	D					
		1.00 - 1.45	SPT	C 7				1.00 - 1.45 Soft, low strength.
					1.20			Brown sandy CLAY. Sand is fine.
					1.60			Multicoloured (light brown to light grey and very light orange) clayey to locally slightly clayey, occasionally gravelly fine to coarse SAND. Gravel is rounded and subrounded fine flint.
		1.90 - 2.00	D					
		2.00 - 2.45	SPT	C 15				2.00 - 2.45 Medium dense.
		2.90 - 3.00	D					
		3.00 - 3.45	SPT	C 50	3.00			Multicoloured (light brown to light grey and very light orange) clayey to locally slightly clayey, occasionally gravelly fine to coarse SAND. Gravel is rounded and subrounded fine flint.
								3.00 - 3.45 Very dense. Refused at 3.45m begl.
					3.45			Borehole completed at 3.45m.
					{4.00}			

0 1 2 3 4

General Remarks

EQUIPMENT: Archway compact window sampling tracked rig.
METHOD: Hand dug inspection pit 0.00m-1.00m begl. Dynamic sampled 1.00m-3.00m begl.
CASING: Not used.
GROUNDWATER: Groundwater not encountered.
BACKFILL: On completion, the borehole was backfilled with arisings.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:25

Logged By: KC

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Tel: 01454 269237
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Web: www.enzygo.com

Site: Richmond

WS18

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 27-04-21 Finish 27-04-21		

Client: Hill Partnership

Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		0.20 - 0.40	ES					MADE GROUND: Grass over multicoloured (brown to light brown and light black) clayey to very clayey very gravelly fine SAND. Gravel is subangular and subrounded, fine to coarse flint, ash and brick.
					0.45			Brown sandy CLAY. Sand is fine.
		0.90 - 1.00	D					
		1.00 - 1.45	SPT	C 10				
					1.20			Brown clayey fine to medium SAND.
					1.70			Multicoloured (brown to light brown and light grey) clayey very gravelly medium to coarse SAND. Gravel is subrounded fine flint.
		1.90 - 2.00	D					
		2.00 - 2.45	SPT	C 13	2.00			2.00 - 2.45 Medium dense. Multicoloured (light brown to light grey and very light orange) clayey to locally slightly clayey, occasionally gravelly fine to coarse SAND. Gravel is rounded and subrounded fine flint.
		2.90 - 3.00	D					
		3.00 - 3.45	SPT	C 51	3.00			Multicoloured (light brown to light grey and very light orange) clayey to locally slightly clayey, occasionally gravelly fine to coarse SAND. Gravel is rounded and subrounded fine flint. 3.00 - 3.45 Very dense, refused.
					3.45			Borehole completed at 3.45m.
					{4.00}			

0 1 2 3 4

General Remarks

EQUIPMENT: Archway compact window sampling tracked rig.
METHOD: Hand dug inspection pit 0.00m-1.00m begl. Dynamic sampled 1.00m-3.00m begl.
CASING: Not used.
GROUNDWATER: Groundwater not encountered.
BACKFILL: On completion, a slotted pipe (50mm) was installed to 3.00m begl, granular response zone (3.00m-1.00m), bentonite seal 1.00m-0.10m, flush steel cover 0.10m-0.00m.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:25

Logged By: KC

Enzygo Ltd
Tel: 01454 269237
Fax: 01454 269760
Web: www.enzygo.com

Site: Ashburnham Road, Richmond

BH1

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 16-08-21 Finish 17-08-21		

Client: Hill Partnership Ltd

Sheet: 1 of 4

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
					0.00			MADE GROUND: Grass over firm brown slightly sandy slightly gravelly CLAY. Gravel is subnagular and fine of brick and flint.
					0.60			Firm brown to light brown very sandy slightly gravelly CLAY. Gravel is subnaguar and coarse of flint.
		1.50 - 1.95	SPT	23	1.60			Medium dense to dense light brown slightly clayey slightly gravelly medium and coarse SAND. Gravel is angular and subangular coarse of flint.
		3.00 - 3.45	SPT	22				
	▽	4.50 - 4.95	SPT	21				
		5.00	D					
					5.40			Stiff greyish brown slightly gravelly CLAY. Gravel is angular and coarse of claystone. Note: Groundwater encountered at 4.3 m bgl.
		6.00 - 6.45	SPT	11				
		7.50 - 7.95	SPT	18				
					{8.00}			Continued next sheet

0 1 2 3 4 5 6 7 8

General Remarks

Cable Percussive Borehole advanced from ground level to 25.0 m bgl. No services encountered. Groundwater encountered at 4.3 m bgl. Backfilled with arisings upon completion.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)
	4.30		

All dimensions in metres
Scale 1:50

Logged By: KC

Enzygo Ltd
Tel: 01454 269237
Fax: 01454 269760
Web: www.enzygo.com

Site: Ashburnham Road, Richmond

BH1

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 16-08-21 Finish 17-08-21		

Client: Hill Partnership Ltd

Sheet: 2 of 4

Well	Water Levels	Samples & In Situ Testing			Depth (m)	Level (mAD)	Legend	Stratum Description
		Depth (m)	No/Type	Results				
		9.00 - 9.45	SPT	20				
		10.00	D					
		10.50 - 10.95	SPT	30				
		12.00 - 12.45	SPT	25				
		13.50 - 13.95	SPT	28				
		15.00	D	46				
		15.00 - 15.45	SPT					
					{16.00}			Continued next sheet

8 9 10 11 12 13 14 15 16

General Remarks

Cable Percussive Borehole advanced from ground level to 25.0 m bgl. No services encountered. Groundwater encountered at 4.3 m bgl. Backfilled with arisings upon completion.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:50

Logged By: KC

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Web: www.enzygo.com

Site: Ashburnham Road, Richmond

BH1

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 16-08-21 Finish 17-08-21		

Client: Hill Partnership Ltd

Sheet: 3 of 4

Well	Water Levels	Samples & In Situ Testing			Depth (m)	Level (mAD)	Legend	Stratum Description
		Depth (m)	No/Type	Results				
		16.50 - 16.95	SPT	29				
		18.00 - 18.45	SPT	37				
		19.50 - 19.95	SPT	37				
		20.00	D					
		21.00 - 21.45	SPT	37				
		22.50 - 22.95	SPT	39				
		24.00 - 24.45	SPT	41	{24.00}			Continued next sheet

16 17 18 19 20 21 22 23 24

General Remarks

Cable Percussive Borehole advanced from ground level to 25.0 m bgl. No services encountered. Groundwater encountered at 4.3 m bgl. Backfilled with arisings upon completion.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:50

Logged By: KC

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Site: Ashburnham Road, Richmond

BH1

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 16-08-21 Finish 17-08-21		

Client: Hill Partnership Ltd

Sheet: 4 of 4

Well	Water Levels	Samples & In Situ Testing: Depth (m)	Samples & In Situ Testing: No/Type	Samples & In Situ Testing: Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		25.00	D		25.00			Borehole completed at 25.00m.
					{32.00}			

24 25 26 27 28 29 30 31 32

General Remarks

Cable Percussive Borehole advanced from ground level to 25.0 m bgl. No services encountered. Groundwater encountered at 4.3 m bgl. Backfilled with arisings upon completion.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:50

Logged By: KC

Enzygo Ltd
Tel: 01454 269237
Fax: 01454 269760
Web: www.enzygo.com

Site: Ashburnham Road, Richmond

BH2

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 16-08-21 Finish 17-08-21		

Client: Hill Partnership Ltd

Sheet: 1 of 4

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
					0.50			MADE GROUND: Grass over firm brown slightly sandy slightly gravelly CLAY. Gravel is subangular and fine of brick and flint.
								Firm brown and mottled light brown very sandy slightly gravelly CLAY. Gravel is subangular and fine to coarse of flint.
		1.50 - 1.95	SPT	14	1.50			Medium dense to dense light brown slightly clayey slightly sandy medium and coarse SAND. Gravel is angular and subangular medium and coarse of flint. Note: Groundwater encountered at 3.8 m bgl.
		3.00 - 3.45	SPT	41				
	▽							
		4.50 - 4.80	SPT	50				
		5.00	D					
					5.20			Stiff greyish brown slightly gravelly CLAY. Gravel is angular and coarse of claystone.
		6.00 - 6.45	SPT	14				
		7.50 - 7.95	SPT	19				
					{8.00}			Continued next sheet

General Remarks

Cable Percussive Borehole advanced from ground level to 25.0 m bgl. No services encountered. Ground water encountered at 5.0 m bgl. Backfilled with arisings upon completion.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)
	3.80		

All dimensions in metres
Scale 1:50

Logged By: KC

Enzygo Ltd
Tel: 01454 269237
Fax: 01454 269760
Web: www.enzygo.com

Site: Ashburnham Road, Richmond

BH2

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 16-08-21 Finish 17-08-21		

Client: Hill Partnership Ltd

Sheet: 2 of 4

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		9.00 - 9.45	SPT	16				
		10.00	D					
		10.50 - 10.95	SPT	23				
		12.00 - 12.45	SPT	22				
		13.50 - 13.95	SPT	26				
		15.00 15.00 - 15.45	D SPT	25				
					{16.00}			Continued next sheet

8 9 10 11 12 13 14 15 16

General Remarks

Cable Percussive Borehole advanced from ground level to 25.0 m bgl. No services encountered. Ground water encountered at 5.0 m bgl. Backfilled with arisings upon completion.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:50

Logged By: KC

Enzygo Ltd
Tel: 01454 269237
Fax: 01454 269760
Web: www.enzygo.com

Site: Ashburnham Road, Richmond

BH2

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 16-08-21 Finish 17-08-21		

Client: Hill Partnership Ltd

Sheet: 3 of 4

Well	Water Levels	Samples & In Situ Testing			Depth (m)	Level (mAD)	Legend	Stratum Description
		Depth (m)	No/Type	Results				
		16.50 - 16.95	SPT	25				
		18.00 - 18.45	SPT	27				
		19.50 - 19.95	SPT	30				
		20.00	D					
		21.00 - 21.45	SPT	24				
		22.50 - 22.95	SPT	30				
		24.00 - 24.45	SPT	34	{24.00}			Continued next sheet

16 17 18 19 20 21 22 23 24

General Remarks

Cable Percussive Borehole advanced from ground level to 25.0 m bgl. No services encountered. Ground water encountered at 5.0 m bgl. Backfilled with arisings upon completion.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:50

Logged By: KC

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Tel: 01454 269237
Fax: 01454 269760
Web: www.enzygo.com

Site: Ashburnham Road, Richmond

BH2

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 16-08-21 Finish 17-08-21		

Client: Hill Partnership Ltd

Sheet: 4 of 4

Well	Water Levels	Samples & In Situ Testing: Depth (m)	Samples & In Situ Testing: No/Type	Samples & In Situ Testing: Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		25.00	D		25.00			Borehole completed at 25.00m.
					{32.00}			

24 25 26 27 28 29 30 31 32

General Remarks

Cable Percussive Borehole advanced from ground level to 25.0 m bgl. No services encountered. Ground water encountered at 5.0 m bgl. Backfilled with arisings upon completion.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:50

Logged By: KC

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Tel: 01454 269237
Fax: 01454 269760
Web: www.enzygo.com

Site: Ashburnham Road, Richmond

BH3

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 16-08-21 Finish 16-08-21		

Client: Hill Partnership Ltd

Sheet: 1 of 2

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
								MADE GROUND: Grass over firm brown slightly sandy slightly gravelly CLAY. Gravel is subangular and fine of brick and flint.
					0.60			Firm brown and mottled light brown very sandy slightly gravelly CLAY. Gravel is subangular and fine to coarse of flint.
		1.20 - 1.65	SPT	6				
					1.50			Medium dense to dense light brown slightly clayey slightly gravelly medium and coarse SAND. Gravel is angular and subangular and coarse of flint. Note: Groundwater encountered at 3.4 m bgl.
	▽	3.00 - 3.45	SPT	33				
		4.50 - 4.95	SPT	13				
		5.00	D					
					5.30			Firm greyish brown CLAY.
		6.00 - 6.45	SPT	14				
		7.50 - 7.95	SPT	23				
					{8.00}			Continued next sheet

0 1 2 3 4 5 6 7 8

General Remarks

Cable Percussive Borehole advanced from ground level to 10.0 m bgl. No services encountered. Groundwater encountered at 3.4 m bgl. Backfilled with arisings upon completion.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)
	3.40		

All dimensions in metres
Scale 1:50

Logged By: KC

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Web: www.enzygo.com

Site: Ashburnham Road, Richmond

BH3

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 16-08-21 Finish 16-08-21		

Client: Hill Partnership Ltd

Sheet: 2 of 2

Well	Water Levels	Samples & In Situ Testing			Depth (m)	Level (mAD)	Legend	Stratum Description
		Depth (m)	No/Type	Results				
		9.00 - 9.45	SPT	21				
		10.00	D		10.00			Borehole completed at 10.00m.
					{16.00}			

General Remarks

Cable Percussive Borehole advanced from ground level to 10.0 m bgl. No services encountered. Groundwater encountered at 3.4 m bgl. Backfilled with arisings upon completion.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:50

Logged By: KC

Enzygo Ltd
Tel: 01454 269237
Fax: 01454 269760
Web: www.enzygo.com

Site: Ashburnham Road, Richmond

BH4

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 18-08-21 Finish 18-08-21		

Client: Hill Partnership Ltd

Sheet: 1 of 2

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
					0.00			MADE GROUND: Firm brown slightly sandy slightly gravelly CLAY. Gravel is subangular and fine of brick and flint.
		1.50 - 1.95	SPT	17	0.60			Firm light brown and orangish brown very sandy CLAY. Sand is fine to coarse.
		3.00 - 3.45	SPT	13	2.50			Medium dense light brown slightly clayey slightly gravelly medium and coarse SAND. Gravel is angular and subangular and coarse of flint. Note: Groundwater encountered at 4.3 m bgl.
	▽	4.50 - 4.95	SPT	11				
		5.00	D		5.20			Firm greyish brown CLAY.
		6.00 - 6.45	SPT	14				
		7.50 - 7.95	SPT	19	{8.00}			Continued next sheet

0 1 2 3 4 5 6 7 8

General Remarks

Cable Percussive Borehole advanced from ground level to 10.0 m bgl. No services encountered. Groundwater encountered at 4.3 m bgl. Backfilled with arisings upon completion.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)
	4.30		

All dimensions in metres
Scale 1:50

Logged By: KC

Enzygo Ltd
Tel: 01454 269237
Fax: 01454 269760
Web: www.enzygo.com

Site: Ashburnham Road, Richmond

BH4

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 18-08-21 Finish 18-08-21		

Client: Hill Partnership Ltd

Sheet: 2 of 2

Well	Water Levels	Samples & In Situ Testing			Depth (m)	Level (mAD)	Legend	Stratum Description
		Depth (m)	No/Type	Results				
		9.00 - 9.45	SPT	19				
		10.00	D		10.00			Borehole completed at 10.00m.
					{16.00}			

8 9 10 11 12 13 14 15 16

General Remarks

Cable Percussive Borehole advanced from ground level to 10.0 m bgl. No services encountered. Groundwater encountered at 4.3 m bgl. Backfilled with arisings upon completion.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:50

Logged By: KC

Enzygo Ltd
Tel: 01454 269237
Fax: 01454 269760
Web: www.enzygo.com

Site: Ashburnham Road, Richmond

BH5

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 18-08-21 Finish 18-08-21		

Client: Hill Partnership Ltd

Sheet: 1 of 2

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
					0.50			MADE GROUND: Brown slightly sandy slightly gravelly CLAY. Gravel is subangular and fine of brick and flint.
								Firm brown and mottled light brown very sandy slightly gravelly CLAY. Gravel is subangular and fine to coarse of flint.
		1.50 - 1.95	SPT	10	1.50			Medium dense to dense light brown slightly clayey slightly gravelly medium and coarse SAND. Gravel is angular and subangular and coarse of flint. Note: Groundwater encountered at 2.5 m bgl.
	▽	3.00 - 3.45	SPT	37				
		4.50 - 4.95	SPT	37				
		5.00	D					
					5.80			
		6.00 - 6.45	SPT	13				Firm to stiff greyish brown CLAY. Note: Claystone between 8.3 and 8.4 m bgl.
		7.50 - 7.95	SPT	14				
					{8.00}			Continued next sheet

0 1 2 3 4 5 6 7 8

General Remarks

Cable Percussive Borehole advanced from ground level to 10.0 m bgl. No services encountered. Groundwater encountered at 2.5 m bgl. Backfilled with arisings upon completion.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)
	2.50		

All dimensions in metres
Scale 1:50

Logged By: KC

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Tel: 01454 269237
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Web: www.enzygo.com

Site: Ashburnham Road, Richmond

BH5

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 18-08-21 Finish 18-08-21		

Client: Hill Partnership Ltd

Sheet: 2 of 2

Well	Water Levels	Samples & In Situ Testing			Depth (m)	Level (mAD)	Legend	Stratum Description
		Depth (m)	No/Type	Results				
		9.00 - 9.45	SPT	19				
		10.00	D		10.00			Borehole completed at 10.00m.
					{16.00}			

General Remarks

Cable Percussive Borehole advanced from ground level to 10.0 m bgl. No services encountered. Groundwater encountered at 2.5 m bgl. Backfilled with arisings upon completion.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:50

Logged By: KC

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Tel: 01454 269237
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Web: www.enzygo.com

Site: Ashburnham Road, Richmond

BH6

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 17-08-21 Finish 17-08-21		

Client: Hill Partnership Ltd

Sheet: 1 of 2

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
					0.00			MADE GROUND: Firm brown slightly sandy slightly gravelly CLAY. Gravel is subangular and fine of brick, concrete and flint.
					0.70			Firm light brown and orangish brown very sandy CLAY. Sand is fine.
		1.50 - 1.95	SPT	13				
					2.80			Medium dense to dense light brown slightly clayey slightly gravelly medium and coarse SAND. Gravel is angular and subangular and coarse of flint. Note: Groundwater encountered at 3.8 m bgl.
	▽	3.00 - 3.45	SPT	34				
		4.50 - 4.95	SPT	36				
		5.00	D					
					5.40			Frim to stifff greyish brown CLAY.
		6.00 - 6.45	SPT	11				
		7.50 - 7.95	SPT	15				
					{8.00}			Continued next sheet

0 1 2 3 4 5 6 7 8

General Remarks

Cable Percussive Borehole advanced from ground level to 10.0 m bgl. No services encountered. Groundwater encountered at 3.8 m bgl. Backfilled with arisings upon completion.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)
	3.80		

All dimensions in metres
Scale 1:50

Logged By: KC

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Tel: 01454 269237
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Web: www.enzygo.com

Site: Ashburnham Road, Richmond

BH6

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 17-08-21 Finish 17-08-21		

Client: Hill Partnership Ltd

Sheet: 2 of 2

Well	Water Levels	Samples & In Situ Testing			Depth (m)	Level (mAD)	Legend	Stratum Description
		Depth (m)	No/Type	Results				
		9.00 - 9.45	SPT	18				
		10.00	D		10.00			Borehole completed at 10.00m.
					{16.00}			

8 9 10 11 12 13 14 15 16

General Remarks

Cable Percussive Borehole advanced from ground level to 10.0 m bgl. No services encountered. Groundwater encountered at 3.8 m bgl. Backfilled with arisings upon completion.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:50

Logged By: KC

Enzygo Ltd
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Site: Ashburnham Road, Richmond

WS1

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 25-10-21 Finish 25-10-21		

Client: Hill Partnership

Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	Samples & In Situ Testing: No/Type	Samples & In Situ Testing: Results	Depth (m)	Level (mAD)	Legend	Stratum Description
					0.02			MADE GROUND: - Angular fine GRAVEL of basalt.
					0.15			MADE GROUND: Tarmacadam comprising light black to light grey very sandy subrounded coarse GRAVEL of flint in tar. Sand is coarse.
		0.30 - 0.40	ES					MADE GROUND: Multicoloured (yellow to red occasionally black to light brown) occasionally clayey sandy GRAVEL of brick and flint with coarse sand-sized ash. Gravel is angular fine to coarse flint. Sand is fine to coarse.
					0.50			Brown occasionally gravelly sandy CLAY. Gravel is angular fine flint. Sand is fine.
		0.70 - 0.80	ES					
					1.30			Light brown orange occasionally gravelly slightly clayey medium to coarse SAND. Gravel is subangular fine flint.
					2.00			Borehole completed at 2.00m.
					{4.00}			

0 1 2 3 4

General Remarks

EUIPMENT: Archway compact window sampling tracked rig.
METHOD: Hand dug inspection pit 0.00m-1.00m begl. Dynamic sampled 1.00m-2.00m begl.
CASING: Not used.
GROUNDWATER: Groundwater not encountered.
BACKFILL: On completion, the borehole was backfilled with arisings.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:25

Logged By: KC

Enzygo Ltd
Tel: 01454 269237
Fax: 01454 269760
Web: www.enzygo.com

Site: Ashburnham Road, Richmond

WS2

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 25-10-21 Finish 25-10-21		

Client: Hill Partnership

Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	Samples & In Situ Testing: No/Type	Samples & In Situ Testing: Results	Depth (m)	Level (mAD)	Legend	Stratum Description
					0.15			MADE GROUND: Tarmacadam comprising light black to light grey very sandy subrounded coarse GRAVEL of flint in tar. Sand is coarse.
		0.30 - 0.40	ES		0.22			MADE GROUND: Subbase comprising light grey to cream gravelly fine to coarse SAND. Gravel is angular and subrounded fine to medium flint.
		0.60 - 0.80	ES		0.55			MADE GROUND: Multicoloured (yellow to red occasionally light black to light brown) occasionally clayey sandy, angular fine to coarse GRAVEL of brick and flint. Sand is fine to coarse.
								Brown occasionally gravelly sandy CLAY. Gravel is angular fine flint. Sand is fine.
					1.75			Light brown orange occasionally gravelly slightly clayey medium to coarse SAND. Gravel is subangular fine flint.
					3.00			Borehole completed at 3.00m.
					{4.00}			

0 1 2 3 4

General Remarks

EUIPMENT: Archway compact window sampling tracked rig.
METHOD: Hand dug inspection pit 0.00m-1.00m begl. Dynamic sampled 1.00m-3.00m begl.
CASING: Not used.
GROUNDWATER: Groundwater not encountered.
BACKFILL: On completion, the borehole was backfilled with arisings.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:25

Logged By: KC

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Tel: 01454 269237
Fax: 01454 269760
Web: www.enzygo.com

Site: Ashburnham Road, Richmond

WS3

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 25-10-21 Finish 25-10-21		

Client: Hill Partnership

Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	Samples & In Situ Testing: No/Type	Samples & In Situ Testing: Results	Depth (m)	Level (mAD)	Legend	Stratum Description
					0.02			MADE GROUND: - Angular fine GRAVEL of basalt.
					0.13			MADE GROUND: Tarmacadam comprising light black to light grey very sandy subrounded coarse GRAVEL of flint in tar. Sand is coarse.
		0.30 - 0.45	ES					MADE GROUND: Multicoloured (yellow to red occasionally black to light brown) occasionally clayey sandy GRAVEL of brick and flint with coarse sand-sized ash. Gravel is angular fine to coarse flint. Sand is fine to coarse.
					0.45			
		0.60 - 0.70	ES					Brown occasionally gravelly sandy CLAY. Gravel is angular fine flint. Sand is fine.
					1.30			Light brown orange occasionally gravelly slightly clayey medium to coarse SAND. Gravel is subangular fine flint.
					2.00			Borehole completed at 2.00m.
					{4.00}			

0 1 2 3 4

General Remarks

EUIPMENT: Archway compact window sampling tracked rig.
METHOD: Hand dug inspection pit 0.00m-1.00m begl. Dynamic sampled 1.00m-2.00m begl.
CASING: Not used.
GROUNDWATER: Groundwater not encountered.
BACKFILL: On completion, the borehole was backfilled with arisings.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:25

Logged By: KC

Enzygo Ltd
Tel: 01454 269237
Fax: 01454 269760
Web: www.enzygo.com

Site: Ashburnham Road, Richmond

WS4

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 25-10-21 Finish 25-10-21		

Client: Hill Partnership

Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	Samples & In Situ Testing: No/Type	Samples & In Situ Testing: Results	Depth (m)	Level (mAD)	Legend	Stratum Description
					0.02			MADE GROUND: - Angular fine GRAVEL of basalt.
					0.12			MADE GROUND: Tarmacadam comprising light black to light grey very sandy subrounded coarse GRAVEL of flint in tar. Sand is coarse.
		0.30 - 0.50	ES					MADE GROUND: Subbase comprising light grey to cream gravelly fine to coarse SAND. Gravel is angular and subrounded fine to medium flint.
					0.55			
		0.70 - 0.80	ES					Brown occasionally gravelly sandy CLAY. Gravel is angular fine flint. Sand is fine.
					1.45			Light brown orange occasionally gravelly slightly clayey medium to coarse SAND. Gravel is subangular fine flint.
					2.00			Borehole completed at 2.00m.
					{4.00}			

0 1 2 3 4

General Remarks

EUIPMENT: Archway compact window sampling tracked rig.
METHOD: Hand dug inspection pit 0.00m-1.00m begl. Dynamic sampled 1.00m-2.00m begl.
CASING: Not used.
GROUNDWATER: Groundwater not encountered.
BACKFILL: On completion, the borehole was backfilled with arisings.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:25

Logged By: KC

Enzygo Ltd
Tel: 01454 269237
Fax: 01454 269760
Web: www.enzygo.com

Site: Ashburnham Road, Richmond

WS5

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 25-10-21 Finish 25-10-21		

Client: Hill Partnership

Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	Samples & In Situ Testing: No/Type	Samples & In Situ Testing: Results	Depth (m)	Level (mAD)	Legend	Stratum Description
					0.02			MADE GROUND: - Angular fine GRAVEL of basalt.
					0.13			MADE GROUND: Tarmacadam comprising light black to light grey very sandy subrounded coarse GRAVEL of flint in tar. Sand is coarse.
		0.35 - 0.48	ES					MADE GROUND: Subbase comprising light grey to cream sandy rounded to subrounded medium GRAVEL of flint and concrete. Sand is fine.
					0.45			
		0.60 - 0.70	ES		0.48			MADE GROUND: Orange brown to black rounded to subrounded coarse GRAVEL of flint with coarse sand-sized ash.
								Brown occasionally gravelly sandy CLAY. Gravel is angular fine flint. Sand is fine.
					1.10			Brown to light brown very clayey fine SAND.
					1.60			Light brown orange occasionally gravelly slightly clayey medium to coarse SAND. Gravel is subangular fine flint.
					2.90			Sampler refused. Borehole completed at 2.90m.
					{4.00}			

0 1 2 3 4

General Remarks

EUIPMENT: Archway compact window sampling tracked rig.
METHOD: Hand dug inspection pit 0.00m-1.00m begl. Dynamic sampled 1.00m-2.90m begl.
CASING: Not used.
GROUNDWATER: Groundwater not encountered.
BACKFILL: On completion, the borehole was backfilled with arisings.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:25

Logged By: KC

Enzygo Ltd
Tel: 01454 269237
Fax: 01454 269760
Web: www.enzygo.com

Site: Ashburnham Road, Richmond

WS6

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 25-10-21 Finish 25-10-21		

Client: Hill Partnership

Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	Samples & In Situ Testing: No/Type	Samples & In Situ Testing: Results	Depth (m)	Level (mAD)	Legend	Stratum Description
					0.02			MADE GROUND: - Angular fine GRAVEL of basalt.
					0.15			MADE GROUND: Tarmacadam comprising light black to light grey very sandy subrounded coarse GRAVEL of flint in tar. Sand is coarse.
		0.30 - 0.40	ES		0.35			MADE GROUND: Subbase comprising light grey to cream gravelly fine to coarse SAND. Gravel is angular and subrounded fine to medium flint.
					0.60			MADE GROUND: Multicoloured (yellow to red occasionally light black to light brown) occasionally clayey sandy, angular fine to coarse GRAVEL of brick and flint. Sand is fine to coarse.
		0.70 - 0.80	ES					Brown occasionally gravelly sandy CLAY. Gravel is angular fine flint. Sand is fine. 1.00 - 1.40 Increasing sand conent.
					1.40			Light brown orange occasionally gravelly slightly clayey medium to coarse SAND. Gravel is subangular fine flint.
					4.00 {4.00}			Borehole completed at 4.00m.

0 1 2 3 4

General Remarks

EUIPMENT: Archway compact window sampling tracked rig.
METHOD: Hand dug inspection pit 0.00m-1.00m begl. Dynamic sampled 1.00m-4.00m begl.
CASING: Not used.
GROUNDWATER: Groundwater not encountered.
BACKFILL: On completion, the borehole was backfilled with arisings.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:25

Logged By: KC

Enzygo Ltd
Tel: 01454 269237
Fax: 01454 269760
Web: www.enzygo.com

Site: Ashburnham Road, Richmond

SA1

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 27-10-21 Finish 27-10-21		

Client: Hill Partnership

Sheet: 1 of 1

Water Levels	Samples & In Situ Testing: Depth (m)	Samples & In Situ Testing: No/Type	Samples & In Situ Testing: Results	Depth (m)	Level (mAD)	Legend	Stratum Description
				0.40			MADE GROUND: Black to dark brown slightly gravelly very sandy CLAY with red tiles. Gravel is subangular and subrounded fine flint and brick. Sand is fine.
				1.00			Brown CLAY.
				1.80			Brown slightly sandy CLAY. Sand is fine.
				2.00			Brown clayey medium SAND.
				{4.00}			Trial Pit completed at 2.00m.

0
1
2
3
4

General Remarks

Dimensions: 2.00x0.60x2.00
1. Machine excavated pit from ground level to 2.00m begl.
2. Groundwater not encountered.
3. Trial pit sides remained vertical and stable.
4. On completion, trial pit was backfilled with arisings.

All dimensions in metres
Scale 1:25

Logged By: KC

Enzygo Ltd
Tel: 01454 269237
Fax: 01454 269760
Web: www.enzygo.com

Site: Ashburnham Road, Richmond

SA2

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 27-10-21 Finish 27-10-21		

Client: Hill Partnership

Sheet: 1 of 1

Water Levels	Samples & In Situ Testing: Depth (m)	Samples & In Situ Testing: No/Type	Samples & In Situ Testing: Results	Depth (m)	Level (mAD)	Legend	Stratum Description
				0.30			MADE GROUND: Black to dark brown slightly gravelly very sandy CLAY with red tiles. Gravel is subangular and subrounded fine flint and brick. Sand is fine.
				1.10			Brown CLAY.
				1.50			Brown clayey medium SAND.
				2.00			Light brown slightly clayey fine SAND.
				{4.00}			Trial Pit completed at 2.00m.

0 1 2 3 4

General Remarks

Dimensions: 2.00x0.60x2.00
1. Machine excavated pit from ground level to 2.00m begl.
2. Groundwater not encountered.
3. Trial pit sides remained vertical and stable.
4. On completion, trial pit was backfilled with arisings.

All dimensions in metres
Scale 1:25

Logged By: KC

Enzygo Ltd
Tel: 01454 269237
Fax: 01454 269760
Web: www.enzygo.com

Site: Ashburnham Road, Richmond

SA3

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 26-10-21 Finish 26-10-21		

Client: Hill Partnership

Sheet: 1 of 1

Water Levels	Samples & In Situ Testing: Depth (m)	Samples & In Situ Testing: No/Type	Samples & In Situ Testing: Results	Depth (m)	Level (mAD)	Legend	Stratum Description
				0.00			MADE GROUND: Grass over black to dark brown slightly gravelly very sandy CLAY. Gravel is subangular and subrounded fine flint and brick. Sand is fine.
				0.30			Brown slightly sandy CLAY. Sand is fine.
				0.50			Light brown occasionally gravelly sandy CLAY. Gravel is subangular fine flint. Sand is fine.
				2.00			Trial Pit completed at 2.00m.
				{4.00}			

0 1 2 3 4

General Remarks

Dimensions: 2.00x0.60x2.00
1. Machine excavated pit from ground level to 2.00m begl.
2. Groundwater not encountered.
3. Trial pit sides remained vertical and stable.
4. On completion, trial pit was backfilled with arisings.

All dimensions in metres
Scale 1:25

Logged By: KC

Enzygo Ltd
Tel: 01454 269237
Fax: 01454 269760
Web: www.enzygo.com

Site: Ashburnham Road, Richmond

SA4

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 26-10-21 Finish 26-10-21		

Client: Hill Partnership

Sheet: 1 of 1

Water Levels	Samples & In Situ Testing: Depth (m)	Samples & In Situ Testing: No/Type	Samples & In Situ Testing: Results	Depth (m)	Level (mAD)	Legend	Stratum Description
				0.00			MADE GROUND: Black to dark brown slightly gravelly very sandy CLAY. Gravel is subangular and subrounded fine flint and brick. Sand is fine.
				0.40			Brown slightly sandy CLAY. Sand is fine.
				0.60			Light brown clayey gravelly fine to medium SAND. Gravel is subangular fine to medium flint.
				2.00			Trial Pit completed at 2.00m.
				{4.00}			

0
1
2
3
4

General Remarks

Dimensions: 2.00x0.60x2.00
1. Machine excavated pit from ground level to 2.00m begl.
2. Groundwater not encountered.
3. Trial pit sides remained vertical and stable.
4. On completion, trial pit was backfilled with arisings.

All dimensions in metres
Scale 1:25

Logged By: KC

Enzygo Ltd
Tel: 01454 269237
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Web: www.enzygo.com

Site: Ashburnham Road, Richmond

SA5

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 26-10-21 Finish 26-10-21		

Client: Hill Partnership

Sheet: 1 of 1

Water Levels	Samples & In Situ Testing: Depth (m)	Samples & In Situ Testing: No/Type	Samples & In Situ Testing: Results	Depth (m)	Level (mAD)	Legend	Stratum Description
							MADE GROUND: Black to dark brown slightly gravelly very sandy CLAY. Gravel is subangular and subrounded fine flint and brick. Sand is fine.
				0.30			MADE GROUND: Multicoloured (yellow to red occasionally light black to light brown) occasionally clayey sandy angular fine to coarse GRAVEL of brick, concrete and flint. Sand is fine to coarse.
				0.55			Light brown occasionally gravelly sandy CLAY. Gravel is subangular fine flint. Sand is fine.
				2.00			Trial Pit completed at 2.00m.
				{4.00}			

0 1 2 3 4

General Remarks

Dimensions: 2.00x0.60x2.00
1. Machine excavated pit from ground level to 2.00m begl.
2. Groundwater not encountered.
3. Trial pit sides remained vertical and stable.
4. On completion, trial pit was backfilled with arisings.

All dimensions in metres
Scale 1:25

Logged By: KC

Enzygo Ltd
Tel: 01454 269237
Fax: 01454 269760
Web: www.enzygo.com

Site: Ashburnham Road, Richmond

SA6

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 27-10-21 Finish 27-10-21		

Client: Hill Partnership

Sheet: 1 of 1

Water Levels	Samples & In Situ Testing: Depth (m)	Samples & In Situ Testing: No/Type	Samples & In Situ Testing: Results	Depth (m)	Level (mAD)	Legend	Stratum Description
				0.40			MADE GROUND: Black to dark brown slightly gravelly very sandy CLAY with red tiles. Gravel is subangular and subrounded fine flint and brick. Sand is fine.
				2.00			Light brown to light orange brown slightly clayey medium SAND.
				{4.00}			Trial Pit completed at 2.00m.

0 1 2 3 4

General Remarks

Dimensions: 2.00x0.60x2.00
1. Machine excavated pit from ground level to 2.00m begl.
2. Groundwater not encountered.
3. Trial pit sides remained vertical and stable.
4. On completion, trial pit was backfilled with arisings.

All dimensions in metres
Scale 1:25

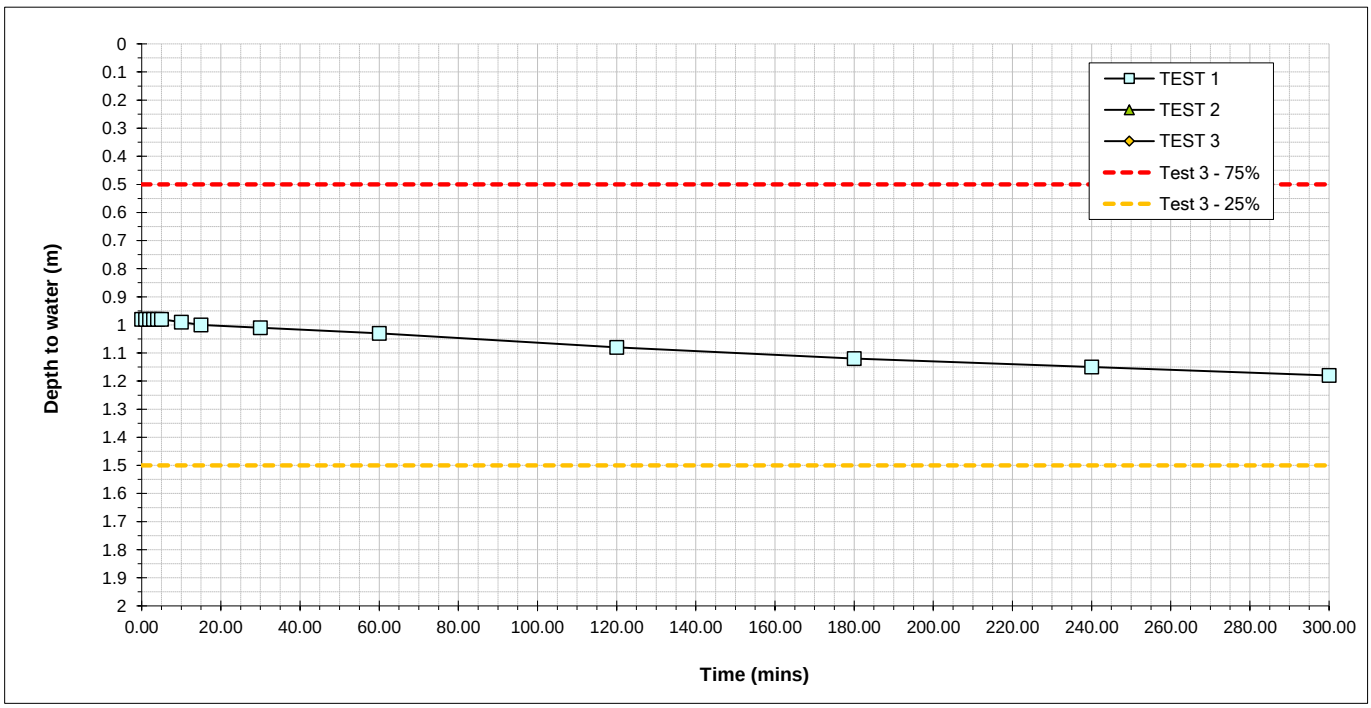
Logged By: KC

Site..... Ashburnham Rd Richmond	Soakaway Number....	SA1
Job Number..... CRM.1027.087	Length.....	1.25 m
Date of Test..... 26th to 27th October 2021	Width.....	0.60 m
	Depth.....	2.00 m
SOIL INFILTRATION RATE TEST	Groundwater Level....	Dry m
See B.R.E. Digest 365, 1991, Soakaway Design.		

	TEST 1		TEST 2		TEST 3	
	Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)
	0.0	0.98	0.0	0.00	0.0	0.00
	1.0	0.98	0.0	0.00	0.0	0.00
	2.0	0.98	0.0	0.00	0.0	0.00
	3.0	0.98	0.0	0.00	0.0	0.00
	4.0	0.98	0.0	0.00	0.0	0.00
	5.0	0.98	0.0	0.00	0.0	0.00
	10.0	0.99	0.0	0.00	0.0	0.00
	15.0	1.00	0.0	0.00	0.0	0.00
	30.0	1.01	0.0	0.00	0.0	0.00
	60.0	1.03	0.0	0.00	0.0	0.00
	120.0	1.08	0.0	0.00	0.0	0.00
			120.0	1.92	0.0	0.00

Effective Storage Depth	m	1.02	2.00	2.00
75% Effective Storage Depth	m	0.77	1.50	1.50
(i.e. depth below GL)	m	**1.24**	**0.50**	**0.50**
25% Effective Storage Depth	m	0.26	0.50	0.50
(i.e. depth below GL)	m	**1.75**	**1.50**	**1.50**
Effective Storage Depth 75%-25%	m	0.51	1.00	1.00
Time to fall to 75% effective depth	mins			
Time to fall to 25% effective depth	mins			
V (75%-25%)	m3	0.38	0.75	0.75
a (50%)	m2	2.64	4.45	4.45
t (75%-25%)	mins	0.00	0.00	0.00
SOIL INFILTRATION RATE	m/s	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**

DESIGN SOIL INFILTRATION RATE, f **#DIV/0!** **m/s**



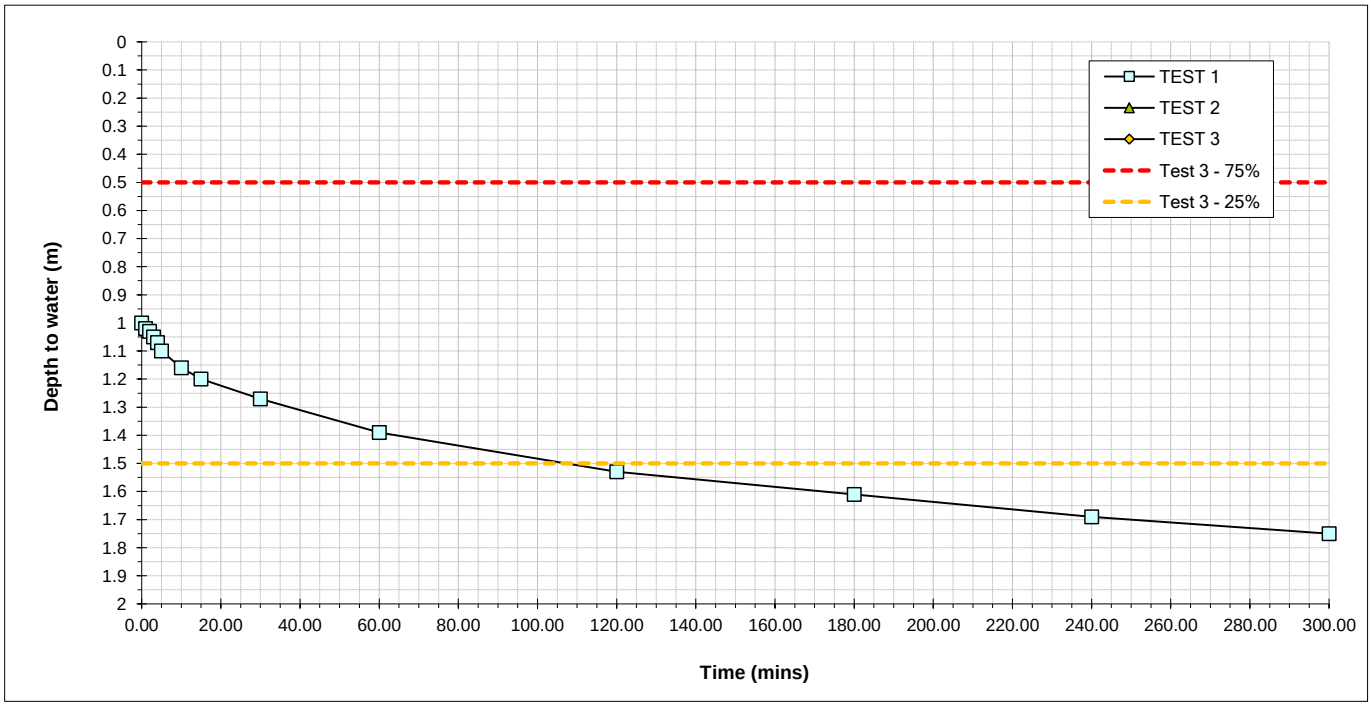
Compiled By:	Date:	Checked By:	Date:	Approved By:	Date:
G.Parr	19.04.21	R.Hamilton	19.04.21	S.Rhodes	19.04.21

Site..... Ashburnham Rd Richmond	Soakaway Number....	SA2
Job Number..... CRM.1027.087	Length.....	1.50 m
Date of Test..... 26th to 27th October 2021	Width.....	0.60 m
	Depth.....	2.00 m
SOIL INFILTRATION RATE TEST	Groundwater Level....	Dry m
See B.R.E. Digest 365, 1991, Soakaway Design.		

	TEST 1		TEST 2		TEST 3	
	Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)
	0.0	1.00	0.0	0.00	0.0	0.00
	1.0	1.02	0.0	0.00	0.0	0.00
	2.0	1.03	0.0	0.00	0.0	0.00
	3.0	1.05	0.0	0.00	0.0	0.00
	4.0	1.07	0.0	0.00	0.0	0.00
	5.0	1.10	0.0	0.00	0.0	0.00
	10.0	1.16	0.0	0.00	0.0	0.00
	15.0	1.20	0.0	0.00	0.0	0.00
	30.0	1.27	0.0	0.00	0.0	0.00
	60.0	1.39	0.0	0.00	0.0	0.00
	120.0	1.53	0.0	0.00	0.0	0.00
			120.0	1.92	0.0	0.00

Effective Storage Depth	m	1.00	2.00	2.00
75% Effective Storage Depth	m	0.75	1.50	1.50
(i.e. depth below GL)	m	**1.25**	**0.50**	**0.50**
25% Effective Storage Depth	m	0.25	0.50	0.50
(i.e. depth below GL)	m	**1.75**	**1.50**	**1.50**
Effective Storage Depth 75%-25%	m	0.50	1.00	1.00
Time to fall to 75% effective depth	mins	25.00		
Time to fall to 25% effective depth	mins	300.00		
V (75%-25%)	m3	0.45	0.90	0.90
a (50%)	m2	3.00	5.10	5.10
t (75%-25%)	mins	275.00	0.00	0.00
SOIL INFILTRATION RATE	m/s	**9.09E-06**	**#DIV/0!**	**#DIV/0!**

DESIGN SOIL INFILTRATION RATE, f	**#DIV/0!**	**m/s**



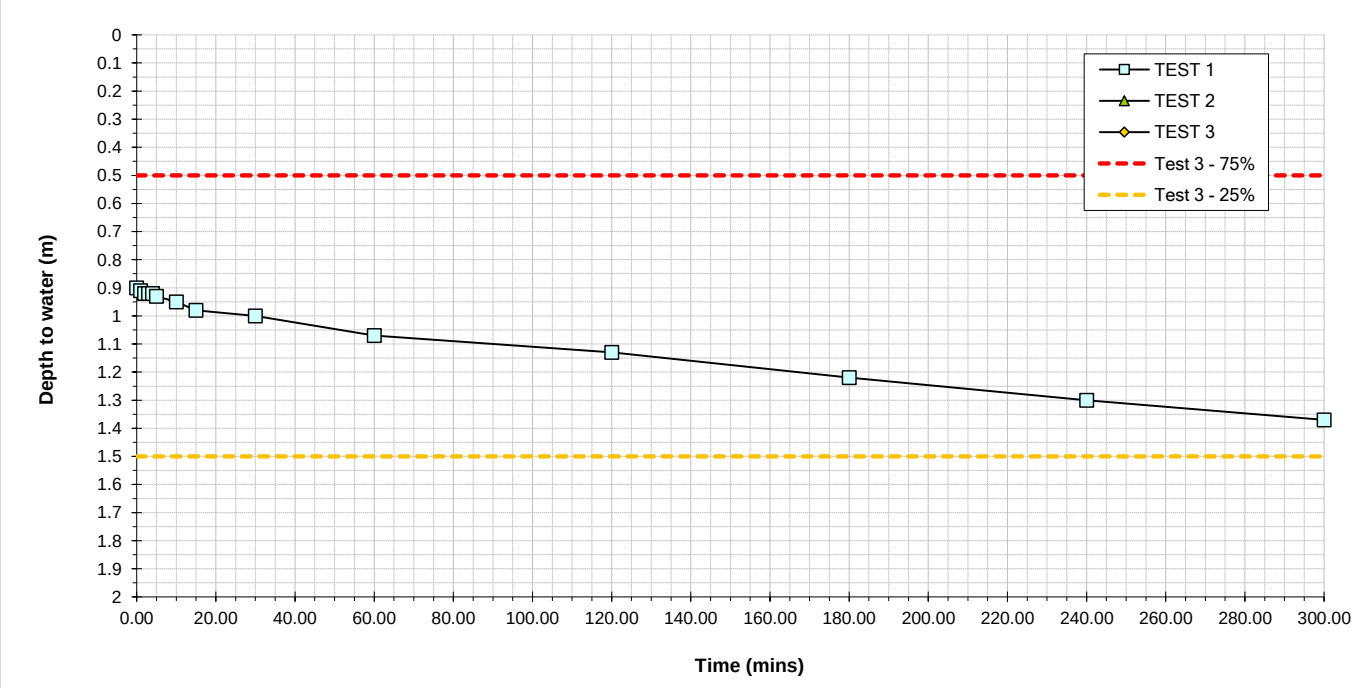
Compiled By:	Date:	Checked By:	Date:	Approved By:	Date:
G.Parr	19.04.21	R.Hamilton	19.04.21	S.Rhodes	19.04.21

Site..... Ashburnham Rd Richmond	Soakaway Number....	SA3
Job Number..... CRM.1027.087	Length.....	1.30 m
Date of Test..... 26th to 27th October 2021	Width.....	0.60 m
	Depth.....	2.00 m
SOIL INFILTRATION RATE TEST	Groundwater Level....	Dry m
See B.R.E. Digest 365, 1991, Soakaway Design.		

	TEST 1		TEST 2		TEST 3	
	Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)
	0.0	0.90	0.0	0.00	0.0	0.00
	1.0	0.91	0.0	0.00	0.0	0.00
	2.0	0.92	0.0	0.00	0.0	0.00
	3.0	0.92	0.0	0.00	0.0	0.00
	4.0	0.92	0.0	0.00	0.0	0.00
	5.0	0.93	0.0	0.00	0.0	0.00
	10.0	0.95	0.0	0.00	0.0	0.00
	15.0	0.98	0.0	0.00	0.0	0.00
	30.0	1.00	0.0	0.00	0.0	0.00
	60.0	1.07	0.0	0.00	0.0	0.00
	120.0	1.13	0.0	0.00	0.0	0.00
			120.0	1.92	0.0	0.00

Effective Storage Depth	m	1.10	2.00	2.00
75% Effective Storage Depth	m	0.83	1.50	1.50
(i.e. depth below GL)	m	**1.18**	**0.50**	**0.50**
25% Effective Storage Depth	m	0.28	0.50	0.50
(i.e. depth below GL)	m	**1.73**	**1.50**	**1.50**
Effective Storage Depth 75%-25%	m	0.55	1.00	1.00
Time to fall to 75% effective depth	mins			
Time to fall to 25% effective depth	mins			
V (75%-25%)	m3	0.43	0.78	0.78
a (50%)	m2	2.87	4.58	4.58
t (75%-25%)	mins	0.00	0.00	0.00
SOIL INFILTRATION RATE	m/s	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**

DESIGN SOIL INFILTRATION RATE, f **#DIV/0!** **m/s**



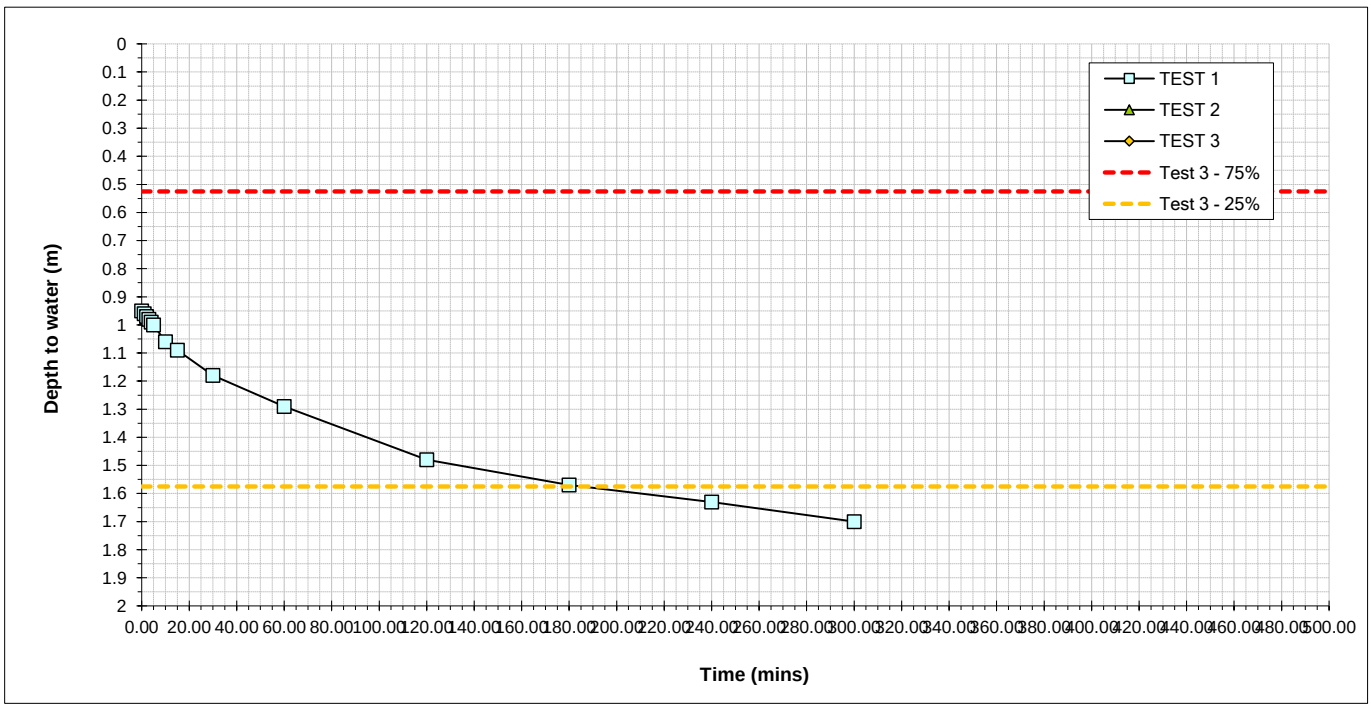
Compiled By:	Date:	Checked By:	Date:	Approved By:	Date:
G.Parr	19.04.21	R.Hamilton	19.04.21	S.Rhodes	19.04.21

Site..... Ashburnham Rd Richmond	Soakaway Number....	SA4
Job Number..... CRM.1027.087	Length.....	1.40 m
Date of Test..... 26th to 27th October 2021	Width.....	0.60 m
	Depth.....	2.10 m
SOIL INFILTRATION RATE TEST	Groundwater Level....	Dry m
See B.R.E. Digest 365, 1991, Soakaway Design.		

	TEST 1		TEST 2		TEST 3	
	Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)
	0.0	0.95	0.0	0.00	0.0	0.00
	1.0	0.96	0.0	0.00	0.0	0.00
	2.0	0.97	0.0	0.00	0.0	0.00
	3.0	0.98	0.0	0.00	0.0	0.00
	4.0	0.99	0.0	0.00	0.0	0.00
	5.0	1.00	0.0	0.00	0.0	0.00
	10.0	1.06	0.0	0.00	0.0	0.00
	15.0	1.09	0.0	0.00	0.0	0.00
	30.0	1.18	0.0	0.00	0.0	0.00
	60.0	1.29	0.0	0.00	0.0	0.00
	120.0	1.48	0.0	0.00	0.0	0.00
			120.0	1.92	0.0	0.00

Effective Storage Depth	m	1.15	2.10	2.10
75% Effective Storage Depth	m	0.86	1.58	1.58
(i.e. depth below GL)	m	**1.24**	**0.53**	**0.53**
25% Effective Storage Depth	m	0.29	0.53	0.53
(i.e. depth below GL)	m	**1.81**	**1.58**	**1.58**
Effective Storage Depth 75%-25%	m	0.58	1.05	1.05
Time to fall to 75% effective depth	mins	45.00		
Time to fall to 25% effective depth	mins	500.00		
V (75%-25%)	m3	0.48	0.88	0.88
a (50%)	m2	3.14	5.04	5.04
t (75%-25%)	mins	455.00	0.00	0.00
SOIL INFILTRATION RATE	m/s	**5.63E-06**	**#DIV/0!**	**#DIV/0!**

DESIGN SOIL INFILTRATION RATE, f	**#DIV/0!**	**m/s**



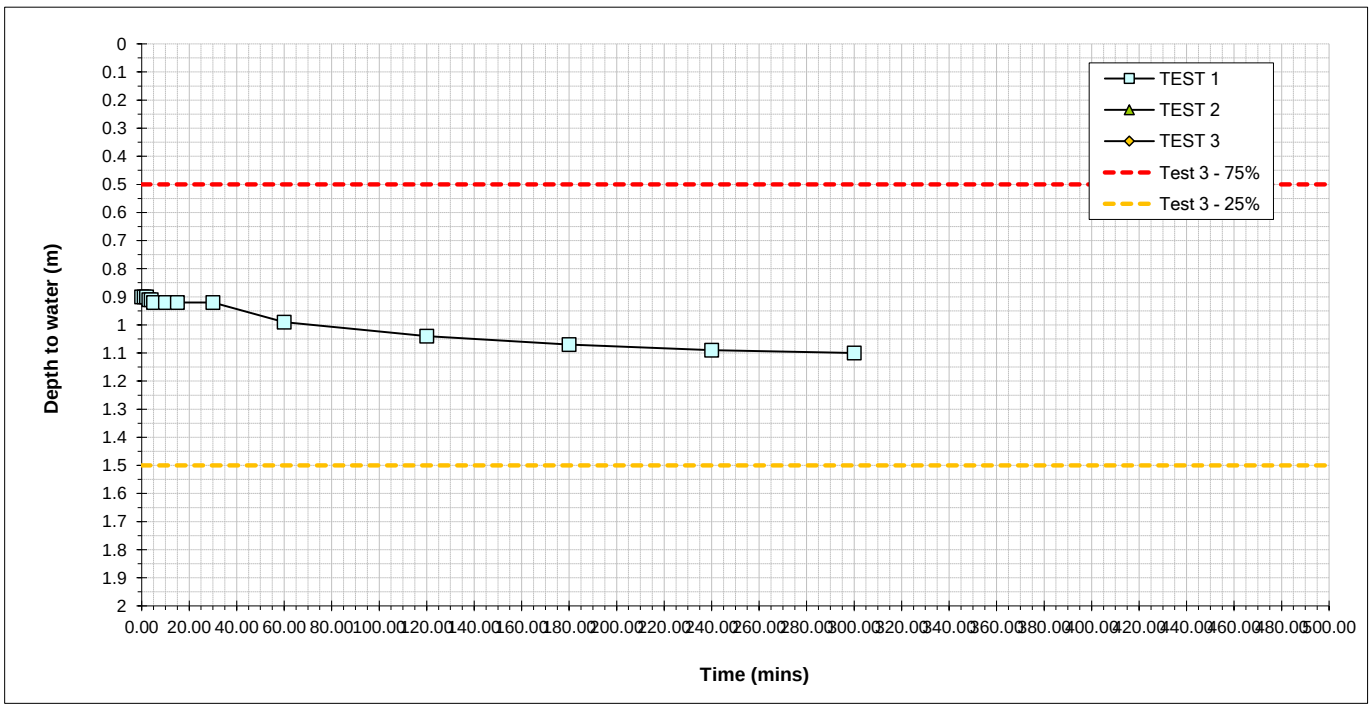
Compiled By:	Date:	Checked By:	Date:	Approved By:	Date:
G.Parr	19.04.21	R.Hamilton	19.04.21	S.Rhodes	19.04.21

Site..... Ashburnham Rd Richmond	Soakaway Number....	SA5
Job Number..... CRM.1027.087	Length.....	1.50 m
Date of Test..... 26th to 27th October 2021	Width.....	0.60 m
	Depth.....	2.00 m
SOIL INFILTRATION RATE TEST	Groundwater Level....	Dry m
See B.R.E. Digest 365, 1991, Soakaway Design.		

	TEST 1		TEST 2		TEST 3	
	Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)
	0.0	0.90	0.0	0.00	0.0	0.00
	1.0	0.90	0.0	0.00	0.0	0.00
	2.0	0.90	0.0	0.00	0.0	0.00
	3.0	0.91	0.0	0.00	0.0	0.00
	4.0	0.91	0.0	0.00	0.0	0.00
	5.0	0.92	0.0	0.00	0.0	0.00
	10.0	0.92	0.0	0.00	0.0	0.00
	15.0	0.92	0.0	0.00	0.0	0.00
	30.0	0.92	0.0	0.00	0.0	0.00
	60.0	0.99	0.0	0.00	0.0	0.00
	120.0	1.04	0.0	0.00	0.0	0.00
			120.0	1.92	0.0	0.00

Effective Storage Depth	m	1.10	2.00	2.00
75% Effective Storage Depth	m	0.83	1.50	1.50
(i.e. depth below GL)	m	**1.18**	**0.50**	**0.50**
25% Effective Storage Depth	m	0.28	0.50	0.50
(i.e. depth below GL)	m	**1.73**	**1.50**	**1.50**
Effective Storage Depth 75%-25%	m	0.55	1.00	1.00
Time to fall to 75% effective depth	mins			
Time to fall to 25% effective depth	mins			
V (75%-25%)	m3	0.50	0.90	0.90
a (50%)	m2	3.21	5.10	5.10
t (75%-25%)	mins	0.00	0.00	0.00
SOIL INFILTRATION RATE	m/s	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**

DESIGN SOIL INFILTRATION RATE, f **#DIV/0!** **m/s**



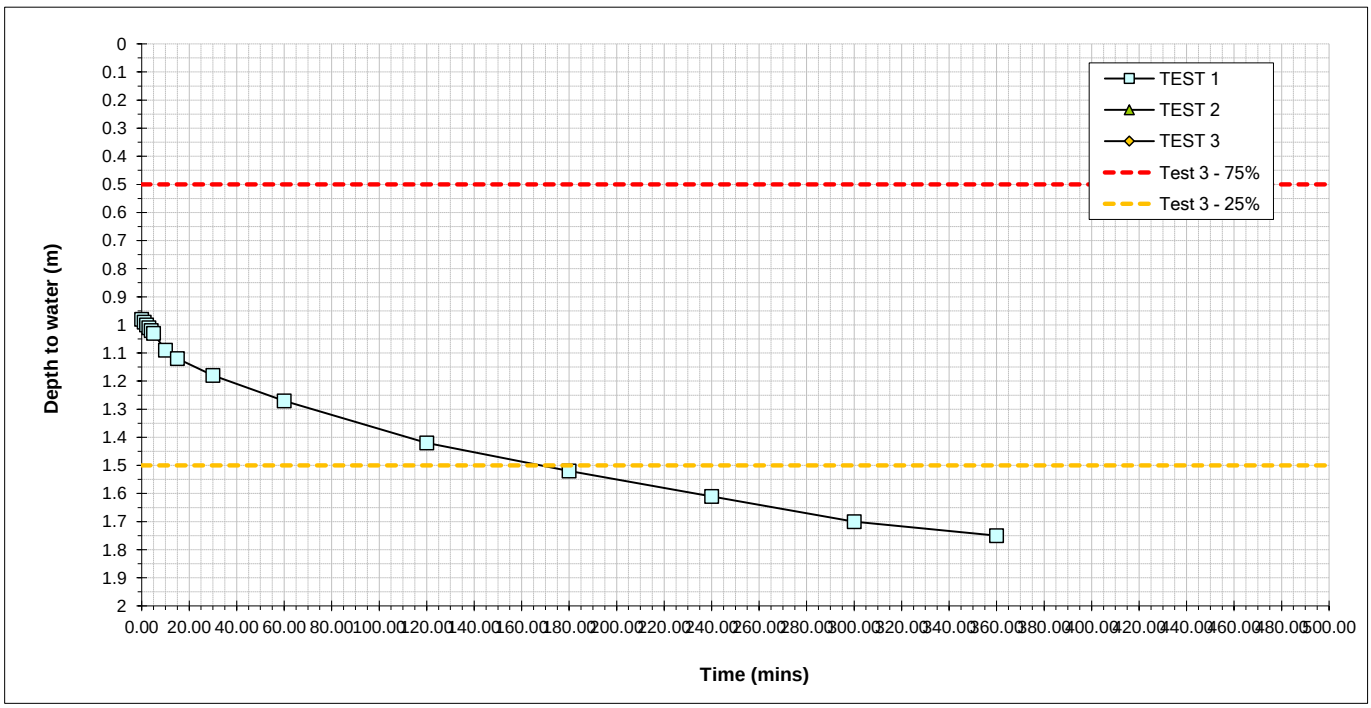
Compiled By:	Date:	Checked By:	Date:	Approved By:	Date:
G.Parr	19.04.21	R.Hamilton	19.04.21	S.Rhodes	19.04.21

Site..... Ashburnham Rd Richmond	Soakaway Number....	SA6
Job Number..... CRM.1027.087	Length.....	1.20 m
Date of Test..... 26th to 27th October 2021	Width.....	0.60 m
	Depth.....	2.00 m
SOIL INFILTRATION RATE TEST	Groundwater Level....	Dry m
See B.R.E. Digest 365, 1991, Soakaway Design.		

	TEST 1		TEST 2		TEST 3	
	Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)
	0.0	0.98	0.0	0.00	0.0	0.00
	1.0	0.99	0.0	0.00	0.0	0.00
	2.0	1.00	0.0	0.00	0.0	0.00
	3.0	1.01	0.0	0.00	0.0	0.00
	4.0	1.02	0.0	0.00	0.0	0.00
	5.0	1.03	0.0	0.00	0.0	0.00
	10.0	1.09	0.0	0.00	0.0	0.00
	15.0	1.12	0.0	0.00	0.0	0.00
	30.0	1.18	0.0	0.00	0.0	0.00
	60.0	1.27	0.0	0.00	0.0	0.00
	120.0	1.42	0.0	0.00	0.0	0.00
					0.0	0.00

Effective Storage Depth	m	1.02	2.00	2.00
75% Effective Storage Depth	m	0.77	1.50	1.50
(i.e. depth below GL)	m	**1.24**	**0.50**	**0.50**
25% Effective Storage Depth	m	0.26	0.50	0.50
(i.e. depth below GL)	m	**1.75**	**1.50**	**1.50**
Effective Storage Depth 75%-25%	m	0.51	1.00	1.00
Time to fall to 75% effective depth	mins	50.00		
Time to fall to 25% effective depth	mins	360.00		
V (75%-25%)	m3	0.37	0.72	0.72
a (50%)	m2	2.56	4.32	4.32
t (75%-25%)	mins	310.00	0.00	0.00
SOIL INFILTRATION RATE	m/s	**7.72E-06**	**#DIV/0!**	**#DIV/0!**

DESIGN SOIL INFILTRATION RATE, f	**#DIV/0!**	**m/s**



Compiled By:	Date:	Checked By:	Date:	Approved By:	Date:
G.Parr	19.04.21	R.Hamilton	19.04.21	S.Rhodes	19.04.21

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Analytical Report Number : 21-72260

Project / Site name:	Richmond	**Samples received on:**	29/04/2021
Your job number:	CRM.1265.087	**Samples instructed on/ Analysis started on:**	30/04/2021
Your order number:		**Analysis completed by:**	11/05/2021
Report Issue Number:	1	**Report issued on:**	11/05/2021
Samples Analysed:	22 soil samples		

Signed: Karolina Marek

Karolina Marek
PL Head of Reporting Team
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 21-72260
Project / Site name: Richmond

Lab Sample Number				1856420	1856421	1856422	1856423	1856424
Sample Reference				WS1	WS2	WS2	WS4	WS5
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.40	0.20-0.45	1.00	0.40	0.40
Date Sampled				28/04/2021	28/04/2021	28/04/2021	28/04/2021	28/04/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	8.3	5.9	10	11	8.4
Total mass of sample received	kg	0.001	NONE	1.2	1.2	0.50	1.2	1.2
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	Crocidolite	-	-	-
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Detected	Not-detected	Not-detected	Not-detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	0.006	-	-	-
Asbestos Quantification Total	%	0.001	ISO 17025	-	0.006	-	-	-
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	7.7	7.7	8.2	6.9	8.1
Total Organic Carbon (TOC)	%	0.1	MCERTS	1.4	1.3	0.3	0.9	1.2
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	0.74	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	0.57	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	0.60	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	6.5	< 0.05	< 0.05	0.76	< 0.05
Anthracene	mg/kg	0.05	MCERTS	1.8	< 0.05	< 0.05	0.20	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	15	0.53	< 0.05	1.3	0.46
Pyrene	mg/kg	0.05	MCERTS	14	0.51	< 0.05	1.2	0.46
Benzo(a)anthracene	mg/kg	0.05	MCERTS	8.1	0.36	< 0.05	0.67	0.26
Chrysene	mg/kg	0.05	MCERTS	5.2	0.32	< 0.05	0.55	0.23
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	8.1	0.44	< 0.05	0.63	0.30
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	3.2	0.24	< 0.05	0.33	0.15
Benzo(a)pyrene	mg/kg	0.05	MCERTS	7.0	0.40	< 0.05	0.60	0.27
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	4.0	0.25	< 0.05	0.41	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	1.1	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	4.6	0.29	< 0.05	0.43	< 0.05
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	80.9	3.34	< 0.80	7.12	2.13
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	16	40	16	17	16
Boron (water soluble)	mg/kg	0.2	MCERTS	1.1	0.8	1.5	0.4	0.6
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	22	26	26	26	28
Copper (aqua regia extractable)	mg/kg	1	MCERTS	52	36	7.6	26	35
Lead (aqua regia extractable)	mg/kg	1	MCERTS	310	150	11	73	84
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	1.2	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	20	19	21	22	23
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	140	110	46	94	130

Analytical Report Number: 21-72260
Project / Site name: Richmond

Lab Sample Number				1856420	1856421	1856422	1856423	1856424
Sample Reference				WS1	WS2	WS2	WS4	WS5
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.40	0.20-0.45	1.00	0.40	0.40
Date Sampled				28/04/2021	28/04/2021	28/04/2021	28/04/2021	28/04/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic > EC35 - EC44	mg/kg	8.4	NONE	< 8.4	< 8.4	< 8.4	< 8.4	< 8.4
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic (EC5 - EC44)	mg/kg	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	7.3	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	38	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	99	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic > EC35 - EC44	mg/kg	8.4	NONE	< 8.4	< 8.4	< 8.4	< 8.4	< 8.4
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	140	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic (EC5 - EC44)	mg/kg	10	NONE	140	< 10	< 10	< 10	< 10
TPH (>C5 - C7)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH (>C7 - C8)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH (C8 - C10)	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH (C10 - C12)	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH (C12 - C16)	mg/kg	4	MCERTS	7.3	< 4.0	< 4.0	< 4.0	< 4.0
TPH (C16 - C21)	mg/kg	1	MCERTS	38	< 1.0	< 1.0	< 1.0	< 1.0
TPH (C21 - C35)	mg/kg	1	MCERTS	99	< 1.0	< 1.0	< 1.0	< 1.0
TPH (C35 - C44)	mg/kg	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH Total C5 - C44	mg/kg	10	NONE	140	< 10	< 10	< 10	< 10

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number: 21-72260
Project / Site name: Richmond

Lab Sample Number				1856425	1856426	1856427	1856428	1856429
Sample Reference				WS5	WS6	WS6	WS7	WS8
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.00	0.40	1.00	0.40	1.00
Date Sampled				28/04/2021	28/04/2021	28/04/2021	28/04/2021	28/04/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	-	< 0.1	-
Moisture Content	%	0.01	NONE	10	9.1	-	7.5	-
Total mass of sample received	kg	0.001	NONE	0.50	1.2	-	1.0	-
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	Chrysotile	-	-	-
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Detected	Not-detected	Not-detected	Not-detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	< 0.001	-	-	-
Asbestos Quantification Total	%	0.001	ISO 17025	-	< 0.001	-	-	-
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	8.4	7.8	-	7.2	-
Total Organic Carbon (TOC)	%	0.1	MCERTS	0.3	1.5	-	1.6	-
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	-	< 1.0	-
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05	-
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05	-
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05	-
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05	-
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05	-
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05	-
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	0.64	-	0.60	-
Pyrene	mg/kg	0.05	MCERTS	< 0.05	0.57	-	0.55	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	0.38	-	0.37	-
Chrysene	mg/kg	0.05	MCERTS	< 0.05	0.33	-	0.32	-
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	0.42	-	0.50	-
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	0.23	-	0.28	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.33	-	0.42	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.25	-	< 0.05	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	0.22	-	< 0.05	-
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	3.37	-	3.04	-
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	15	19	-	18	-
Boron (water soluble)	mg/kg	0.2	MCERTS	1.6	0.7	-	0.8	-
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	-	< 0.2	-
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	-	< 4.0	-
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	26	21	-	25	-
Copper (aqua regia extractable)	mg/kg	1	MCERTS	11	32	-	33	-
Lead (aqua regia extractable)	mg/kg	1	MCERTS	15	160	-	120	-
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	-	< 0.3	-
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	22	20	-	21	-
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	-	< 1.0	-
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	48	110	-	170	-

Analytical Report Number: 21-72260
Project / Site name: Richmond

Lab Sample Number				1856425	1856426	1856427	1856428	1856429
Sample Reference				WS5	WS6	WS6	WS7	WS8
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.00	0.40	1.00	0.40	1.00
Date Sampled				28/04/2021	28/04/2021	28/04/2021	28/04/2021	28/04/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	-	< 0.001	-
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	-	< 0.001	-
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	-	< 0.001	-
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	-	< 1.0	-
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	-	< 2.0	-
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	-	< 8.0	-
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0	-	< 8.0	-
TPH-CWG - Aliphatic > EC35 - EC44	mg/kg	8.4	NONE	< 8.4	< 8.4	-	< 8.4	-
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	-	< 10	-
TPH-CWG - Aliphatic (EC5 - EC44)	mg/kg	10	NONE	< 10	< 10	-	< 10	-
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	-	< 0.001	-
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	-	< 0.001	-
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	-	< 0.001	-
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	-	< 1.0	-
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	-	< 2.0	-
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	< 10	-	< 10	-
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	< 10	-	< 10	-
TPH-CWG - Aromatic > EC35 - EC44	mg/kg	8.4	NONE	< 8.4	< 8.4	-	< 8.4	-
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	-	< 10	-
TPH-CWG - Aromatic (EC5 - EC44)	mg/kg	10	NONE	< 10	< 10	-	< 10	-
TPH (>C5 - C7)	mg/kg	1	MCERTS	< 1.0	< 1.0	-	< 1.0	-
TPH (>C7 - C8)	mg/kg	1	MCERTS	< 1.0	< 1.0	-	< 1.0	-
TPH (C8 - C10)	mg/kg	0.1	MCERTS	< 0.1	< 0.1	-	< 0.1	-
TPH (C10 - C12)	mg/kg	2	MCERTS	< 2.0	< 2.0	-	< 2.0	-
TPH (C12 - C16)	mg/kg	4	MCERTS	< 4.0	< 4.0	-	< 4.0	-
TPH (C16 - C21)	mg/kg	1	MCERTS	< 1.0	< 1.0	-	< 1.0	-
TPH (C21 - C35)	mg/kg	1	MCERTS	< 1.0	< 1.0	-	< 1.0	-
TPH (C35 - C44)	mg/kg	10	NONE	< 10	< 10	-	< 10	-
TPH Total C5 - C44	mg/kg	10	NONE	< 10	< 10	-	< 10	-

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Lab Sample Number				1856430	1856431	1856432	1856433	1856434
Sample Reference				WS8	WS9	WS10	WS11	WS12
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.40	0.40	0.40	0.40	0.40
Date Sampled				28/04/2021	28/04/2021	28/04/2021	28/04/2021	28/04/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	5.7	7.1	9.3	8.7	9.4
Total mass of sample received	kg	0.001	NONE	0.50	1.2	1.2	1.2	1.2
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	Chrysotile	-	-	-	-
Asbestos in Soil	Type	N/A	ISO 17025	Detected	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	3.127	-	-	-	-
Asbestos Quantification Total	%	0.001	ISO 17025	3.13	-	-	-	-
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	8.6	8.2	10.8	7.9	8.0
Total Organic Carbon (TOC)	%	0.1	MCERTS	2.7	1.2	1.6	1.0	1.7
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	2.2	< 0.05	< 0.05	0.48	< 0.05
Anthracene	mg/kg	0.05	MCERTS	0.43	< 0.05	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	5.9	0.46	0.48	0.81	0.50
Pyrene	mg/kg	0.05	MCERTS	4.8	0.41	0.55	0.72	0.50
Benzo(a)anthracene	mg/kg	0.05	MCERTS	3.8	0.26	0.43	0.44	0.24
Chrysene	mg/kg	0.05	MCERTS	2.3	0.27	0.36	0.38	0.38
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	3.4	0.35	0.47	0.48	0.52
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	1.5	0.21	0.26	0.26	0.13
Benzo(a)pyrene	mg/kg	0.05	MCERTS	2.6	0.32	0.47	0.42	0.34
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	1.6	< 0.05	0.31	0.30	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.53	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	1.7	< 0.05	0.38	0.31	< 0.05
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	30.7	2.28	3.71	4.60	2.61
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	34	16	17	19	18
Boron (water soluble)	mg/kg	0.2	MCERTS	2.3	0.9	0.3	0.6	1.1
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	32	22	25	25	25
Copper (aqua regia extractable)	mg/kg	1	MCERTS	110	37	27	30	40
Lead (aqua regia extractable)	mg/kg	1	MCERTS	320	140	250	110	140
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.9	< 0.3	< 0.3	< 0.3	0.9
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	48	18	19	23	21
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	310	120	160	190	180

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Lab Sample Number				1856430	1856431	1856432	1856433	1856434
Sample Reference				WS8	WS9	WS10	WS11	WS12
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.40	0.40	0.40	0.40	0.40
Date Sampled				28/04/2021	28/04/2021	28/04/2021	28/04/2021	28/04/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic > EC35 - EC44	mg/kg	8.4	NONE	< 8.4	< 8.4	< 8.4	< 8.4	< 8.4
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic (EC5 - EC44)	mg/kg	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	16	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	50	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic > EC35 - EC44	mg/kg	8.4	NONE	< 8.4	< 8.4	< 8.4	< 8.4	< 8.4
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	66	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic (EC5 - EC44)	mg/kg	10	NONE	66	< 10	< 10	< 10	< 10
TPH (>C5 - C7)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH (>C7 - C8)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH (C8 - C10)	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH (C10 - C12)	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH (C12 - C16)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
TPH (C16 - C21)	mg/kg	1	MCERTS	16	< 1.0	< 1.0	< 1.0	< 1.0
TPH (C21 - C35)	mg/kg	1	MCERTS	50	< 1.0	< 1.0	< 1.0	< 1.0
TPH (C35 - C44)	mg/kg	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH Total C5 - C44	mg/kg	10	NONE	66	< 10	< 10	< 10	< 10

U/S = Unsuitable Sample I/S = Insufficient Sample

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Lab Sample Number				1856435	1856436	1856437	1856438	1856439
Sample Reference				WS13	WS13	WS14	WS15	WS16
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.40	1.00	0.40	0.40	0.40
Date Sampled				28/04/2021	28/04/2021	28/04/2021	28/04/2021	28/04/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	6.3	14	8.7	11	7.9
Total mass of sample received	kg	0.001	NONE	1.2	0.40	1.2	1.2	1.2
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	-	-
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	-	-	-	-
Asbestos Quantification Total	%	0.001	ISO 17025	-	-	-	-	-
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	8.2	8.3	8.4	8.3	7.9
Total Organic Carbon (TOC)	%	0.1	MCERTS	1.1	0.4	2.5	1.2	1.2
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.31	< 0.05	0.55	0.66	0.27
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	0.59	< 0.05	0.81	1.7	0.42
Pyrene	mg/kg	0.05	MCERTS	0.54	< 0.05	0.69	1.5	0.39
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.39	< 0.05	0.46	0.73	< 0.05
Chrysene	mg/kg	0.05	MCERTS	0.39	< 0.05	0.41	1.0	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	0.40	< 0.05	0.48	1.1	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.29	< 0.05	< 0.05	0.66	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.36	< 0.05	0.41	0.87	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.26	0.60	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.30	0.59	< 0.05
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	3.27	< 0.80	4.37	9.38	1.08
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	17	18	19	19	16
Boron (water soluble)	mg/kg	0.2	MCERTS	0.7	1.2	0.7	0.8	0.8
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	23	30	28	29	25
Copper (aqua regia extractable)	mg/kg	1	MCERTS	35	14	42	43	27
Lead (aqua regia extractable)	mg/kg	1	MCERTS	110	26	85	170	370
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	22	28	33	28	21
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	160	55	110	150	110

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Lab Sample Number				1856435	1856436	1856437	1856438	1856439
Sample Reference				WS13	WS13	WS14	WS15	WS16
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.40	1.00	0.40	0.40	0.40
Date Sampled				28/04/2021	28/04/2021	28/04/2021	28/04/2021	28/04/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic > EC35 - EC44	mg/kg	8.4	NONE	< 8.4	< 8.4	< 8.4	< 8.4	< 8.4
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic (EC5 - EC44)	mg/kg	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	< 10	< 10	15	< 10
TPH-CWG - Aromatic > EC35 - EC44	mg/kg	8.4	NONE	< 8.4	< 8.4	< 8.4	< 8.4	< 8.4
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10	22	< 10
TPH-CWG - Aromatic (EC5 - EC44)	mg/kg	10	NONE	< 10	< 10	< 10	22	< 10
TPH (>C5 - C7)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH (>C7 - C8)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH (C8 - C10)	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH (C10 - C12)	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH (C12 - C16)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
TPH (C16 - C21)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	6.8	< 1.0
TPH (C21 - C35)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	15	< 1.0
TPH (C35 - C44)	mg/kg	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH Total C5 - C44	mg/kg	10	NONE	< 10	< 10	< 10	22	< 10

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number: 21-72260
Project / Site name: Richmond

Lab Sample Number				1856440	1856441
Sample Reference				WS17	WS18
Sample Number				None Supplied	None Supplied
Depth (m)				0.40	0.40
Date Sampled				28/04/2021	28/04/2021
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
Stone Content	%	0.1	NONE	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	7.9	6.1
Total mass of sample received	kg	0.001	NONE	1.2	1.0
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	-
Asbestos Quantification Total	%	0.001	ISO 17025	-	-
General Inorganics					
pH - Automated	pH Units	N/A	MCERTS	8.1	8.2
Total Organic Carbon (TOC)	%	0.1	MCERTS	1.1	1.9
Total Phenols					
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0
Speciated PAHs					
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	0.46
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	0.56	1.0
Pyrene	mg/kg	0.05	MCERTS	0.49	0.87
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.29	0.57
Chrysene	mg/kg	0.05	MCERTS	0.28	0.38
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	0.71
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	0.18
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.57
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.33
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	0.42
Total PAH					
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	1.62	5.49
Heavy Metals / Metalloids					
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	17	18
Boron (water soluble)	mg/kg	0.2	MCERTS	0.7	0.6
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	25	25
Copper (aqua regia extractable)	mg/kg	1	MCERTS	26	41
Lead (aqua regia extractable)	mg/kg	1	MCERTS	92	280
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	20	20
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	120	110

Analytical Report Number: 21-72260
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Lab Sample Number				1856440	1856441
Sample Reference				WS17	WS18
Sample Number				None Supplied	None Supplied
Depth (m)				0.40	0.40
Date Sampled				28/04/2021	28/04/2021
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
Petroleum Hydrocarbons					
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0
TPH-CWG - Aliphatic > EC35 - EC44	mg/kg	8.4	NONE	< 8.4	< 8.4
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10
TPH-CWG - Aliphatic (EC5 - EC44)	mg/kg	10	NONE	< 10	< 10
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	< 10
TPH-CWG - Aromatic > EC35 - EC44	mg/kg	8.4	NONE	< 8.4	< 8.4
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	11
TPH-CWG - Aromatic (EC5 - EC44)	mg/kg	10	NONE	< 10	11
TPH (>C5 - C7)	mg/kg	1	MCERTS	< 1.0	< 1.0
TPH (>C7 - C8)	mg/kg	1	MCERTS	< 1.0	< 1.0
TPH (C8 - C10)	mg/kg	0.1	MCERTS	< 0.1	< 0.1
TPH (C10 - C12)	mg/kg	2	MCERTS	< 2.0	< 2.0
TPH (C12 - C16)	mg/kg	4	MCERTS	< 4.0	< 4.0
TPH (C16 - C21)	mg/kg	1	MCERTS	< 1.0	2.9
TPH (C21 - C35)	mg/kg	1	MCERTS	< 1.0	7.7
TPH (C35 - C44)	mg/kg	10	NONE	< 10	< 10
TPH Total C5 - C44	mg/kg	10	NONE	< 10	11

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number: 21-72260
Project / Site name: Richmond
Your Order No:

Certificate of Analysis - Asbestos Quantification

Methods:

Qualitative Analysis

The samples were analysed qualitatively for asbestos by polarising light and dispersion staining as described by the Health and Safety Executive in HSG 248.

Quantitative Analysis

The analysis was carried out using our documented in-house method A006-PL based on HSE Contract Research Report No: 83/1996: Development and Validation of an analytical method to determine the amount of asbestos in soils and loose aggregates (Davies et al, 1996) and HSG 248. Our method includes initial examination of the entire representative sample, then fractionation and detailed analysis of each fraction, with quantification by hand picking and weighing.

The limit of detection (reporting limit) of this method is 0.001 %.

The method has been validated using samples of at least 100 g, results for samples smaller than this should be interpreted with caution.

Both Qualitative and Quantitative Analyses are UKAS accredited.

Sample Number	Sample ID	Sample Depth (m)	Sample Weight (g)	Asbestos Containing Material Types Detected (ACM)	PLM Results	Asbestos by hand picking/weighing (%)	Total % Asbestos in Sample
1856421	WS2	0.20-0.45	165	Loose Fibrous Debris	**Crocidolite**	0.006	**0.006**
1856426	WS6	0.40	220	Loose Fibrous Debris	**Chrysotile**	< 0.001	**< 0.001**
1856430	WS8	0.40	158	Hard/Cement Type Material	**Chrysotile**	3.127	**3.13**

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

Analytical Report Number : 21-72260
Project / Site name: Richmond

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1856420	WS1	None Supplied	0.4	Brown sandy loam with gravel and vegetation.
1856421	WS2	None Supplied	0.20-0.45	Brown sandy loam with gravel and vegetation.
1856422	WS2	None Supplied	1	Brown clay and sand with gravel.
1856423	WS4	None Supplied	0.4	Brown clay and loam with gravel and vegetation.
1856424	WS5	None Supplied	0.4	Brown clay and loam with gravel and brick.
1856425	WS5	None Supplied	1	Brown clay and loam.
1856426	WS6	None Supplied	0.4	Brown loam and clay with gravel and vegetation.
1856428	WS7	None Supplied	0.4	Brown sandy loam with gravel and vegetation.
1856430	WS8	None Supplied	0.4	Brown sandy loam with gravel.
1856431	WS9	None Supplied	0.4	Brown loam and clay with gravel.
1856432	WS10	None Supplied	0.4	Brown loam and clay with gravel and brick.
1856433	WS11	None Supplied	0.4	Brown loam and clay with gravel and brick.
1856434	WS12	None Supplied	0.4	Brown loam and clay with gravel and vegetation.
1856435	WS13	None Supplied	0.4	Brown loam and clay with gravel and brick.
1856436	WS13	None Supplied	1	Brown loam and clay with gravel and vegetation.
1856437	WS14	None Supplied	0.4	Brown clay and loam with gravel.
1856438	WS15	None Supplied	0.4	Brown loam and clay with gravel and vegetation.
1856439	WS16	None Supplied	0.4	Brown sandy clay with gravel and vegetation.
1856440	WS17	None Supplied	0.4	Brown sandy clay with gravel and vegetation.
1856441	WS18	None Supplied	0.4	Brown sandy clay with gravel and vegetation.

Analytical Report Number : 21-72260
Project / Site name: Richmond

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS
TPH in (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	D	NONE
Asbestos Quantification - Gravimetric	Asbestos quantification by gravimetric method - in house method based on references.	HSE Report No: 83/1996, HSG 248, HSG 264 & SCA Blue Book (draft).	A006-PL	D	ISO 17025
D.O. for Gravimetric Quant if Screen/ID positive	Dependent option for Gravimetric Quant if Screen/ID positive scheduled.	In house asbestos methods A001 & A006.	A006-PL	D	NONE

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

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Analytical Report Number : 21-72267

Project / Site name:	Richmond	**Samples received on:**	29/04/2021
Your job number:	CRM.1265.087	**Samples instructed on/ Analysis started on:**	30/04/2021
Your order number:		**Analysis completed by:**	12/05/2021
Report Issue Number:	1	**Report issued on:**	12/05/2021
Samples Analysed:	5 wac multi samples		

Signed:

Zina Abdul Razzak
Senior Quality Specialist
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

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Waste Acceptance Criteria Analytical Results

Report No:	**21-72267**						
					Client:	**ENZYGOGEO**	
Location	**Richmond**						
Lab Reference (Sample Number)	1856455				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	28/04/2021				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	WS1						
Depth (m)	0.40						
Solid Waste Analysis							
TOC (%)**	1.4				3%	5%	6%
Loss on Ignition (%) **	3.7				--	--	10%
BTEX (µg/kg) **	< 10				6000	--	--
Sum of PCBs (mg/kg) **	< 0.30				1	--	--
Mineral Oil (mg/kg) #	95				500	--	--
Total PAH (WAC-17) (mg/kg)	81.9				100	--	--
pH (units)**	7.9				--	>6	--
Acid Neutralisation Capacity (mol / kg)	3.8				--	To be evaluated	To be evaluated
Eluate Analysis	2:1	8:1		Cumulative 10:1	Limit values for compliance leaching test		
(BS EN 12457 - 3 preparation utilising end over end leaching procedure)	mg/l	mg/l		mg/kg	using BS EN 12457-3 at L/S 10 l/kg (mg/kg)		
Arsenic *	< 0.010	< 0.010		0.080	0.5	2	25
Barium *	0.023	0.043		0.41	20	100	300
Cadmium *	< 0.0005	< 0.0005		0.0035	0.04	1	5
Chromium *	< 0.0010	0.0010		0.0095	0.5	10	70
Copper *	0.032	0.026		0.26	2	50	100
Mercury *	< 0.0015	< 0.0015		< 0.010	0.01	0.2	2
Molybdenum *	< 0.0030	< 0.0030		< 0.020	0.5	10	30
Nickel *	0.0068	0.0058		0.059	0.4	10	40
Lead *	0.0098	0.057		0.52	0.5	10	50
Antimony *	0.014	0.0060		0.069	0.06	0.7	5
Selenium *	< 0.010	< 0.010		0.049	0.1	0.5	7
Zinc *	0.017	0.0398		0.37	4	50	200
Chloride *	< 4.0	< 4.0		38	800	15000	25000
Fluoride	0.76	0.59		6.1	10	150	500
Sulphate *	5.6	6.6		65	1000	20000	50000
TDS*	91	60		630	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.13	< 0.13		< 0.50	1	-	-
DOC	15	23		220	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	1.2						
Dry Matter (%)	92						
Moisture (%)	8.3						
Stage 1							
Volume Eluate L2 (litres)	0.34						
Filtered Eluate VE1 (litres)	0.19						

Results are expressed on a dry weight basis, after correction for moisture content where applicable.

*= UKAS accredited (liquid eluate analysis only)

Stated limits are for guidance only and i2 cannot be held responsible for any discrepancies with current legislation

** = MCERTS accredited

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes as defined by the Waste (England and Wales) Regulations 2011 (as amended) and EA Guidance WM3.
This analysis is only applicable for landfill acceptance criteria (The Environmental Permitting (England and Wales) Regulations) and does not give any indication as to whether a waste may be hazardous or non-hazardous.

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Waste Acceptance Criteria Analytical Results

Report No:	**21-72267**						
					Client:	**ENZYGOGEO**	
Location	**Richmond**						
Lab Reference (Sample Number)	1856456				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	28/04/2021				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	WS6						
Depth (m)	1.00						
Solid Waste Analysis							
TOC (%)**	0.4				3%	5%	6%
Loss on Ignition (%) **	2.2				--	--	10%
BTEX (µg/kg) **	< 10				6000	--	--
Sum of PCBs (mg/kg) **	< 0.30				1	--	--
Mineral Oil (mg/kg) #	49				500	--	--
Total PAH (WAC-17) (mg/kg)	< 0.85				100	--	--
pH (units)**	7.5				--	>6	--
Acid Neutralisation Capacity (mol / kg)	1.7				--	To be evaluated	To be evaluated
Eluate Analysis	2:1	8:1		Cumulative 10:1	Limit values for compliance leaching test		
(BS EN 12457 - 3 preparation utilising end over end leaching procedure)	mg/l	mg/l		mg/kg	using BS EN 12457-3 at L/S 10 l/kg (mg/kg)		
Arsenic *	< 0.010	< 0.010		< 0.050	0.5	2	25
Barium *	0.0058	0.029		0.27	20	100	300
Cadmium *	< 0.0005	< 0.0005		< 0.0020	0.04	1	5
Chromium *	< 0.0010	< 0.0010		< 0.0050	0.5	10	70
Copper *	0.0086	0.0067		0.069	2	50	100
Mercury *	< 0.0015	< 0.0015		< 0.010	0.01	0.2	2
Molybdenum *	< 0.0030	< 0.0030		< 0.020	0.5	10	30
Nickel *	0.013	0.0040		0.047	0.4	10	40
Lead *	< 0.0050	< 0.0050		< 0.020	0.5	10	50
Antimony *	< 0.0050	< 0.0050		< 0.020	0.06	0.7	5
Selenium *	< 0.010	< 0.010		< 0.040	0.1	0.5	7
Zinc *	0.014	0.0067		0.074	4	50	200
Chloride *	< 4.0	4.7		45	800	15000	25000
Fluoride	0.15	0.16		1.6	10	150	500
Sulphate *	7.4	5.1		53	1000	20000	50000
TDS*	45	34		350	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.13	< 0.13		< 0.50	1	-	-
DOC	8.6	21		200	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	0.80						
Dry Matter (%)	86						
Moisture (%)	14						
Stage 1							
Volume Eluate L2 (litres)	0.32						
Filtered Eluate VE1 (litres)	0.15						

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Waste Acceptance Criteria Analytical Results

Report No:	21-72267						
					Client: ENZYGOGEO		
Location	Richmond						
Lab Reference (Sample Number)	1856457				Landfill Waste Acceptance Criteria Limits		
Sampling Date	28/04/2021				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	WS8						
Depth (m)	1.00						
Solid Waste Analysis							
TOC (%)**	0.6				3%	5%	6%
Loss on Ignition (%) **	2.2				--	--	10%
BTEX (µg/kg) **	< 10				6000	--	--
Sum of PCBs (mg/kg) **	< 0.30				1	--	--
Mineral Oil (mg/kg) #	< 10				500	--	--
Total PAH (WAC-17) (mg/kg)	< 0.85				100	--	--
pH (units)**	7.6				--	>6	--
Acid Neutralisation Capacity (mol / kg)	1.4				--	To be evaluated	To be evaluated
Eluate Analysis	2:1	8:1		Cumulative 10:1	Limit values for compliance leaching test		
(BS EN 12457 - 3 preparation utilising end over end leaching procedure)	mg/l	mg/l		mg/kg	using BS EN 12457-3 at L/S 10 l/kg (mg/kg)		
Arsenic *	< 0.010	< 0.010		< 0.050	0.5	2	25
Barium *	0.0075	0.031		0.29	20	100	300
Cadmium *	< 0.0005	< 0.0005		< 0.0020	0.04	1	5
Chromium *	< 0.0010	< 0.0010		0.0090	0.5	10	70
Copper *	0.0047	0.017		0.16	2	50	100
Mercury *	< 0.0015	< 0.0015		< 0.010	0.01	0.2	2
Molybdenum *	< 0.0030	< 0.0030		< 0.020	0.5	10	30
Nickel *	0.0042	0.0044		0.044	0.4	10	40
Lead *	< 0.0050	< 0.0050		< 0.020	0.5	10	50
Antimony *	< 0.0050	< 0.0050		< 0.020	0.06	0.7	5
Selenium *	< 0.010	< 0.010		0.046	0.1	0.5	7
Zinc *	0.013	0.0128		0.13	4	50	200
Chloride *	< 4.0	4.2		41	800	15000	25000
Fluoride	0.27	0.24		2.5	10	150	500
Sulphate *	4.4	6.1		60	1000	20000	50000
TDS*	52	39		400	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.13	< 0.13		< 0.50	1	-	-
DOC	9.1	19		180	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	0.80						
Dry Matter (%)	87						
Moisture (%)	13						
Stage 1							
Volume Eluate L2 (litres)	0.32						
Filtered Eluate VE1 (litres)	0.14						

Results are expressed on a dry weight basis, after correction for moisture content where applicable.

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Waste Acceptance Criteria Analytical Results
Report No: 21-72267

					Client:	**ENZYGOGEO**	
Location	**Richmond**						
Lab Reference (Sample Number)	1856458				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	28/04/2021				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	WS10						
Depth (m)	0.40						
Solid Waste Analysis							
TOC (%)**	0.7				3%	5%	6%
Loss on Ignition (%) **	2.3				--	--	10%
BTEX (µg/kg) **	< 10				6000	--	--
Sum of PCBs (mg/kg) **	< 0.30				1	--	--
Mineral Oil (mg/kg) #	< 10				500	--	--
Total PAH (WAC-17) (mg/kg)	3.71				100	--	--
pH (units)**	8.1				--	>6	--
Acid Neutralisation Capacity (mol / kg)	7.5				--	To be evaluated	To be evaluated
Eluate Analysis	2:1	8:1		Cumulative 10:1	Limit values for compliance leaching test		
(BS EN 12457 - 3 preparation utilising end over end leaching procedure)	mg/l	mg/l		mg/kg	using BS EN 12457-3 at L/S 10 l/kg (mg/kg)		
Arsenic *	< 0.010	< 0.010		< 0.050	0.5	2	25
Barium *	0.020	0.023		0.23	20	100	300
Cadmium *	< 0.0005	< 0.0005		0.0032	0.04	1	5
Chromium *	0.0072	0.012		0.11	0.5	10	70
Copper *	0.012	0.018		0.17	2	50	100
Mercury *	< 0.0015	< 0.0015		< 0.010	0.01	0.2	2
Molybdenum *	< 0.0030	< 0.0030		< 0.020	0.5	10	30
Nickel *	0.0031	0.0043		0.042	0.4	10	40
Lead *	< 0.0050	0.026		0.23	0.5	10	50
Antimony *	0.011	< 0.0050		0.042	0.06	0.7	5
Selenium *	< 0.010	< 0.010		0.052	0.1	0.5	7
Zinc *	0.0079	0.0285		0.26	4	50	200
Chloride *	< 4.0	< 4.0		35	800	15000	25000
Fluoride	0.54	0.40		4.1	10	150	500
Sulphate *	9.3	23		220	1000	20000	50000
TDS*	94	80		820	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.13	< 0.13		< 0.50	1	-	-
DOC	8.0	13		120	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	1.2						
Dry Matter (%)	91						
Moisture (%)	9.3						
Stage 1							
Volume Eluate L2 (litres)	0.33						
Filtered Eluate VE1 (litres)	0.20						
Results are expressed on a dry weight basis, after correction for moisture content where applicable.					*= UKAS accredited (liquid eluate analysis only)		
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Waste Acceptance Criteria Analytical Results		
Report No:	**21-72267**	
		Client: **ENZYGOGEO**

Location	Richmond						
Lab Reference (Sample Number)	1856459				Landfill Waste Acceptance Criteria Limits		
Sampling Date	28/04/2021						
Sample ID	WS18				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Depth (m)	0.40						
Solid Waste Analysis							
TOC (%)**	0.9				3%	5%	6%
Loss on Ignition (%) **	3.0				--	--	10%
BTEX (µg/kg) **	< 10				6000	--	--
Sum of PCBs (mg/kg) **	< 0.30				1	--	--
Mineral Oil (mg/kg) #	< 10				500	--	--
Total PAH (WAC-17) (mg/kg)	10.4				100	--	--
pH (units)**	7.4				--	>6	--
Acid Neutralisation Capacity (mol / kg)	1.1				--	To be evaluated	To be evaluated
Eluate Analysis	2:1	8:1		Cumulative 10:1	Limit values for compliance leaching test		
(BS EN 12457 - 3 preparation utilising end over end leaching procedure)	mg/l	mg/l		mg/kg	using BS EN 12457-3 at L/S 10 l/kg (mg/kg)		
Arsenic *	< 0.010	< 0.010		< 0.050	0.5	2	25
Barium *	0.017	0.019		0.18	20	100	300
Cadmium *	< 0.0005	< 0.0005		0.0025	0.04	1	5
Chromium *	< 0.0010	< 0.0010		0.0099	0.5	10	70
Copper *	0.021	0.016		0.16	2	50	100
Mercury *	< 0.0015	< 0.0015		< 0.010	0.01	0.2	2
Molybdenum *	< 0.0030	< 0.0030		< 0.020	0.5	10	30
Nickel *	0.0092	0.0046		0.051	0.4	10	40
Lead *	< 0.0050	0.0072		0.070	0.5	10	50
Antimony *	0.024	0.0058		0.075	0.06	0.7	5
Selenium *	< 0.010	< 0.010		< 0.040	0.1	0.5	7
Zinc *	0.0099	0.0230		0.22	4	50	200
Chloride *	< 4.0	< 4.0		33	800	15000	25000
Fluoride	0.58	0.45		4.6	10	150	500
Sulphate *	5.3	8.5		82	1000	20000	50000
TDS*	95	72		740	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.13	< 0.13		< 0.50	1	-	-
DOC	13	17		170	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	1.0						
Dry Matter (%)	94						
Moisture (%)	6.1						
Stage 1							
Volume Eluate L2 (litres)	0.34						
Filtered Eluate VE1 (litres)	0.16						

Results are expressed on a dry weight basis, after correction for moisture content where applicable.

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Analytical Report Number : 21-72267
Project / Site name: Richmond

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1856455	WS1	None Supplied	0.4	Brown sandy loam with gravel and vegetation.
1856456	WS6	None Supplied	1	Brown clay and sand.
1856457	WS8	None Supplied	1	Brown clay.
1856458	WS10	None Supplied	0.4	Brown loam and clay with gravel and brick.
1856459	WS18	None Supplied	0.4	Brown sandy clay with gravel and vegetation.

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Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Preparation WAC leachate		In-house method	L043-PL	W	NONE
Speciated WAC-17 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270. MCERTS accredited except Coronene.	L064-PL	D	MCERTS
Chloride in WAC leachate (BS EN 12457-3 Prep)	Determination of Chloride colorimetrically by discrete analyser.	In house based on MEWAM Method ISBN 0117516260.	L082-PL	W	ISO 17025
Fluoride in WAC leachate (BS EN 12457-3 Prep)	Determination of fluoride in leachate by 1:1ratio with a buffer solution followed by Ion Selective Electrode.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L033-PL	W	ISO 17025
Phenol Index in WAC leachate (BS EN 12457-3 Prep)	Determination of monohydric phenols in leachate by continuous flow analyser.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
Sulphate in WAC leachate (BS EN 12457-3 Prep)	Determination of sulphate in leachate by acidification followed by ICP-OES.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L039-PL	W	ISO 17025
TDS in WAC leachate (BS EN 12457-3 Prep)	Determination of total dissolved solids in leachate by electrometric measurement.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L031-PL	W	NONE
DOC in WAC leachate (BS EN 12457-3 Prep)	Determination of dissolved organic carbon in leachate by TOC/DOC NDIR analyser.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L037-PL	W	NONE
Acid neutralisation capacity of soil	Determination of acid neutralisation capacity by addition of acid or alkali followed by electronic probe.	In-house method based on Guidance an Sampling and Testing of Wastes to Meet Landfill Waste Acceptance	L046-PL	W	NONE
Loss on ignition of soil @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace.	In house method.	L047-PL	D	MCERTS
Mineral Oil in Soil C10 - C40	Determination of dichloromethane/hexane extractable hydrocarbons in soil by GC-MS.	In-house method based on USEPA 8270	L076-PL	D	NONE
pH in soil	Determination of pH in soil by addition of water followed by electrometric measurement.	In house method.	L005-PL	W	MCERTS
Total organic carbon in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L023-PL	D	MCERTS
Metals in WAC leachate (BS EN 12457-3 Prep)	Determination of metals in leachate by acidification followed by ICP-OES.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L039-PL	W	ISO 17025
PCB's by GC-MS in soil	Determination of PCB by extraction with acetone and hexane followed by GC-MS.	In-house method based on USEPA 8082	L027-PL	D	MCERTS

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Project / Site name: Richmond

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
BTEX (Sum of BTEX compounds) in soil	Determination of BTEX in soil by headspace GC-MS. Individual components MCERTS accredited	In-house method based on USEPA8260	L073B-PL	W	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

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Analytical Report Number : 21-18748

Project / Site name:	Richmond	**Samples received on:**	26/10/2021
Your job number:	CRM 1265 087	**Samples instructed on/ Analysis started on:**	26/10/2021
Your order number:		**Analysis completed by:**	02/11/2021
Report Issue Number:	1	**Report issued on:**	02/11/2021
Samples Analysed:	6 soil samples		

Signed: Karolina Marek

Karolina Marek
PL Head of Reporting Team
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 21-18748
Project / Site name: Richmond

Lab Sample Number				2060566	2060567	2060568	2060569	2060570
Sample Reference				WS101	WS102	WS103	WS104	WS105
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.30-0.50	0.30-0.40	0.30-0.45	0.30-0.50	0.35-0.45
Date Sampled				25/10/2021	25/10/2021	25/10/2021	25/10/2021	25/10/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	12	15	16	10	6.6
Total mass of sample received	kg	0.001	NONE	1.0	1.0	1.0	1.0	1.0
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	10.3	9.8	8.9	10.8	11.1
Total Organic Carbon (TOC)	%	0.1	MCERTS	0.9	1.1	1.7	1.2	1.5
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	0.33	< 0.05	0.28	0.37
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	0.28	0.48	< 0.05	0.59	0.50
Pyrene	mg/kg	0.05	MCERTS	0.30	0.57	< 0.05	0.50	0.49
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.28	0.66	< 0.05	0.43	0.37
Chrysene	mg/kg	0.05	MCERTS	0.20	0.49	< 0.05	0.39	0.33
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	1.1	< 0.05	0.43	0.29
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	0.74	< 0.05	0.26	0.24
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	1.3	< 0.05	0.34	0.30
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.72	< 0.05	0.27	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	0.91	< 0.05	0.33	< 0.05
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	1.06	7.35	< 0.80	3.82	2.89
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	19	18	30	83	23
Boron (water soluble)	mg/kg	0.2	MCERTS	0.7	0.7	1.7	14	2.5
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	37	25	35	64	32
Copper (aqua regia extractable)	mg/kg	1	MCERTS	470	28	79	340	180
Lead (aqua regia extractable)	mg/kg	1	MCERTS	180	1400	130	510	320
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	1.1	< 0.3	0.6	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	35	17	44	34	30
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	470	230	110	340	260

Analytical Report Number: 21-18748
Project / Site name: Richmond

Lab Sample Number				2060566	2060567	2060568	2060569	2060570
Sample Reference				WS101	WS102	WS103	WS104	WS105
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.30-0.50	0.30-0.40	0.30-0.45	0.30-0.50	0.35-0.45
Date Sampled				25/10/2021	25/10/2021	25/10/2021	25/10/2021	25/10/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	5.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	68	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	82	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0	36	< 8.0	< 8.0
TPH-CWG - Aliphatic > EC35 - EC44	mg/kg	8.4	NONE	< 8.4	< 8.4	17	< 8.4	< 8.4
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	190	< 10	< 10
TPH-CWG - Aliphatic (EC5 - EC44)	mg/kg	10	NONE	< 10	< 10	210	< 10	< 10
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	13	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	< 10	58	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	30	50	< 10	< 10
TPH-CWG - Aromatic > EC35 - EC44	mg/kg	8.4	NONE	< 8.4	27	38	< 8.4	< 8.4
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	36	120	< 10	< 10
TPH-CWG - Aromatic (EC5 - EC44)	mg/kg	10	NONE	< 10	63	160	< 10	< 10
TPH (>C5 - C7)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH (>C7 - C8)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH (C8 - C10)	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH (C10 - C12)	mg/kg	2	MCERTS	< 2.0	< 2.0	5.0	< 2.0	< 2.0
TPH (C12 - C16)	mg/kg	4	MCERTS	< 4.0	< 4.0	82	< 4.0	< 4.0
TPH (C16 - C21)	mg/kg	1	MCERTS	< 1.0	6.2	140	< 1.0	< 1.0
TPH (C21 - C35)	mg/kg	1	MCERTS	< 1.0	30	86	< 1.0	< 1.0
TPH (C35 - C44)	mg/kg	10	NONE	< 10	27	55	< 10	< 10
TPH Total C5 - C44	mg/kg	10	NONE	< 10	63	370	< 10	< 10

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number: 21-18748
Project / Site name: Richmond

Lab Sample Number				2060571
Sample Reference				WS106
Sample Number				None Supplied
Depth (m)				0.30-0.40
Date Sampled				25/10/2021
Time Taken				None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**	
Stone Content	%	0.1	NONE	< 0.1
Moisture Content	%	0.01	NONE	9.9
Total mass of sample received	kg	0.001	NONE	1.0
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected
General Inorganics				
pH - Automated	pH Units	N/A	MCERTS	10.3
Total Organic Carbon (TOC)	%	0.1	MCERTS	1.0
Total Phenols				
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0
Speciated PAHs				
Naphthalene	mg/kg	0.05	MCERTS	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	0.33
Pyrene	mg/kg	0.05	MCERTS	0.35
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.21
Chrysene	mg/kg	0.05	MCERTS	0.21
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05
Total PAH				
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	1.10
Heavy Metals / Metalloids				
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	8.4
Boron (water soluble)	mg/kg	0.2	MCERTS	3.1
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	25
Copper (aqua regia extractable)	mg/kg	1	MCERTS	17
Lead (aqua regia extractable)	mg/kg	1	MCERTS	45
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	17
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	49

Analytical Report Number: 21-18748
Project / Site name: Richmond

Lab Sample Number				2060571
Sample Reference				WS106
Sample Number				None Supplied
Depth (m)				0.30-0.40
Date Sampled				25/10/2021
Time Taken				None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**	
Petroleum Hydrocarbons				
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	13
TPH-CWG - Aliphatic > EC35 - EC44	mg/kg	8.4	NONE	23
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	13
TPH-CWG - Aliphatic (EC5 - EC44)	mg/kg	10	NONE	36
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	32
TPH-CWG - Aromatic > EC35 - EC44	mg/kg	8.4	NONE	62
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	35
TPH-CWG - Aromatic (EC5 - EC44)	mg/kg	10	NONE	96
TPH (>C5 - C7)	mg/kg	1	MCERTS	< 1.0
TPH (>C7 - C8)	mg/kg	1	MCERTS	< 1.0
TPH (C8 - C10)	mg/kg	0.1	MCERTS	< 0.1
TPH (C10 - C12)	mg/kg	2	MCERTS	< 2.0
TPH (C12 - C16)	mg/kg	4	MCERTS	< 4.0
TPH (C16 - C21)	mg/kg	1	MCERTS	2.5
TPH (C21 - C35)	mg/kg	1	MCERTS	45
TPH (C35 - C44)	mg/kg	10	NONE	85
TPH Total C5 - C44	mg/kg	10	NONE	130

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number : 21-18748
Project / Site name: Richmond

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2060566	WS101	None Supplied	0.30-0.50	Grey clay and sand with gravel.
2060567	WS102	None Supplied	0.30-0.40	Brown clay and sand with rubble.
2060568	WS103	None Supplied	0.30-0.45	Brown clay and sand with rubble.
2060569	WS104	None Supplied	0.30-0.50	Brown clay and sand with rubble.
2060570	WS105	None Supplied	0.35-0.45	Brown sand with rubble.
2060571	WS106	None Supplied	0.30-0.40	Brown sand with gravel and rubble.

Analytical Report Number : 21-18748
Project / Site name: Richmond

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS
TPH in (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	D	NONE
D.O. for Gravimetric Quant if Screen/ID positive	Dependent option for Gravimetric Quant if Screen/ID positive scheduled.	In house asbestos methods A001 & A006.	A006-PL	D	NONE

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Determinant	Units	GAC Value Residential					
		With Plant Uptake			Without Plant Uptake		
Arsenic	mg/kg	37			40		
Cadmium	mg/kg	11			85		
Chromium	mg/kg	910			910		
Chromium VI	mg/kg	6			6		
Lead	mg/kg	200			310		
Mercury	mg/kg	40			56		
Nickel	mg/kg	180			180		
Selenium	mg/kg	250			430		
Copper	mg/kg	2400			7100		
Zinc	mg/kg	3700			40000		
Cyanide	mg/kg	791			800		
SOM	%	1	2.5	6	1	2.5	6
Phenol	mg/kg	120	200	380	440	690	1200
Napthalene	mg/kg	2.3	5.6	13	2.3	5.6	13
Acenaphtylene	mg/kg	170	420	920	2900	4600	6000
Acenaphthene	mg/kg	210	510	1100	3000	4700	6000
Flourene	mg/kg	170	400	860	2800	3800	4500
Phenanthrene	mg/kg	95	220	440	1300	1500	1500
Anthracene	mg/kg	2400	5400	11000	31000	35000	37000
Fluoranthene	mg/kg	280	560	890	1500	1600	1600
Pyrene	mg/kg	620	1200	2000	3700	3800	3800
Benzo(a)Anthracene	mg/kg	7.2	11	13	11	14	15
Chrysene	mg/kg	15	22	27	30	31	32
Benzo(b)Flouranthene	mg/kg	2.6	3.3	3.7	3.9	4.0	4.0
Benzo(k)Flouranthene	mg/kg	77	93	100	110	110	110
Benzo(a)Pyrene	mg/kg	2.2	2.7	3.0	3.2	3.2	3.2
Indeno(123-cd)Pyrene	mg/kg	27	36	41	45	46	46
Dibenzo(a,h)Anthracene	mg/kg	0.24	0.28	0.3	0.31	0.32	0.32
Benzo(ghi)Perylene	mg/kg	320	340	350	360	360	360
TPH C_5-C_6 Aliphatic	mg/kg	**42**	**78**	**160**	**42**	**78**	**160**
TPH C_6-C_8 Aliphatic	mg/kg	**100**	**230**	**530**	**100**	**230**	**530**
TPH C_8-C_{10} Aliphatic	mg/kg	**27**	**65**	**150**	**27**	**65**	**150**
TPH C_{10}-C_{12} Aliphatic	mg/kg	130	330	760	**130**	**330**	**770**
TPH C_{12}-C_{16} Aliphatic	mg/kg	1100	2400	4300	**1100**	2400	4400
TPH C_{16}-C_{35} Aliphatic	mg/kg	65000	92000	110000	65000	92000	110000
TPH C_{35}-C_{44} Aliphatic	mg/kg	65000	92000	110000	65000	92000	110000
TPH C_5-C_7 Aromatic	mg/kg	70	140	300	370	690	1400
TPH C_7-C_8 Aromatic	mg/kg	130	290	660	860	1800	3900
TPH C_8-C_{10} Aromatic	mg/kg	34	83	190	47	110	270
TPH C_{10}-C_{12} Aromatic	mg/kg	**74**	**180**	**380**	250	590	1200
TPH C_{12}-C_{16} Aromatic	mg/kg	**140**	**330**	**660**	1800	**2300**	**2500**
TPH C_{16}-C_{21} Aromatic	mg/kg	**260**	**540**	**930**	**1900**	**1900**	**1900**
TPH C_{21}-C_{35} Aromatic	mg/kg	**1100**	**1500**	**1700**	**1900**	**1900**	**1900**
TPH C_{35}-C_{44} Aromatic	mg/kg	**1100**	**1500**	**1700**	**1900**	**1900**	**1900**
Benzene	mg/kg	0.087	0.17	0.37	0.38	0.70	1.4
Toluene	mg/kg	130	290	660	880	1900	3900
Ethylebenzene	mg/kg	47	110	260	83	190	440
Xylene	mg/kg	56	130	310	79	180	430

Determinant	Units	GAC Value					
		Residential POS			Commercial		
Arsenic	mg/kg	79			640		
Cadmium	mg/kg	120			190		
Chromium	mg/kg	1500			8600		
Chromium VI	mg/kg	7.7			33		
Lead	mg/kg	630			2330		
Mercury	mg/kg	120			1100		
Nickel	mg/kg	230			980		
Selenium	mg/kg	1100			12000		
Copper	mg/kg	12000			68000		
Zinc	mg/kg	81000			730000		
Cyanide	mg/kg	N/A			16200		
SOM	%	1	2.5	6	1	2.5	6
Phenol	mg/kg	440	690	1300	440	690	1300
Napthalene	mg/kg	4900	4900	4900	190	460	1100
Acenaphtylene	mg/kg	15000	15000	15000	83000	97000	100000
Acenaphthene	mg/kg	15000	15000	15000	84000	97000	100000
Flourene	mg/kg	9900	9900	9900	63000	68000	71000
Phenanthrene	mg/kg	3100	3100	3100	22000	22000	23000
Anthracene	mg/kg	74000	74000	74000	520000	540000	540000
Fluoranthene	mg/kg	3100	3100	3100	23000	23000	23000
Pyrene	mg/kg	7400	7400	7400	54000	54000	54000
Benzo(a)Anthracene	mg/kg	29	29	29	170	170	180
Chrysene	mg/kg	57	57	57	350	350	350
Benzo(b)Flouranthene	mg/kg	7.1	7.2	7.2	44	44	45
Benzo(k)Flouranthene	mg/kg	190	190	190	1200	1200	1200
Benzo(a)Pyrene	mg/kg	5.7	5.7	5.7	35	35	36
Indeno(123-cd)Pyrene	mg/kg	82	82	82	500	510	510
Dibenzo(a,h)Anthracene	mg/kg	0.57	0.57	0.58	3.5	3.6	3.6
Benzo(ghi)Perylene	mg/kg	640	640	640	3900	4000	4000
TPH C_5-C_6 Aliphatic	mg/kg	570000	590000	600000	**3200**	**5900**	**12000**
TPH C_6-C_8 Aliphatic	mg/kg	600000	610000	620000	**7800**	**17000**	**40000**
TPH C_8-C_{10} Aliphatic	mg/kg	13000	13000	13000	**2000**	**4800**	**11000**
TPH C_{10}-C_{12} Aliphatic	mg/kg	13000	13000	13000	**9700**	**23000**	47000
TPH C_{12}-C_{16} Aliphatic	mg/kg	13000	13000	13000	59000	82000	90000
TPH C_{16}-C_{35} Aliphatic	mg/kg	250000	250000	250000	1600000	1700000	1800000
TPH C_{35}-C_{44} Aliphatic	mg/kg	250000	250000	250000	1600000	1700000	1800000
TPH C_5-C_7 Aromatic	mg/kg	**56000**	**56000**	**56000**	26000	46000	86000
TPH C_7-C_8 Aromatic	mg/kg	**56000**	**56000**	**56000**	56000	110000	180000
TPH C_8-C_{10} Aromatic	mg/kg	**5000**	**5000**	**5000**	3500	8100	17000
TPH C_{10}-C_{12} Aromatic	mg/kg	**5000**	**5000**	**5000**	16000	28000	**34000**
TPH C_{12}-C_{16} Aromatic	mg/kg	**5100**	**5100**	**5000**	**36000**	**37000**	**38000**
TPH C_{16}-C_{21} Aromatic	mg/kg	**3800**	**3800**	**3800**	**28000**	**28000**	**28000**
TPH C_{21}-C_{35} Aromatic	mg/kg	**3800**	**3800**	**3800**	**28000**	**28000**	**28000**
TPH C_{35}-C_{44} Aromatic	mg/kg	**3800**	**3800**	**3800**	**28000**	**28000**	**28000**
Benzene	mg/kg	72	72	73	27	47	90
Toluene	mg/kg	56000	56000	56000	56000	110000	180000
Ethylebenzene	mg/kg	24000	24000	25000	5700	13000	27000
Xylene	mg/kg	41000	42000	43000	5900	14000	30000

Determinant	Units	GAC Value					
		Park POS			Allotments		
Arsenic	mg/kg	170			43		
Cadmium	mg/kg	532			1.9		
Chromium	mg/kg	33000			18000		
Chromium VI	mg/kg	220			1.8		
Lead	mg/kg	1300			80		
Mercury	mg/kg	240			19		
Nickel	mg/kg	3400			230		
Selenium	mg/kg	1800			88		
Copper	mg/kg	44000			520		
Zinc	mg/kg	170000			620		
Cyanide	mg/kg						
SOM	%	1	2.5	6	1	2.5	6
Phenol	mg/kg	440	690	1300	23	42	83
Napthalene	mg/kg	1200	1900	3000	4.1	10	24
Acenaphtylene	mg/kg	29000	30000	30000	28	69	160
Acenaphthene	mg/kg	29000	30000	30000	34	85	200
Flourene	mg/kg	20000	20000	20000	27	67	160
Phenanthrene	mg/kg	6200	6200	6300	15	38	90
Anthracene	mg/kg	150000	150000	150000	380	950	2200
Fluoranthene	mg/kg	6300	6300	6400	52	130	290
Pyrene	mg/kg	15000	15000	15000	110	270	620
Benzo(a)Anthracene	mg/kg	49	56	62	2.9	6.5	13
Chrysene	mg/kg	93	110	120	4.1	9.4	19
Benzo(b)Flouranthene	mg/kg	13	15	16	0.99	2.1	3.9
Benzo(k)Flouranthene	mg/kg	370	410	440	37	75	130
Benzo(a)Pyrene	mg/kg	11	12	13	0.97	2.0	3.5
Indeno(123-cd)Pyrene	mg/kg	150	170	180	9.5	21	39
Dibenzo(a,h)Anthracene	mg/kg	1.1	1.3	1.4	0.14	0.27	0.43
Benzo(ghi)Perylene	mg/kg	1400	1500	1600	290	470	640
TPH C_5-C_6 Aliphatic	mg/kg	95000	130000	180000	730	1700	3900
TPH C_6-C_8 Aliphatic	mg/kg	150000	220000	320000	2300	5600	13000
TPH C_8-C_{10} Aliphatic	mg/kg	14000	18000	21000	320	770	1700
TPH C_{10}-C_{12} Aliphatic	mg/kg	21000	23000	24000	2200	4400	7300
TPH C_{12}-C_{16} Aliphatic	mg/kg	25000	25000	26000	11000	13000	13000
TPH C_{16}-C_{35} Aliphatic	mg/kg	450000	480000	490000	260000	270000	270000
TPH C_{35}-C_{44} Aliphatic	mg/kg	450000	480000	490000	260000	270000	270000
TPH C_5-C_7 Aromatic	mg/kg	**76000**	**84000**	**92000**	**13**	**27**	**57**
TPH C_7-C_8 Aromatic	mg/kg	**87000**	**95000**	**100000**	**22**	**51**	**120**
TPH C_8-C_{10} Aromatic	mg/kg	**7200**	**8500**	**9300**	**8.6**	**21**	**51**
TPH C_{10}-C_{12} Aromatic	mg/kg	**9200**	**9700**	**10000**	**13**	**31**	**74**
TPH C_{12}-C_{16} Aromatic	mg/kg	**10000**	**10000**	**10000**	**23**	**57**	**130**
TPH C_{16}-C_{21} Aromatic	mg/kg	**7600**	**7700**	**7800**	**46**	**110**	**260**
TPH C_{21}-C_{35} Aromatic	mg/kg	**7800**	**7800**	**7900**	**370**	**820**	**1600**
TPH C_{35}-C_{44} Aromatic	mg/kg	**7800**	**7800**	**7900**	**370**	**820**	**1600**
Benzene	mg/kg	90	100	110	0.017	0.034	0.075
Toluene	mg/kg	87000	95000	100000	22	51	120
Ethylebenzene	mg/kg	17000	22000	27000	16	39	91
Xylene	mg/kg	17000	23000	31000	28	67	160

Controlled Waters Assessment Reference Values

Determinant	Unit	EQS Freshwater	Uk DWS	WHO
Arsenic	ug/l	50	10	10
Boron	ug/l	2000	1000	0.3
Cadmium	ug/l	5	5	3
Chromium	ug/l	5 - 250	50	50
Lead	ug/l	4 - 250	25	10
Mercury	ug/l	1	1	1
Selenium	ug/l		10	10
Copper	ug/l	1 - 28	20000	2000
Nickel	ug/l	50 - 200	20	70
Zinc	ug/l	8 - 50	5000	3000
Sulphate	mg/l	400	250	250
PAH	ug/l		0.1	
Anthracene	ug/l	0.02		
Napthalene	ug/l	10		
Benzo(a)Pyrene	ug/l	0.03		0.01
Fluoranthene	ug/l	0.02		
Benzene	ug/l	30	1	10
Toluene	ug/l	50		
Ethylebenzene	ug/l	20		
Xylene	ug/l	30		
TPH	ug/l			
$C_5 – C_6$ Aliphatic	ug/l			15000
$C_6 – C_8$ Aliphatic	ug/l			15000
$C_8 – C_{10}$ Aliphatic	ug/l			300
$C_{10} – C_{12}$ Aliphatic	ug/l			300
$C_{12} – C_{16}$ Aliphatic	ug/l			300
$C_{16} – C_{36}$ Aliphatic	ug/l			N/A
$C_6 – C_7$ Aromatic	ug/l			10
$C_7 – C_8$ Aromatic	ug/l	50		10
$C_8 – C_{10}$ Aromatic	ug/l	20		300
$C_{10} – C_{12}$ Aromatic	ug/l			1000
$C_{12} – C_{16}$ Aromatic	ug/l			1000
$C_{16} – C_{21}$ Aromatic	ug/l			90
$C_{21} – C_{35}$ Aromatic	ug/l			90

TEST CERTIFICATE

Liquid and Plastic Limits

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.4 and 5

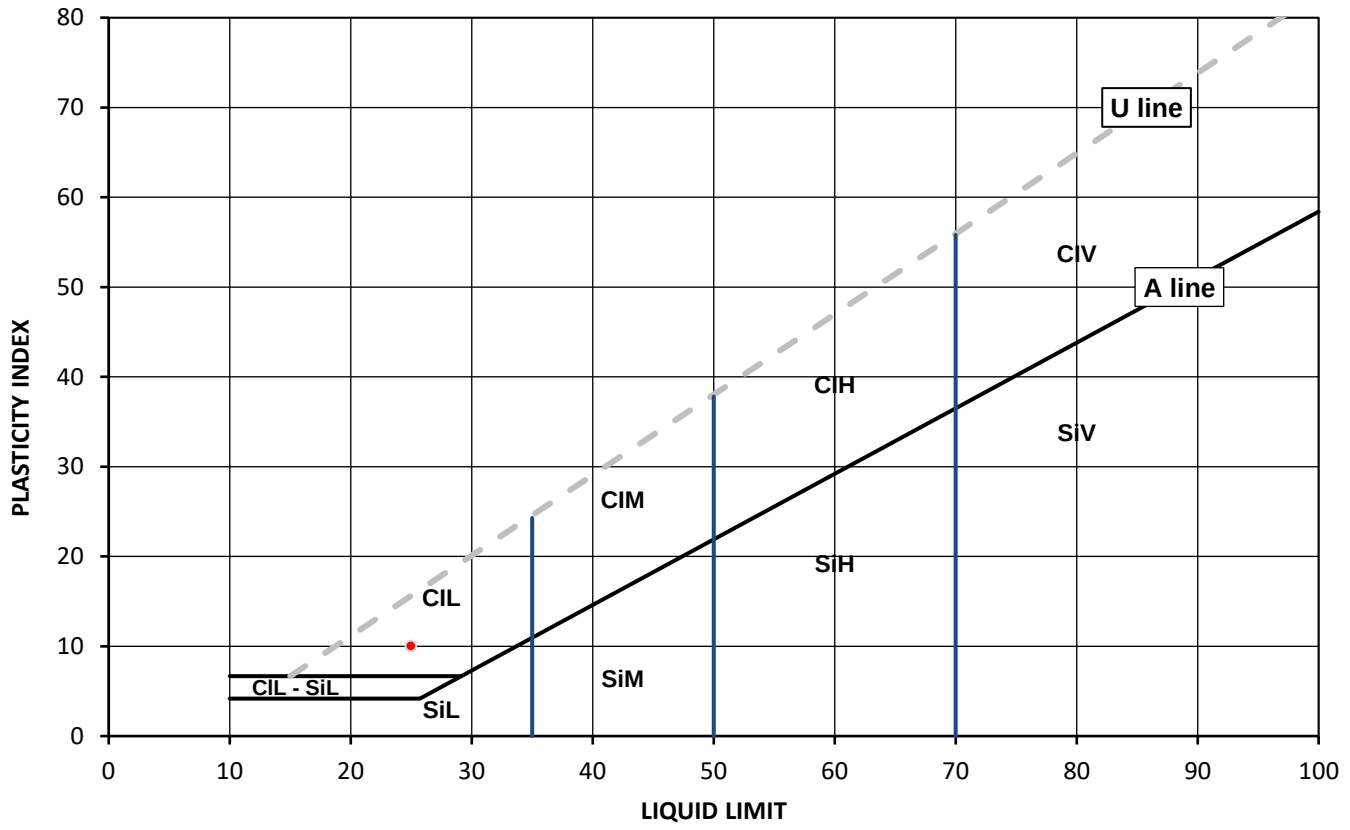
Client:	Enzygo Geoenvironmental Ltd	Client Reference:	CRM 1027 087
Client Address:	The Byre, Woodend Lane, Cromhall, Gloucestershire, GL12 8AA	Job Number:	21-72520
		Date Sampled:	28/04/2021
		Date Received:	27/04/2021
Contact:	Steve Rhodes	Date Tested:	19/05/2021
Site Address:	Richmond	Sampled By:	Client

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1857736	Depth Top [m]:	1.00
Hole No.:	WS2	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Soil Description:	Brown clayey SAND with fragments of rootlets		
Sample Preparation:	Tested in natural condition		

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
16	25	15	10	100



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed:

Szczepan Bielatowicz
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

Date Reported: 24/05/2021

GF 232.10

TEST CERTIFICATE

Liquid and Plastic Limits

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.4 and 5

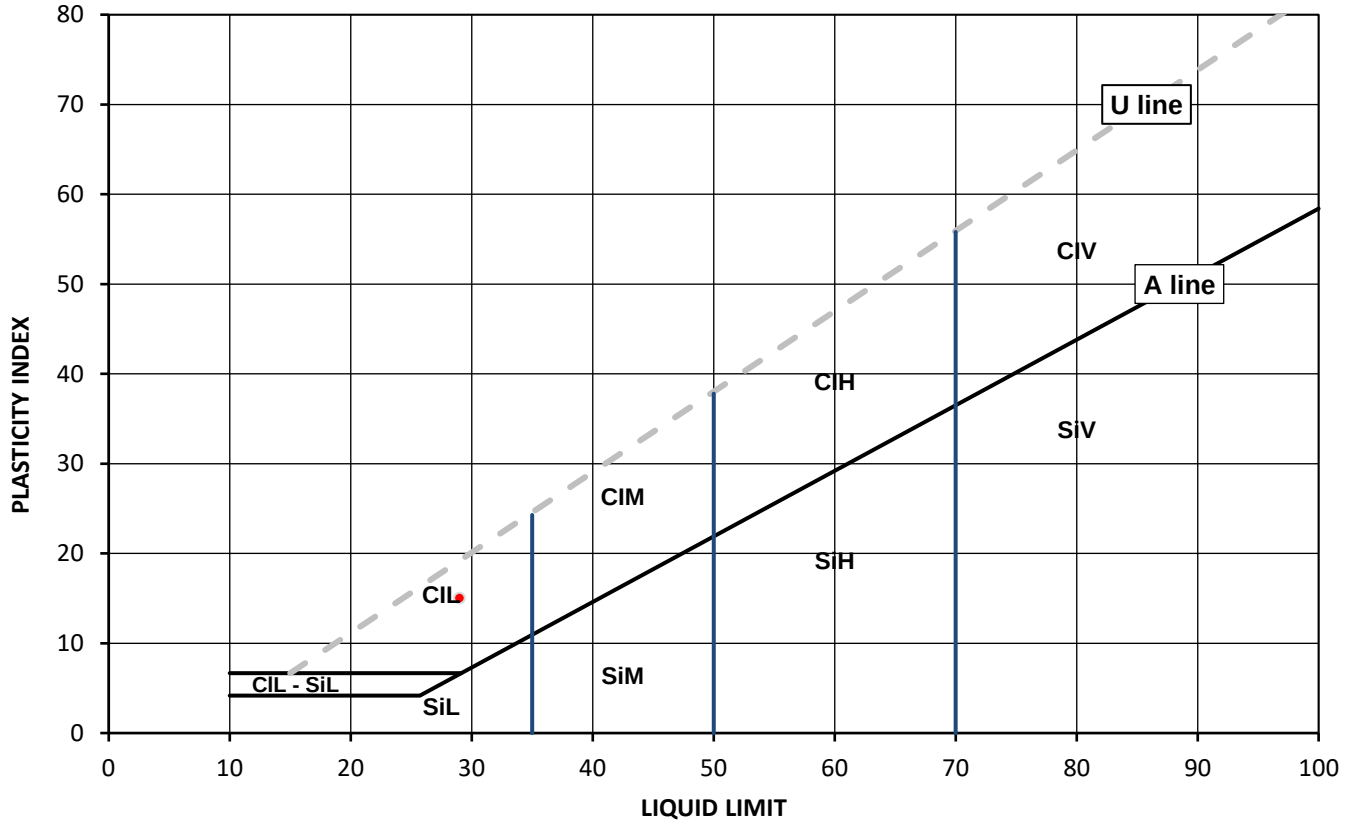
Client:	Enzygo Geoenvironmental Ltd	Client Reference:	CRM 1027 087
Client Address:	The Byre, Woodend Lane, Cromhall, Gloucestershire, GL12 8AA	Job Number:	21-72520
		Date Sampled:	28/04/2021
		Date Received:	27/04/2021
Contact:	Steve Rhodes	Date Tested:	19/05/2021
Site Address:	Richmond	Sampled By:	Client

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1857737	Depth Top [m]:	2.00
Hole No.:	WS2	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Soil Description:	Yellowish brown very gravelly very sandy CLAY		
Sample Preparation:	Tested after washing to remove >425um		

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
8.2	29	14	15	29



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed:

Szczepan Bielatowicz
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

Date Reported: 24/05/2021

GF 232.10

TEST CERTIFICATE

Liquid and Plastic Limits

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.4 and 5

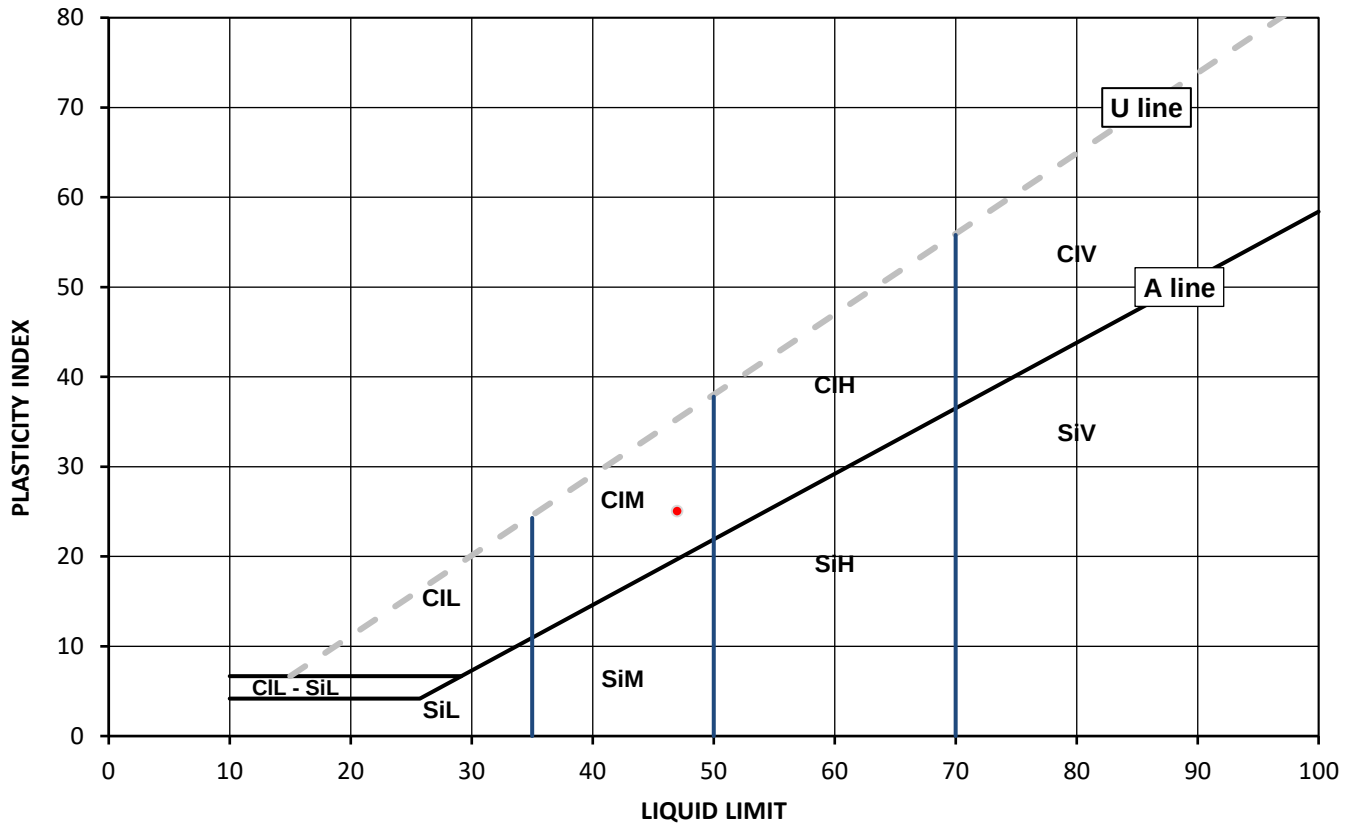
Client:	Enzygo Geoenvironmental Ltd	Client Reference:	CRM 1027 087
Client Address:	The Byre, Woodend Lane, Cromhall, Gloucestershire, GL12 8AA	Job Number:	21-72520
		Date Sampled:	28/04/2021
		Date Received:	27/04/2021
Contact:	Steve Rhodes	Date Tested:	19/05/2021
Site Address:	Richmond	Sampled By:	Client

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1857738	Depth Top [m]:	1.00
Hole No.:	WS4	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Soil Description:	Brown slightly sandy CLAY		
Sample Preparation:	Tested in natural condition		

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
22	47	22	25	100



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed:

Szczepan Bielatowicz
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

Date Reported: 24/05/2021

GF 232.10

TEST CERTIFICATE

Liquid and Plastic Limits

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.4 and 5

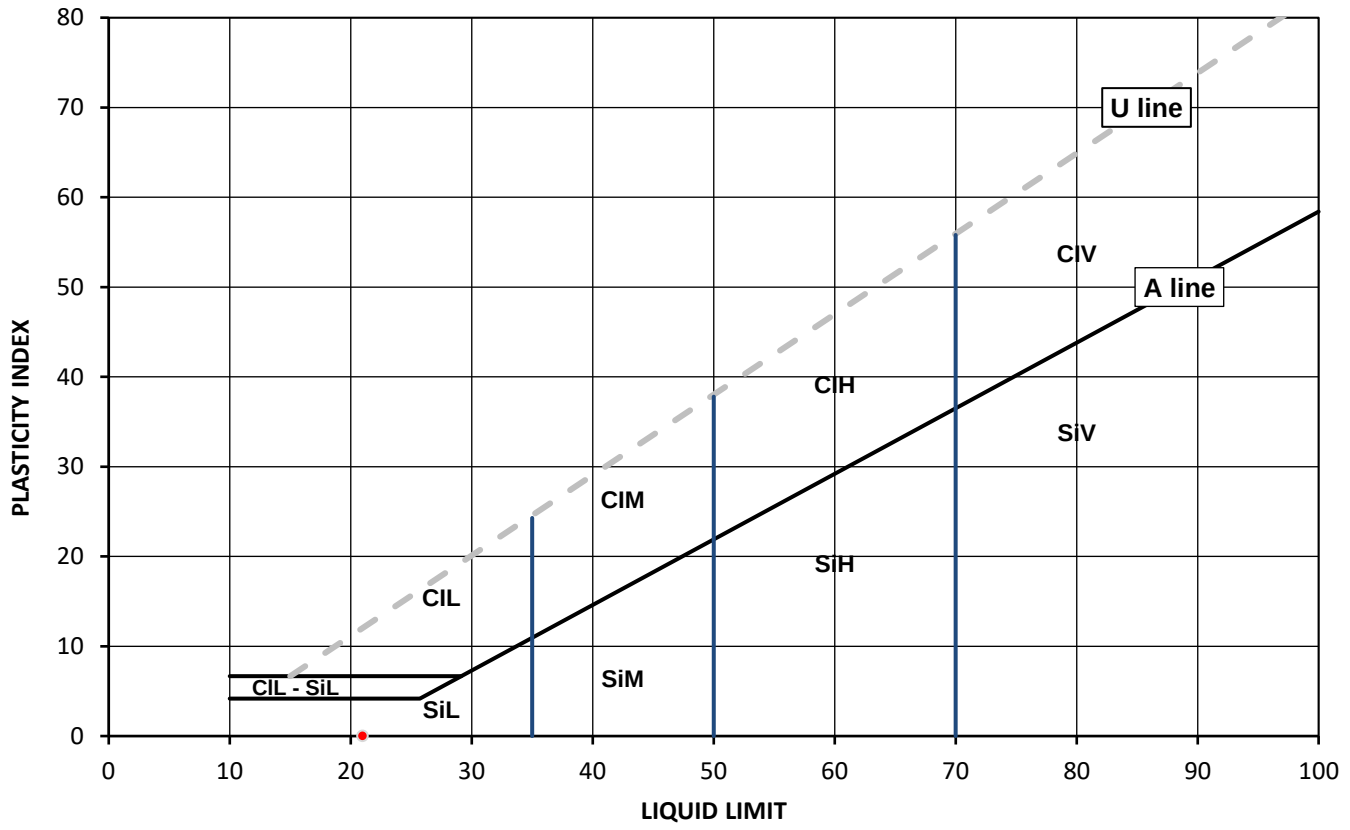
Client:	Enzygo Geoenvironmental Ltd	Client Reference:	CRM 1027 087
Client Address:	The Byre, Woodend Lane, Cromhall, Gloucestershire, GL12 8AA	Job Number:	21-72520
		Date Sampled:	28/04/2021
		Date Received:	27/04/2021
Contact:	Steve Rhodes	Date Tested:	19/05/2021
Site Address:	Richmond	Sampled By:	Client

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1857739	Depth Top [m]:	2.00
Hole No.:	WS4	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Soil Description:	Yellowish brown slightly gravelly slightly clayey SAND		
Sample Preparation:	Tested after >425um removed by hand		

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
13	21	NP	NP	68



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks: NP - non plastic

Signed:

Szczepan Bielatowicz
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

Date Reported: 24/05/2021

GF 232.10

TEST CERTIFICATE

Liquid and Plastic Limits

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.4 and 5

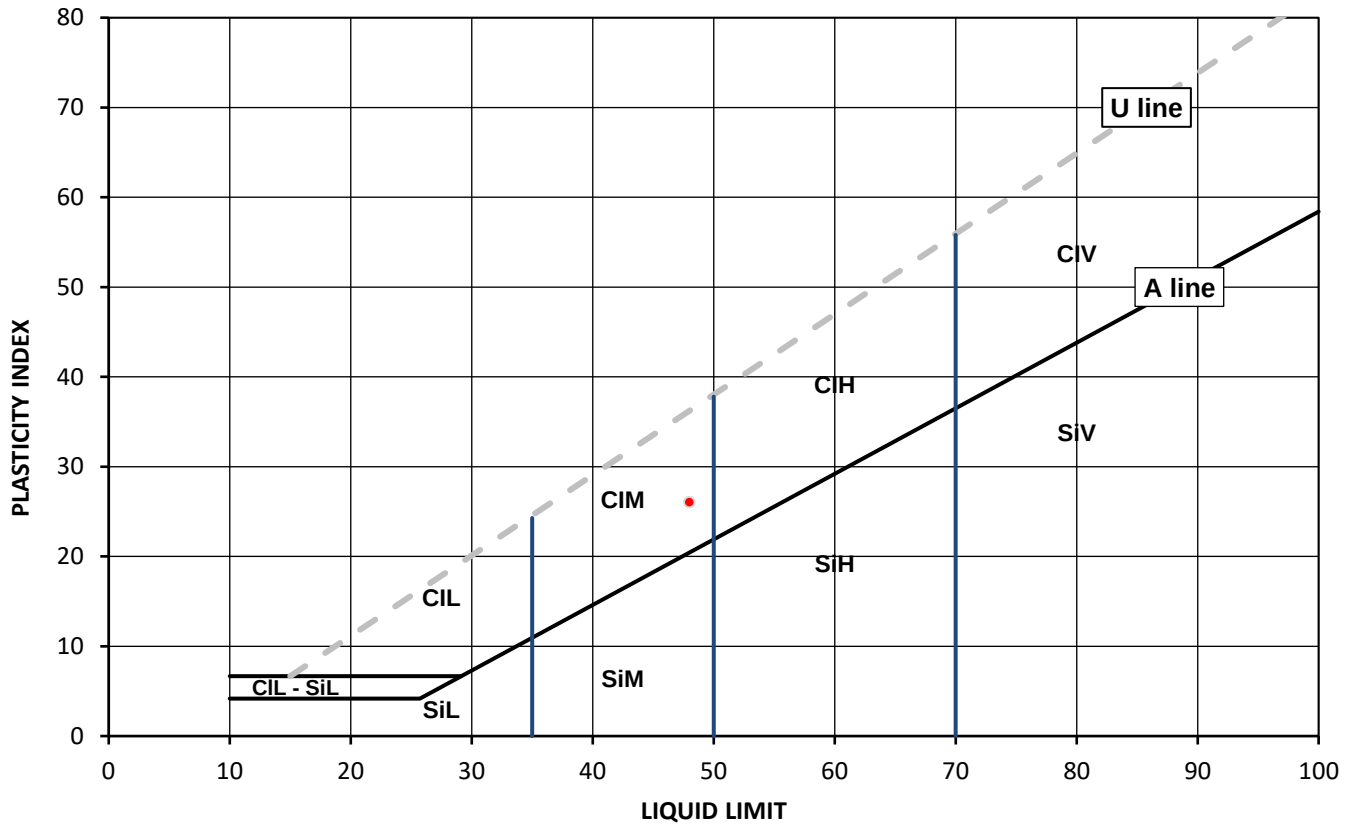
Client:	Enzygo Geoenvironmental Ltd	Client Reference:	CRM 1027 087
Client Address:	The Byre, Woodend Lane, Cromhall, Gloucestershire, GL12 8AA	Job Number:	21-72520
		Date Sampled:	28/04/2021
		Date Received:	27/04/2021
Contact:	Steve Rhodes	Date Tested:	19/05/2021
Site Address:	Richmond	Sampled By:	Client

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1857740	Depth Top [m]:	1.00
Hole No.:	WS7	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Soil Description:	Dark brown slightly gravelly slightly sandy CLAY with fragments of flintstone		
Sample Preparation:	Tested after >425um removed by hand		

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
22	48	22	26	76



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed:

Szczepan Bielatowicz
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

Date Reported: 24/05/2021

GF 232.10

TEST CERTIFICATE

Liquid and Plastic Limits

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.4 and 5

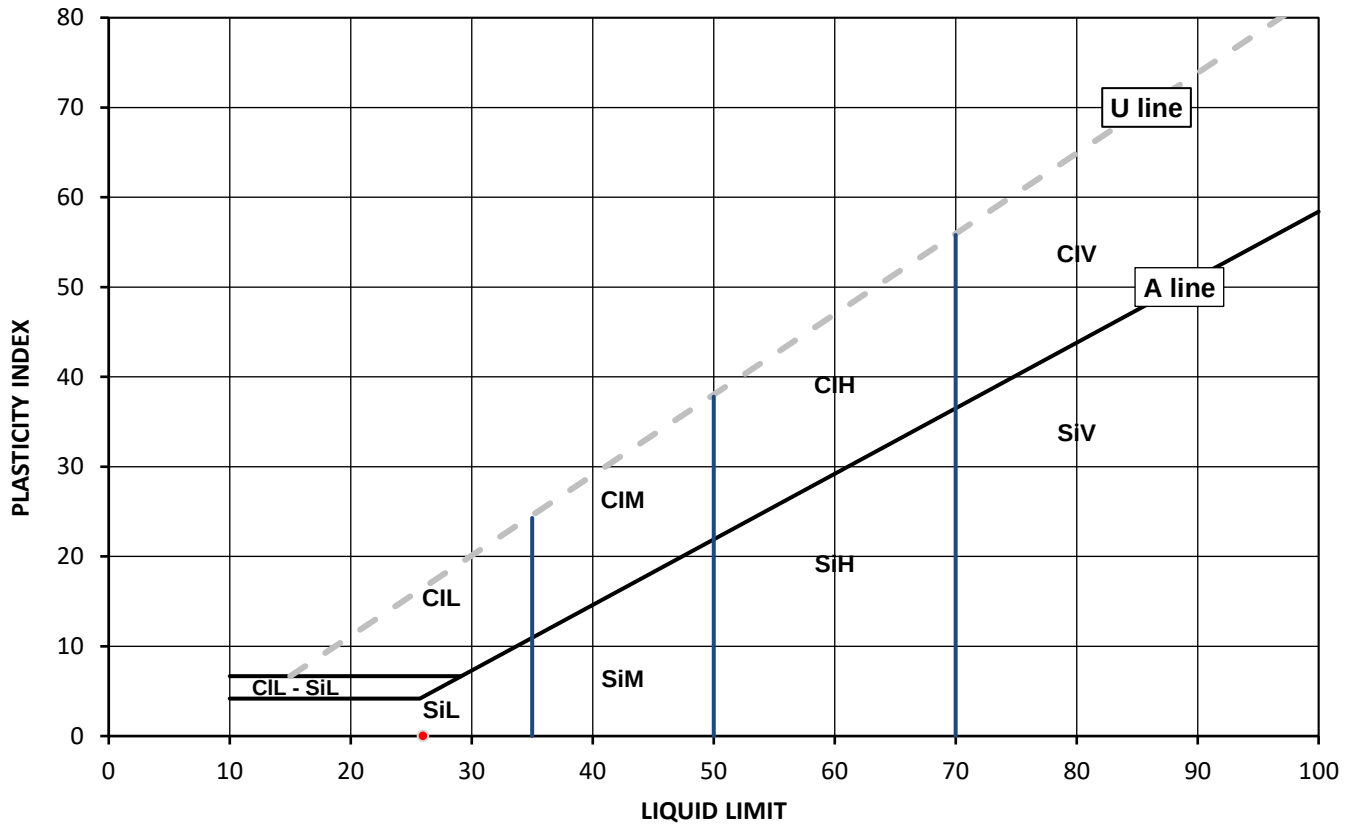
Client:	Enzygo Geoenvironmental Ltd	Client Reference:	CRM 1027 087
Client Address:	The Byre, Woodend Lane, Cromhall, Gloucestershire, GL12 8AA	Job Number:	21-72520
		Date Sampled:	28/04/2021
		Date Received:	27/04/2021
Contact:	Steve Rhodes	Date Tested:	19/05/2021
Site Address:	Richmond	Sampled By:	Client

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1857741	Depth Top [m]:	2.00
Hole No.:	WS7	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Soil Description:	Light brown slightly clayey SAND		
Sample Preparation:	Tested in natural condition		

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
6.6	26	NP	NP	100



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks: NP - non plastic

Signed:

Szczepan Bielatowicz
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

Date Reported: 24/05/2021

GF 232.10

TEST CERTIFICATE

Liquid and Plastic Limits

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.4 and 5

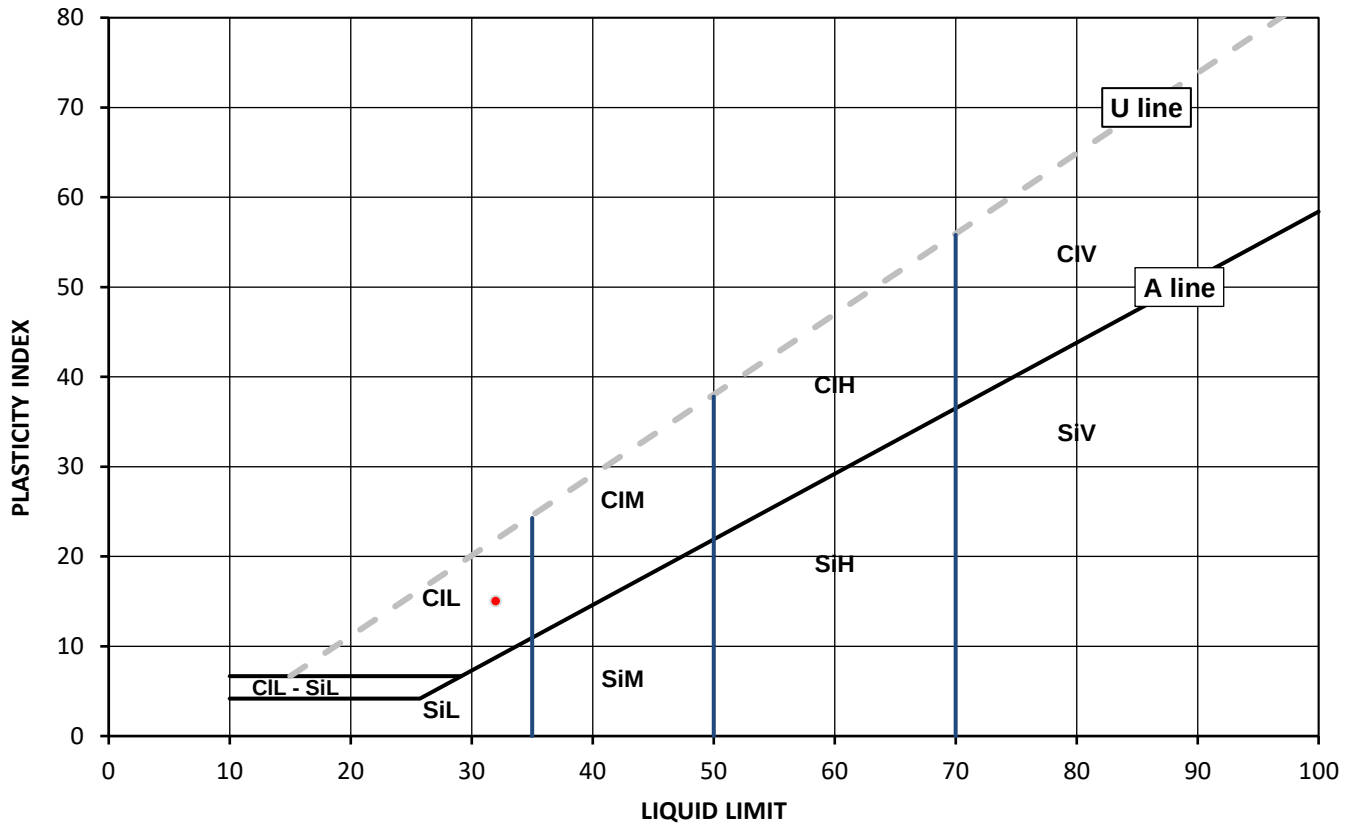
Client:	Enzygo Geoenvironmental Ltd	Client Reference:	CRM 1027 087
Client Address:	The Byre, Woodend Lane, Cromhall, Gloucestershire, GL12 8AA	Job Number:	21-72520
		Date Sampled:	28/04/2021
		Date Received:	27/04/2021
Contact:	Steve Rhodes	Date Tested:	19/05/2021
Site Address:	Richmond	Sampled By:	Client

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1857742	Depth Top [m]:	1.00
Hole No.:	WS9	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Soil Description:	Brown very sandy CLAY		
Sample Preparation:	Tested in natural condition		

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
18	32	17	15	100



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed:

Szczepan Bielatowicz
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

Date Reported: 24/05/2021

GF 232.10

TEST CERTIFICATE

Liquid and Plastic Limits

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.4 and 5

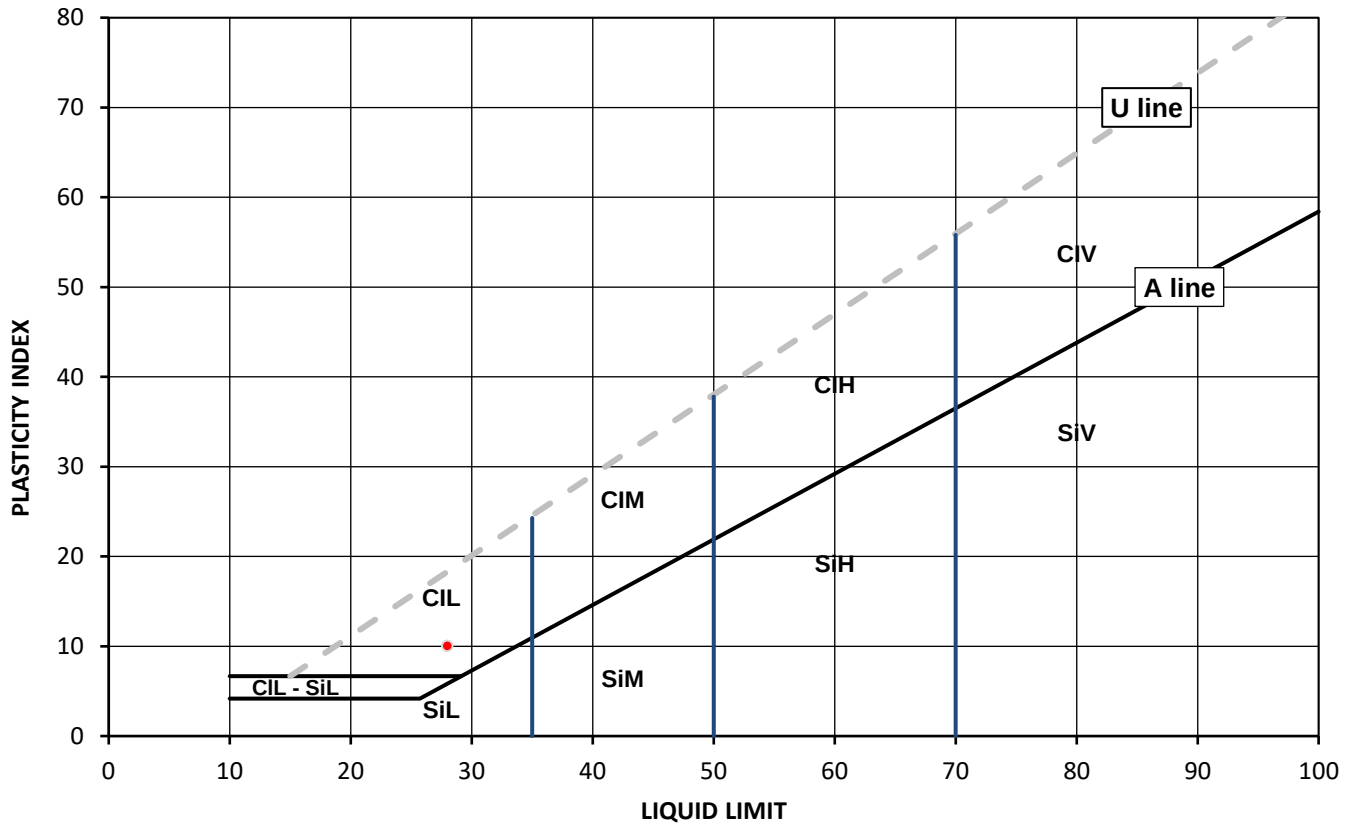
Client:	Enzygo Geoenvironmental Ltd	Client Reference:	CRM 1027 087
Client Address:	The Byre, Woodend Lane, Cromhall, Gloucestershire, GL12 8AA	Job Number:	21-72520
		Date Sampled:	28/04/2021
		Date Received:	27/04/2021
Contact:	Steve Rhodes	Date Tested:	19/05/2021
Site Address:	Richmond	Sampled By:	Client

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1857743	Depth Top [m]:	2.00
Hole No.:	WS9	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Soil Description:	Light brown slightly gravelly very sandy CLAY		
Sample Preparation:	Tested after >425um removed by hand		

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
24	28	18	10	99



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed:

Szczepan Bielatowicz
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

Date Reported: 24/05/2021

GF 232.10

TEST CERTIFICATE

Liquid and Plastic Limits

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.4 and 5

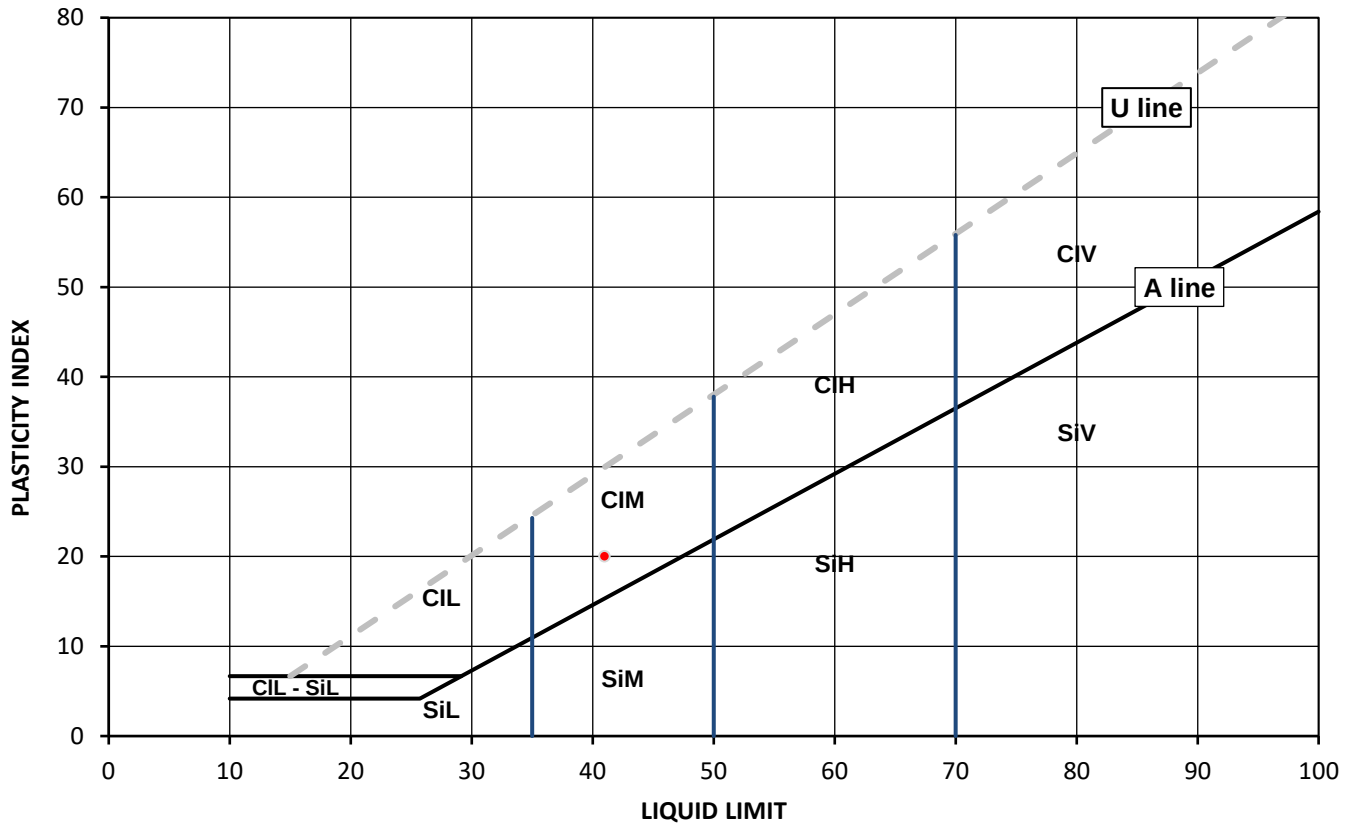
Client:	Enzygo Geoenvironmental Ltd	Client Reference:	CRM 1027 087
Client Address:	The Byre, Woodend Lane, Cromhall, Gloucestershire, GL12 8AA	Job Number:	21-72520
		Date Sampled:	28/04/2021
		Date Received:	27/04/2021
Contact:	Steve Rhodes	Date Tested:	19/05/2021
Site Address:	Richmond	Sampled By:	Client

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1857744	Depth Top [m]:	1.00
Hole No.:	WS11	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Soil Description:	Light brown sandy CLAY		
Sample Preparation:	Tested in natural condition		

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
19	41	21	20	100



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed:

Szczepan Bielatowicz
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

Date Reported: 24/05/2021

GF 232.10

TEST CERTIFICATE

Liquid and Plastic Limits

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.4 and 5

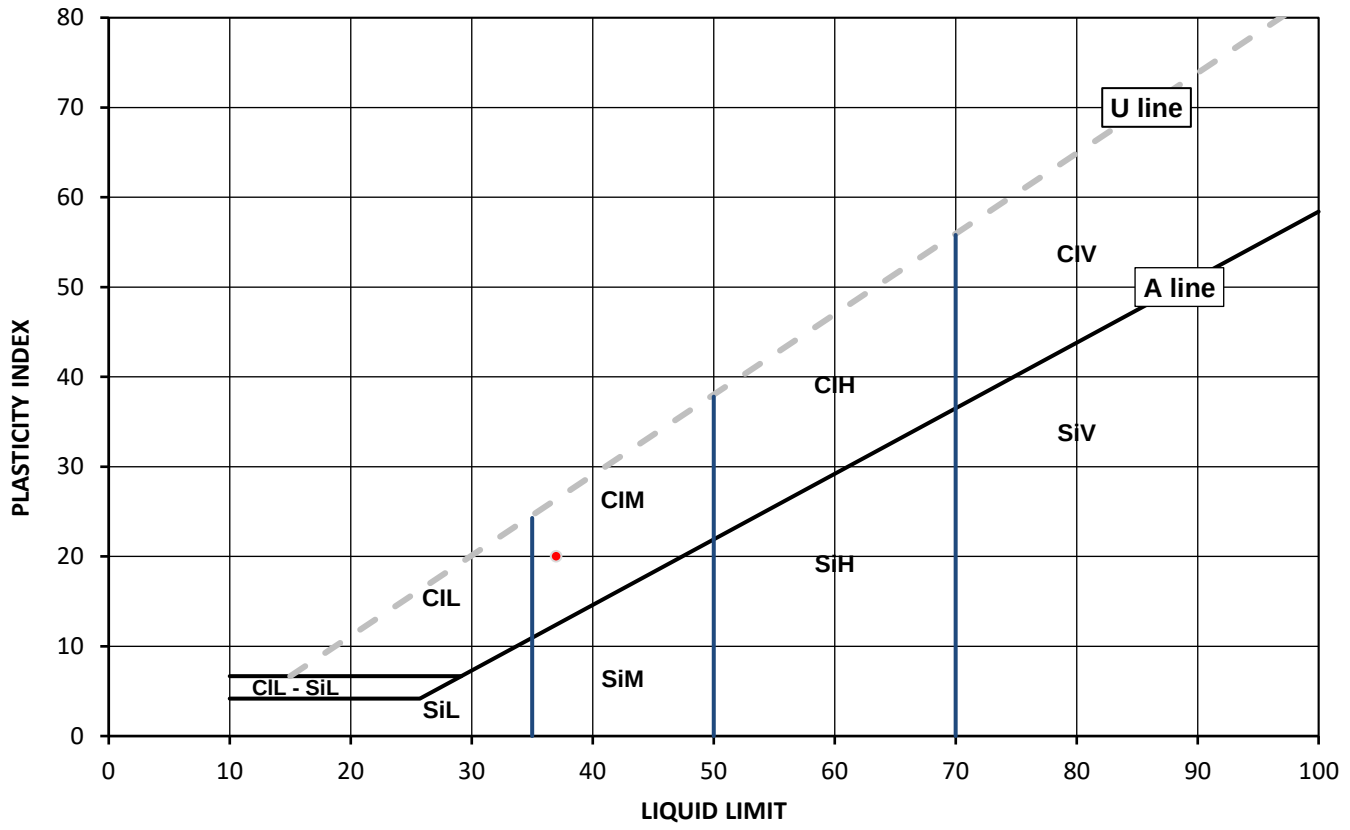
Client:	Enzygo Geoenvironmental Ltd	Client Reference:	CRM 1027 087
Client Address:	The Byre, Woodend Lane, Cromhall, Gloucestershire, GL12 8AA	Job Number:	21-72520
		Date Sampled:	28/04/2021
		Date Received:	27/04/2021
Contact:	Steve Rhodes	Date Tested:	19/05/2021
Site Address:	Richmond	Sampled By:	Client

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1857745	Depth Top [m]:	1.00
Hole No.:	WS13	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Soil Description:	Dark brown sandy CLAY		
Sample Preparation:	Tested in natural condition		

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
22	37	17	20	100



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed:

Szczepan Bielatowicz
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

Date Reported: 24/05/2021

GF 232.10

TEST CERTIFICATE

Liquid and Plastic Limits

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.4 and 5

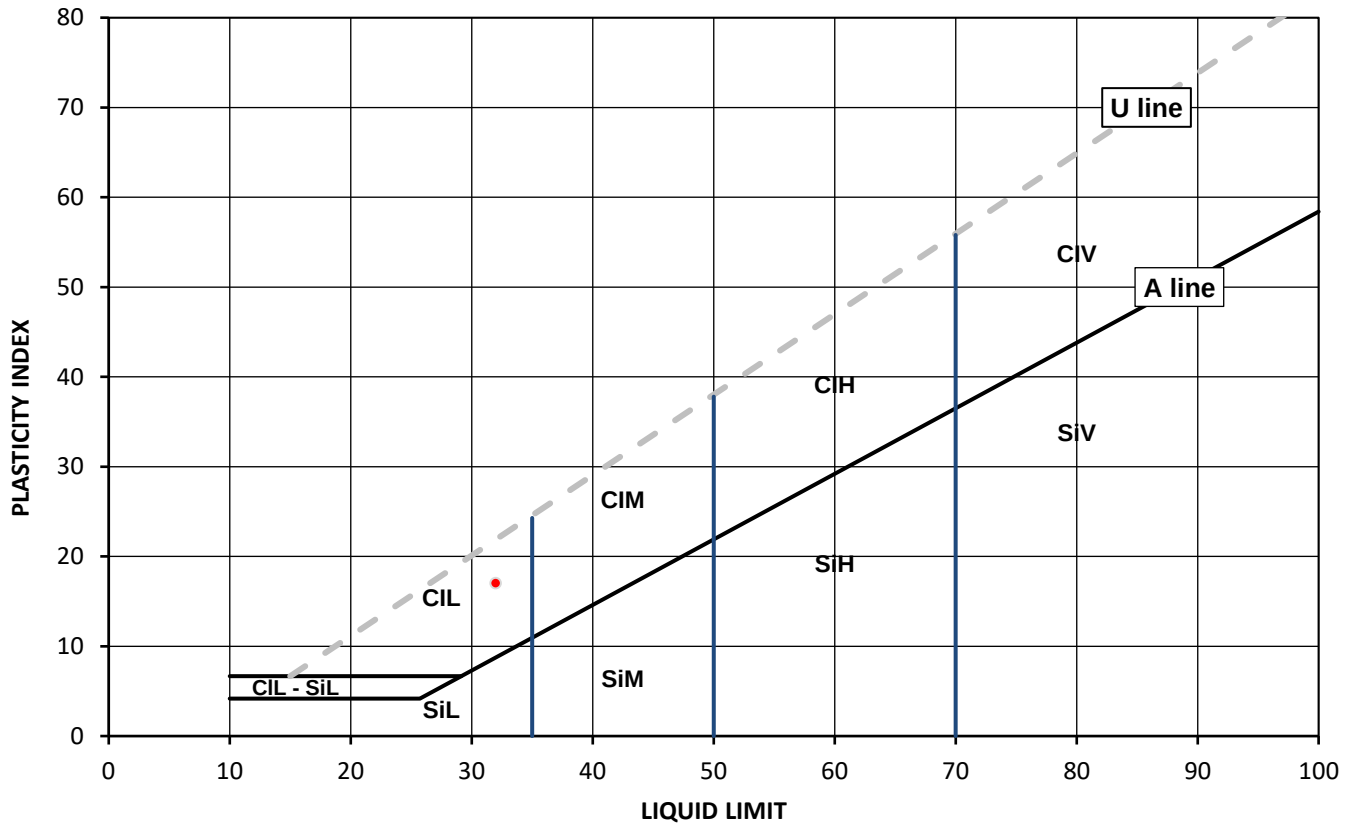
Client:	Enzygo Geoenvironmental Ltd	Client Reference:	CRM 1027 087
Client Address:	The Byre, Woodend Lane, Cromhall, Gloucestershire, GL12 8AA	Job Number:	21-72520
		Date Sampled:	28/04/2021
		Date Received:	27/04/2021
Contact:	Steve Rhodes	Date Tested:	19/05/2021
Site Address:	Richmond	Sampled By:	Client

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1857746	Depth Top [m]:	1.00
Hole No.:	WS5	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Soil Description:	Brown very sandy CLAY		
Sample Preparation:	Tested in natural condition		

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
17	32	15	17	100



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed:

Szczepan Bielatowicz
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

Date Reported: 24/05/2021

GF 232.10

TEST CERTIFICATE

Liquid and Plastic Limits

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.4 and 5

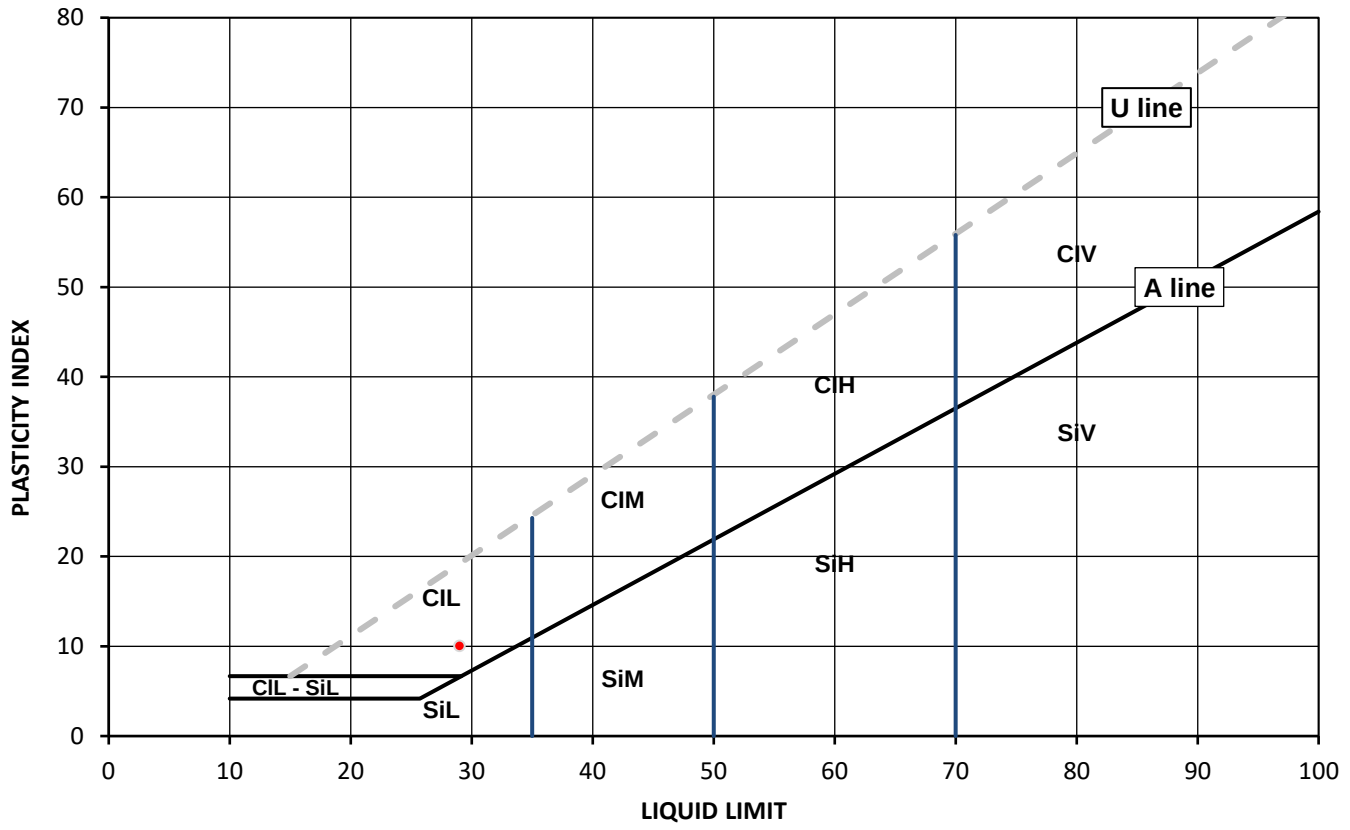
Client:	Enzygo Geoenvironmental Ltd	Client Reference:	CRM 1027 087
Client Address:	The Byre, Woodend Lane, Cromhall, Gloucestershire, GL12 8AA	Job Number:	21-72520
		Date Sampled:	28/04/2021
		Date Received:	27/04/2021
Contact:	Steve Rhodes	Date Tested:	19/05/2021
Site Address:	Richmond	Sampled By:	Client

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1857747	Depth Top [m]:	2.00
Hole No.:	WS5	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Soil Description:	Yellowish brown very sandy CLAY		
Sample Preparation:	Tested in natural condition		

As Received Moisture Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
23	29	19	10	100



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed:

Szczepan Bielatowicz
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

Date Reported: 24/05/2021

GF 232.10

SUMMARY REPORT

Summary of Classification Test Results

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

UKAS TESTING 4041

Tested in Accordance with:

Moisture Content by BS 1377-2: 1990: Clause 3.2; Water Content by BS EN 17892-1: 2014; Atterberg by BS 1377-2: 1990: Clause 4.3 (4 Point Test), Clause 4.4 (1 Point Test) and 5; PD by BS 1377-2: 1990: Clause 8.2

Client: Enzygo Geoenvironmental Ltd

Client Address: The Byre, Woodend Lane, Cromhall, Gloucestershire, GL12 8AA

Contact: Steve Rhodes

Site Address: Richmond

Client Reference: CRM 1027 087
Job Number: 21-72520
Date Sampled: 28/04/2021
Date Received: 27/04/2021
Date Tested: 19/05/2021
Sampled By: Client

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	Moisture Content [W]	Water Content [W]	Atterberg				Density			Total Porosity#		
		Reference	Depth Top m	Depth Base m	Type			%	%	% Passing 425um %	WL %	Wp %	Ip %	bulk Mg/m3	dry Mg/m3	PD Mg/m3	%		
1857744	WS11	Not Given	1.00	Not Given	D	Light brown sandy CLAY	Atterberg 1 Point	19		100	41	21	20						
1857745	WS13	Not Given	1.00	Not Given	D	Dark brown sandy CLAY	Atterberg 1 Point	22		100	37	17	20						
1857736	WS2	Not Given	1.00	Not Given	D	Brown clayey SAND with fragments of rootlets	Atterberg 1 Point	16		100	25	15	10						
1857737	WS2	Not Given	2.00	Not Given	D	Yellowish brown very gravelly very sandy CLAY	Atterberg 1 Point	8.2		29	29	14	15						
1857738	WS4	Not Given	1.00	Not Given	D	Brown slightly sandy CLAY	Atterberg 1 Point	22		100	47	22	25						
1857739	WS4	Not Given	2.00	Not Given	D	Yellowish brown slightly gravelly slightly clayey SAND	Atterberg 1 Point	13		68	21	NP	NP						
1857746	WS5	Not Given	1.00	Not Given	D	Brown very sandy CLAY	Atterberg 1 Point	17		100	32	15	17						
1857747	WS5	Not Given	2.00	Not Given	D	Yellowish brown very sandy CLAY	Atterberg 1 Point	23		100	29	19	10						
1857740	WS7	Not Given	1.00	Not Given	D	Dark brown slightly gravelly slightly sandy CLAY with fragments of flintstone	Atterberg 1 Point	22		76	48	22	26						
1857741	WS7	Not Given	2.00	Not Given	D	Light brown slightly clayey SAND	Atterberg 1 Point	6.6		100	26	NP	NP						

Note: # Non accredited; NP - Non plastic

Comments:

Signed:

Szczepan Bielatowicz
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

Date Reported: 24/05/2021

GF 234.12

SUMMARY REPORT

Summary of Classification Test Results

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

UKAS TESTING 4041

Tested in Accordance with:

Moisture Content by BS 1377-2: 1990: Clause 3.2; Water Content by BS EN 17892-1: 2014; Atterberg by BS 1377-2: 1990: Clause 4.3 (4 Point Test), Clause 4.4 (1 Point Test) and 5; PD by BS 1377-2: 1990: Clause 8.2

Client: Enzygo Geoenvironmental Ltd

Client Address: The Byre, Woodend Lane, Cromhall, Gloucestershire, GL12 8AA

Contact: Steve Rhodes

Site Address: Richmond

Client Reference: CRM 1027 087
Job Number: 21-72520
Date Sampled: 28/04/2021
Date Received: 27/04/2021
Date Tested: 19/05/2021
Sampled By: Client

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	Moisture Content [W]	Water Content [W]	Atterberg				Density			Total Porosity#		
		Reference	Depth Top	Depth Base	Type					% Passing 425um	WL	Wp	Ip	bulk	dry	PD			
			m	m				%	%	%	%	%	%	Mg/m3	Mg/m3	Mg/m3	%		
1857742	WS9	Not Given	1.00	Not Given	D	Brown very sandy CLAY	Atterberg 1 Point	18		100	32	17	15						
1857743	WS9	Not Given	2.00	Not Given	D	Light brown slightly gravelly very sandy CLAY	Atterberg 1 Point	24		99	28	18	10						

Note: # Non accredited; NP - Non plastic

Comments:

Signed:

Szczepan Bielatowicz
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

Date Reported: 24/05/2021

GF 234.12

Steve Rhodes
Enzygo Geoenvironmental Ltd
The Byre
Woodend Lane
Cromhall
Gloucestershire
GL12 8AA

e: steve.rhodes@enzygo.com

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404
f: 01923 237404
e: reception@i2analytical.com

Analytical Report Number : 21-72525

Project / Site name:	Richmond	**Samples received on:**	27/04/2021
Your job number:	CRM 1027 087	**Samples instructed on/ Analysis started on:**	30/04/2021
Your order number:		**Analysis completed by:**	14/05/2021
Report Issue Number:	1	**Report issued on:**	20/05/2021
Samples Analysed:	7 soil samples		

Signed:

Joanna Wawrzeczko
Technical Reviewer (Reporting Team)
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 21-72525
Project / Site name: Richmond

Lab Sample Number				1857753	1857754	1857755	1857756	1857757
Sample Reference				WS2	WS2	WS7	WS7	WS11
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.00	2.00	1.00	2.00	1.00
Date Sampled				28/04/2021	28/04/2021	28/04/2021	28/04/2021	28/04/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	10	11	16	4.5	15
Total mass of sample received	kg	0.001	NONE	0.50	0.50	0.50	0.50	0.50
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	8.0	7.5	6.8	8.5	7.9
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.013	0.015	0.016	0.0058	0.016

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number: 21-72525
Project / Site name: Richmond

Lab Sample Number				1857758	1857759
Sample Reference				WS5	WS5
Sample Number				None Supplied	None Supplied
Depth (m)				1.00	2.00
Date Sampled				28/04/2021	28/04/2021
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
Stone Content	%	0.1	NONE	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	10	16
Total mass of sample received	kg	0.001	NONE	0.50	0.50
General Inorganics					
pH - Automated	pH Units	N/A	MCERTS	8.2	8.5
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.034	0.013

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number : 21-72525
Project / Site name: Richmond

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1857753	WS2	None Supplied	1	Brown clay and sand with gravel.
1857754	WS2	None Supplied	2	Brown sandy clay with gravel and vegetation.
1857755	WS7	None Supplied	1	Brown clay and sand with gravel and vegetation.
1857756	WS7	None Supplied	2	Light brown sand.
1857757	WS11	None Supplied	1	Brown clay and sand with vegetation and gravel
1857758	WS5	None Supplied	1	Brown clay and loam.
1857759	WS5	None Supplied	2	Brown sandy clay with gravel.

Analytical Report Number : 21-72525
Project / Site name: Richmond

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Steve Rhodes
Enzygo Geoenvironmental Ltd
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Analytical Report Number : 21-94030

Project / Site name:	Richmond	**Samples received on:**	19/08/2021
Your job number:	CRM.1265.087	**Samples instructed on/ Analysis started on:**	19/08/2021
Your order number:		**Analysis completed by:**	25/08/2021
Report Issue Number:	1	**Report issued on:**	26/08/2021
Samples Analysed:	17 soil samples		

Signed: A. Czerwińska

Agnieszka Czerwińska
Technical Reviewer (Reporting Team)
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 21-94030
Project / Site name: Richmond

Lab Sample Number				1979344	1979345	1979346	1979347	1979348
Sample Reference				BH1	BH1	BH1	BH1	BH1
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				5.00	10.00	15.00	20.00	25.00
Date Sampled				18/08/2021	18/08/2021	18/08/2021	18/08/2021	18/08/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	9.0	15	11	12	11
Total mass of sample received	kg	0.001	NONE	1.0	0.50	0.50	0.50	0.50
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	9.0	9.1	8.8	9.0	9.3
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.019	0.25	0.45	0.49	0.38

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number: 21-94030
Project / Site name: Richmond

Lab Sample Number				1979349	1979350	1979351	1979352	1979353
Sample Reference				BH2	BH2	BH2	BH2	BH2
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				5.00	10.00	15.00	20.00	25.00
Date Sampled				18/08/2021	18/08/2021	18/08/2021	18/08/2021	18/08/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	12	13	11	13	11
Total mass of sample received	kg	0.001	NONE	1.0	0.50	0.50	0.60	0.50
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	9.0	9.2	9.2	9.0	9.3
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.015	0.31	0.35	0.47	0.50

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number: 21-94030
Project / Site name: Richmond

Lab Sample Number				1979354	1979355	1979356	1979357	1979358
Sample Reference				BH3	BH3	BH4	BH4	BH5
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				5.00	10.00	5.00	10.00	5.00
Date Sampled				18/08/2021	18/08/2021	18/08/2021	18/08/2021	18/08/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	8.7	12	7.6	14	2.6
Total mass of sample received	kg	0.001	NONE	1.0	0.50	1.0	0.60	0.80
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	8.9	9.2	8.6	9.0	8.9
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.013	0.27	0.021	0.24	0.0059

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number: 21-94030
Project / Site name: Richmond

Lab Sample Number				1979359	1979531
Sample Reference				BH6	BH6
Sample Number				None Supplied	None Supplied
Depth (m)				5.00	10.00
Date Sampled				18/08/2021	18/08/2021
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
Stone Content	%	0.1	NONE	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	1.7	11
Total mass of sample received	kg	0.001	NONE	0.90	0.60
General Inorganics					
pH - Automated	pH Units	N/A	MCERTS	8.8	9.1
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.0087	0.22

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number : 21-94030
Project / Site name: Richmond

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1979344	BH1	None Supplied	5	Brown sand with gravel.
1979345	BH1	None Supplied	10	Brown clay.
1979346	BH1	None Supplied	15	Brown clay.
1979347	BH1	None Supplied	20	Brown clay.
1979348	BH1	None Supplied	25	Brown clay.
1979349	BH2	None Supplied	5	Brown sand with gravel.
1979350	BH2	None Supplied	10	Brown clay.
1979351	BH2	None Supplied	15	Brown clay.
1979352	BH2	None Supplied	20	Grey clay.
1979353	BH2	None Supplied	25	Grey clay.
1979354	BH3	None Supplied	5	Brown sand with gravel.
1979355	BH3	None Supplied	10	Grey clay.
1979356	BH4	None Supplied	5	Brown sand with gravel.
1979357	BH4	None Supplied	10	Grey clay.
1979358	BH5	None Supplied	5	Brown sand with gravel.
1979359	BH6	None Supplied	5	Brown sand with gravel.
1979531	BH6	None Supplied	10	Brown clay.

Analytical Report Number : 21-94030
Project / Site name: Richmond

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

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Ham Close Regeneration

Planning Application:

Flood Risk Assessment & Drainage Strategy

Author: Jubb
April 2022

Contents

1 Project Information

1.1 Project Information

Client	Hill Residential

1.2 Project Details

Project Name	Ham Close, Richmond
Location	Ham Close, Ham, Richmond Upon Thames, TW10 7PG
Jubb Project Number	21246

1.3 Report Details

Version	V2
Status	Planning
Date	March 2022

1.4 Project Authorisation

ISSUE HISTORY:

AUTHORISATION:

Version	Date	Detail	Prepared By	Approved By
DRAFT	24/01/22	Draft Issue	KG	
V1	07/02/22	First Issue	KG	RL
V2	23/03/22	Updated to suit comments	KG	RL

2 Introduction

2.1 Instruction

2.1.1 Jubb has been commissioned by Hill Residential to provide flood risk and drainage advice in relation to proposals for the residential development in Ham Close, Ham, Richmond Upon Thames, TW10 7PG.

2.1.2 This report may not be reproduced by any third party for any use without the written agreement of Jubb Consulting Engineers Ltd.

2.2 Brief

2.2.1 This Drainage Statement is prepared in accordance with the requirements of the National Planning Policy Framework (NPPF) published by the Department of Communities and Local Government. The NPPF sets out the government's national policies to protect people and property from flooding in both existing and future situations as a result of development.

2.2.2 Section 14 of the NPPF and the associated Planning Practice Guidance for Flood Risk and Coastal Change sets out the framework for planning decisions made by the local, regional and national government and the Environment Agency (EA). In order for planning authorities to make informed decisions on the Development of sites in areas at risk of flooding, NPPF requires the developer to carry out an assessment of flood risk.

2.2.3 This report addresses the requirements given in Section 14 of the NPPF and other issues which are deemed relevant to flood risk. These requirements include the following:

- Assessment of the magnitude and severity of flood risk to the Site, including consideration of current and future impacts of climate change;
- Assess suitability of the site and future development through the application of the Sequential Test and Exception Test (where required);
- Assess the impacts of current and future development of the site on flood risk to adjacent developments;
- Determine ability of existing and proposed drainage to accommodate development flows with respect to surface water runoff and flood risk;
- Demonstrate that appropriate mitigation measures have been taken to prevent flooding;
- Demonstrate that appropriate emergency situations have been considered e.g. overland flow path and evacuation routes.

2.2.4 This report also considers the disposal of wastewater generated by the proposed Development. Existing infrastructure will be reviewed to identify potential options for the disposal of foul and surface water runoff for future development.

3 Site Location & Description

3.1 Existing Site Context

3.1.1 The Application Site area is 4.69 Hectares. The site is located on Ham Close, between St Richard's CE Primary School and Ham Street/Wiggins Lane, in a predominantly residential setting. The site is centred at National Grid Reference TQ 0030585, OS co-ordinates 550309 158566.

3.1.2 The application site currently houses 192 homes, a community centre and a Maker Labs use as part of the existing Ham Close Estate, existing site layout can be seen in Figure 1.

3.1.3 Access is provided from Ham Close which forms two parallel minor roads that generally run north-west to south-east, connecting to Ashburnham Road in the south and Woodville Road in the north.

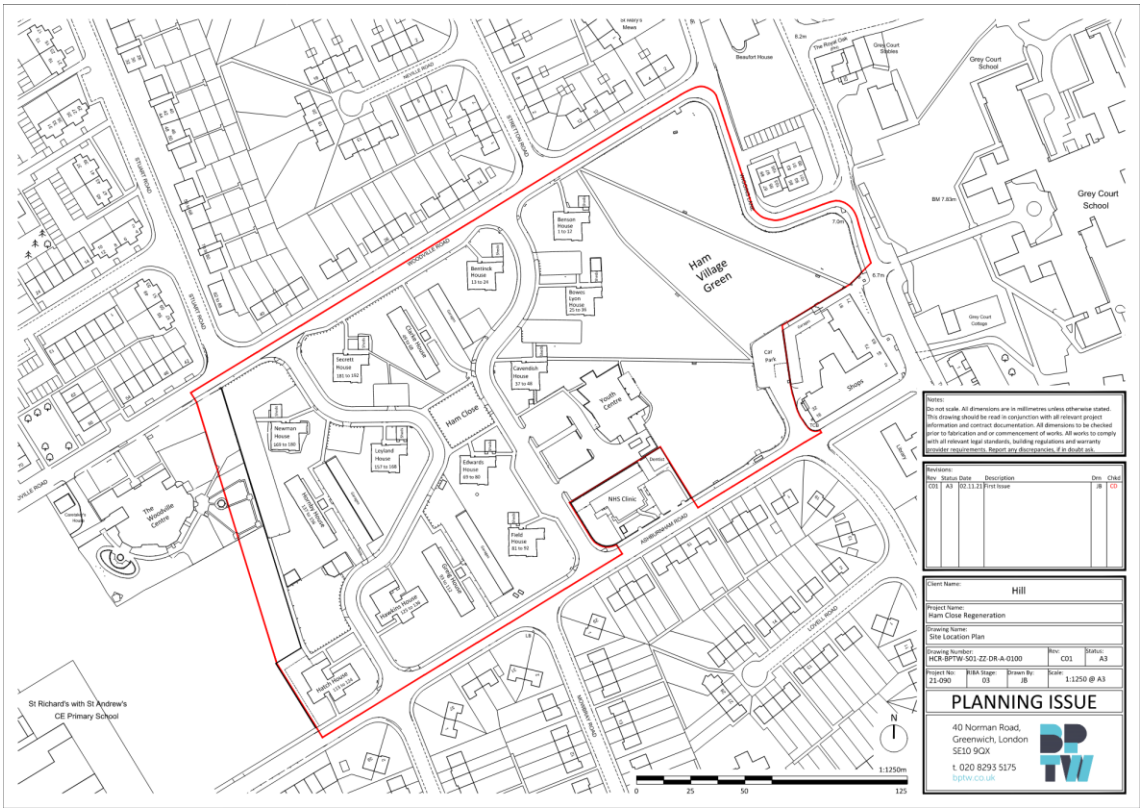

Figure 1: Indicative Site Masterplan

3.2 Development Proposals

3.2.1 The development proposals comprise the "demolition of the existing buildings on-site and phased mixed-use development comprising 452 residential homes (Class C3) up to six storeys; a Community/Leisure Facility (Class F2) of up to three storeys in height, a "Maker Labs" (sui generis) of up to two storeys together with basement car parking and site wide landscaping ('the Development')."

3.2.2 This application is being submitted to the London Borough of Richmond upon Thames (LBRuT). Architectural layouts can be found in Appendix A.

3.3 Site Topography

3.3.1 The site levels vary between 7.5mAOD at the north boundary (Woodville Road) and 6.7mAOD at the south-eastern boundary (Ashburnham Road).

3.3.2 Refer to Appendix B for topographical survey.

3.4 Site Geology

3.4.1 A Geo-Environmental Report prepared by Enzygo Geoenvironmental Ltd (Aug 2021) summarises the ground conditions to comprise Made Ground over firm clay and loose becoming dense with depth sand and gravel. This is underlain by London Clay comprising stiff clay. The report extracts can be found in Appendix C.

3.4.2 Groundwater was encountered at depth between 2.2m and 4.3m below ground level.

3.4.3 The site is not located within a designated Source Protection Zone.

3.5 Existing Sewers

3.5.1 There are number of existing Thames Water sewers within the site boundary, all avaliable sewer information can be found in Appendix D, extract of the asset map can be seen in Figure 2.

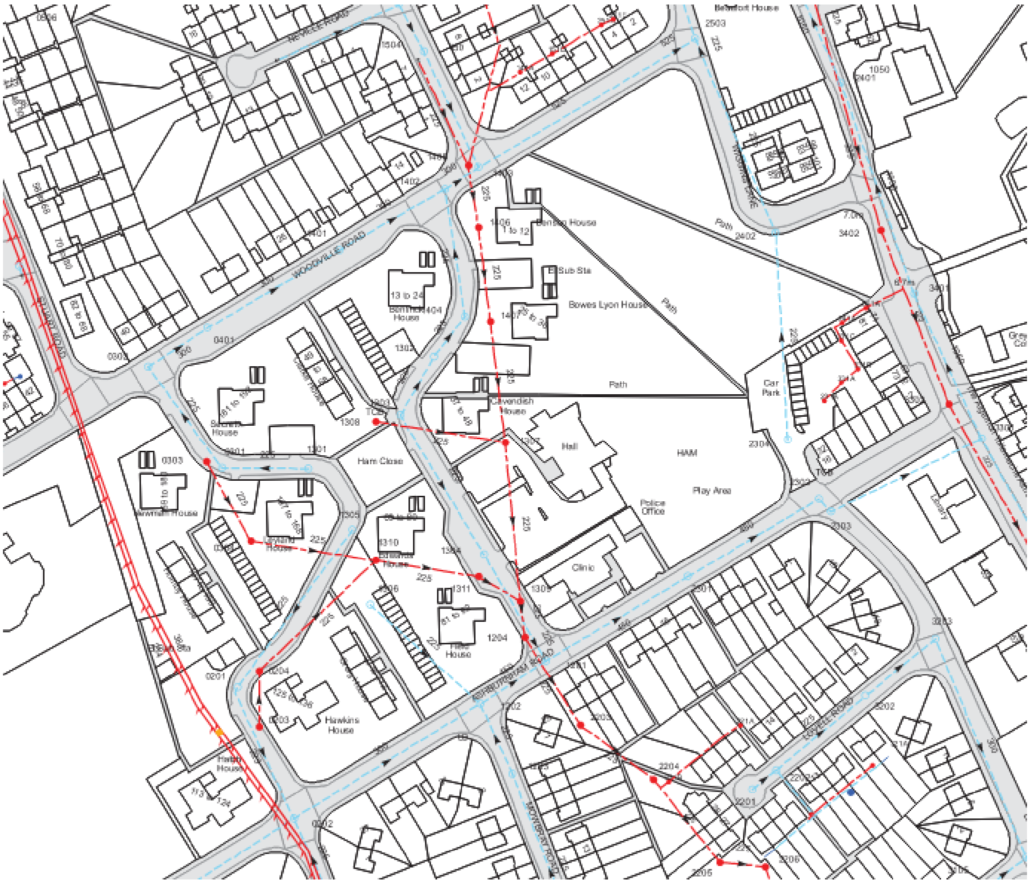

Figure 2, Existing Drainage Layout

3.5.2 The surface water sewers onsite follow the layout of the existing road infrastructure, with 5 total discharge locations: 2 outfalls towards the 300-525mmØ sewer in Woodville Road to the north, and 3 outfalls towards the 300-450mmØ sewer in Ashburnham Road to the south. All surface water outfalls are 225mmØ and have invert levels roughly at 2m below ground levels.

3.5.3 There is also an existing 225mmØ surface water sewer running in the northern direction through the eastern part of the Ham Village Green, originating within the existing car park, at a location of the proposed Community Centre. This sewer runs towards Wiggins Lane and joints the 525mmØ sewer in Woodville Road north of the site.

3.5.4 The foul water network onsite is connected towards a 225mmØ sewer running directly across the site. This sewer appears to drain the residential properties along Stretton Road north of the site (outside of the site boundary) and is routed in a straight line through the site running under landscaping and car parking areas. Once outside of the site boundary, the sewer crosses Ashburnham Road and is routed through private gardens in the southern direction. The levels of this sewer appear to be relatively flat, with some areas showing no falls between manholes, with an invert level approximately 3m below ground level.

3.5.5 Two Thames Water rising mains are also present onsite, running south to north, parallel to each other along the western boundary.

3.5.6 To the east of the site, there are two sewers located within Ham Street, a 225mmØ foul water sewer running in the southern direction and a 1050mmØ surface water sewer running in the northern direction.

3.5.7 There are private drainage networks onsite, an Underground Survey drawing can be found in Appendix D. The drains appear to serve the development only, with no drains from outside of the site boundary, other than the public sewers described above.

3.6 Existing runoff rates

3.6.1 For the purposes of drainage calculations, the Ham Village Green has been excluded from the catchment as the existing and proposed use of this area will remain unchanged and will not drain towards the neighbouring sewers.

3.6.2 The Site area discharging to the sewers measures approximately 2.96Ha, of which approximately 1.24Ha is landscaped (30% impermeable). The existing runoff rates have been estimated using Modified Rationale Method, results can be seen in Table 1 below.

Storm	*Rainfall Intensity (mm/hr)*	*Existing Rainfall (l/s)*
1 in 1	*28.2*	*231.8*
1 in 30	*86.0*	*708.4*
1 in 100	*113.8*	*936.9*

Table 1, Existing Runoff Rates

3.6.3 The Site is currently split into 5 catchments, each with their own 225mmØ outfall. As the areas are similar in size, it can be assumed the current discharge rate per outfall is ~187 l/s for a 1 in 100 year storm.

3.7 Existing Watercourses

3.7.1 The site is located approximately 750m east from the river Thames. The nearest watercourse appears to be a ditch in Ham Lands, approximately 300m west of the site, Ham Pond is also located approximately 400m southeast of the site. All of these are too distant to be significantly impacted by the site.

4 Proposed Development

4.1 Development Description

4.1.1 The development proposals comprise the "demolition of the existing buildings on-site and phased mixed-use development comprising 452 residential homes (Class C3) up to six storeys; a Community/Leisure Facility (Class F2) of up to three storeys in height, a "Maker Labs" (sui generis) of up to two storeys together with basement car parking and site wide landscaping ('the Development')."

4.2 Development Suitability

4.2.1 The NPPF sets out the Sequential Test to steer developments towards areas of lowest probability of flooding, taking account of their vulnerability to flooding.

Flood Risk Vulnerability Classification	Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone 1 **(<1 in 1000)**	✓	✓	✓	✓	✓
Flood Zone 2 **(up to 1 in 1000)**	✓	✓	Exception Test	✓	✓
Flood Zone 3a **(1 in 100 fluvial) (1 in 200 tidal)**	Exception Test	✓	X	Exception Test	✓
Flood Zone 3b **(functional floodplain)**	Exception Test	✓	X	X	X

Table 2, Development Suitability

4.2.2 The development use is classified as a 'More Vulnerable' development. Under Table 2 of the NPPF Planning Practice Guidance as the site is in Flood Zone 1, all vulnerability classes are suitable and thus the proposed scheme is deemed acceptable.

5 Flood Risk

5.1 Fluvial Flooding

5.1.1 The Environment Agency (EA) produces floodplain maps for the UK, which show the area at risk of fluvial and tidal flooding. The EA flood zone maps identify undefended floodplain, giving the horizontal extent of low (Zone 1), medium (Zone 2) and high-risk flood zones (Zones 3a and 3b) depending on the severity of the flood event.

5.1.2 The EA's Flood Map for Planning (Figure 3) indicates the site to be wholly located within Flood Zone 1 (Low Probability) and therefore defined as having less than a 1 in 1,000 annual probability of river flooding.

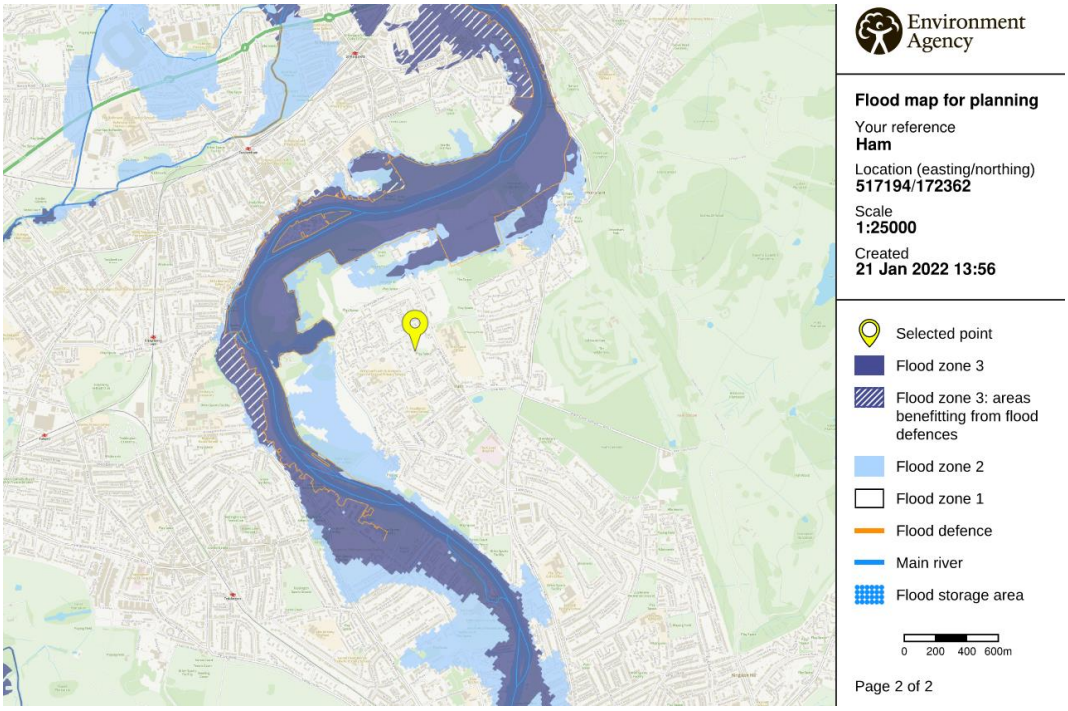

Figure 3, Extract from Environment Agency Tidal and Fluvial Flood Risk Map

5.1.3 Table 2 of the NPPF Planning Practice Guidance for Flood Risk and Coastal Change states in terms of flood risk vulnerability, that all types of development are suitable within this flood zone. Sequential and exception tests are not required.

5.1.4 The risk of fluvial and tidal flooding to the development is low.

5.2 Overland (Surface Water) Flooding

5.2.1 The EA also produces maps which highlight the risk of flooding from surface water flows. The Long-Term Flood Risk Information maps can illustrate when the capacity of existing surface water drainage networks or channels are exceeded in extreme rainfall events. These maps are produced, as with fluvial modelling, based on generalised information, and need to be verified in terms of topographical ground levels and indicated flow routes.

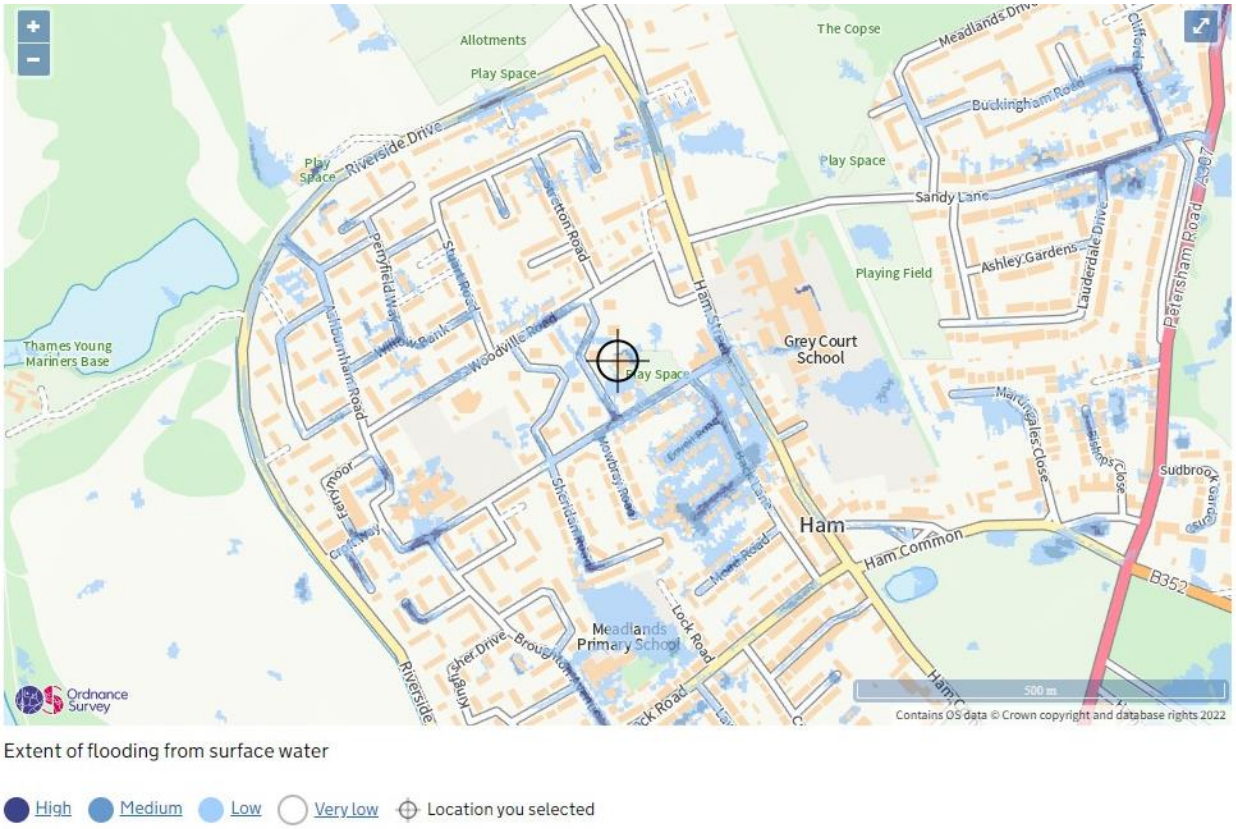

Figure 4, Extract from Environment Agency's Long-Term Flood Risk mapping indicating Surface Water Flood Risk

5.2.2 Figure 4 indicates there are number of flood risk areas within the site. The locations shown on the map correspond to topographical low points, which as shown on the topographical survey, have gullies to ensure that area is drained during rainfalls.

5.2.3 A review of the capacity of existing pipes shows the maximum capacity of the 225mmØ outlet pipes to be ~63 l/s. The maximum rainfall flows amount to ~187 l/s (as discussed in section 3.6.2). This would result in surface water flooding during times of extreme rainfall which would contribute to the surface water flooding shown above.

5.2.4 The proposed development will provide suitable drainage arrangements for all areas within the site boundary, with the onsite drainage designed to accommodate all storms up to and including 1 in 100 year + 40% climate change. The runoff rates from site will also be reduced, as a result helping with any existing sewer capacity concerns.

5.2.5 The risk of surface water flooding to the development is low.

5.3 Flooding from Groundwater

5.3.1 Groundwater flooding can occur after a prolonged period of rainfall, a considerable rise in the water table can result in inundation for extended periods of time.

5.3.2 The LBRuT web page contains an interactive map, which compiles information on the geology and the risks of groundwater flooding from numerous sources, such as the Environmental Agency (EA), GLA Drain London and the British Geological Survey (BGS). Summary of the results can be seen in the Table 3:

Source (Map)	Result
EA, Area Susceptible to Groundwater Flooding	75% or more
GLA Drain London, Increased Potential for Elevated Groundwater	Consolidated & Permeable Superficial
BGS, Susceptibility to Groundwater Flooding	Potential for groundwater flooding to occur at surface

Table 3, Groundwater vulnerability mapping summary

5.3.3 Based on the mapping information, the site is susceptible to groundwater flooding and mitigation measures will be required to ensure that the proposals are sufficiently protected from groundwater ingress.

5.3.4 The Geo-Environmental Report prepared by Enzygo Geoenvironmental Ltd (Aug 2021) states that the groundwater onsite was encountered at depths of between 2.2m and 4.3m below ground level. Further groundwater monitoring is being undertaken and will be used to inform any further design.

5.3.5 Groundwater will be considered during construction, especially during excavations and will have an impact on the below ground design, such as the drainage strategy. Additionally, all basements onsite will be designed to be safe from groundwater, a specialist waterproofing design will be implemented, to ensure that the required level of protection is achieved.

5.3.6 In terms of risk, the basements onsite are proposed to be used for 'less vulnerable' uses, such as car parking and plant. Therefore, in the unlikely event of the waterproofing measures failing, the consequences will be minimised. A separate Basement Impact Assessment is being submitted as part of the planning application.

5.3.7 Given the mitigation measures above, groundwater flooding is considered low risk.

5.4 Flooding from Sewers

5.4.1 The LBRuT web page contains an interactive map, which provides information on historic flooding incidents from sewers. The site lies within an area classified as "0 to 10 incidents recorded", which indicates a low risk of flooding from sewers.

5.4.2 The drainage strategy for the development aims to reduce the surface water runoff from site to greenfield. This will increase the capacity within the neighbouring sewer network – reducing any potential risk of surface water sewers flooding.

5.4.3 Thames Water have been consulted via a pre-development application and confirmed that the neighbouring sewer network has sufficient capacity.

5.4.4 The risk of flooding from sewers is low.

5.5 Flooding from Artificial Sources

5.5.1 The EA's Long-Term Flood Risk Information mapping indicates the potential extent of flooding from reservoir breach/failure. The site is safe from reservoir flooding while the river levels are normal.

5.5.2 Risk of flooding from reservoirs is very low, as in line with the Reservoirs Act 1975, reservoirs need to be regularly inspected and maintained, therefore reservoir flooding is unlikely.

5.5.3 Flood risk from artificial sources is considered to be low risk.

6 Proposed Drainage Strategy

6.1 Works to existing sewers

6.1.1 As highlighted in the earlier section of this report, there are numerous existing sewers onsite. There are three sewers which are identified to convey water from outside of the site, which will need to be retained or diverted. A description of the proposed works to the existing sewers can be found in Table 4 below.

Existing route of sewer	Proposed Works	Comment
Pumped Foul Water rising mains to the west of the site.	To be retained.	The proposed layout has allowed for the existing sewer easement. This easement is a big constraint onsite and has a significant impact on the landscaping and the drainage strategy.
Gravity Foul Water 225mmØ sewer between manholes TW1405 – TW1204.	To be diverted.	The existing route of the sewer cannot be accommodated within the proposals and must be diverted towards the 225mmØ sewer in Ham Street, through the Green. Thames Water have been consulted and confirmed capacity for the diversion.
Gravity Surface Water 225mmØ sewer from existing car park (from manhole TW2304).	To be abandoned	Sewer underneath the proposed structure. Any existing connections will be diverted towards the new connection into sewer in Ashburnham Road.
All other drains onsite.	To be abandoned	All other drains onsite appear to only serve the existing development. As the proposals are to demolish the existing buildings, the drains will become redundant and will be abandoned.

Table 4, Works to Existing Sewers

6.1.2 To complete the diversions and sewer abandonments, Section 185 applications will be made to Thames Water during the next design stage.

6.2 Foul Water Drainage

6.2.1 A new foul water drainage network will be required to service the proposed development. The new network will collect and convey foul water discharge from the development to a point of connection on the existing sewer network.

6.2.2 As shown on the proposed drainage plan (Appendix E) two gravity foul water outfalls can be made to existing manholes TW1403 and TW1204.

6.2.3 Thames Water have been contacted via the pre-planning application and confirmed sufficient capacity for the neighbouring development. Confirmation can be found in Appendix G.

6.3 Surface Water Drainage

6.3.1 New surface water drainage will be required to drain surface water runoff from the proposed buildings. In line with the LBRuT Local Plan and the London Plan, the runoff from the proposed development will aim to restrict runoff rates to greenfield rates and the SuDS measures and discharge methods have been evaluated in accordance with the hierarchy, as shown in Table 5.

Hierarchy	Method	Feasibility	Comment
1	Rainwater use as a resource (rainwater harvesting / blue roofs).	✓	The proposals utilise green and blue roofs wherever possible.
2	Rainwater infiltration	X	Infiltration is not suitable for this site, due to minimum space requirements for soakaways to be positioned away from structures and the underlaying clay ground conditions.
3	Rainwater attenuation in green infrastructure features for gradual release (for example green roofs, rain gardens)	✓	Green roofs, raingardens and permeable paving will be utilised across the scheme.
4	Rainwater discharge direct to a watercourse (unless not appropriate)	X	There is no suitable watercourse near the site.
5	Controlled rainwater discharge to a surface water sewer or drain	✓	It is proposed to discharge towards the neighbouring surface water sewers at greenfield runoff rates.
6	Controlled rainwater discharge to a combined sewer	X	There are no combined sewers in the area.

Table 5, Surface Water Discharge Hierarchy

6.3.2 As highlighted above, the site will discharge towards the neighbouring surface water sewer. The site can accommodate green and blue roofs, raingardens, permeable paving and below ground attenuation tanks to treat and attenuate runoff. A drainage strategy included in Appendix E shows the possible sizes and locations of these SuDS features, extract can be seen in Figure 5.

Figure 5 Proposed Drainage Layout

6.3.3 Greenfield Runoff Tool (from UKSuDS website) was used to calculate the greenfield runoff rate for the site, extract can be found in Appendix F. The site aims to discharge at greenfield runoff rates of 11.7 l/s/ha for all storms up to and including a 1 in 100 year + 40% climate change.

6.3.4 The site has been split into catchments taking the phasing and the outfall locations into account. The storage requirement for each outfall has been calculated and summarised on the drainage strategy drawings in Appendix E, all calculations can be found in Appendix F.

6.3.5 Constraints within the ground, such as the Thames Water easement, tree root protections and the required space for the services limit how much attenuation can be provided within some of the catchments. As a result, Catchment 1 will only be able to provide 315m³ of the 355m³ required to restrict the runoff to the greenfield target of 8.4 l/s. Based on the avaliable storage, the achievable runoff rate for this catchment is 10.7 l/s (equivalent to ~15 l/s/ha), which still offers a significant improvement compared to the existing unmitigated scenario.

6.3.6 It's important to highlight, that although the greenfield rates are shown to be achievable for all other catchments, further constraints may emerge during the detailed design stages and runoff rates may need to be increased (as highlighted above with regards to Catchment 1). The drainage strategy for the Site is a 'best endeavours' aproach, to meet the greenfield rates, without the need for pumping.

6.3.7 In total, approximately 7,000m² of the site area will be attenuated via blue roofs, these will be restricted to approximately 11.1 l/s in total (see blue roof manufacturer calculations in Appendix F). The remaining site area will require approximately 1,570m³ of attenuation below ground. This is estimated to be split as ~340m³ of permeable paving, ~740m³ of podium storage (200mm of geo-cellular storage layer above the basement) and approximately 540m³ of attenuation tank storage.

6.3.8 This will provide a betterment of up to 97% over the existing unrestricted scenario, as shown in Table 6.

Storm	*Rainfall Intensity (mm/hr)*	*Existing Rainfall (l/s)*	Proposed Runoff (l/s)	*Betterment (%)*
1 in 1	*28.2*	*231.8*	37	*84%*
1 in 30	*86.0*	*708.4*	37	*95%*
1 in 100	*113.8*	*936.9*	37	*96%*
1 in 100 + 40%	*159.3*	*1311.7*	37	*97%*

Table 6, Existing vs Proposed Runoff Rates

6.4 Water Quality

6.4.1 Surface water management should incorporate sustainable drainage techniques to restrict surface water discharge from the Site, in addition to improving water quality of runoff. Runoff from the proposed development may contain hydrocarbons, pollutants and nutrients which may be harmful if discharged directly to the ground.

6.4.2 It is proposed to utilise green and blue roofs, raingardens, permeable paving, and extensive green landscaping throughout the site to provide biodiversity, amenity, treatment and control the rate of runoff.

6.4.3 A SuDS pro-forma for LBRuT has been completed and can be found in Appendix G.

7 SuDS Management & Maintenance

7.1.1 SuDs features will be managed in accordance with the guidelines outlined within The SuDS Manual (CIRIA C753, Chapter 32).

7.1.2 The drainage infrastructure to be constructed as part of proposed development will be a mixture of adopted and privately owned. All diversions and public sewers will be maintained by Thames Water. All other drainage infrastructure will be maintained privately, by a management company.

7.1.3 As the scheme is progressed management and maintenance practices for taking care of the SuDS/drainage infrastructure will be constantly reviewed and updated with a final confirmed plan to be detailed at the completion of the construction.

7.1.4 SuDS features will be managed in accordance with the guidelines in Ciria C753, Chapter 32. As this is early in the application process the final details of the SuDS system and exact maintenance requirements are not yet fully known. However, a few fundamental actions can be specified now, these are noted in the maintenance schedule in Appendix H.

8 Conclusions and Recommendations

8.1.1 It is considered that this assessment represents a comprehensive and robust analysis of the flood impact of the current proposals on the Site itself and on adjacent properties. In addition, this report demonstrates that the proposed development can be delivered sustainably in terms of flood risk, which can be summarised as follows:

Subject	Conclusion
TIDAL & FLUVIAL FLOOD RISK	The Development is located in Flood Zone 1 – classified as low probability for tidal and fluvial flooding on the Environment Agency flood maps.
FLOOD RISK FROM OTHER SOURCES	Groundwater risk is considered to be mitigated through waterproofing of the basement and using it for less vulnerable uses such as parking and plant space. All other sources of flood risk are considered low risk.
DEVELOPMENT SUITABILITY	The proposed land-use is considered suitable for the Site which lies within Flood Zone 1 – all vulnerability classifications appropriate in accordance with Table 3 of the NPPG Technical Guidance.
EXISTING DRAINAGE	The existing Site is drained via sewers onsite and within the neighbouring roads. The existing TW rising main will be retained and the foul water sewer will be diverted. Thames Water have been consulted regarding the proposals.
PROPOSED DRAINAGE	The London Plan drainage hierarchy has been followed to provide a reduction in runoff rates to as close as possible to greenfield rates, for all storms of up to and including 1 in 100 years + 40% climate change. The proposals will discharge both surface and foul water towards the neighbouring sewers; Thames Water have been consulted and confirmed capacity for the development.
SURFACE WATER MANAGEMENT	Proposals will utilise green and blue roofs, raingardens, permeable paving, and extensive green landscaping throughout the site to provide biodiversity, amenity, treatment and control the rate of runoff. Overland flow routes have been considered in the design, a SuDS Proforma has been completed and a Maintenance Schedule has been provided as part of this report.

Table 7, Summary Table

Appendix A: Architectural Plans