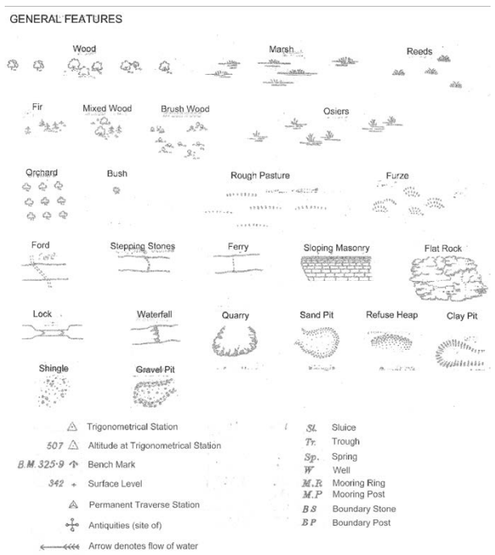
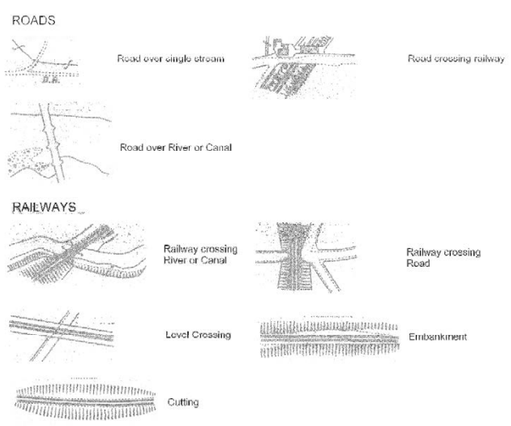
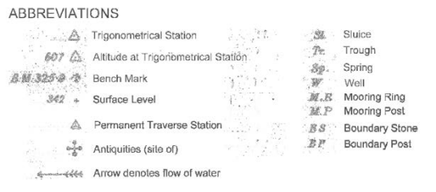
County Series 1:2,500 scale







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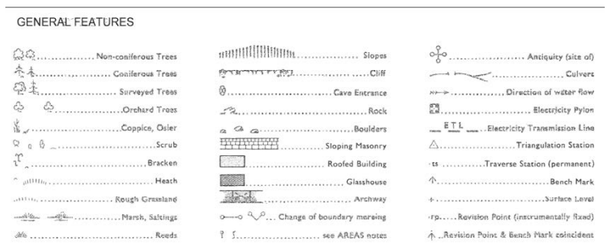

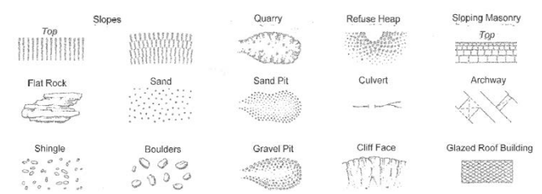

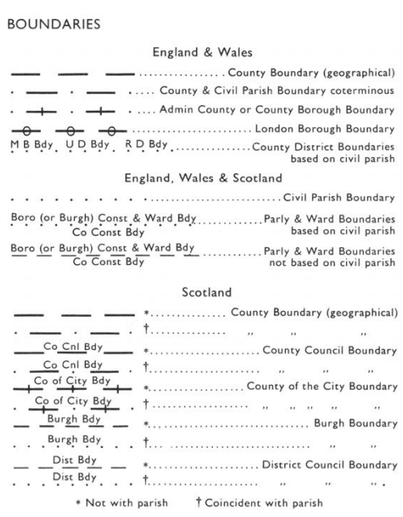

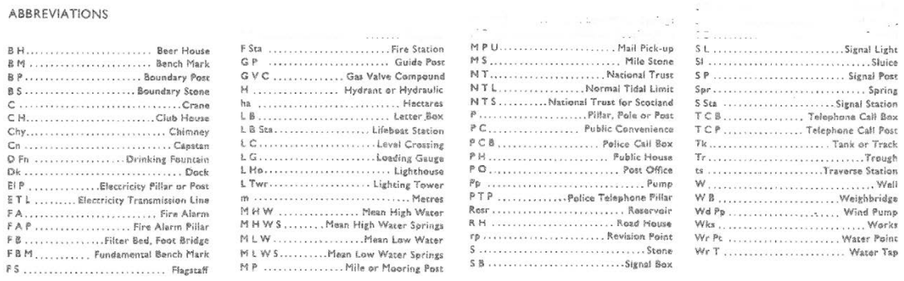

GroundSure

Historical Map Pack Legend

County Series

1:1,250 scale

~

County Series & National Grid

1:2,500 scale

Information present on these legends is sourced from the same Ordnance Survey mapping as the maps used in this product.

If you have a query regarding any of the maps provided within this map pack, please contact GroundSure's technical helpline. We will endeavour to answer any queries you may have.

Technical Helpline:

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APPENDIX G
PRELIMINARY UXO RISK ASSESSMENT

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Express Preliminary UXO Risk Assessment

Client	RSK
Project	The Hope Project
Site Address	The Hope Project, Camden, NW1 7JE
Report Reference	EP3439-00
Date	06/05/2016
Originator	WE

Assessment Objective

This preliminary risk assessment is a qualitative screening exercise to assess the likely potential of encountering unexploded ordnance (UXO) at The Hope Project. The assessment involves the consideration of the basic factors that affect the potential for UXO to be present at a site as outlined in Stage One of the UXO risk management process.

Background

This assessment uses the sources of information available in-house to 1st Line Defence Limited to enable the placement of a development site in context with events that may have led to the presence of German air-delivered or Allied military UXO. The report will identify any immediate necessity for risk mitigation or additional research in the form of a Detailed UXO Risk Assessment. It makes use of 1st Line Defence's extensive historical archives, library and unique geo-databases as well as internet resources, and is researched and compiled by UXO specialists and graduate researchers.

The assessment directly follows CIRIA C681 guidelines "Unexploded Ordnance, a Guide for the Construction Industry". The document will therefore assess the following factors:

- Basic Site Data
- Previous Military Use
- Indicators of potential aerial delivered UXO threat
- Consideration of any Mitigating Factors
- Extent of Proposed Intrusive Works
- Any requirement for Further Work

It should be noted that the vast majority of construction sites in the UK will have a low or negligible risk of encountering UXO and should be able to be screened out at this preliminary stage. The report is meant as a common sense 'first step' in the UXO risk management process. The content of the report and conclusions drawn are based on basic, preliminary research using the information available to 1st Line Defence at the time this report was produced.

Risk Assessment Considerations	
Site location and description/current use	The site is located in Mornington Crescent, in the London Borough of Camden.  The site is an irregular shaped parcel of land. The eastern area of the site is defined by the former Hope and Anchor Pub, and the western section is occupied by the nightclub 'Koko'. The northern site boundary is adjacent to a number of commercial premises adjoining Camden High Street. The eastern site boundary is adjacent to Bayham Street. The southern site boundary is adjacent to Crowndale Road and the eastern site boundary is adjacent to Camden High Street. The site is centred on the approximate OS grid reference: **TQ 2923683404**
Are there any indicators of current/historical military activity on/close to the site?	There is no evidence to suggest any current or historic military occupation of the site area in available record sets. The closest recorded anti-aircraft battery was located 3.1km to the north-west in the vicinity of Primrose Hill. Regent's Park Barracks is located 450m to the west of the site area. There are numerous urban features located between the site and the barracks, including train lines, significantly reducing the chance of ordnance from the barracks contaminating the site area.
What was the pre- and post-WWII history of the site?	WWI era OS mapping indicates that the site was occupied by a 'Picture Theatre'. The building was also known as the Camden Theatre and was constructed in 1900. A 'Public House' is also evident in the east of the site at this time. There is no obivous alteration evident to structures on site in post WWI or pre WWII mapping. The Camden Theatre, later labelled the 'Camden Hippodrome' and the adjoining public house also appear unaltered in post war mapping.
Was the area subject to bombing during WWII?	The site was situated in the Metropolitan Borough of St. Pancras during WWII. St. Pancras experienced a high density bombing campaign with 258.4 items of ordnance recorded per 1,000 acres. A total of 641 HE bombs, 8 Parachute Mines, 14 Oil Bombs, 11 Phosphorus Bombs, 20 V1 Pilotless Aircraft and 2 V2 long range rocket bombs were recorded. There is no record of any strikes within the site boundary, or recorded on structures immediately adjacent to the site area on the available London bomb census mapping from the National Archives. The closest recorded strikes occurred on Oakley street and on Harrington Square, both located to the south of the site. Neither strike is considered sufficiently proximate to have resulted in significant damage or disturbance to the site area.
Is there any evidence of bomb damage on/close to the site?	London Bomb Damage Mapping indicates that the site was not damaged during WWII. Structures to the east and to the south of the site suffered general blast damage, largely light in nature. The closest structures recorded to have endured significant damage are located to the south-east on Oakley Street and to the south on Harrington Place. The damage largely corresponds with bomb census mapping. In addition low resolution WWII era photography indicates that the structures on the site were present and undamaged. The image further corroborates consulted records indicating areas of clearance to the south.

To what degree would the site have been subject to access?	Local historical information indicates that The Camden Hippodrome Theatre was converted into a cinema from 1913 and was later shut to the public at the outbreak of the war, in alignment with government policy. The theatre was reopened after the conclusion of the Blitz, although its exact date of reopening is not clear at this stage. Despite this it is considered likely that both the theatre and public house on-site would have served some form of communal or civic purpose during the war d, and would have been subject to regular, thorough, and specific post raid checks. In 1945 the site was used by the BBC as a base for broadcasting.
To what degree has the site been developed post-WWII?	There has been no significant structural development to the site area in the post war era.
What is the nature and extent of the intrusive works proposed?	The exact nature of the proposed works have not been disclosed at the time of writing but are believed to include site investigation works prior to the redevelopment of the Koko night club and the demolition of two adjacent buildings.

Summary and Conclusions

The site area was located in the Metropolitan Borough of St Pancras. St Pancras endured a high density bombing campaign during WWII, although the area immediately around the site appears to have evaded the worst concentration of bombing.

There is no record of bombing within the site area. The site does not alter in OS mapping, and it is not described as having sustained any damage in damage mapping. The structure appears relatively undamaged in low resolution WWII era photography.

The site was occupied by a theatre (converted into a cinema) and a Public House during WWII. The theatre was not open to the public for commercial purposes during the Blitz, but due to its size and importance is still likely to have been utilised by the local community and is anticipated to have sustained a reasonable frequency of access. It is highly likely that damage to the site and to adjacent structures would have been noted and investigated, and that the site would have been subject to regular and specific checks for signs of UXO.

There is no available record of any current or historic military occupation of the site area.

Recommendations

Based on the findings of this report, the risk of encountering UXO during the proposed works is considered to be **minimal**. Whilst it would be possible to undertake a Detailed UXO Threat Assessment for the site and obtain all available local historical information, it is not considered likely that this information would significantly change this preliminary assessment given the findings of this report. It is therefore **not recommended that any further action** should be taken for this site.

If the client has any anecdotal or empirical evidence of UXO risk on site, please contact 1st Line Defence.

APPENDIX H
EXPLORATORY HOLE RECORDS

DRAFT

BOREHOLE LOG

Contract:	Client:	Borehole:
The Hope Project	The Hope Lease Ltd	BH1

Contract Ref:	Start:	Ground Level:	Co-ordinates:	Sheet:
371475	29.06.16 End: 01.07.16	22.75	---	1 of 4

Samples and In-situ Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	No	Type	Results						
						CONCRETE.	22.65	0.10	
						CONCRETE.	22.45	0.30	
						Made Ground: Dark brown slightly sandy gravelly silty CLAY. Gravel is very angular to subrounded fine to coarse flint, brick, charcoal, ash, clinker and pottery. With occasional light brown clay pockets.		(0.90)	
1.10	1	ES	Tubx1, VL + J			. . . Below 0.85m, occasional half bricks.	21.55	1.20	
1.40	1	D				Firm brown mottled grey silty CLAY. With occasional burrows infilled with grey clay. (LONDON CLAY FORMATION)			
1.60-2.05	1	SPT	N=5						
1.60	2	D				. . . At 1.40m, brown and orange mottled. Rare subrounded coarse gravel of claystone and rare fragments of carbonaceous matter.			
2.50	1	UT	40 blows 100% recovery						
2.95	3	D				. . . Below 2.95m, fissured. With occasional mica and light brown fine sand partings. Frequent orange silt lenses.			
3.50-3.95	2	SPT	N=9						
3.50	4	D				. . . Below 3.50m, occasional selenite crystals.			
								(6.60)	
4.50	2	UT	40 blows 100% recovery			. . . Below 4.50m, stiff.			
4.95	5	D				. . . Below 4.95m, with frequent becoming occasional partings of orange fine sand.			
5.50	6	D				. . . Below 5.50m, occasional nodules of cemented orange sand and selenite <10mm.			
6.00-6.45	3	SPT	N=16						
6.00	7	D							
7.00	8	D							
7.50	3	UT	45 blows 100% recovery				14.95	7.80	
7.95	9	D				Stiff fissured dark grey silty CLAY. Fissures are very closely spaced, randomly orientated. With occasional mica and rare pockets of orange fine sand. Rare, locally occasional, forams. (LONDON CLAY FORMATION)			
8.50	10	D							

Boring Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
29/06/16	08:00	1.20	-	150	Dry
29/06/16	17:00	6.50	1.50	150	Dry
30/06/16	08:00	6.50	1.50	150	Dry
30/06/16		24.50	1.50	150	24.50
30/06/16	17:00	30.00	1.50	150	Dry
01/07/16	08:00	30.00	1.50	150	Dry
01/07/16	17:00	30.00	1.50	150	Dry

Chiselling / Slow Progress

From	To	Duration (hh:mm)

General Remarks

1. Inspection pit dug to 1.20m by others.
2. Water seepage encountered at a depth of 24.50m.
3. On completion, the borehole was grouted to a depth of 5.90m. A 50mm diameter combined gas and groundwater standpipe was installed by engineer on 5/7/16 to a depth of 5.00m,

All dimensions in metres | Scale: 1:50

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Cable percussion	Dando 150 (cut down)	Dave Rosenwold	CSiberry	

DRAFT

BOREHOLE LOG

Contract:	Client:	Borehole:
The Hope Project	**The Hope Lease Ltd**	**BH1**

Contract Ref:	Start:	Ground Level:	Co-ordinates:	Sheet:
371475	End: **01.07.16**	**22.75**	**---**	**2** of **4**

Samples and In-situ Tests				Water	Backfill & Instrumentation	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
9.00-9.45	4	SPT	N=20			Stiff fissured dark grey silty CLAY. Fissures are very closely spaced, randomly orientated. With occasional mica and rare pockets of orange fine sand. Rare, locally occasional, forams. (LONDON CLAY FORMATION) *(stratum copied from 7.80m from previous sheet)*			
9.00	11	D							
10.00	12	D				. . . At 10.00m, rare black fine sand pockets.			
10.50	4	UT	65 blows 100% recovery						
10.95	13	D				. . . Below 10.95m very stiff, dark brownish grey.		(6.70)	
11.50	14	D				. . . Between 11.80m and 11.90m, claystone.			
12.00-12.45	5	SPT	N=23						
12.00	15	D				. . . Between 12.80m and 13.10m, claystone.			
13.00	16	D							
13.50	5	UT	65 blows 100% recovery						
13.95	17	D					8.25	14.50	
14.50	18	D				Stiff / very stiff dark grey slightly sandy silty CLAY. Sand is fine and medium. With occasional mica. Rare forams and rare burrows infilled with grey clay. (LONDON CLAY FORMATION) . . . At 15.00m, with thick laminations of very stiff dark grey silty clay.			
15.00-15.45	6	SPT	N=27						
15.00	19	D							
16.00	20	D							
16.50	6	UT	80 blows 100% recovery						
16.95	21	D							
17.50	22	D				. . . At 17.50m, rare pyritised wood fragments.		(6.50)	

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

Chiselling / Slow Progress		
From	To	Duration (hh:mm)

General Remarks

with a response zone between 1.40m and 5.00m.
4. Standing groundwater in borehole on 5/7/16 at a depth of 4.85m depth.
5. SPT hammer DR02-2016 (E_r = 63.01%) used.

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Cable percussion	**Dando 150 (cut down)**	**Dave Rosenwold**	**CSiberry**	

DRAFT

BOREHOLE LOG

Contract:	Client:	Borehole:
The Hope Project	The Hope Lease Ltd	BH1

Contract Ref:	Start:	Ground Level:	Co-ordinates:	Sheet:
371475	29.06.16 End: 01.07.16	22.75	---	3 of 4

Samples and In-situ Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	No	Type	Results						
18.00-18.45	7	SPT	N=31			Stiff / very stiff dark grey slightly sandy silty CLAY. Sand is fine and medium. With occasional mica. Rare forams and rare burrows infilled with grey clay. (LONDON CLAY FORMATION) *(stratum copied from 14.50m from previous sheet)*			
18.00	23	D							
19.00	24	D							
19.50	7	UT	90 blows 89% recovery						
19.95	25	D							
20.50	26	D				. . . At 20.50m, recovered as firm.	1.75	21.00	
21.00-21.45	8	SPT	N=33			Very stiff fissured dark grey silty CLAY. With occasional mica. Rare light brown fine sand partings and rare forams. (LONDON CLAY FORMATION)			
21.00	27	D						(1.95)	
22.00	28	D							
22.50	8	UT	90 blows 78% recovery				-0.20	22.95	
22.95	29	D				Very stiff dark grey slightly sandy silty CLAY. Sand is fine. With occasional light brown fine sand pockets <3mm. Occasional mica and rare forams. Rare burrows infilled with grey clay. Occasional black clay lenses <4mm. (LONDON CLAY FORMATION)		(1.05)	
23.50	30	D					-1.25	24.00	
24.00-24.45	9	SPT	N=32	≈		Stiff / very stiff dark greyish brown silty CLAY. With occasional pockets of partially pyritised black carbonaceous matter and with veins of pyrite. Occasional light brown fine sand partings and burrows infilled with grey clay. (LONDON CLAY FORMATION)		(1.00)	
24.00	31	D					-2.25	25.00	
25.00	32	D				Stiff / very stiff sandy silty CLAY. Sand is fine. With occasional light brown fine sand pockets <20mm and occasional dark green glauconitic fine and medium sand speckling. Rare forams and occasional mica. (HARWICH FORMATION - SWANSCOMBE MEMBER)	-2.65	25.40	
25.50	9	UT	100 blows 78% recovery			Very stiff fissured brown mottled blue-grey CLAY. Fissures are extremely closely spaced, randomly orientated, polished. (LAMBETH GROUP) . . . At 25.95m, blue-grey and yellowish brown mottled.			
25.95	33	D							
26.50	34	D							

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

Chiselling / Slow Progress		
From	To	Duration (hh:mm)

General Remarks

All dimensions in metres | Scale: 1:50

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Cable percussion	Dando 150 (cut down)	Dave Rosenwold	CSiberry	

DRAFT

BOREHOLE LOG

Contract:	Client:	Borehole:
The Hope Project	**The Hope Lease Ltd**	**BH1**

Contract Ref:	Start:	Ground Level:	Co-ordinates:	Sheet:
371475	End: **01.07.16**	**22.75**	**---**	**4** of **4**

Samples and In-situ Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	No	Type	Results						
27.00-27.43	10	SPT	N=54*			Very stiff fissured brown mottled blue-grey CLAY. Fissures are extremely closely spaced, randomly orientated, polished. (LAMBETH GROUP)			
27.00	35	D				*(stratum copied from 25.40m from previous sheet)*		(4.60)	
						. . . Below 27.00m, mottled dark red.			
28.00	36	D							
28.50	10	UT	110 blows 67% recovery						
28.95	37	D				. . . Below 28.95m, blue-grey mottled dark red and yellowish brown.			
29.20	38	D				. . . Below 29.20m, silty.			
29.50-29.92	11	SPT	N=56*						
29.50	39	D					-7.25	30.00	
						Cable percussion borehole terminated at a depth of 30.00m.			

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

Chiselling / Slow Progress		
From	To	Duration (hh:mm)

General Remarks

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Cable percussion	**Dando 150 (cut down)**	**Dave Rosenwold**	**CSiberry**	

DRAFT

WINDOW SAMPLE LOG

Contract:	Client:	Window Sample:
The Hope Project	**The Hope Lease Ltd**	**WS1**

Contract Ref:	Start:	Ground Level:	Co-ordinates:	Sheet:
371475	End: **20.07.16**	**19.40**	**---**	**1** of **1**

Progress	Samples / Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Window Run	Depth	No	Type	Results						
0.00 - 1.00 (98mm dia) 100% rec							MADE GROUND: Brown slightly sandy gravelly CLAY. Gravel is very angular to subangular fine to coarse flint, brick, concrete and ash. (Reworked London Clay).	19.05	(0.35) 0.35	
							MADE GROUND: (Soft) brown CLAY with rare angular to subangular fine to coarse gravel of flint and brick.	18.90	0.50	
	0.70	D1	D				. . . Between 0.40m and 0.50m, black sandy clay.			
	1.00-1.45	1	SPT	N=32			Firm becoming stiff fissured brown silty CLAY. With occasional thin laminae of orange brown silty fine sand. Fissures are extremely closely spaced, randomly orientated, with blue-grey gleying and locally with fine sand infill. Occasional mica. (LONDON CLAY FORMATION)			
1.00 - 2.00 (85mm dia) 100% rec							. . . Below 1.00m occasional locally frequent selenite crystals.			
	1.63	D3	D				. . . Between 1.25m and 1.35m, claystone.			
							. . . At 1.45m, thin horizon of very stiff/hard yellow silt, recovered as subangular clasts.			
	2.00-2.45	2	SPT	N=19			. . . Between 2.00m and 3.00m, occasional laminae of orange brown silty fine sand.		(3.21)	
	2.30	D5	D							
2.00 - 3.00 (75mm dia) 100% rec										
	2.75	D6	D							
	3.00-3.45	3	SPT	N=21	20/07					
3.00 - 3.60 (65mm dia) 100% rec										
	3.60-3.71	4	SPT	N=250*			. . . At 3.60m, claystone recovered as medium to coarse gravel.	15.69	3.71	
							Window sampler terminated at a depth of 3.71m on claystone.			

Drilling Progress and Water Observations

Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)
20/07/16		0.00	-	0	Dry
20/07/16		1.25	1.00	98	1.25
20/07/16		2.00	1.00	85	2.00
20/07/16		3.71	1.00	65	3.20

General Remarks

1. Window sampler advanced through Trial Pit TP13a.
2. Window sampler refused at a depth of 3.60m on claystone.
3. Groundwater level at 3.20m upon completion of drilling, rising to 3.00m after pulling casing. Water level at 2.10m on completion of installation.
4. On completion, a 50mm diameter combined gas and groundwater monitoring standpipe was installed at a depth of 3.60m, with a response zone between 1.00m and 3.60m.

All dimensions in metres | Scale: **1:25**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Tracked window	**Bespoke Rig**	**Ian Cowan**	**CSiberry + SRamaswamy**	

DRAFT

WINDOW SAMPLE LOG

Contract:	Client:	Window Sample:
The Hope Project	**The Hope Lease Ltd**	**WS2**

Contract Ref:	Start:	Ground Level:	Co-ordinates:	Sheet:
371475	End: **20.07.16**	**17.65**	**---**	**1** of **2**

Progress	Samples / Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Window Run	Depth	No	Type	Results						
0.00 - 1.00 (98mm dia) 100% rec							MADE GROUND: Brown clayey sandy GRAVEL. Gravel is very angular to subangular fine to coarse flint, brock, concrete and wood.	17.05	(0.60) 0.60	
	1.00-1.45	1	SPT	N=20			Stiff fissured brown silty CLAY. With occasional lenses of orange fine sand and occasional selenite crystals. (LONDON CLAY FORMATION) . . . At 0.95m, 30mm nodule of very stiff cemented orange fine sand with selenite crystals in core of nodule. Blue-grey gleying on fissures. . . . Below 0.95m, fissures stained dark red.			
1.00 - 2.00 (85mm dia) 100% rec	1.60	D2	D				. . . At 1.45m, 2mm thick lense of dark orange silty fine and medium sand, occasionaly cemented. . . . Between 1.57m and 1.70m, sub-vertical fissure, plain, smooth, with dark orange fine sand dusting. . . . Below 1.70m, occasional thin laminae of dark orange fine and medium sand. . . . At 1.90m, horizon of coarse sand sized selenite crystals in a dark orange fine and medium sand horizon. Damp.		(2.00)	
	2.00-2.45	2	SPT	N=21				15.05	2.60	
2.00 - 3.00 (75mm dia) 100% rec	2.65	D4	D				Stiff fissured dark grey silty CLAY. With occasional mica and light brown silt pockets. With silt dustings on fissures. (LONDON CLAY FORMATION)			
	3.00-3.45	3	SPT	N=27						
3.00 - 4.00 (65mm dia) 100% rec	3.55	D6	D				. . . Between 3.60m and 3.87m, subvertical fissure, plain, smooth, with silt dustings.			
	4.00-4.45	4	SPT	N=28					(2.85)	
4.00 - 5.00 (65mm dia) 100% rec										

Drilling Progress and Water Observations

Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)
20/07/16		0.00	-	0	Dry
20/07/16		5.45	1.00	65	Dry

General Remarks

1. Window sampler advanced through Trial Pit TP9.
2. Borehole dry on completion.
3. On completion, a 50mm diameter combined gas and groundwater monitoring standpipe was installed at a depth of 4.55m, with a response zone between 0.55m and 4.55m.

All dimensions in metres | Scale: **1:25**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Tracked window	**Bespoke Rig**	**Ian Cowan**	**CSiberry + SRamaswamy**	

DRAFT

WINDOW SAMPLE LOG

Contract:	Client:	Window Sample:
The Hope Project	**The Hope Lease Ltd**	**WS2**

Contract Ref:	Start:	Ground Level:	Co-ordinates:	Sheet:
371475	End: **20.07.16**	**17.65**	**---**	**2** of **2**

Progress	Samples / Tests				Water	Backfill & Instrumentation	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results						
4.00 - 5.00 (65mm dia) 100% rec	4.80	D8	D				. . . At 4.45m, nodule of light brown claystone. Stiff fissured dark grey silty CLAY. With occasional mica and light brown silt pockets. With silt dustings on fissures. (LONDON CLAY FORMATION) *(stratum copied from 2.60m from previous* sheet)			
	5.00-5.45	5	SPT	N=32				12.20	5.45	
							Window sampler terminated at a depth of 5.45m.			

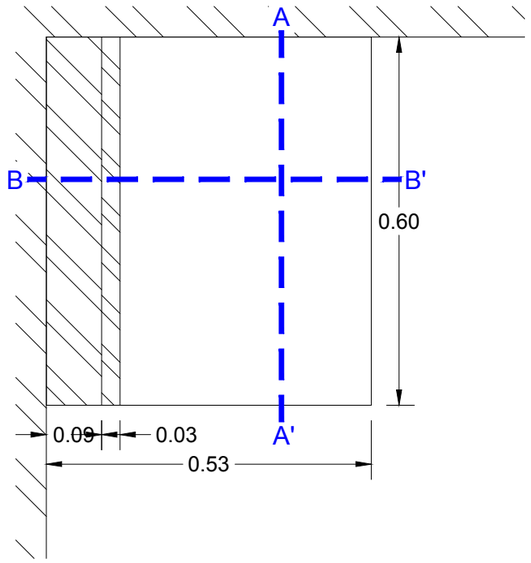
Drilling Progress and Water Observations					
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)

General Remarks

All dimensions in metres | Scale: **1:25**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Inspection pit + Tracked window	**Bespoke Rig**	**Ian Cowan**	**CSiberry + SRamaswamy**	

Plan View:
(1:10)



Scale 1 : 10

0 100 200 300 400 500 600 700 800 900 1000mm

LEGEND

- Section Line
- ① Concrete with damp proof sheet at 0.08m and 0.31m.
- ② MADE GROUND: Dark red brown and brown silty very gravelly SAND with clasts of sandy gravelly CLAY. Sand is fine to medium. Gravel is sub-angular to sub-rounded fine to coarse brick, concrete, occasional clinker, ash and rare slate.

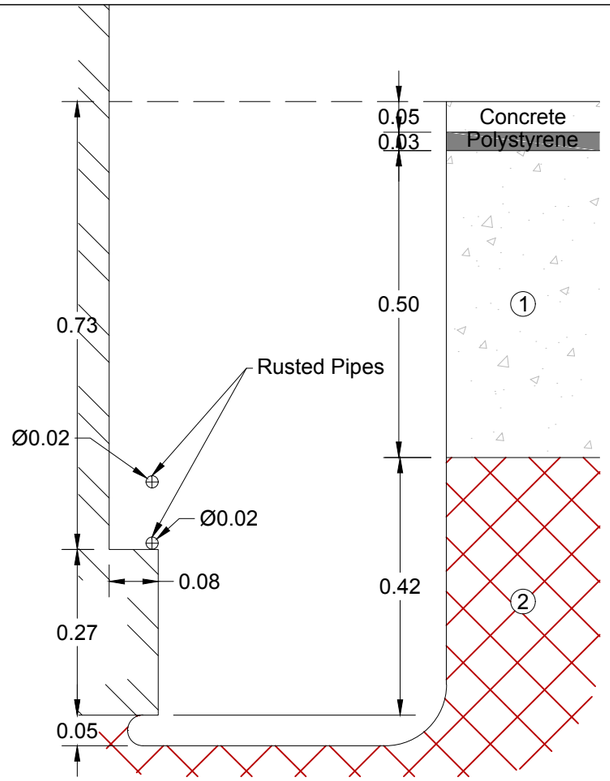
Ground Level: 22.80m AOD

Excavated 07.07.16

Logged by: Mike McCann

Rev.	Date	Amendment	Drawn	Chkd.	Appd.

Section A-A':
(1:10)



Scale 1 : 10

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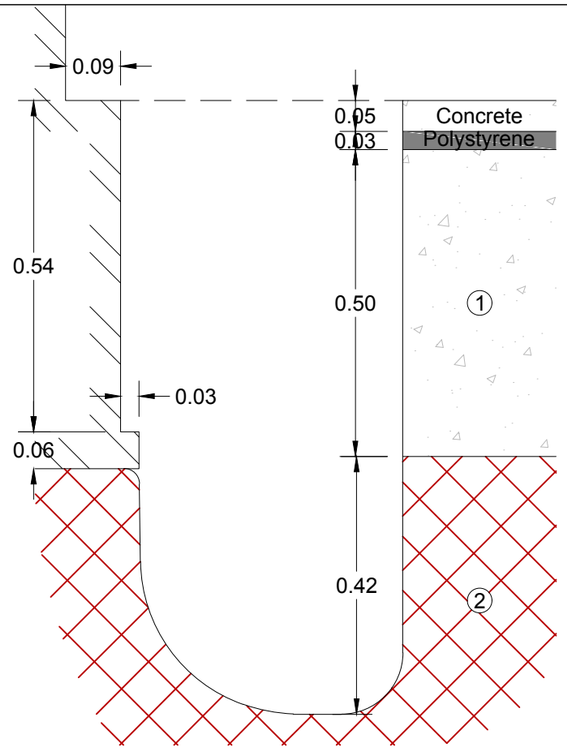
Section B-B':
(1:10)



Scale 1 : 10

0 100 200 300 400 500 600 700 800 900 1000mm

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Client

THE HOPE LEASE LTD

Project Title

THE HOPE PROJECT

Drawing Title

TRIAL PIT 1

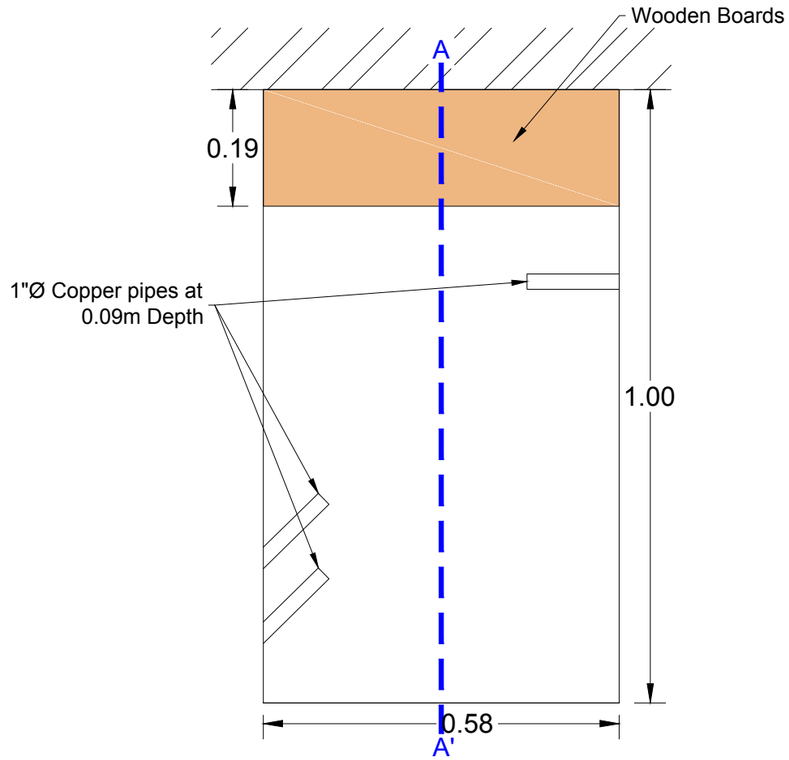
Drawn	Date	Checked	Date	Approved	Date
ASC	13.07.16	CS	13.07.16	CS	13.07.16

Scale	Orig Size	Dimensions
AS SHOWN	A3	m

Project No.	Drawing File
371475 - R01 (00)	371475 (R01-00) TP.dwg

Drawing No.	Rev.
TP1	P1

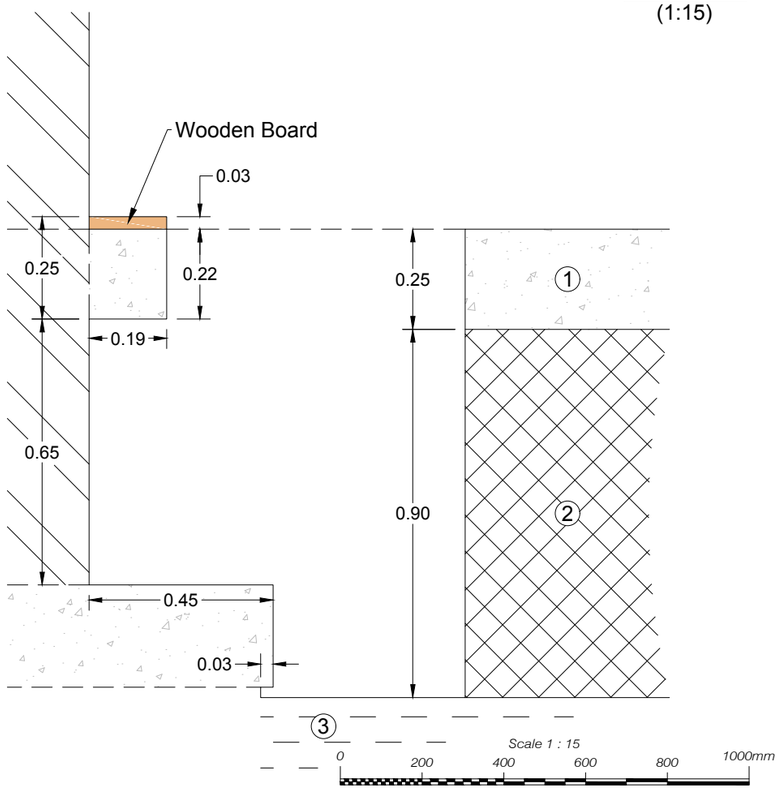
Plan View:
(1:10)



Copper Pipes within concrete,
plastic sheeting at 0.10m

Scale 1 : 10
0 100 200 300 400 500 600 700 800 900 1000mm

Section A-A':
(1:15)



Scale 1 : 15
0 200 400 600 800 1000mm

LEGEND

- Section Line
- ① Concrete
- ② MADE GROUND: Brown slightly sandy gravelly silty CLAY. Gravel is very angular to sub-rounded fine to coarse flint, brick, ash and clinker. Occasional pockets of light brown clay.
- ③ Firm grey and brown mottled slightly gravelly silty CLAY. Gravel is very angular to rounded fine to coarse multicoloured flint.

Ground Level: 22.80m AOD

Excavated 28.06.16

Logged by: Claire Siberry

Rev.	Date	Amendment	Drawn	Chkd.	Appd.

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Project Title
THE HOPE PROJECT

Drawing Title
TRIAL PIT 2

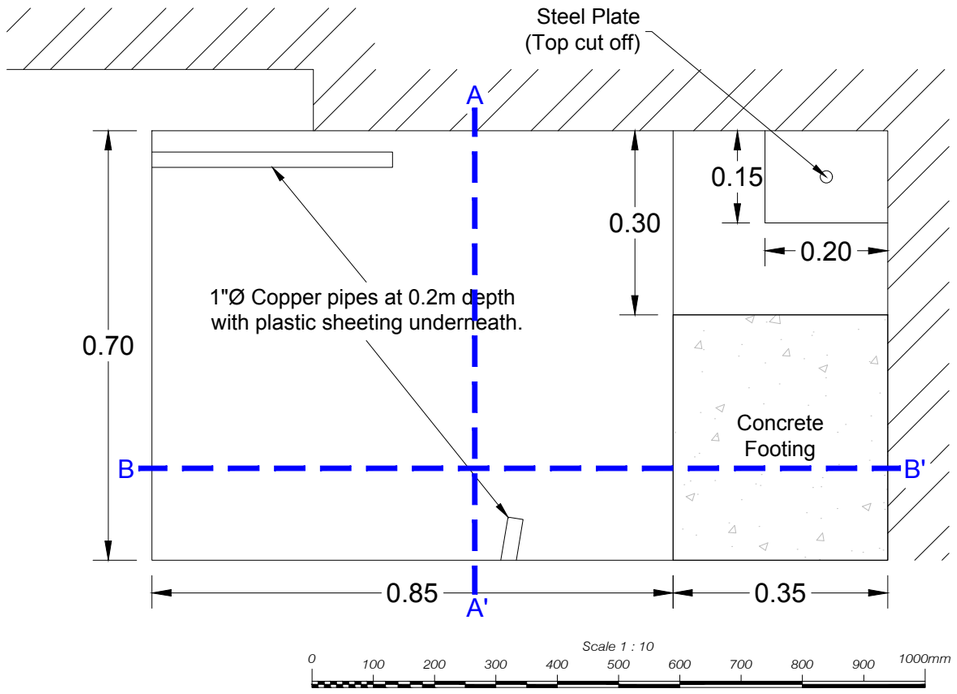
Drawn	Date	Checked	Date	Approved	Date
ASC	04.07.16	CS	04.07.16	CS	04.07.16

Scale	Orig Size	Dimensions
AS SHOWN	A3	m

Project No.	Drawing File
371475 - R01 (00)	371475 (R01-00) TP.dwg

Drawing No.	Rev.
TP2	P1

Plan View:
(1:10)



LEGEND

- Section Line
- ① MADE GROUND: Brown slightly sandy gravelly CLAY. Gravel is very angular to subangular fine to coarse flint, brick, concrete, ash, clinker. Occasional pockets of black carbonaceous matter and occasional pockets of light brown clay.
- ② Damp, recovered as soft, dark brown slightly sandy silty CLAY (on end of road pin)

Groundwater in Base of Pit (29.06.16)

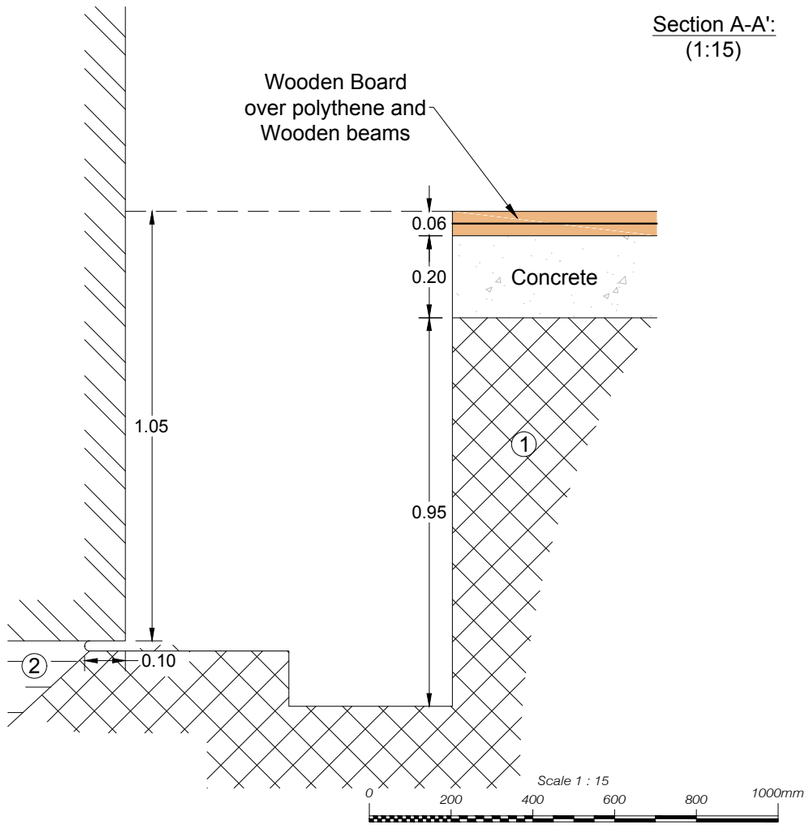
Ground Level: 22.80m AOD

Excavated 28.06.16

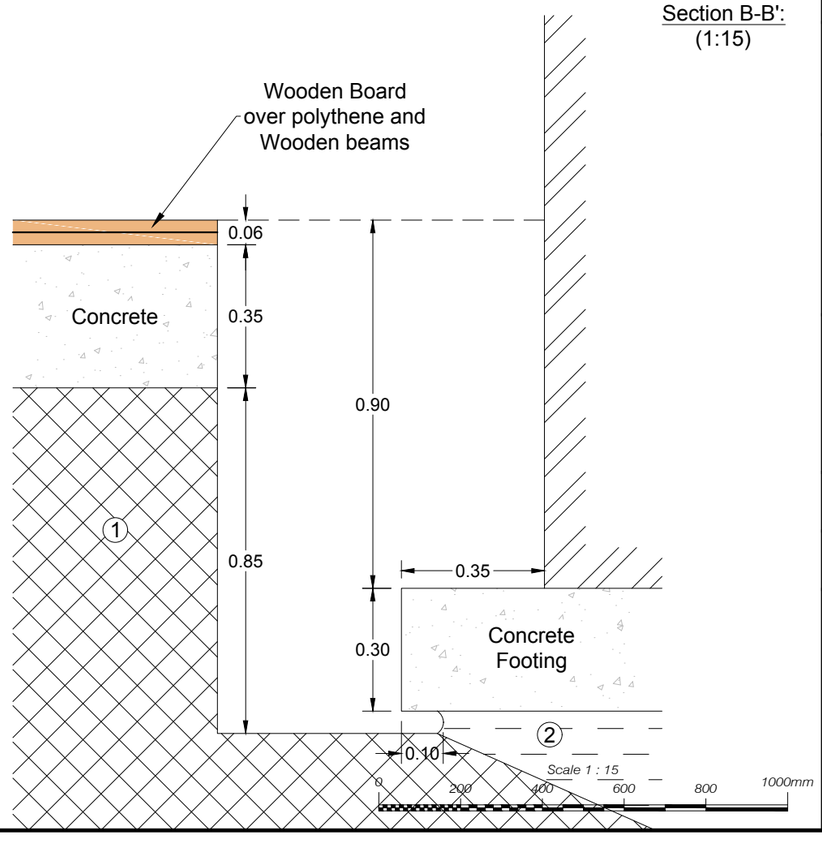
Logged by: Claire Siberry

Rev.	Date	Amendment	Drawn	Chkd.	Appd.

Section A-A':
(1:15)



Section B-B':
(1:15)



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THE HOPE LEASE LTD

Project Title

THE HOPE PROJECT

Drawing Title

TRIAL PIT 3

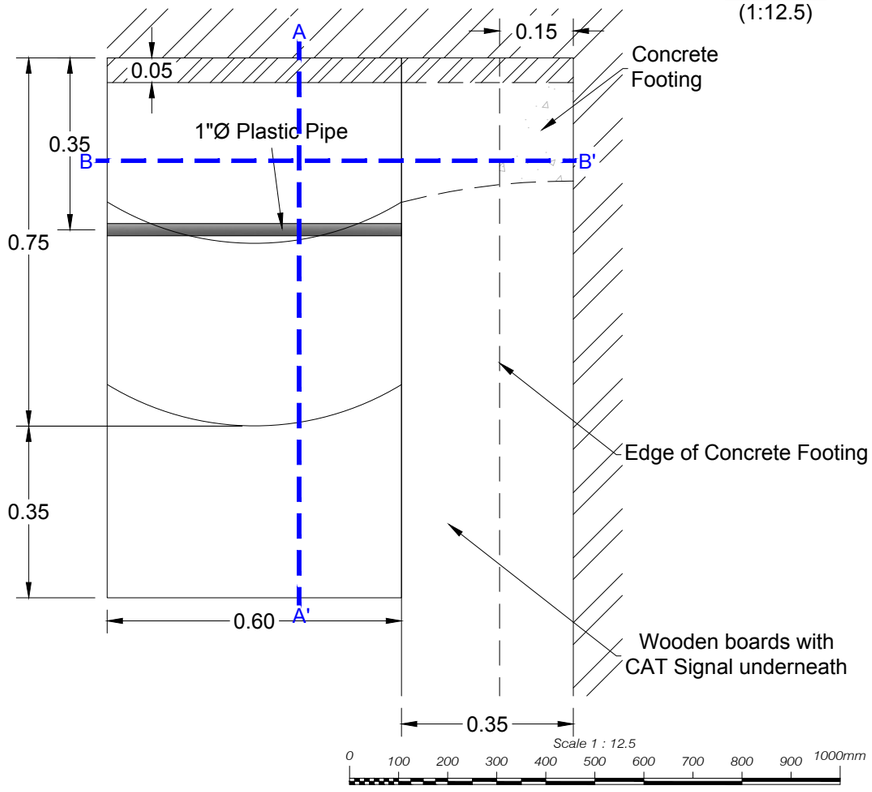
Drawn	Date	Checked	Date	Approved	Date
ASC	04.07.16	CS	04.07.16	CS	04.07.16

Scale	Orig Size	Dimensions
AS SHOWN	A3	m

Project No.	Drawing File
371475 - R01 (00)	371475 (R01-00) TP.dwg

Drawing No.	Rev.
TP3	P1

Plan View:
(1:12.5)



LEGEND

- Section Line
- ① MADE GROUND: Brown sandy GRAVEL with occasional brick cobbles. Gravel is very angular to sub-angular fine to coarse flint and brick.
- ② MADE GROUND: Brown slightly sandy gravelly silty CLAY. Gravel is angular to sub-angular fine to coarse flint, brick, concrete clinker, ash and tile. Occasional light brown clay pockets.
- ③ Firm brown silty CLAY.

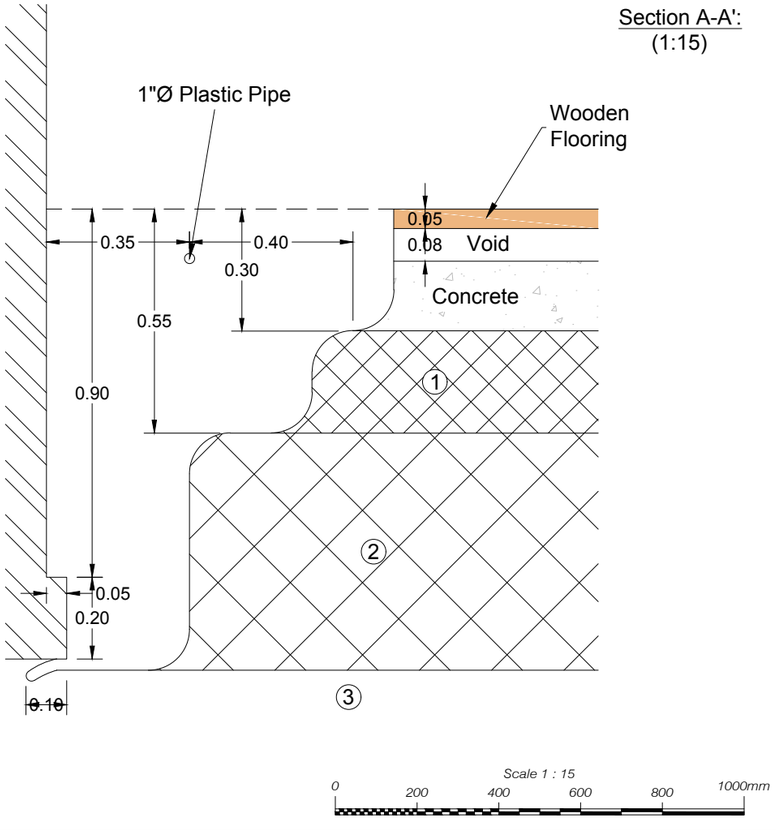
Ground Level: 22.80m AOD

Excavated 28.06.16

Logged by: Claire Siberry

Rev.	Date	Amendment	Drawn	Chkd.	Appd.

Section A-A':
(1:15)



Section B-B':
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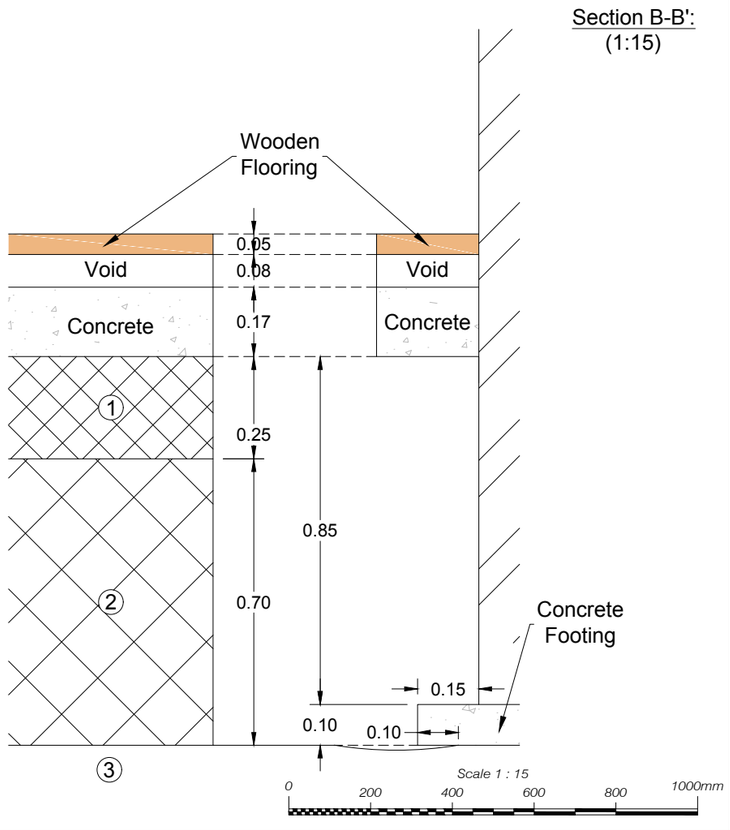

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THE HOPE LEASE LTD

Project Title

THE HOPE PROJECT

Drawing Title

TRIAL PIT 4

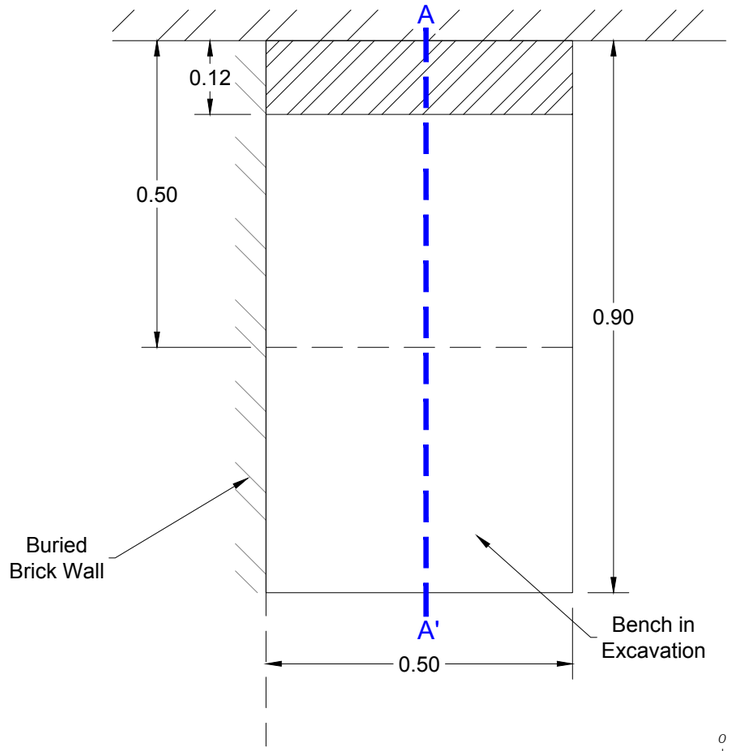
Drawn	Date	Checked	Date	Approved	Date
ASC	04.07.16	CS	04.07.16	CS	04.07.16

Scale	Orig Size	Dimensions
AS SHOWN	A3	m

Project No.	Drawing File
371475 - R01 (00)	371475 (R01-00) TP.dwg

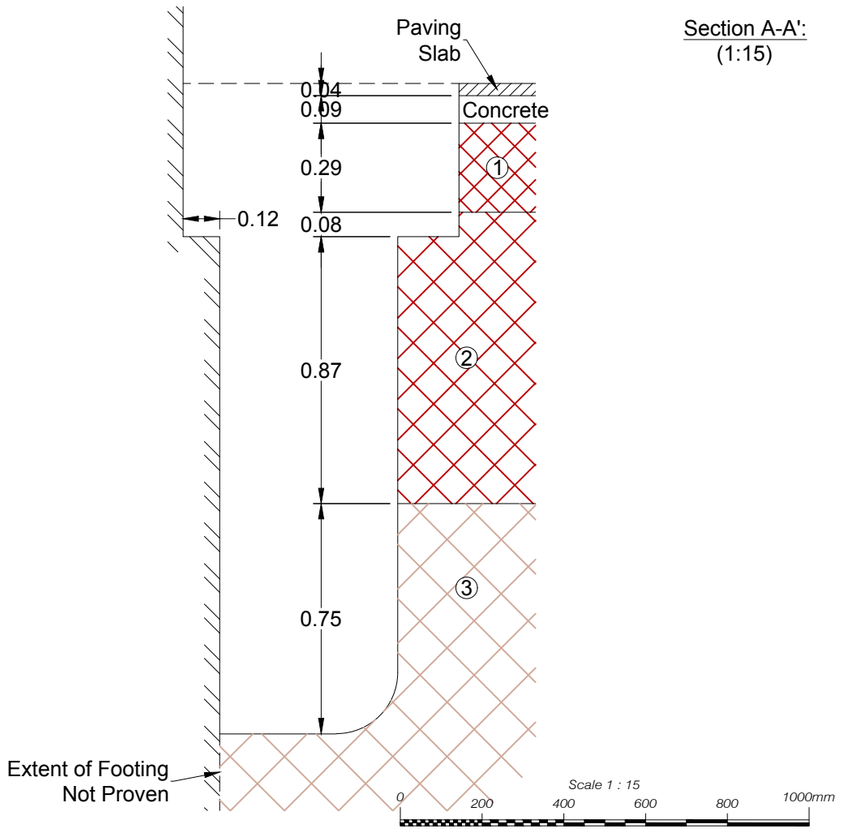
Drawing No.	Rev.
TP4	P1

Plan View:
(1:10)



Scale 1 : 10
0 100 200 300 400 500 600 700 800 900 1000mm

Section A-A':
(1:15)



LEGEND

Section Line

① MADE GROUND: Brown and dark brown silty gravelly SAND with high cobble content. Sand is fine to medium. Gravel is angular to sub-rounded fine to coarse concrete, brick and occasional pieces of earthenware.

② MADE GROUND: Brown and dark brown gravelly CLAY. Gravel is angular to sub-angular fine to coarse red brick, concrete and clinker slag.

③ Possible MADE GROUND: Firm orange brown, brown mottled grey CLAY with pockets of orange brown silty sand.

Excavated 30.06.16 - 08.07.16

Ground Level: 22.35m AOD
Logged by: Mike McCann

Rev.	Date	Amendment	Drawn	Chkd.	Appd.

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Project Title
THE HOPE PROJECT

Drawing Title
TRIAL PIT 5

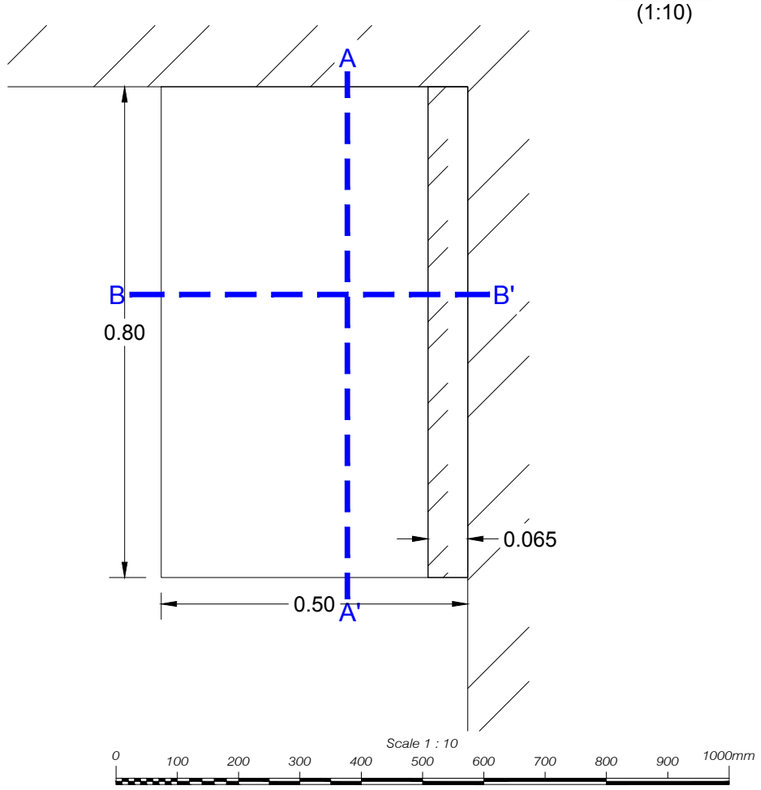
Drawn	Date	Checked	Date	Approved	Date
ASC	04.07.16	CS	04.07.16	CS	04.07.16

Scale	Orig Size	Dimensions
AS SHOWN	A3	m

Project No.	Drawing File
371475 - R01 (00)	371475 (R01-00) TP.dwg

Drawing No.	Rev.
TP5	P1

Plan View:
(1:10)



LEGEND

Section Line

① MADE GROUND: Brown slightly gravelly sandy CLAY. Gravel is angular to sub-angular fine to coarse of brick, flint, concrete and ash.
At top: 50mm layer of black sandy clay

② Firm fissured brown and grey mottled silty CLAY with occasional pockets of light brown silt and occasional mica.

Groundwater at 0.75m

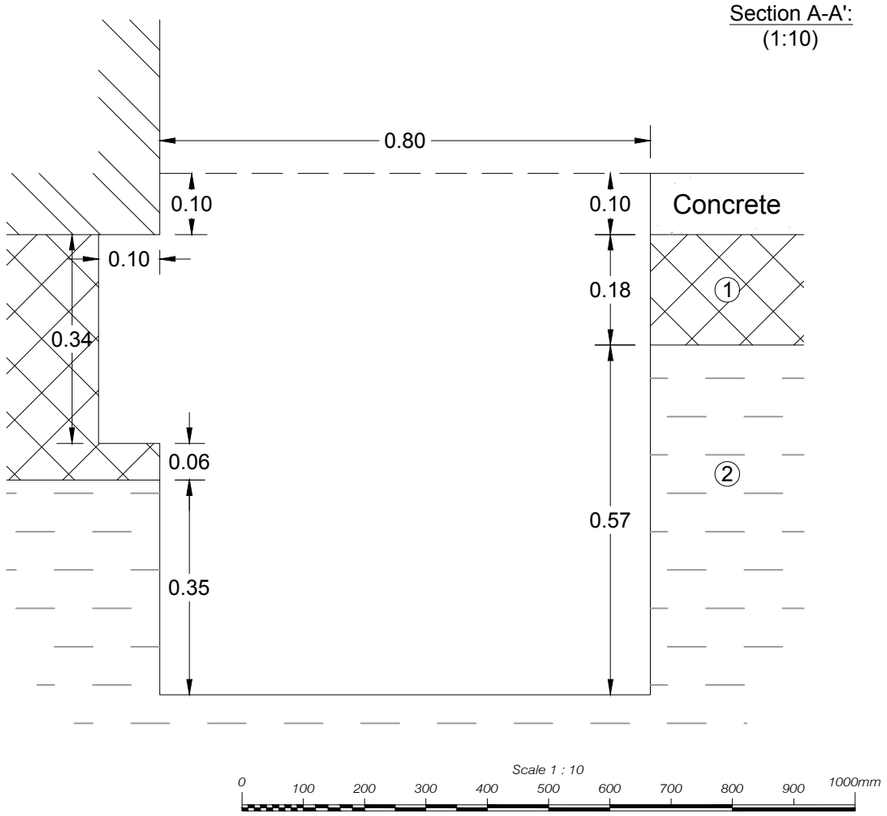
Ground Level: 20.60m AOD

Excavated 30.06.16

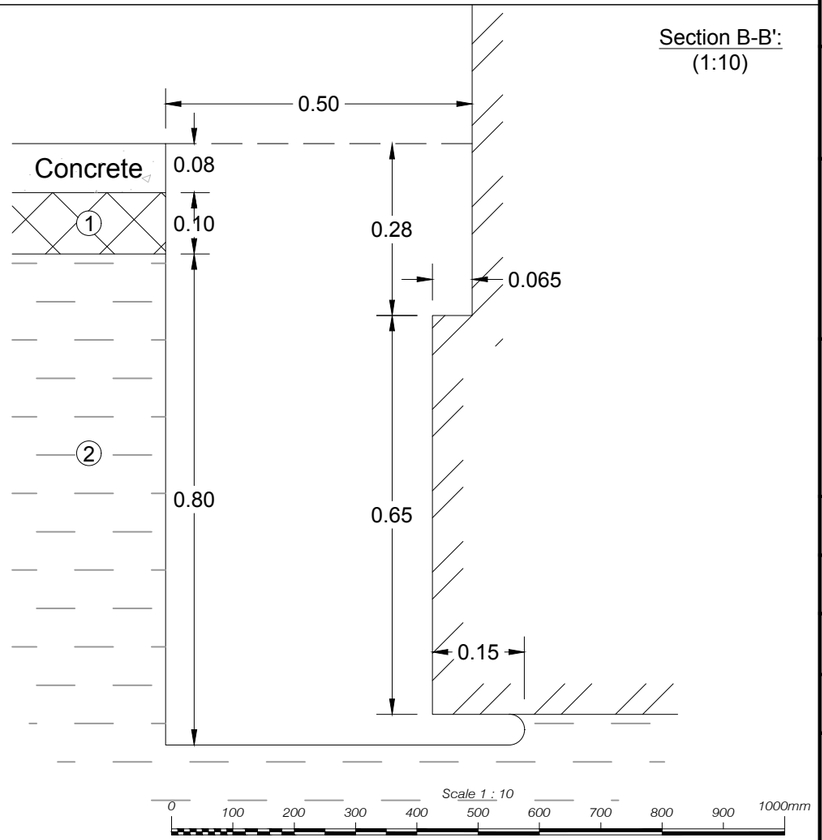
Logged by: Claire Siberry

Rev.	Date	Amendment	Drawn	Chkd.	Appd.

Section A-A':
(1:10)



Section B-B':
(1:10)



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Project Title
THE HOPE PROJECT

Drawing Title
TRIAL PIT 6

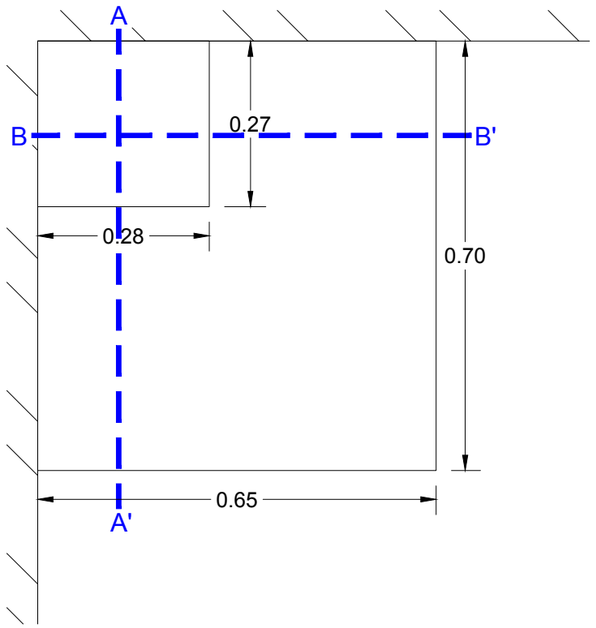
Drawn	Date	Checked	Date	Approved	Date
ASC	12.07.16	CS	12.07.16	CS	12.07.16

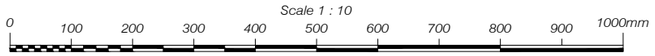
Scale	Orig Size	Dimensions
AS SHOWN	A3	m

Project No.	Drawing File
371475 - R01 (00)	371475 (R01-00) TP.dwg

Drawing No.	Rev.
TP6	P1

Plan View:
(1:10)





LEGEND

- Section Line
- ① MADE GROUND: Black ash GRAVEL.
- ② MADE GROUND: Brown slightly sandy gravelly CLAY. Gravel is angular to sub-angular fine to coarse of brick, ash, concrete and clinker.
- ③ Firm fissured brown and grey mottled silty CLAY with occasional mica and occasional grey gleying on fissures.

Groundwater at 0.53m

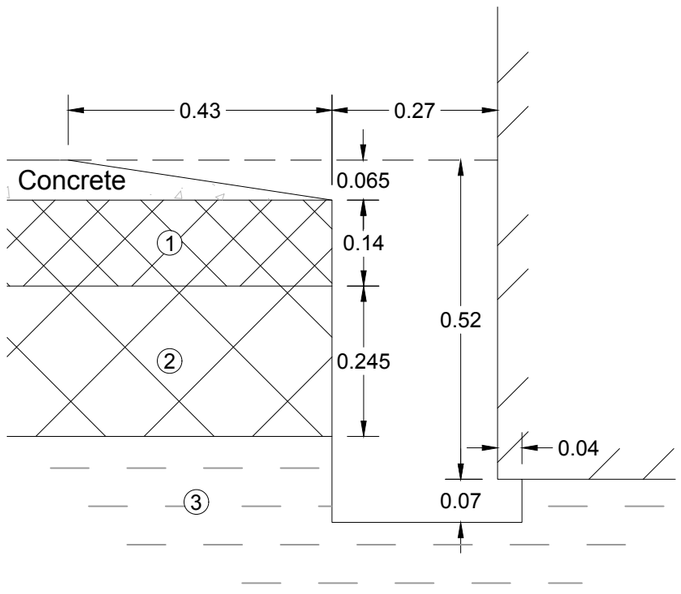
Ground Level: 20.65m AOD

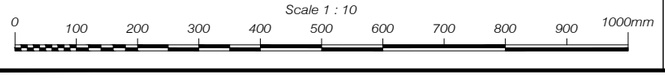
Excavated 13.06.16

Logged by Claire Siberry

Rev.	Date	Amendment	Drawn	Chkd.	Appd.

Section A-A':
(1:10)





Section B-B':
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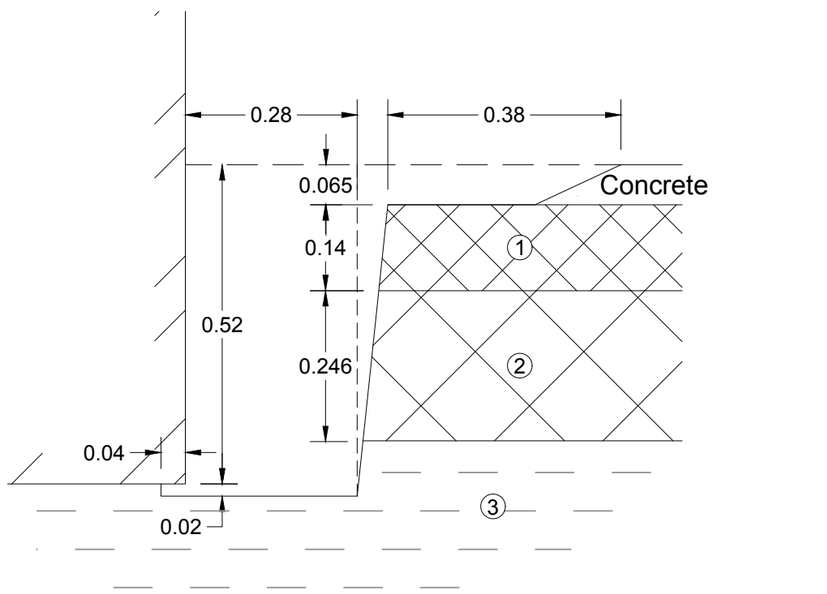

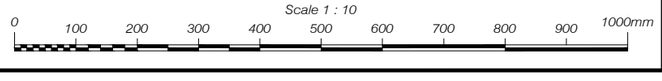

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Client

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Project Title

THE HOPE PROJECT

Drawing Title

TRIAL PIT 7

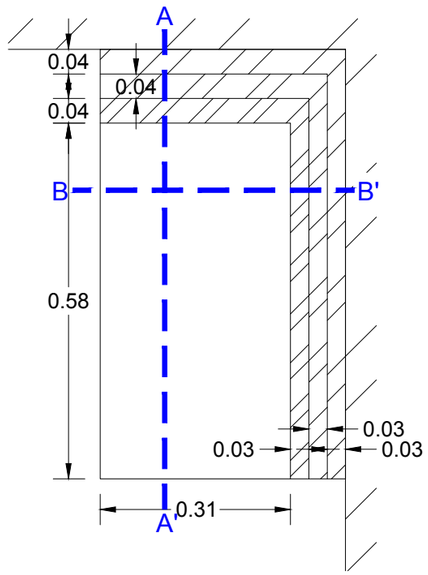
Drawn	Date	Checked	Date	Approved	Date
ASC	12.07.16	CS	12.07.16	CS	12.07.16

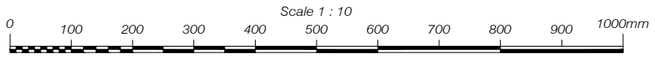
Scale	Orig Size	Dimensions
AS SHOWN	A3	m

Project No.	Drawing File
371475 - R01 (00)	371475 (R01-00) TP.dwg

Drawing No.	Rev.
TP7	P1

Plan View:
(1:10)





LEGEND

Section Line

① MADE GROUND: Brown sandy slightly gravelly CLAY. Gravel is angular to sub-angular fine to coarse of brick, flint, ash and clinker. Occasional pockets of brown and grey mottled clay.

② Firm fissured brown mottled grey CLAY with occasional mica.

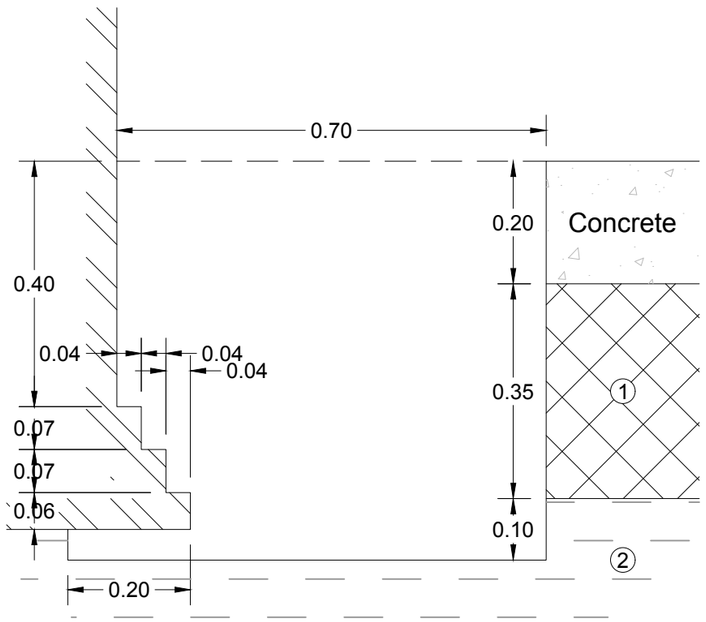
Ground Level: 20.65m AOD

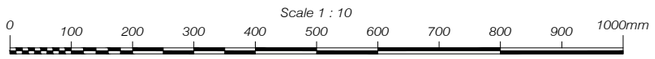
Excavated 30.06.16

Logged by Claire Siberry

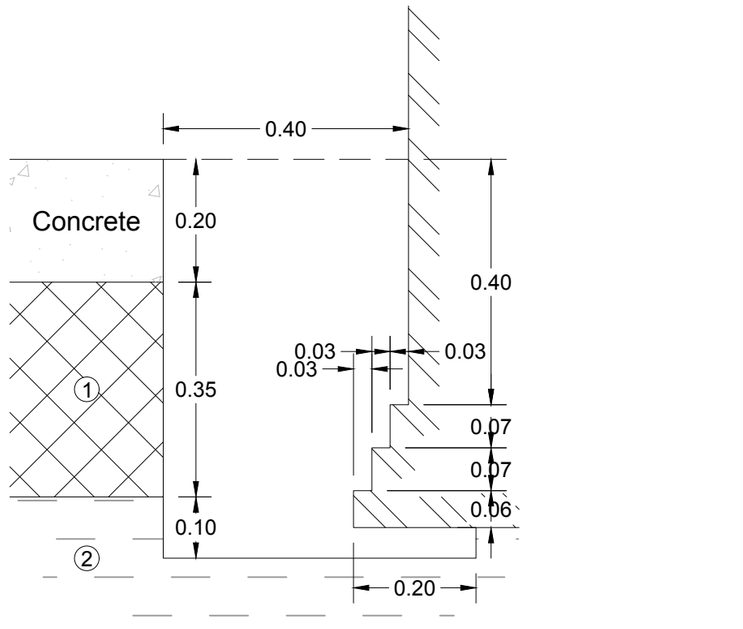
Rev.	Date	Amendment	Drawn	Chkd.	Appd.

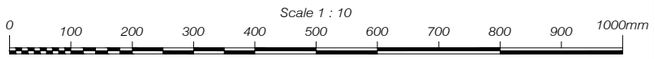
Section A-A':
(1:10)





Section B-B':
(1:10)





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Client

THE HOPE LEASE LTD

Project Title

THE HOPE PROJECT

Drawing Title

TRIAL PIT 8

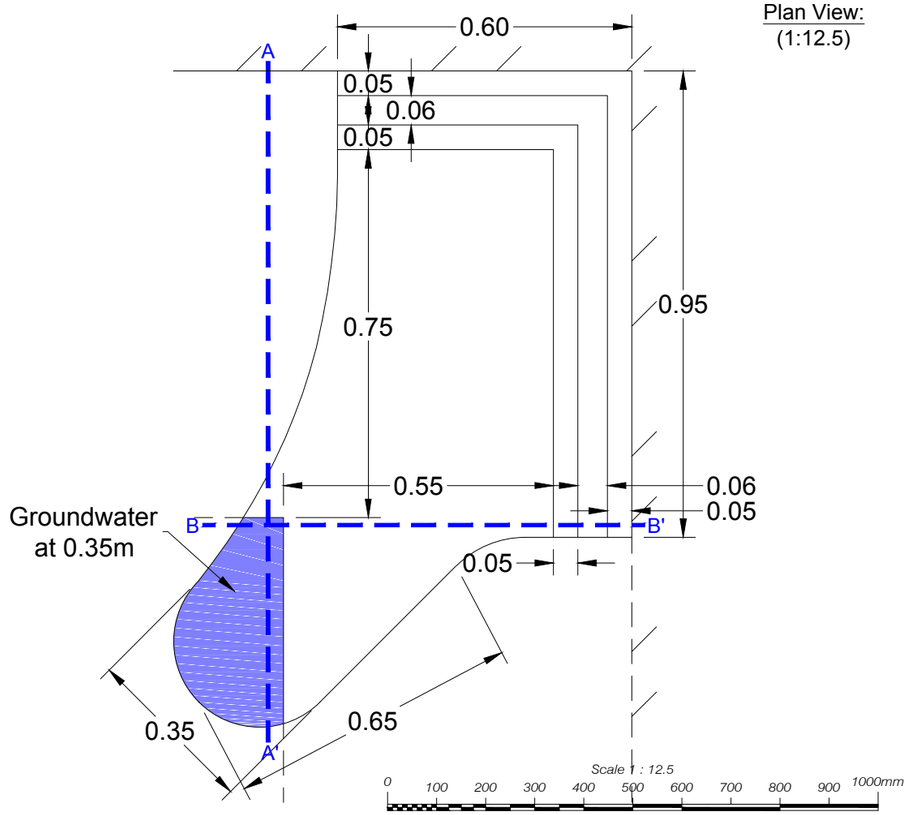
Drawn	Date	Checked	Date	Approved	Date
ASC	04.07.16	CS	04.07.16	CS	04.07.16

Scale	Orig Size	Dimensions
AS SHOWN	A3	m

Project No.	Drawing File
371475 - R01 (00)	371475 (R01-00) TP.dwg

Drawing No.	Rev.
TP8	P1

Plan View:
(1:12.5)



LEGEND

Section Line

① MADE GROUND: Brown clayey sandy GRAVEL. Gravel is very angular to sub-angular fine to coarse flint, brick, concrete and wood.

Groundwater at 0.35m

Ground Level: 17.65m AOD

Excavated 01.07.16

Logged by Claire Siberry

Rev.	Date	Amendment	Drawn	Chkd.	Appd.

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THE HOPE LEASE LTD

Project Title

THE HOPE PROJECT

Drawing Title

TRIAL PIT 9

Drawn	Date	Checked	Date	Approved	Date
ASC	05.07.16	CS	05.07.16	CS	05.07.16

Scale	Orig Size	Dimensions
AS SHOWN	A3	m

Project No.	Drawing File
371475 - R01 (00)	371475 (R01-00) TP.dwg

Drawing No.	Rev.
TP9	P1

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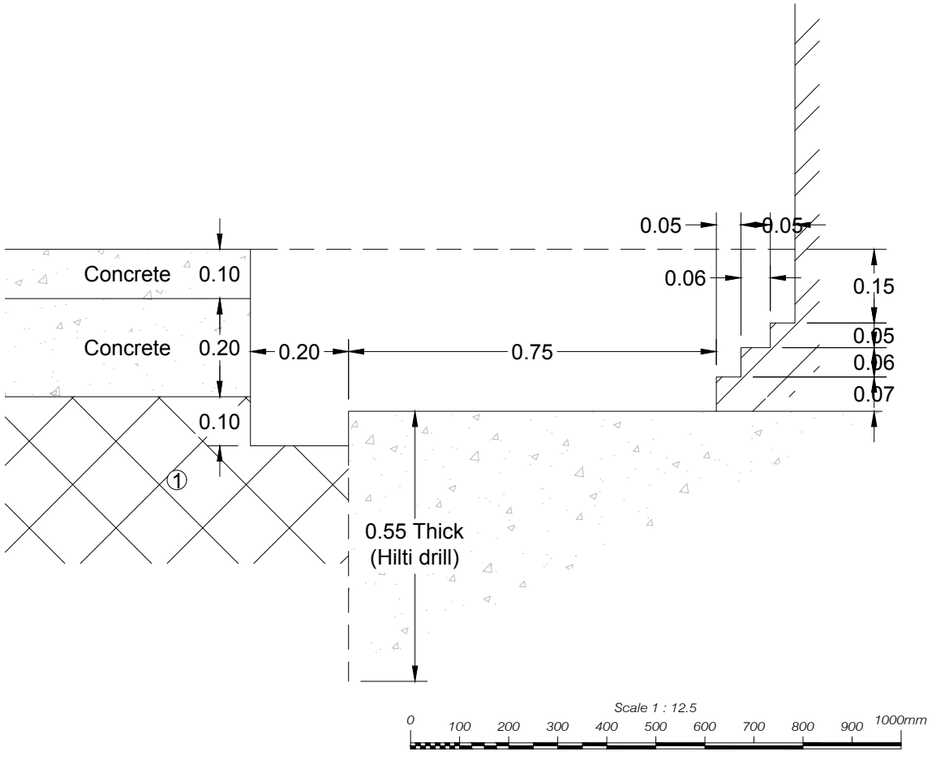
(1:12.5)



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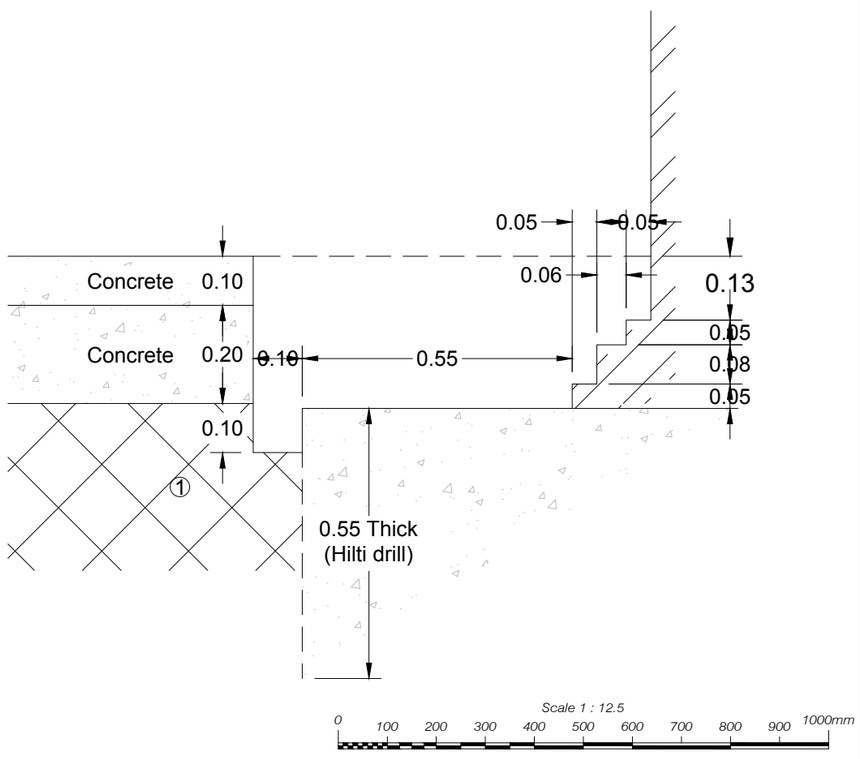
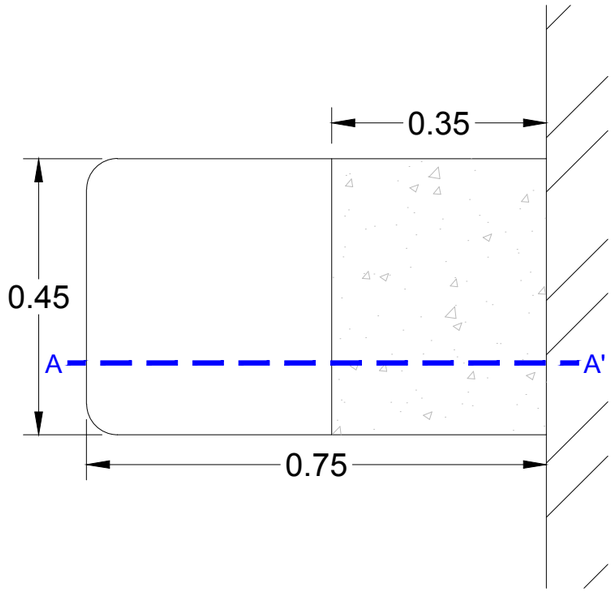
(1:12.5)



Plan View:
(1:10)



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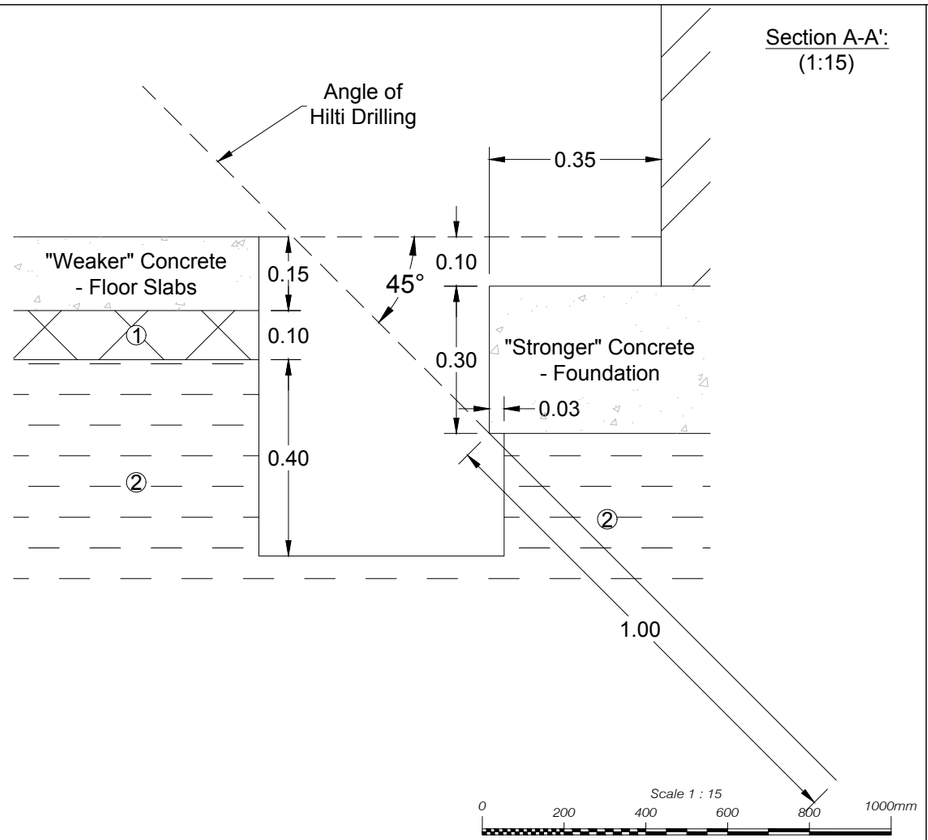
Section A-A':
(1:15)



Scale 1 : 15
0 200 400 600 800 1000mm

LEGEND

Section Line

① MADE GROUND: Brown silty gravelly sand/sandy GRAVEL. Gravel is angular and sub-angular fine to coarse flint, brick, clinker and concrete.

② Firm fissured brown and grey mottled silty CLAY with occasional mica speckling.

Ground Level: 17.60m AOD

Excavated 29.06.16

Logged by Claire Siberry

Rev.	Date	Amendment	Drawn	Chkd.	Appd.

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Project Title
THE HOPE PROJECT

Drawing Title
TRIAL PIT 10

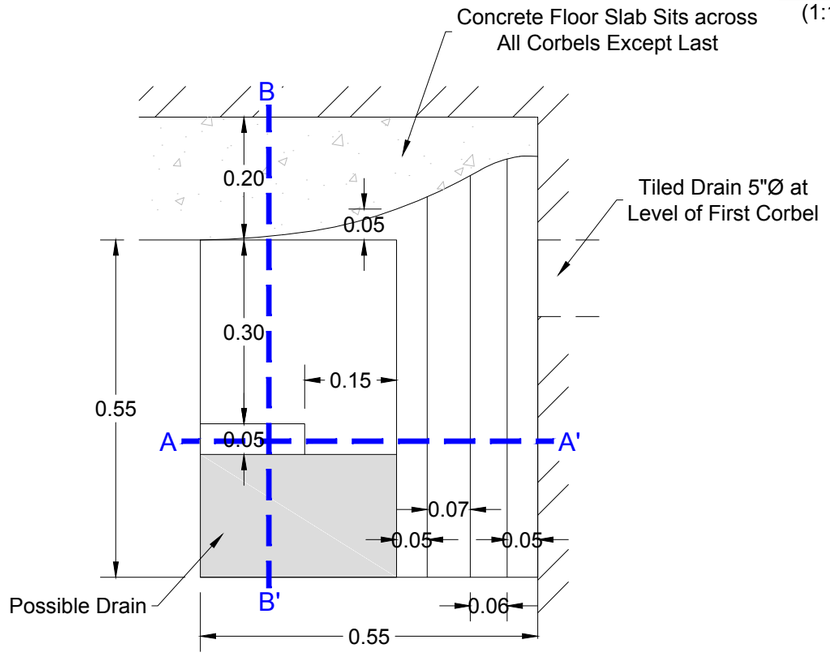
Drawn	Date	Checked	Date	Approved	Date
ASC	05.07.16	CS	05.07.16	CS	05.07.16

Scale	Orig Size	Dimensions
AS SHOWN	A3	m

Project No.	Drawing File
371475 - R01 (00)	371475 (R01-00) TP.dwg

Drawing No.	Rev.
TP10	P1

Plan View:
(1:10)



Scale 1 : 10
0 100 200 300 400 500 600 700 800 900 1000mm

LEGEND

- Section Line
- ① MADE GROUND: Brown slightly silty sandy GRAVEL. Gravel is very angular to angular fine to coarse flint, brick and tile.
- ② MADE GROUND: Brown slightly sandy gravelly CLAY. Gravel is angular to sub-rounded fine to coarse flint and brick with occasional pockets of firm clay. Recovered as soft and saturated.

Groundwater at 0.40m

Ground Level: 17.65m AOD

Excavated 01.07.16

Logged by Claire Siberry

Rev.	Date	Amendment	Drawn	Chkd.	Appd.

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THE HOPE LEASE LTD

Project Title

THE HOPE PROJECT

Drawing Title

TRIAL PIT 11

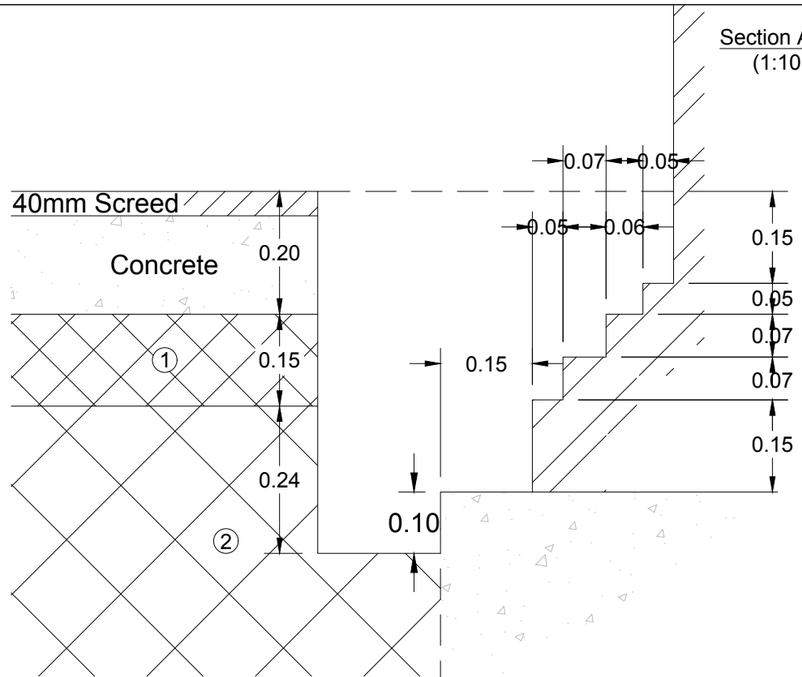
Drawn	Date	Checked	Date	Approved	Date
ASC	05.07.16	CS	05.07.16	CS	05.07.16

Scale	Orig Size	Dimensions
AS SHOWN	A3	m

Project No.	Drawing File
371475 - R01 (00)	371475 (R01-00) TP.dwg

Drawing No.	Rev.
TP11	P1

Section A-A':
(1:10)



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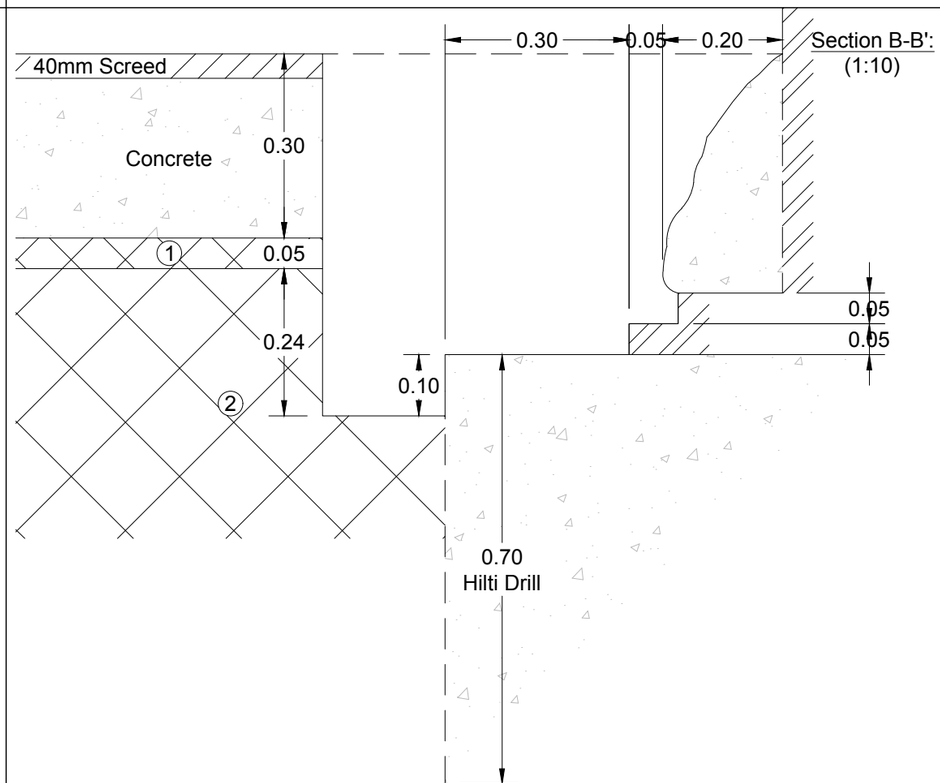
Section B-B':
(1:10)



Scale 1 : 10
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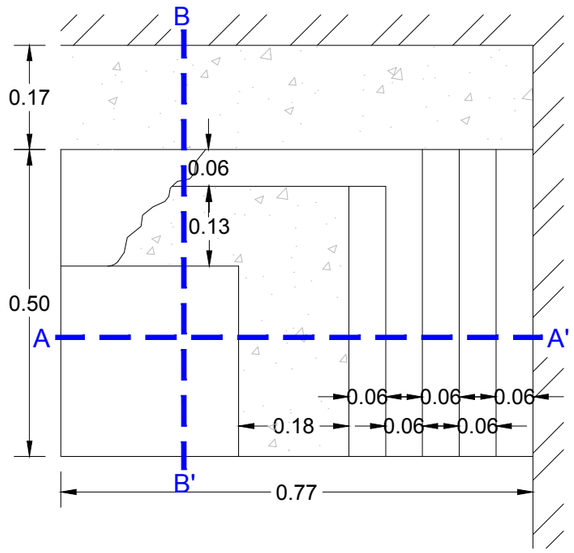
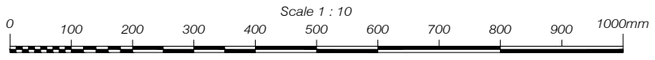
Plan View:
(1:10)





LEGEND

- Section Line
- ① MADE GROUND: Brown slightly silty sandy GRAVEL. Gravel is very angular to angular fine to coarse flint, concrete, brick and tile.
- ② Firm to stiff brown mottled grey CLAY with occasional orange silt pockets.

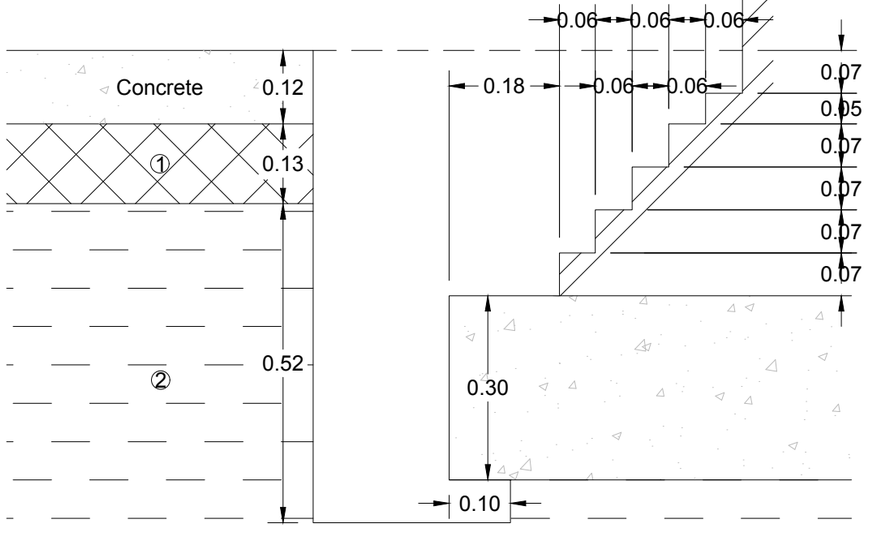
Groundwater at 0.60m

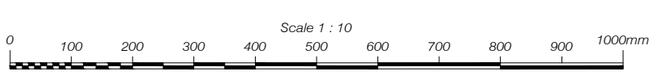
Ground Level: 17.55m AOD

Excavated 01.07.16

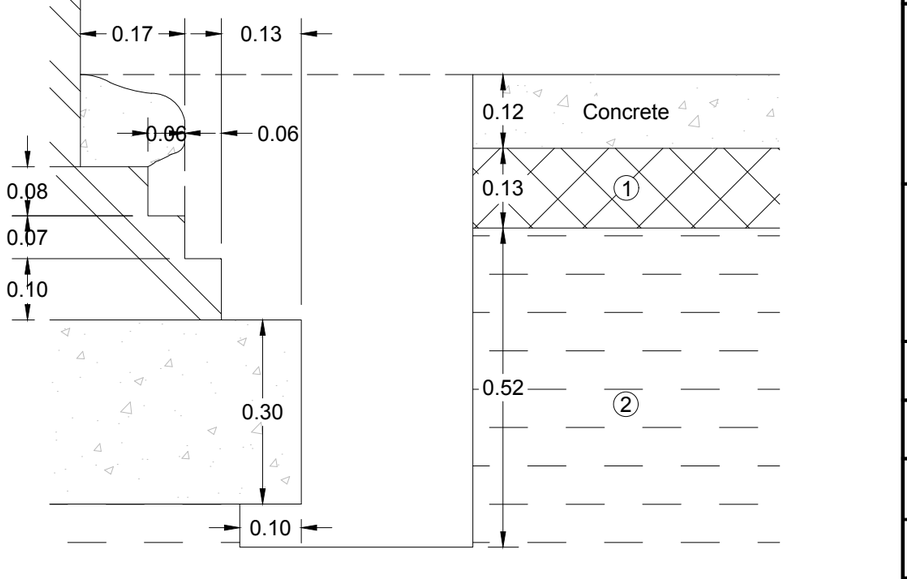
Logged by Claire Siberry

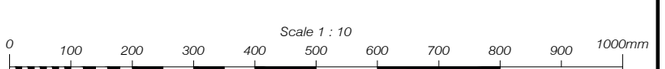
Section A-A':
(1:10)





Section B-B':
(1:10)





Rev.	Date	Amendment	Drawn	Chkd.	Appd.

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Project Title

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Drawing Title

TRIAL PIT 12

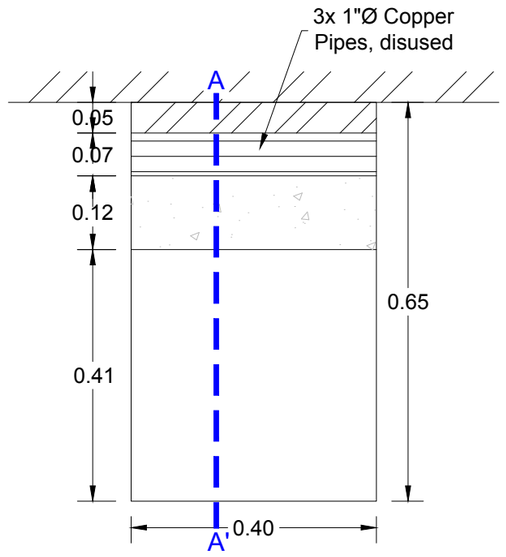
Drawn	Date	Checked	Date	Approved	Date
ASC	06.07.16	CS	06.07.16	CS	06.07.16

Scale	Orig Size	Dimensions
AS SHOWN	A3	m

Project No.	Drawing File
371475 - R01 (00)	371475 (R01-00) TP.dwg

Drawing No.	Rev.
TP12	P1

Plan View:
(1:10)



Scale 1 : 10

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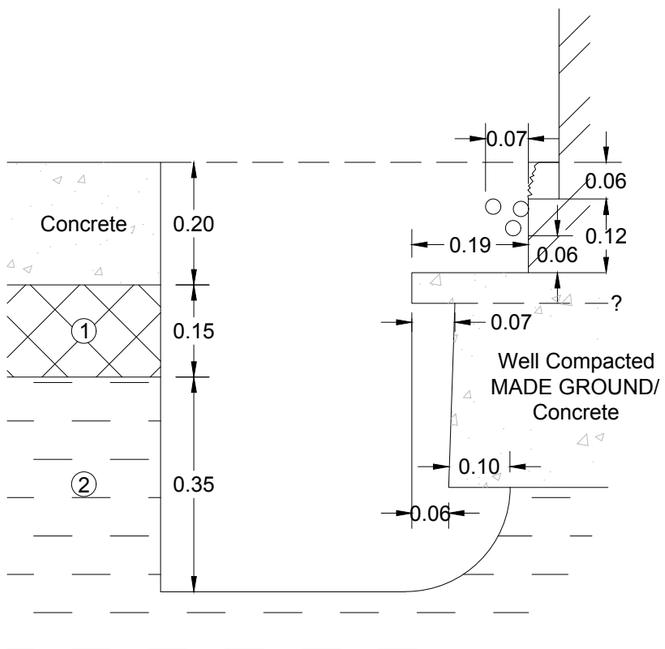
Section A-A':
(1:10)



Scale 1 : 10

0 100 200 300 400 500 600 700 800 900 1000mm

LEGEND

- Section Line
- ① MADE GROUND: Brown slightly sandy gravelly CLAY. Gravel is very angular to sub-angular fine to coarse flint, brick, concrete and ash. (Reworked London Clay)
- ② Firm brown mottled grey CLAY with occasional orange fine sand pockets.

Strong sewage odour (Pit adjacent to sewer and in bin stores)

Groundwater at 0.60m, Black

Ground Level: 19.40m AOD

Excavated 06.07.16

Logged by Claire Siberry

Rev.	Date	Amendment	Drawn	Chkd.	Appd.

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Project Title

THE HOPE PROJECT

Drawing Title

TRIAL PIT 13a

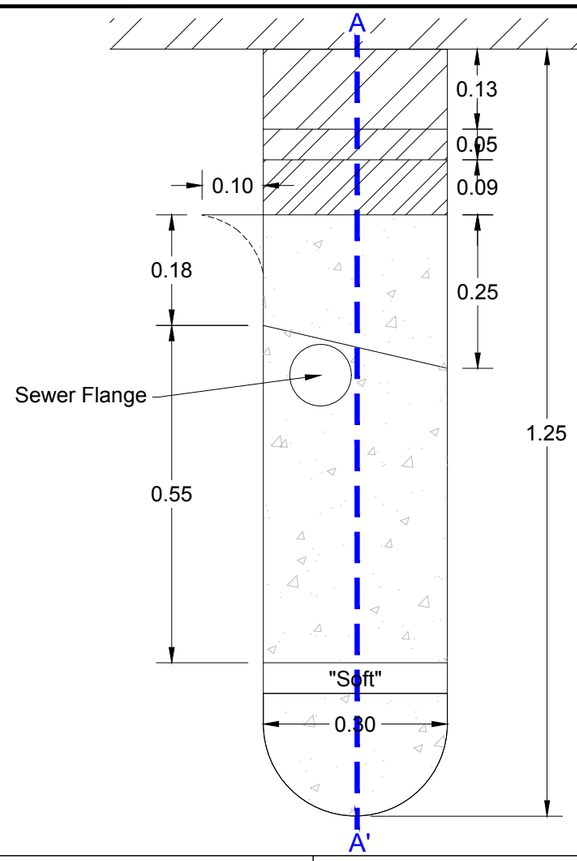
Drawn	Date	Checked	Date	Approved	Date
ASC	12.07.16	CS	12.07.16	CS	12.07.16

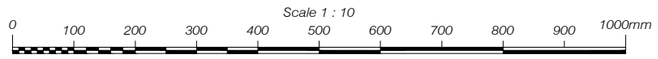
Scale	Orig Size	Dimensions
AS SHOWN	A3	m

Project No.	Drawing File
371475 - R01 (00)	371475 (R01-00) TP.dwg

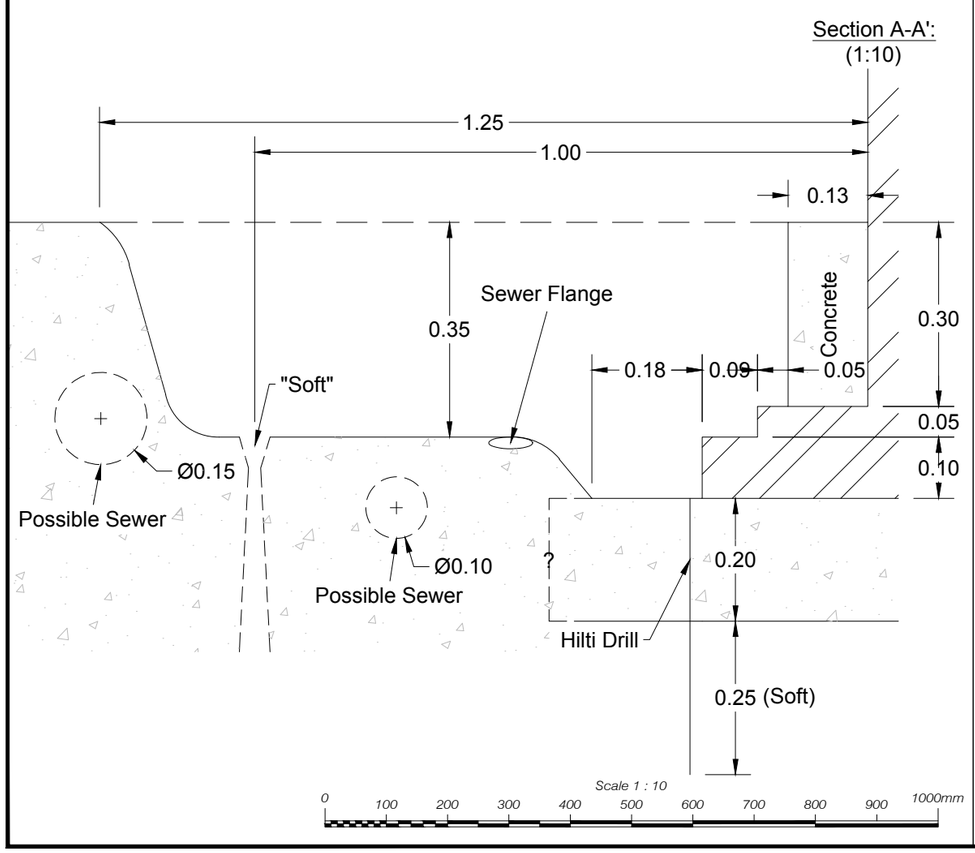
Drawing No.	Rev.
TP13a	P1

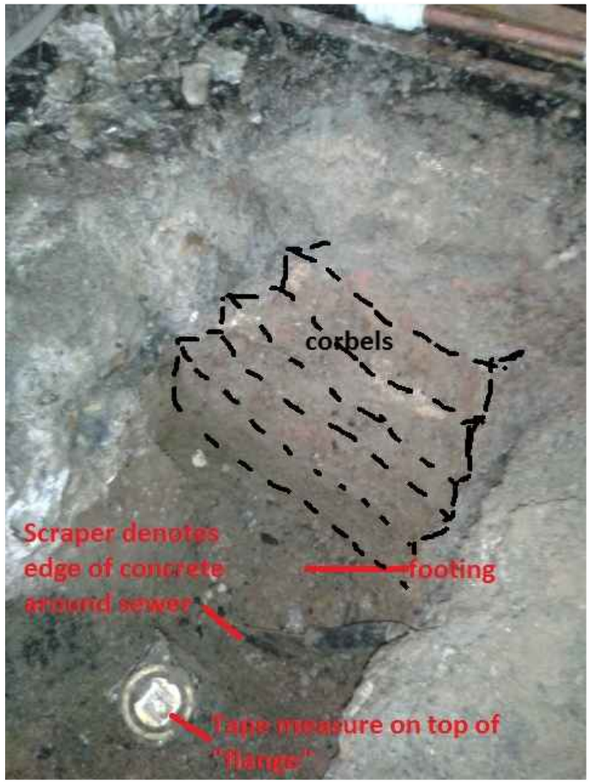
Plan View:
(1:10)





Section A-A':
(1:10)





LEGEND

Section Line

MADE GROUND: Brown slightly sandy gravelly silty CLAY. Gravel is very angular to sub-angular flint, brick, concrete, chalk and tile.

Ground Level: 19.40m AOD

Excavated 06.07.16

Logged by Claire Siberry

Rev.	Date	Amendment	Drawn	Chkd.	Appd.

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Project Title

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Drawing Title

TRIAL PIT 13b

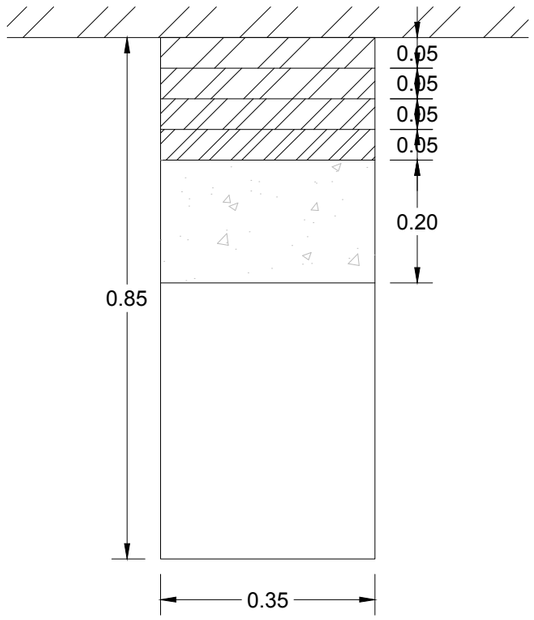
Drawn	Date	Checked	Date	Approved	Date
ASC	13.07.16	CS	13.07.16	CS	13.07.16

Scale	Orig Size	Dimensions
AS SHOWN	A3	m

Project No.	Drawing File
371475 - R01 (00)	371475 (R01-00) TP.dwg

Drawing No.	Rev.
TP13b	P1

Plan View:
(1:10)



Scale 1 : 10
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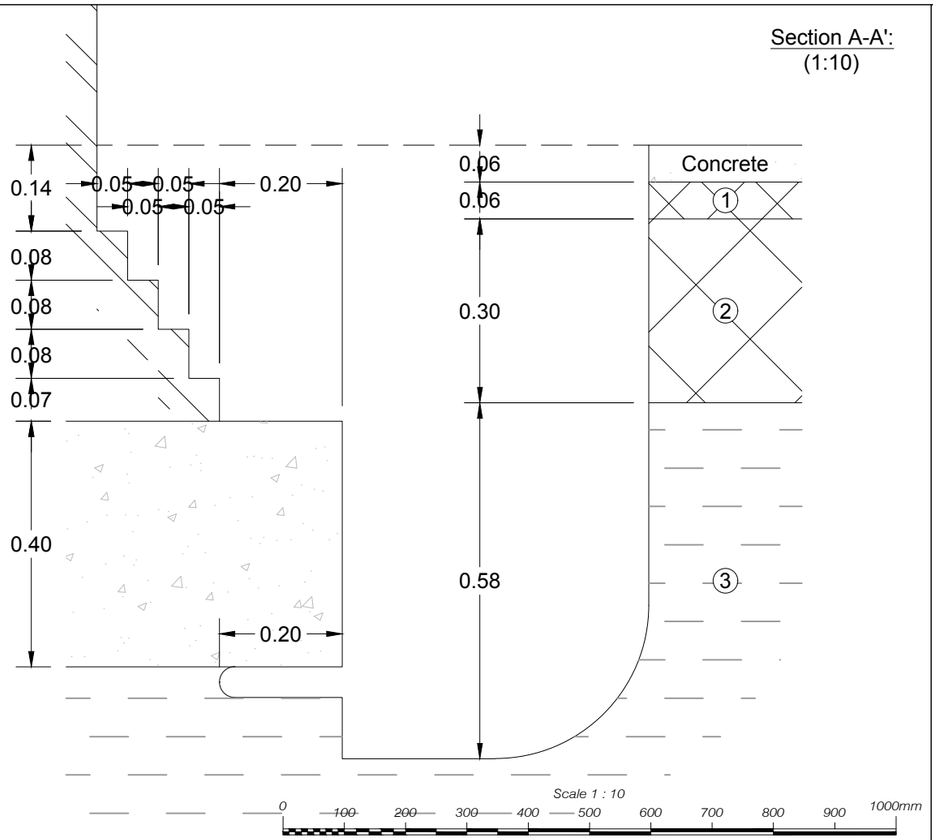
Section A-A':
(1:10)



Scale 1 : 10
0 100 200 300 400 500 600 700 800 900 1000mm

LEGEND

- Section Line
- ① MADE GROUND: Brown sandy GRAVEL. Gravel is very angular to sub-rounded fine to coarse flint.
- ② MADE GROUND: Brown mottled grey slightly gravelly silty CLAY. Gravel is angular and sub-angular fine to coarse flint and brick with occasional black ash pockets. (Reworked London Clay)
- ③ Firm to stiff fissured brown mottled grey silty CLAY with occasional orange silt lenses.

Groundwater seepage at 1.00m

Ground Level: 19.35m AOD

Excavated 11.07.16

Logged by Claire Siberry

Rev.	Date	Amendment	Drawn	Chkd.	Appd.

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Project Title
THE HOPE PROJECT

Drawing Title
TRIAL PIT 14

Drawn	Date	Checked	Date	Approved	Date
ASC	14.07.16	CS	14.07.16	CS	14.07.16

Scale	Orig Size	Dimensions
AS SHOWN	A3	m

Project No.	Drawing File
371475 - R01 (00)	371475 (R01-00) TP.dwg

Drawing No.	Rev.
TP14	P1

STANDARD PENETRATION TEST SUMMARY TABLE

Exploratory Position ID	Depth (m)	Hole Dia (mm)	Casing Depth (m)	Water Depth (m)	Seating Drive		Test Drive			Hammer ID	Calibration Date	Energy Ratio (%)	N_{60}	Comments
					Blows	Pen (mm)	Blows	R (mm)	Result					
BH1	1.60	150	1.50	DRY	1,1	150	1,1,1,2		N=5	DR02-2016	11/04/2016	63.01	5	
	3.50	150	1.50	DRY	1,1	150	2,2,2,3		N=9	DR02-2016	11/04/2016	63.01	9	
	6.00	150	1.50	DRY	2,3	150	3,4,4,5		N=16	DR02-2016	11/04/2016	63.01	17	
	9.00	150	1.50	DRY	2,3	150	4,5,5,6		N=20	DR02-2016	11/04/2016	63.01	21	
	12.00	150	1.50	DRY	2,4	150	5,5,6,7		N=23	DR02-2016	11/04/2016	63.01	24	
	15.00	150	1.50	DRY	3,5	150	6,6,7,8		N=27	DR02-2016	11/04/2016	63.01	28	
	18.00	150	1.50	DRY	3,5	150	6,7,8,10		N=31	DR02-2016	11/04/2016	63.01	33	
	21.00	150	1.50	DRY	4,6	150	7,8,8,10		N=33	DR02-2016	11/04/2016	63.01	35	
	24.00	150	1.50	DRY	4,6	150	6,7,9,10		N=32	DR02-2016	11/04/2016	63.01	34	
	27.00	150	1.50	DRY	5,9	150	11,13,16,10+	280	N=54*	DR02-2016	11/04/2016	63.01	57	
	29.50	150	1.50	DRY	6,9	150	12,14,16,8+	270	N=56*	DR02-2016	11/04/2016	63.01	59	
WS1	1.00			DRY	4	150	3,18,6,5		N=32					
	2.00			2.00	5	150	4,4,5,6		N=19					
	3.00			2.90	7	150	4,5,6,6		N=21					
	3.60			3.60	25	50	50+	60	N=250*					
WS2	1.00			DRY	5	150	4,6,5,5		N=20					

Notes:
1. Tests carried out in general accordance with BS EN ISO 22476-3:2005, including amendment A1 (2011).
2. Reported blows are for 75mm penetration unless indicated "+".
3. Where full test drive was not achieved, actual penetration (R) and extrapolated N value (N*) reported.
4. Tests carried out using a split spoon sampler unless noted as SPT(c) (denotes use of solid cone method) in the comments column.
5. Entries in the water depth column reflects the measured water depth at time of test.

N_{60} = (Measured hammer energy ratio / 60) x N value

RSK Environment Ltd
18 Frogmore Road
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Compiled By	Date	Contract Ref:
CSIBERRY	**22.07.16**	**371475**

Contract: **The Hope Project**

AGS

STANDARD PENETRATION TEST SUMMARY TABLE

Exploratory Position ID	Depth (m)	Hole Dia (mm)	Casing Depth (m)	Water Depth (m)	Seating Drive		Test Drive			Hammer ID	Calibration Date	Energy Ratio (%)	N_{60}	Comments
					Blows	Pen (mm)	Blows	R (mm)	Result					
WS2	2.00			DRY	6	150	5,5,5,6		N=21					
	3.00			DRY	9	150	6,6,6,9		N=27					
	4.00			DRY	10	150	5,7,8,8		N=28					
	5.00			DRY	12	150	7,8,9,8		N=32					

Notes:
1. **Tests carried out in general accordance with BS EN ISO 22476-3:2005, including amendment A1 (2011).**
2. **Reported blows are for 75mm penetration unless indicated "+".**
3. **Where full test drive was not achieved, actual penetration (R) and extrapolated N value (N*) reported.**
4. **Tests carried out using a split spoon sampler unless noted as SPT(c) (denotes use of solid cone method) in the comments column.**
5. **Entries in the water depth column reflects the measured water depth at time of test.**

N_{60} = (Measured hammer energy ratio / 60) x N value

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Compiled By	Date	Contract Ref:
CSIBERRY	**22.07.16**	**371475**

Contract: **The Hope Project**

AGS

APPENDIX I
GROUND GAS / WATER MONITORING DATA

IN-SITU GAS MONITORING RESULTS

[Pressures]	Previous	During	Start	End	Equipment Used & Remarks
Round 2	Constant	Constant	1007	1007	Dipmeter + GA2000 + Weather: Dry and Sunnry + Ground: Dry + Wind: Light
Round 3	Constant	Constant	1009	1009	Dipmeter + GA2000 + Weather: Dry, sunny, hot + Ground: Dry + Wind: Light
Round 4	Falling	Falling	1019	1019	Dipmeter + GA2000 + Weather: Dry, sunny, cool + Ground: Dry + Wind: Light

Exploratory Position ID	Monitoring Round	Measured Installation Depth (mbgl)	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	PID (ppm)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)	
BH1	2	5.00	03/08/2016 11:05:00	-	1007	0.1 (SS)	3.90	0.0 (SS)	0.0 (SS)	20.6 (SS)	0.0 (SS)	0.0 (SS)	0.0 (SS)	1.0 (SS)	
BH1	2	5.00	15 secs	-	1007	-	3.90	0.0	0.0	20.1	0.0	-	0.0	1.0	
BH1	2	5.00	30 secs	-	1007	-	3.90	0.0	0.0	19.8	0.0	-	0.0	1.0	
BH1	2	5.00	60 secs	-	1007	-	3.90	0.0	0.0	19.7	0.0	-	0.0	1.0	
BH1	2	5.00	90 secs	-	1007	-	3.90	0.0	0.0	19.6	0.0	-	0.0	1.0	
BH1	2	5.00	120 secs	-	1007	-	3.90	0.0	0.0	19.6	0.0	-	0.0	1.0	
BH1	2	5.00	180 secs	-	1007	-	3.90	0.0	0.0	19.5	0.0	-	0.0	1.0	
BH1	2	5.00	240 secs	-	1007	-	3.90	0.0	0.0	19.3	0.0	-	0.0	2.0	
BH1	2	5.00	300 secs	-	1007	-	3.90	0.0	0.0	19.3	0.0	-	1.0	2.0	
BH1	2	5.00	360 secs	-	1007	-	3.90	0.0	0.0	19.2	0.0	-	0.0	1.0	
BH1	2	5.00	420 secs	-	1007	-	3.90	0.0	0.0	19.1	0.0	-	0.0	1.0	
BH1	2	5.00	540 secs	-	1007	-	3.90	0.0	0.0	19.2	0.0	-	0.0	1.0	
BH1	2	5.00	600 secs	-	1007	-	3.90	0.0	0.0	19.2	0.0	-	0.0	1.0	
BH1	4	---	03/11/2016 13:30:00	-	-	-	-	-	-	-	-	-	-	-	
	Remarks: Borehole obstructed - no monitoring undertaken.														
BH1	3	5.00	08/09/2019 11:15:00	-	1009	-0.1 (SS)	4.02	0.0	0.0	20.4	0.0	-	0.0	1.0	
BH1	3	5.00	15 secs	-	1009	-	4.02	0.0	0.0	19.3	0.0	-	0.0	1.0	
BH1	3	5.00	30 secs	-	1009	-	4.02	0.0	0.0	19.4	0.0	-	0.0	1.0	

Key: I = Initial, P = Peak, SS = Steady State. Note: LEL = Lower Explosive Limit = 5% v/v.

RSK Environment Ltd
18 Frogmore Road
Hemel Hempstead
Hertfordshire
HP3 9RT

Compiled By	Date	Checked By	Date	Contract Ref:
	04/11/16			371475

Contract: **The Hope Project**

Page: **1** of **4**

IN-SITU GAS MONITORING RESULTS

Exploratory Position ID	Monitoring Round	Installation Depth (mbgl)	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	PID (ppm)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)	
BH1	3	5.00	60 secs	-	1009	-	4.02	0.0	0.0	19.9	0.0	-	0.0	1.0	
BH1	3	5.00	120 secs	-	1009	-	4.02	0.0	0.0	20.0	0.0	-	0.0	1.0	
BH1	3	5.00	180 secs	-	1009	-	4.02	0.0	0.0	20.1	0.0	-	0.0	1.0	
BH1	3	5.00	240 secs	-	1009	-	4.02	0.0	0.0	20.1	0.0	-	0.0	2.0	
BH1	3	5.00	300 secs	-	1009	-	4.02	0.0	0.0	20.1	0.0	-	2.0	2.0	
BH1	3	5.00	360 secs	-	1009	-	4.02	0.0	0.0	20.2	0.0	-	0.0	1.0	
BH1	3	5.00	420 secs	-	1009	-	4.02	0.0	0.0	20.2	0.0	-	0.0	1.0	
WS1	2	3.60	03/08/2016 13:35:00	-	1007	$0.2_{(SS)}$	0.88	-	-	-	-	-	-	-	
	Remarks: Initial flow of 13.4 l/hr noted falling to 0.2 l/hr after 5 minutes. Water sucked up into analyser. Test aborted.														
WS1	3	3.58	08/09/2016 12:00:00	-	1009	$0.1_{(SS)}$	0.95	-	-	20.5	-	-	1.0	1.0	
	Remarks: Initial flow of >>> l/hr (release of pressure heard), falling to 14.2 l.hr then to 0.1 l/hr after 10 minutes.														
WS1	3	3.58	30 secs	-	-	-	0.95	1.1	20.0	7.5	22.0	-	4.0	1.0	
WS1	3	3.58	60 secs	-	-	-	0.95	15.3	1.3	3.2	26.0	-	5.0	2.0	
WS1	3	3.58	120 secs	-	-	-	0.95	15.9	1.4	1.7	28.0	-	3.0	2.0	
WS1	3	3.58	180 secs	-	-	-	0.95	17.2	4.1	2.1	>>>	-	9.0	4.0	
WS1	3	3.58	240 secs	-	-	-	0.95	18.4	11.8	5.2	>>>	-	12.0	52.0	
WS1	3	3.58	300 secs	-	-	-	0.95	18.4	11.9	6.8	>>>	-	11.0	84.0	
WS1	3	3.58	360 secs	-	-	-	0.95	18.4	12.5	9.5	>>>	-	7.0	110.0	
WS1	3	3.58	420 secs	-	-	-	0.95	16.9	10.6	11.6	>>>	-	5.0	125.0	
WS1	3	3.58	480 secs	-	-	-	0.95	14.5	7.2	13.4	>>>	-	10.0	119.0	
WS1	3	3.58	540 secs	-	-	-	0.95	12.2	4.7	14.7	82.0	-	7.0	113.0	
WS1	3	3.58	600 secs	-	-	-	0.95	11.0	2.6	15.6	50.0	-	2.0	105.0	
WS1	3	3.58	660 secs	-	-	-	0.95	10.1	2.6	16.1	37.0	-	6.0	97.0	
WS1	3	3.58	720 secs	-	-	-	0.95	9.3	1.4	16.4	26.0	-	4.0	88.0	

Key: I = Initial, P = Peak, SS = Steady State. Note: LEL = Lower Explosive Limit = 5% v/v.

RSK Environment Ltd
18 Frogmore Road
Hemel Hempstead
Hertfordshire
HP3 9RT

Compiled By	Date	Checked By	Date	Contract Ref:
	04/11/16			**371475**

Contract: **The Hope Project**

AGS

IN-SITU GAS MONITORING RESULTS

Exploratory Position ID	Monitoring Round	Installation Depth (mbgl)	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	PID (ppm)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)	
WS1	3	3.58	780 secs	-	-	-	0.95	8.6	1.1	16.7	22.0	-	7.0	80.0	
WS1	3	3.58	840 secs	-	-	-	0.95	8.2	1.0	16.8	19.0	-	6.0	73.0	
WS1	4	3.50	03/11/2016 14:00:00	-	1018	-0.4$_{(SS)}$	1.00	0.0	-	20.0	-	-	-	-	
	Remarks: Initial flow of >>> l/hr (release of pressure heard), then steady fall to -0.4 l/hr after 6 minutes. Strong methane / hydrogen sulphide odour when pumping during monitoring.														
WS1	4	3.50	15 secs	-	-	-	1.00	0.0	0.0	20.4	0.0	-	0.0	1.0	
WS1	4	3.50	30 secs	-	-	-	1.00	33.1	71.0	3.6	>>>	-	0.0	99.0	
WS1	4	3.50	60 secs	-	-	-	1.00	36.4	70.9	0.2	>>>	-	0.0	161.0	
WS1	4	3.50	90 secs	-	-	-	1.00	36.3	70.8	0.0	>>>	-	0.0	175.0	
WS1	4	3.50	120 secs	-	-	-	1.00	36.1	71.2	0.0	>>>	-	0.0	180.0	
WS1	4	3.50	180 secs	-	-	-	1.00	35.8	71.0	0.0	>>>	-	0.0	185.0	
WS1	4	3.50	240 secs	-	-	-	1.00	35.5	70.8	0.0	>>>	-	0.0	196.0	
WS1	4	3.50	300 secs	-	-	-	1.00	35.6	70.9	0.0	>>>	-	0.0	214.0	
WS1	4	3.50	360 secs	-	-	-	1.00	34.5	60.7	1.7	>>>	-	0.0	>>>	
WS1	4	3.50	420 secs	-	-	-	1.00	26.8	38.7	5.5	>>>	-	0.0	>>>	
WS1	4	3.50	480 secs	-	-	-	1.00	23.4	26.7	7.7	0.0	-	0.0	>>>	
WS1	4	3.50	540 secs	-	-	-	1.00	20.7	19.8	9.5	>>>	-	5.0	>>>	
WS1	4	3.50	600 secs	-	-	-	1.00	19.3	15.4	10.7	>>>	-	0.0	>>>	
WS1	4	3.50	660 secs	-	-	-	1.00	18.1	13.0	11.5	>>>	-	7.0	>>>	
WS1	4	3.50	720 secs	-	-	-	1.00	17.1	9.9	12.3	>>>	-	4.0	>>>	
WS1	4	3.50	780 secs	-	-	-	1.00	15.6	6.9	13.3	>>>	-	3.0	>>>	
WS1	4	3.50	840 secs	-	-	-	1.00	14.5	5.3	13.8	>>>	-	5.0	>>>	
WS1	4	3.50	980 secs	-	-	-	1.00	8.2	2.3	16.6	49.0	-	3.0	109.0	
WS1	4	3.50	1040 secs	-	-	-	1.00	8.8	2.7	16.2	55.0	-	5.0	112.0	
WS1	4	3.50	1100 secs	-	-	-	1.00	9.5	2.9	15.7	59.0	-	5.0	101.0	
WS1	4	3.50	1160 secs	-	-	-	1.00	9.8	2.8	15.7	55.0	-	2.0	69.0	

Key: I = Initial, P = Peak, SS = Steady State. Note: LEL = Lower Explosive Limit = 5% v/v.

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18 Frogmore Road
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Hertfordshire
HP3 9RT

Compiled By	Date	Checked By	Date	Contract Ref:
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Contract: **The Hope Project**

IN-SITU GAS MONITORING RESULTS

Exploratory Position ID	Monitoring Round	Installation Depth (mbgl)	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	PID (ppm)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)	
WS1	4	3.50	1220 secs	-	-	-	1.00	9.1	2.4	16.0	49.0	-	1.0	51.0	
WS1	4	3.50	1280 secs	-	-	-	1.00	9.2	2.3	15.8	44.0	-	2.0	40.0	
WS2	2	4.53	03/08/2016 12:05:00	-	1007	-	0.18	-	-	-	-	$0.0_{(SS)}$	-	-	
	Remarks: Water sucked up into gas analyser. Test aborted. Basement partly flooded, including corridor next to WS2.														
WS2	3	4.55	08/09/2016 12:40:00	-	1009	$0.1_{(SS)}$	0.50	0.4	0.1	18.8	1.0	-	2.0	2.0	
	Remarks: Initial flow of >>> l/hr (release of pressure heard) then falling to 0.1 l/hr after 5 minutes.														
WS2	3	4.55	30 secs	-	-	-	0.50	0.3	0.0	19.1	0.0	-	2.0	2.0	
WS2	3	4.55	60 secs	-	-	-	0.50	0.2	0.0	19.5	0.0	-	0.0	2.0	
WS2	3	4.55	120 secs	-	-	-	0.50	0.0	0.0	20.2	0.0	-	0.0	2.0	
WS2	3	4.55	180 secs	-	-	-	0.50	0.0	0.0	20.5	0.0	-	0.0	1.0	
WS2	3	4.55	240 secs	-	-	-	0.50	0.0	0.0	20.7	0.0	-	1.0	1.0	
WS2	3	4.55	300 secs	-	-	-	0.50	0.0	0.0	20.8	0.0	-	1.0	2.0	
WS2	3	4.55	360 secs	-	-	-	0.50	0.0	0.0	20.7	0.0	-	0.0	1.0	
WS2	4	4.56	03/11/2016 13:45:00	-	1019	$-1.0_{(SS)}$	0.37	0.0	-	20.3	-	-	-	-	
	Remarks: Initial flow of 11.3 l/hr (release of pressure heard), falling to -1.0 l/hr after 2 minutes.														
WS2	4	4.58	15 secs	-	-	-	0.39	1.8	-	17.8	0.0	-	0.0	1.0	
WS2	4	4.58	30 secs	-	-	-	0.39	1.9	-	17.1	-	-	-	1.0	
WS2	4	4.58	60 secs	-	-	-	0.39	1.9	-	17.0	-	-	-	-	
	Remarks: Water sucked up into gas monitor - test aborted.														

Key: I = Initial, P = Peak, SS = Steady State. Note: LEL = Lower Explosive Limit = 5% v/v.

RSK Environment Ltd
18 Frogmore Road
Hemel Hempstead
Hertfordshire
HP3 9RT

Compiled By	Date	Checked By	Date	Contract Ref:
	04/11/16			**371475**

Contract: **The Hope Project**

AGS

IN-SITU WATER MONITORING RESULTS

	Weather	Ground Conditions	Wind Conditions	Air Temperature (°C)	Equipment Used & Remarks
Round 1	Dry and Sunnry	Dry	Light	-	Dipmeter
Round 2	Dry and Sunnry	Dry	Light	-	Dipmeter + GA2000
Round 3	Dry, sunny, hot	Dry	Light	-	Dipmeter + GA2000
Round 4	Dry, sunny, cool	Dry	Light	-	Dipmeter + GA2000

Exploratory Position ID	Pipe Ref	Pipe Diameter	Monitoring Round / Test Number	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring	Water Depth (mbgl)	Remarks
BH1	1	50	1 / 1	5.00	5.00	1.40 to 5.00	20/07/2016 09:50	3.90	Operator: CSiberry, General Remarks: Borehole developed.
BH1	1	50	2 / 1	5.00	5.00	1.40 to 5.00	03/08/2016 11:05	3.90	Operator: CSiberry
BH1	1	50	3 / 1	5.00	4.97	1.40 to 5.00	08/09/2016 11:15	4.02	Operator: CSiberry
BH1	1	50	4 / 1	5.00	NDA	1.40 to 5.00	03/11/2016 13:30	---	Operator: CSiberry, General Remarks: Borehole obstructed - no monitoring undertaken.
WS1	1	50	2 / 1	3.60	3.60	1.00 to 3.60	03/08/2016 13:35	0.88	Operator: CSiberry, Weather: Damp in bin store., Surface Conditions: Damp, General Remarks: Groundwater noted to be black and have a very strong sewage odour. Water sample taken at 0.88m. Borehole developed.
WS1	1	50	3 / 1	3.60	3.60	1.00 to 3.60	08/09/2016 12:00	0.95	Operator: CSiberry, Weather: Damp in bin store., Surface Conditions: Damp
WS1	1	50	4 / 1	3.60	3.50	1.00 to 3.60	03/11/2016 14:00	1.00	Operator: CSiberry, Weather: Damp in bin store., Surface Conditions: Damp
WS2	1	50	2 / 1	4.55	4.53	0.55 to 5.00	03/08/2016 12:05	0.18	Operator: CSiberry, Weather: Dry, sunny, Surface Conditions: Flooded, General Remarks: Basement partly flooded, including corridor next to WS2. Borehole developed.
WS2	1	50	3 / 1	4.55	4.54	0.55 to 5.00	08/09/2016 12:40	0.48	Operator: CSiberry, Weather: Dry, sunny, Surface Conditions: Damp
WS2	1	50	4 / 1	4.55	4.56	0.55 to 5.00	03/11/2016 13:45	0.37	Operator: CSiberry, Weather: Dry, sunny, Surface Conditions: Damp

Key: NDA denotes 'no data available'.

RSK Environment Ltd
18 Frogmore Road
Hemel Hempstead
Hertfordshire
HP3 9RT

Compiled By	Date	Checked By	Date	Contract Ref:
	04/11/16			371475

Contract: **The Hope Project**

APPENDIX J
CERTIFICATES OF GEOTECHNICAL ANALYSIS

envirolab
Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

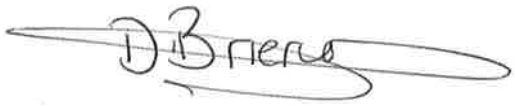
FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 16/04334
Issue Number: 1 **Date:** 27 July, 2016

Client: RSK Environment Ltd Hemel
18 Frogmore Road
Hemel Hempstead
Hertfordshire
UK
HP3 9RT

Project Manager: Claire Siberry
Project Name: The Hope Project, Camden
Project Ref: 371475
Order No: N/A
Date Samples Received: 14/07/16
Date Instructions Received: 14/07/16
Date Analysis Completed: 26/07/16

Prepared by:



Danielle Brierley
Administrative Assistant

Approved by:

Gill Walker
Laboratory Manager

mCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME
UKAS TESTING 1247

Envirolab Job Number: 16/04334

Client Project Name: The Hope Project, Camden

Client Project Ref: 371475

Lab Sample ID	16/04334/1	16/04334/2	16/04334/3	16/04334/4	16/04334/5	16/04334/6	16/04334/7		Units	Method ref
Client Sample No	6	11	16	22	29	34	1			
Client Sample ID	BH1	BH1	BH1	BH1	BH1	BH1	BH1			
Depth to Top	5.50	9.00	13.00	17.50	22.95	26.50	1.40			
Depth To Bottom										
Date Sampled										
Sample Type	Soil - D	Soil - D	Solid	Soil - D	Soil - D	Soil - D	Soil - D			
Sample Matrix Code	5	3	7	5	5	5	3			
% Stones >10mm$_A^{\#}$	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		% w/w	A-T-044
pH BRE$_D^{M\#}$	7.84	8.20	8.31	8.43	8.52	9.23	8.02		pH	A-T-031s
Ammonium NH4 BRE (water sol 2:1)$_D$	-	-	-	-	-	-	5.68		mg/l	A-T-033s
Chloride BRE, SO4 equiv. (water sol 2:1)$_D^{M\#}$	-	-	-	-	-	-	8		mg/l	A-T-026s
Nitrate BRE, SO4 equiv. (water sol 2:1)$_D$	-	-	-	-	-	-	0.7		mg/l	A-T-026s
Sulphate BRE (water sol 2:1)$_D^{M\#}$	2610	719	160	644	494	99	116		mg/l	A-T-026s
Sulphate BRE (acid sol)$_D^{M\#}$	-	-	-	-	-	-	0.05		% w/w	A-T-028s
Sulphur BRE (total)$_D$	-	-	-	-	-	-	0.02		% w/w	A-T-024s
Magnesium BRE (water sol 2:1)$_D$	-	-	-	-	-	-	25		mg/l	A-T-SOLMETS

REPORT NOTES

Notes - Soil chemical analysis
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones and brick and concrete fragments >10mm are removed or excluded from the sample prior to analysis and reported results corrected to a whole sample basis. For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis.

Notes - General
This report shall not be reproduced, except in full, without written approval from Envirolab.
Subscript "A" indicates analysis performed on the sample as received. "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve, unless asbestos is found to be present in which case all analysis is performed on the sample as received.
All analysis is performed on the dried and crushed sample for samples with Matrix Code 7 and this supersedes any "A" subscripts.
All analysis is performed on the sample as received for soil samples which are positive for asbestos and/or if they are from outside the European Union and this supercedes any "D" subscripts.
Superscript "M" indicates method accredited to MCERTS.
If results are in italic font they are associated with an AQC failure. These are not accredited and are unreliable.
A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

TPH analysis of water by method A-T-007
Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Asbestos in soil
Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if present as discrete fibres/fragments. Stones etc. are not removed from the sample prior to analysis.
Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:
1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.
Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

Secondary Matrix Codes:
A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

IS indicates Insufficient Sample for analysis.
US indicates Unsuitable Sample for analysis.
NDP indicates No Determination Possible.
NAD indicates No Asbestos Detected.
N/A indicates Not Applicable.
Superscript # indicates method accredited to ISO 17025.
Analytical results reflect the quality of the sample at the time of analysis only. Opinions and interpretations expressed are outside the scope of our accreditation.

Please contact us if you need any further information.

envirolab
Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 16/04541
Issue Number: 1 **Date:** 29 July, 2016

Client: RSK Environment Ltd Hemel
18 Frogmore Road
Hemel Hempstead
Hertfordshire
UK
HP3 9RT

Project Manager: Claire Siberry/Nigel Austin
Project Name: The Hope Project, Camden
Project Ref: 371475
Order No: N/A
Date Samples Received: 25/07/16
Date Instructions Received: 25/07/16
Date Analysis Completed: 29/07/16

Prepared by:

Melanie Marshall
Laboratory Coordinator

Approved by:

Georgia King
Client Service Manager

Envirolab Job Number: 16/04541

Client Project Name: The Hope Project, Camden

Client Project Ref: 371475

Lab Sample ID	16/04541/1	16/04541/2	16/04541/3						Units	Method ref
Client Sample No	1	5	3							
Client Sample ID	WS1	WS1	WS2							
Depth to Top	0.70	2.30	2.00							
Depth To Bottom		2.40								
Date Sampled										
Sample Type	Soil - D	Soil - D	Soil - D							
Sample Matrix Code	5	6	3							
% Stones >10mm$_A^{\#}$	<0.1	<0.1	<0.1						% w/w	A-T-044
pH BRE$_D^{M\#}$	7.97	7.76	7.81						pH	A-T-031s
Sulphate BRE (water sol 2:1)$_D^{M\#}$	1490	2490	2640						mg/l	A-T-026s

REPORT NOTES

Notes - Soil chemical analysis
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones and brick and concrete fragments >10mm are removed or excluded from the sample prior to analysis and reported results corrected to a whole sample basis. For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis.

Notes - General
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Subscript "A" indicates analysis performed on the sample as received. "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve, unless asbestos is found to be present in which case all analysis is performed on the sample as received.
All analysis is performed on the dried and crushed sample for samples with Matrix Code 7 and this supersedes any "A" subscripts.
All analysis is performed on the sample as received for soil samples which are positive for asbestos and/or if they are from outside the European Union and this supercedes any "D" subscripts.
Superscript "M" indicates method accredited to MCERTS.
If results are in italic font they are associated with an AQC failure. These are not accredited and are unreliable.
A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

TPH analysis of water by method A-T-007
Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Asbestos in soil
Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if present as discrete fibres/fragments. Stones etc. are not removed from the sample prior to analysis.
Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:
1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.
Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

Secondary Matrix Codes:
A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

IS indicates Insufficient Sample for analysis.
US indicates Unsuitable Sample for analysis.
NDP indicates No Determination Possible.
NAD indicates No Asbestos Detected.
N/A indicates Not Applicable.
Superscript # indicates method accredited to ISO 17025.
Analytical results reflect the quality of the sample at the time of analysis only. Opinions and interpretations expressed are outside the scope of our accreditation.

Please contact us if you need any further information.

TESTING VERIFICATION CERTIFICATE

1774

The test results included in this report are certified as:-

ISSUE STATUS: **FINAL**

In accordance with the Structural Soils Ltd Laboratory Quality Management System, results sheets and summaries of results issued by the laboratory are checked by an approved signatory. The integrity of the test data and results are ensured by control of the computer system employed by the laboratory as part of the Software Verification Program as detailed in the Laboratory Quality Manual.

This testing verification certificate covers all testing compiled on or before the following datetime: **05/08/2016 14:03:17**.

Testing reported after this date is not covered by this Verification Certificate.

Dimitris Xirouchakis

Approved Signatory
Dimitris Xirouchakis (Associate Laboratory Director)

(Head Office)
Bristol Laboratory
Unit 1A, Princess Street
Bedminster
Bristol
BS3 4AG

Castleford Laboratory
The Potteries, Pottery Street
Castleford
West Yorkshire
WF10 1NJ

Hemel Laboratory
18 Frogmore Road
Hemel Hempstead
Hertfordshire
HP3 9RT

Tonbridge Laboratory
Anerley Court, Half Moon Lane
Hildenborough
Tonbridge
TN11 9HU

	Contract:	Job No:
STRUCTURAL SOILS LTD	**The Hope Project**	**583462**

STRUCTURAL SOILS LTD

TEST REPORT

Report No. 583462-01 (00) 1774

Date 08-August-2016 Contract The Hope Project

Client RSK
Address 18 Frogmore Rd
Apsley
Hemel Hempstead
Hertfordshire
HP3 9RT
For the Attention of Claire Siberry

Samples submitted by client	12-July-2016	Client Reference	371475
Testing Started	14-July-2016	Client Order No.	n/a
Testing Completed	27-July-2016	Instruction Type	Written

Tests marked 'Not UKAS Accredited' in this report are not included in the UKAS Accreditation Schedule for our Laboratory.

UKAS Accredited Tests

1.01	Moisture Content (oven drying method) BS1377:Part 2:1990:clause 3.2 (superseded)*
1.03	Liquid Limit (one point method) & Plastic Limit BS1377:Part 2:1990,clause 4.4/5.3
1.10	Particle Size Distribution wet sieve method BS1377:Part 2:1990,clause 9.2
1.13a	Particle Size Distribution sedimentation pipette method BS1377:Part 2: 1990,clause 9.4
5.04	Undrained shear strength triaxial compression without pore pressure measurement (definitive method) 100mm diameter specimens BS1377:Part 7:1990,clause 8.4

* This clause of BS1377 is no longer the most up to date method due to the publication of ISO17892

Please Note: Remaining samples will be retained for a period of one month from today and will then be disposed of .
Test were undertaken on samples 'as received' unless otherwise stated.
Opinions and interpretations expressed in this report are outside the scope of accreditation for this laboratory.

SUMMARY OF SOIL CLASSIFICATION TESTS

In accordance with clauses 3.2,4.3,4.4,5.3,5.4,7.2,8.2,8.3 of BS1377:Part 2:1990

Exploratory Position ID	Sample Ref	Sample Type	Depth (m)	Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity Index	% <425um	Description of Sample
BH1	2	D	1.60	27					Brown CLAY
BH1	3	D	2.95	31					Brown slightly sandy CLAY
BH1	4	D	3.50	32	70	27	43	98	Brown slightly sandy CLAY with occasional gypsum
BH1	5	D	4.95	30	60	24	36	99	Brown slightly sandy CLAY
BH1	7	D	6.00	30					Brown slightly sandy CLAY
BH1	8	D	7.00	35					Brown slightly gravelly slightly sandy CLAY
BH1	10	D	8.50	29					Brown slightly sandy CLAY
BH1	12	D	10.00	29	76	31	45	100	Brown CLAY

SUMMARY OF SOIL CLASSIFICATION TESTS

In accordance with clauses 3.2,4.3,4.4,5.3,5.4,7.2,8.2,8.3 of BS1377:Part 2:1990

Exploratory Position ID	Sample Ref	Sample Type	Depth (m)	Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity Index	% <425um	Description of Sample
BH1	14	D	11.50	29					Dark grey CLAY
BH1	15	D	12.00	30					Dark brown CLAY
BH1	17	D	13.95	30					Grey CLAY
BH1	19	D	15.00	26					Dark brown CLAY
BH1	20	D	16.00	28	78	33	45	100	Dark brown slightly sandy CLAY
BH1	21	D	16.95	24					Dark grey slightly sandy CLAY
BH1	24	D	19.00	23					Dark brown slightly sandy CLAY
BH1	26	D	20.50	22					Brown slightly sandy CLAY

SUMMARY OF SOIL CLASSIFICATION TESTS

In accordance with clauses 3.2,4.3,4.4,5.3,5.4,7.2,8.2,8.3 of BS1377:Part 2:1990

Exploratory Position ID	Sample Ref	Sample Type	Depth (m)	Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity Index	% <425um	Description of Sample
BH1	28	D	22.00	27	78	30	48	100	Dark brown CLAY
BH1	31	D	24.00	22					Dark brown CLAY
BH1	33	D	25.95	24	56	25	31	100	Brown mottled grey CLAY
BH1	36	D	28.00	24					Grey mottled reddish brown CLAY
BH1	37	D	28.95	20	56	24	32	100	Grey mottled reddish brown CLAY
BH1	39	D	29.50	19					Grey mottled reddish brown CLAY

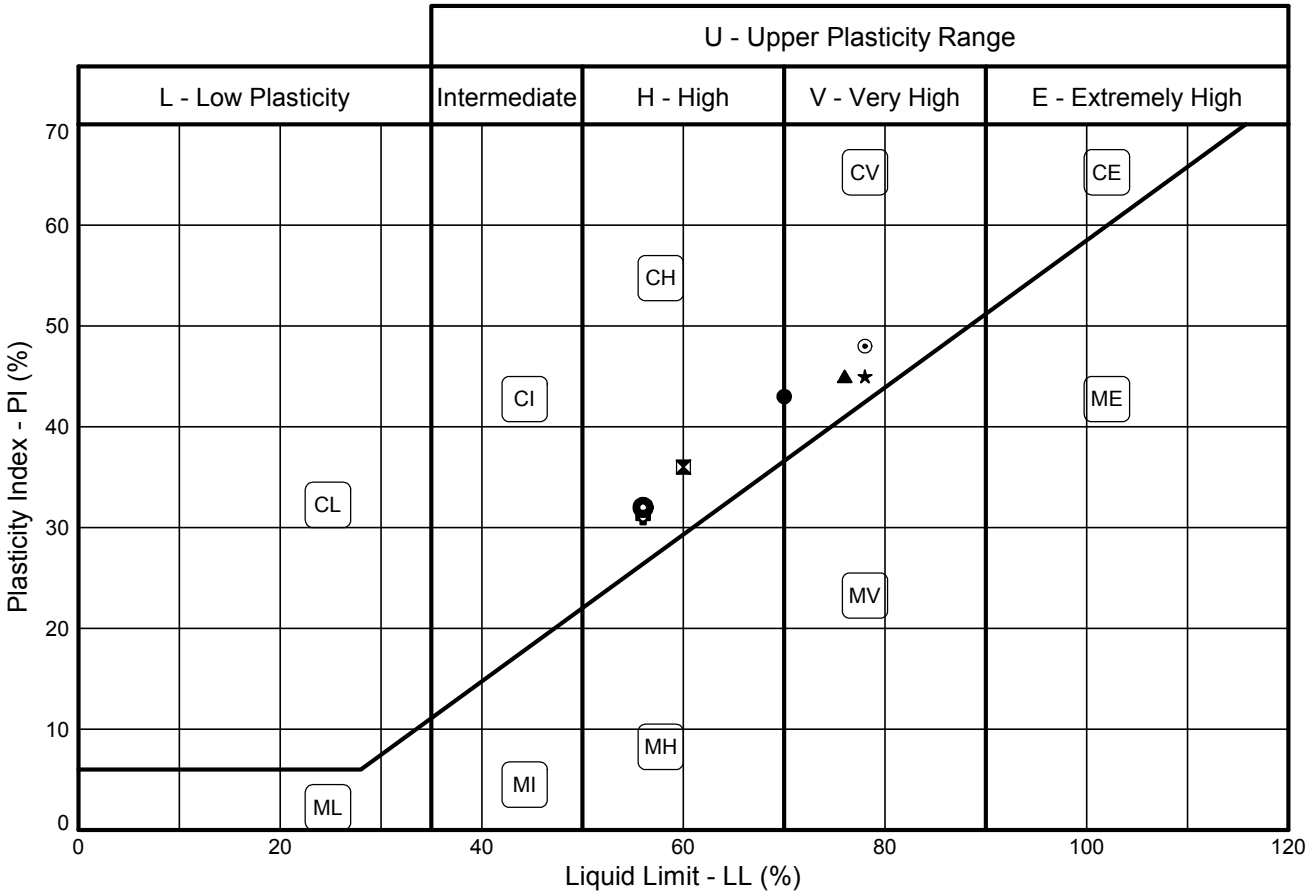
SUMMARY OF SOIL CLASSIFICATION TESTS

In accordance with clauses 3.2,4.3,4.4,5.3,5.4,7.2,8.2,8.3 of BS1377:Part 2:1990

Exploratory Position ID	Sample Ref	Sample Type	Depth (m)	Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity Index	% <425um	Description of Sample
WS1	2	D	1.00	25	73	32	41	98	Brown slightly sandy CLAY with much gypsum
WS1	4	D	2.00	26					Brown slightly sandy CLAY with much gypsum
WS1	6	D	2.75	30	70	28	42	98	Brown slightly sandy CLAY
WS2	2	D	1.60	30					Brown slightly sandy CLAY
WS2	4	D	2.65	28	75	30	45	100	Brown slightly sandy CLAY
WS2	6	D	3.55	28					Brown CLAY
WS2	8	D	4.80	28	75	26	49	100	Dark brown slightly sandy CLAY

PLASTICITY CHART - PI Vs LL

In accordance with clause 42.3 of BS5930:1999
Testing in accordance with BS1377-2:1990



Sample Identification				BS Test Method #	Preparation Method +	MC %	LL %	PL %	PI %	<425um %	Lab location	
	Exploratory Position ID	Sample	Depth (m)									
●	BH1	4D	3.50	3.2/4.4/5.3/5.4	4.2.4	32	70	27	43	98	H	
⊠	BH1	5D	4.95	3.2/4.4/5.3/5.4	4.2.4	30	60	24	36	99	H	
▲	BH1	12D	10.00	3.2/4.4/5.3/5.4	4.2.4	29	76	31	45	100	H	
★	BH1	20D	16.00	3.2/4.4/5.3/5.4	4.2.3	28	78	33	45	100	H	
⊙	BH1	28D	22.00	3.2/4.4/5.3/5.4	4.2.3	27	78	30	48	100	H	
✿	BH1	33D	25.95	3.2/4.4/5.3/5.4	4.2.3	24	56	25	31	100	H	
◉	BH1	37D	28.95	3.2/4.4/5.3/5.4	4.2.3	20	56	24	32	100	H	

Tested in accordance with the following clauses of BS1377-2:1990.

3.2 - Moisture Content
4.3 - Cone Penetrometer Method
4.4 - One Point Cone Penetrometer Method
4.6 - One Point Casagrande Method
5.3 - Plastic Limit Method
5.4 - Plasticity Index

+ Tested in accordance with the following clauses of BS1377-2:1990.

4.2.3 - Natural State
4.2.4 - Wet Sieved

Key: * = Non-standard test, NP = Non plastic.

Lab location: B = Bristol (BS3 4AG), C = Castleford (WF10 1NJ), H = Hemel Hempstead (HP3 9RT), T = Tonbridge (TN11 9HU)

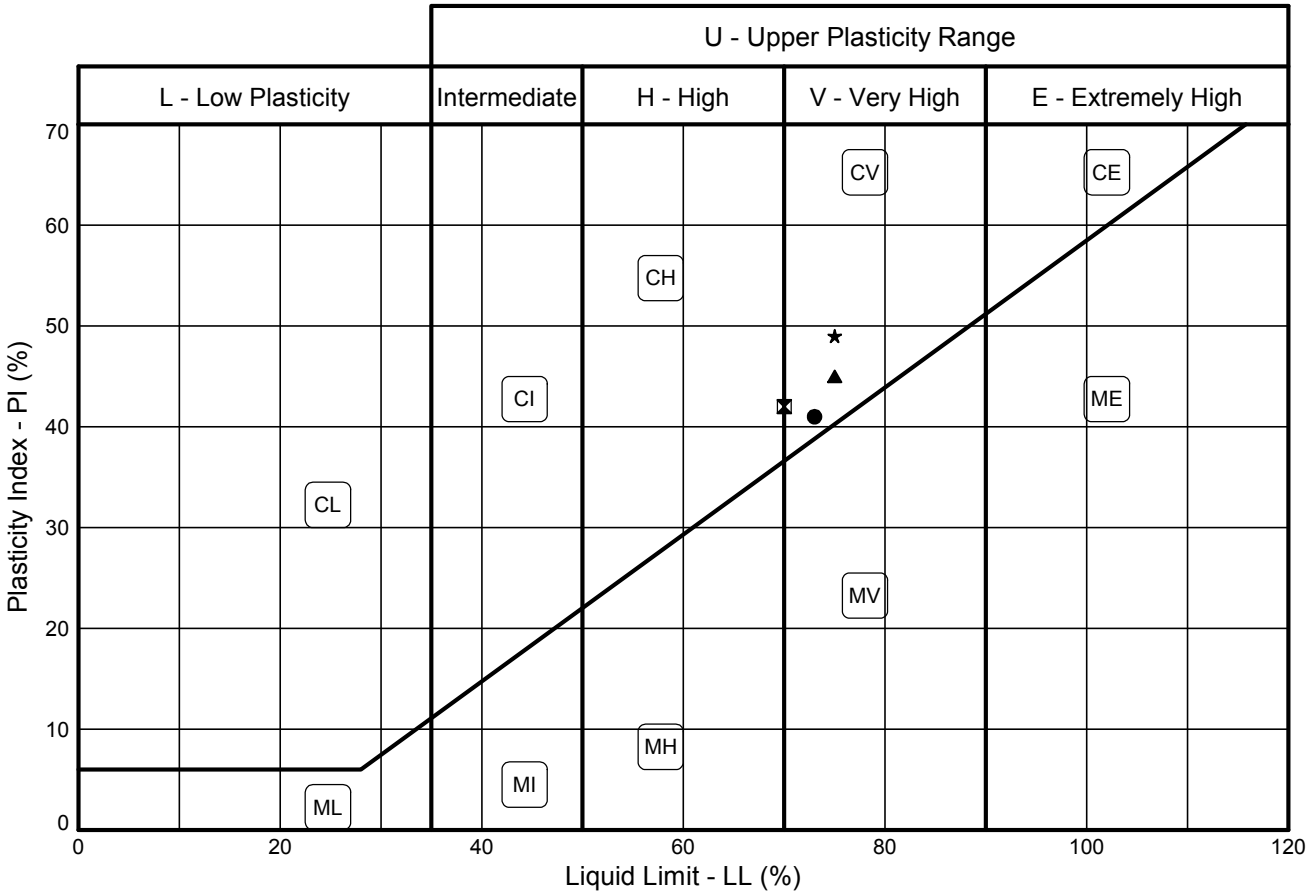
STRUCTURAL SOILS
18 Frogmore Road
Hemel Hempstead
Hertfordshire
HP3 9RT

Compiled By		Date
SC	SHARON CAIRNS	05/08/16

Contract	Contract Ref:
The Hope Project	583462

PLASTICITY CHART - PI Vs LL

In accordance with clause 42.3 of BS5930:1999
Testing in accordance with BS1377-2:1990



Sample Identification				BS Test Method #	Preparation Method +	MC %	LL %	PL %	PI %	<425um %	Lab location	
	Exploratory Position ID	Sample	Depth (m)									
●	WS1	2D	1.00	3.2/4.4/5.3/5.4	4.2.4	25	73	32	41	98	H	
⊠	WS1	6D	2.75	3.2/4.4/5.3/5.4	4.2.4	30	70	28	42	98	H	
▲	WS2	4D	2.65	3.2/4.4/5.3/5.4	4.2.3	28	75	30	45	100	H	
★	WS2	8D	4.80	3.2/4.4/5.3/5.4	4.2.3	28	75	26	49	100	H	

Tested in accordance with the following clauses of BS1377-2:1990.

3.2 - Moisture Content
4.3 - Cone Penetrometer Method
4.4 - One Point Cone Penetrometer Method
4.6 - One Point Casagrande Method
5.3 - Plastic Limit Method
5.4 - Plasticity Index

+ Tested in accordance with the following clauses of BS1377-2:1990.

4.2.3 - Natural State
4.2.4 - Wet Sieved

Key: * = Non-standard test, NP = Non plastic.

Lab location: B = Bristol (BS3 4AG), C = Castleford (WF10 1NJ), H = Hemel Hempstead (HP3 9RT), T = Tonbridge (TN11 9HU)

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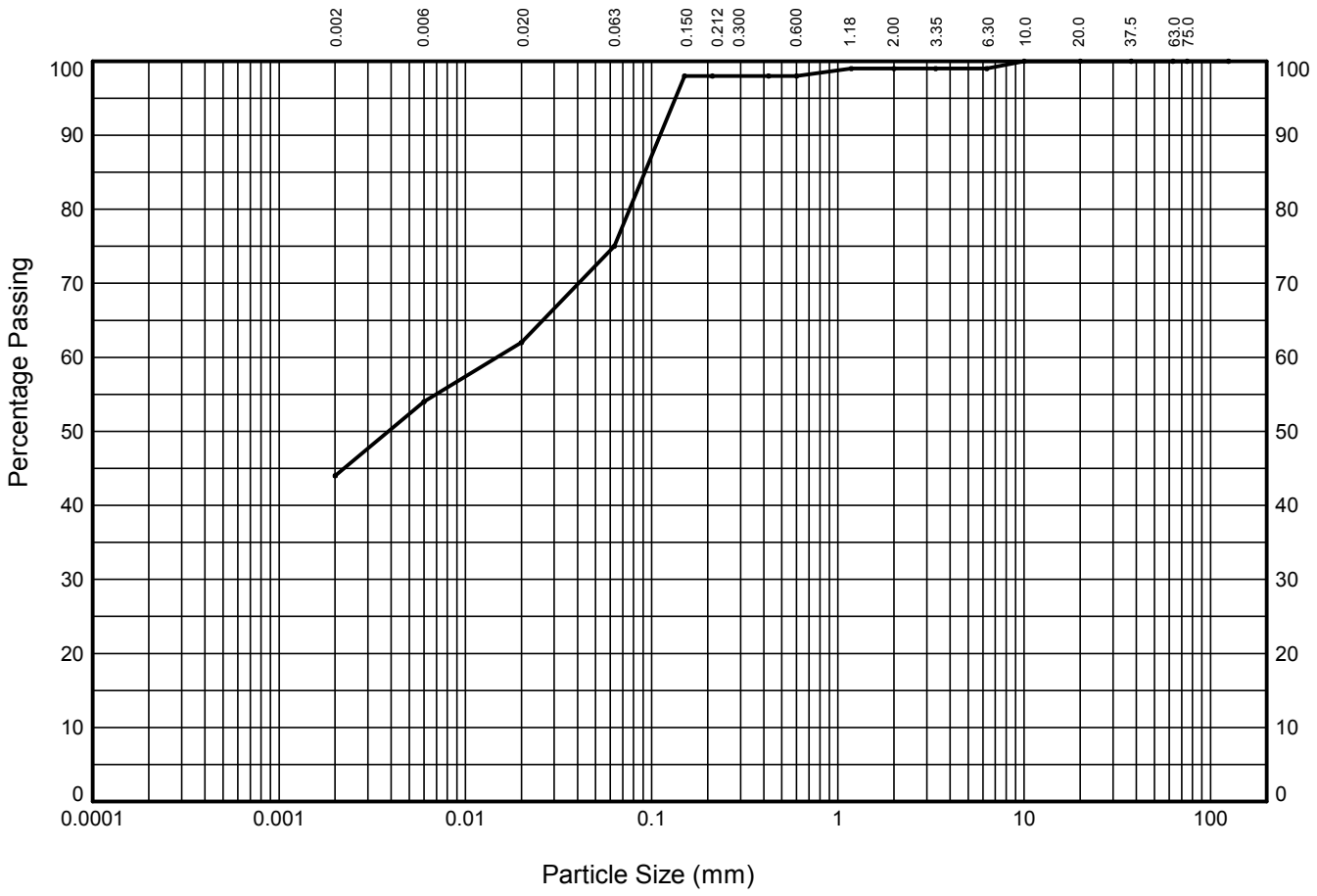
SC	SHARON CAIRNS	05/08/16

Contract	Contract Ref:
The Hope Project	583462

PARTICLE SIZE DISTRIBUTION TEST

In accordance with clauses 9.2, 9.4 of BS1377:Part 2:1990

Borehole: **BH1** Sample Ref: **18** Sample Type: **D** Depth (m): **14.50**



CLAY	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	COBBLES
	SILT			SAND			GRAVEL			

Test Sieve (mm)	Percent Passing (%)
125.0	**100**
75.0	**100**
63.0	**100**
37.5	**100**
20.0	**100**
10.0	**100**
6.30	**99**
3.35	**99**
2.00	**99**
1.18	**99**
0.600	**98**
0.425	**98**
0.212	**98**
0.150	**98**
0.063	**75**

Particle Diameter (mm)	Percent Passing (%)
0.02	**62**
0.006	**54**
0.002	**44**

Sedimentation sample was not pre-treated

Soil Fraction	Sieve Percentage (%)
GRAVEL	**1**
SAND	**24**
SILT	**31**
CLAY	**44**

Soil Description:

Dark grey slightly gravelly slightly sandy CLAY

STRUCTURAL SOILS
18 Frogmore Road
Hemel Hempstead
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MDStrowger	**MICHAEL STROWGER**	**27/07/16**

Contract	Contract Ref:
The Hope Project	**583462**

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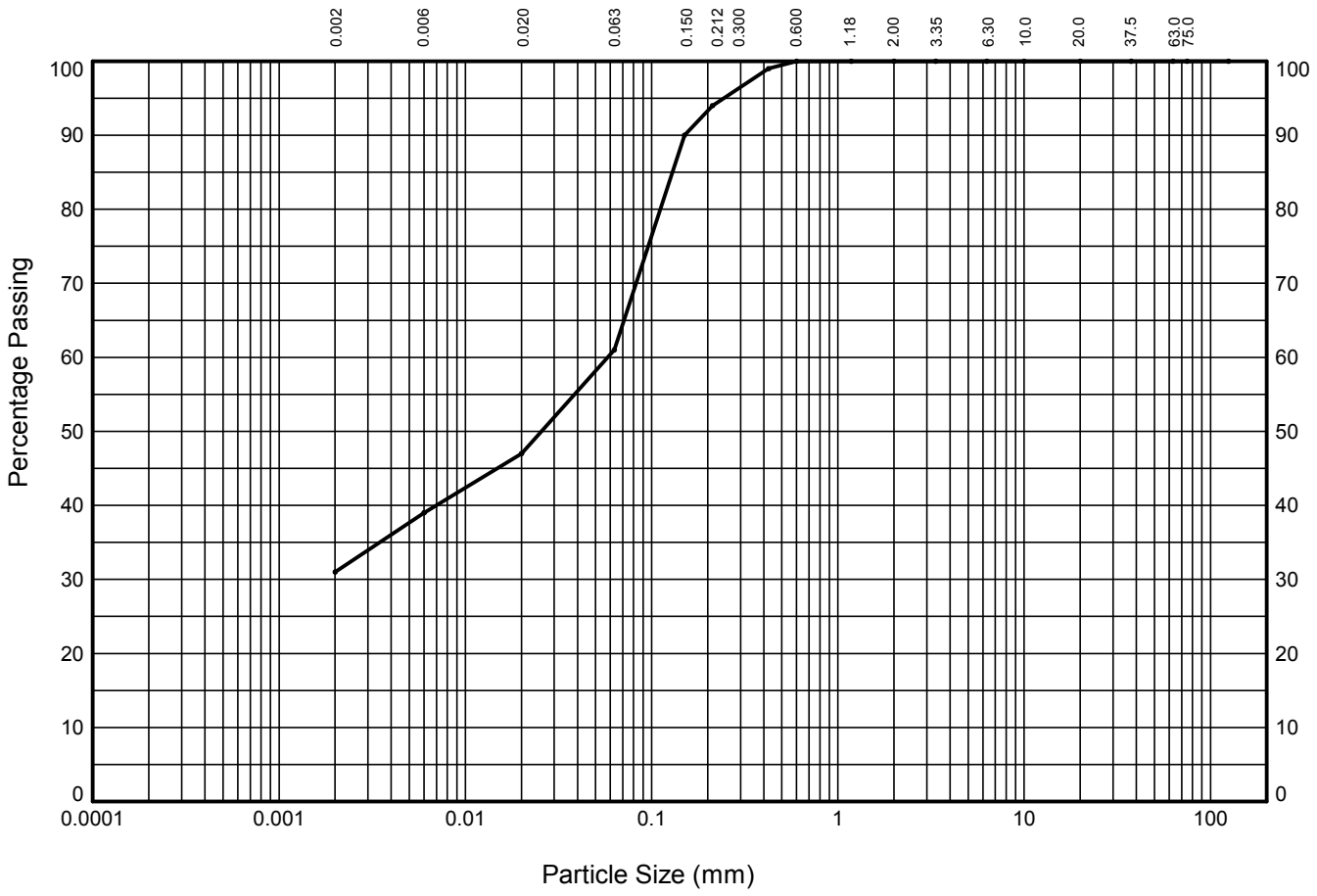
PARTICLE SIZE DISTRIBUTION TEST

In accordance with clauses 9.2, 9.4 of BS1377:Part 2:1990

Borehole: **BH1** Sample Ref: **32** Sample Type: **D** Depth (m): **25.00**



CLAY	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	COBBLES
	SILT			SAND			GRAVEL			

Test Sieve (mm)	Percent Passing (%)
125.0	**100**
75.0	**100**
63.0	**100**
37.5	**100**
20.0	**100**
10.0	**100**
6.30	**100**
3.35	**100**
2.00	**100**
1.18	**100**
0.600	**100**
0.425	**99**
0.212	**94**
0.150	**90**
0.063	**61**

Particle Diameter (mm)	Percent Passing (%)
0.02	**47**
0.006	**39**
0.002	**31**

Sedimentation sample was not pre-treated

Soil Fraction	Sieve Percentage (%)
GRAVEL	**0**
SAND	**39**
SILT	**30**
CLAY	**31**

Soil Description:

Dark brown sandy CLAY

STRUCTURAL SOILS
18 Frogmore Road
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Hertfordshire
HP3 9RT

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MDStrowger	**MICHAEL STROWGER**	**27/07/16**

Contract	Contract Ref:
The Hope Project	**583462**

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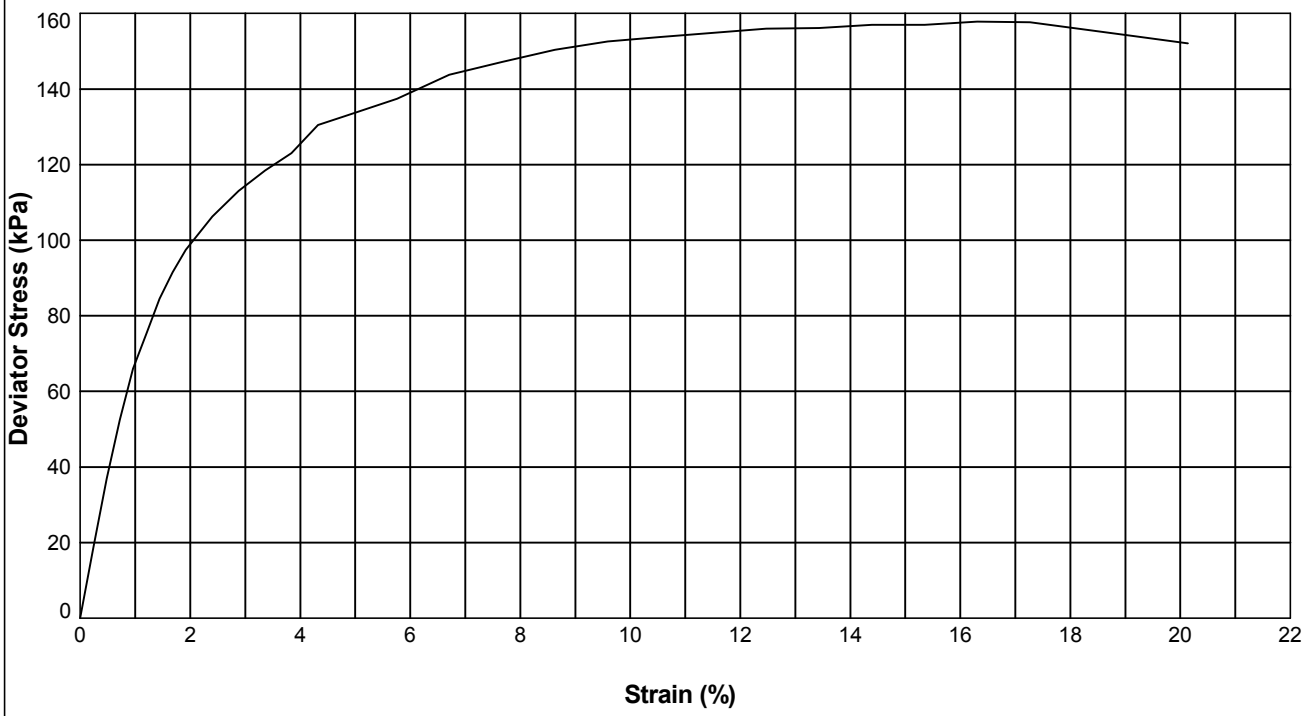
UNCONSOLIDATED QUICK UNDRAINED (SINGLE STAGE) TRIAXIAL COMPRESSION TEST

In accordance with BS1377:Part 7:1990, Clause 8

Borehole: **BH1** Sample Ref: **1** Sample Type: **U** Depth (m): **2.50**

Description : **Brown slightly sandy CLAY**

STAGE NUMBER			1	2	3
SAMPLE DETAILS	Sample Condition		Undisturbed		
	Orientation of sample		Vertical		
	Diameter	(mm)	103.68		
	Height	(mm)	208.49		
	Moisture Content	(%)	29		
	Bulk Density	(Mg/m^3)	1.98		
	Dry Density	(Mg/m^3)	1.54		
TEST DETAILS	Membrane Thickness	(mm)	0.30		
	Rate of Axial Displacement	(%/min)	1.99		
	Cell Pressure	(kPa)	50		
	Membrane Correction	(kPa)	0.94		
	Corrected Deviator Stress	(kPa)	158		
	Undrained Shear Strength	(kPa)	79		
	Strain at Failure	(%)	16.3		
	Mode of Failure		Compound		



STRUCTURAL SOILS
18 Frogmore Road
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Hertfordshire
HP3 9RT

Compiled By		Date
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AGS

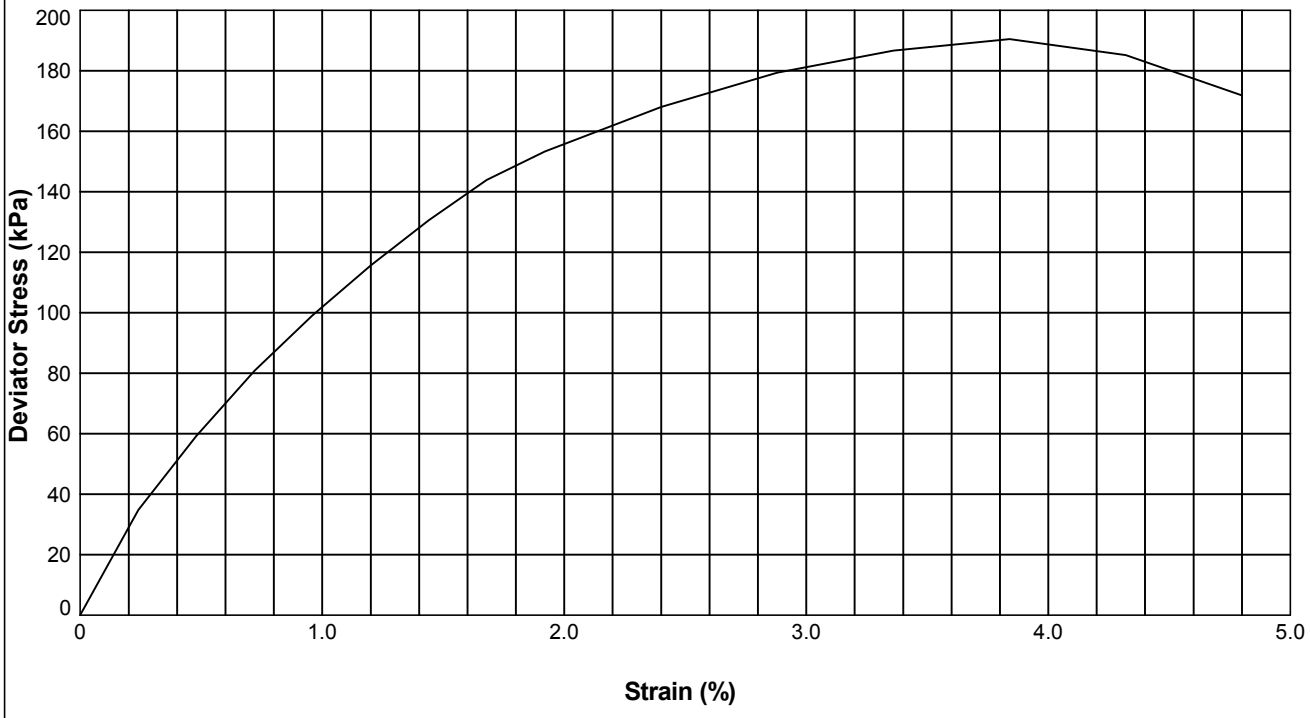
UNCONSOLIDATED QUICK UNDRAINED (SINGLE STAGE) TRIAXIAL COMPRESSION TEST

In accordance with BS1377:Part 7:1990, Clause 8

Borehole: **BH1** Sample Ref: **2** Sample Type: **U** Depth (m): **4.50**

Description : **Brown slightly sandy CLAY with occasional gypsum**

STAGE NUMBER			1	2	3
SAMPLE DETAILS	Sample Condition		Undisturbed		
	Orientation of sample		Vertical		
	Diameter	(mm)	103.58		
	Height	(mm)	208.29		
	Moisture Content	(%)	31		
	Bulk Density	(Mg/m^3)	1.96		
	Dry Density	(Mg/m^3)	1.49		
TEST DETAILS	Membrane Thickness	(mm)	0.29		
	Rate of Axial Displacement	(%/min)	1.51		
	Cell Pressure	(kPa)	90		
	Membrane Correction	(kPa)	0.30		
	Corrected Deviator Stress	(kPa)	190		
	Undrained Shear Strength	(kPa)	95		
	Strain at Failure	(%)	3.8		
	Mode of Failure		Brittle		



STRUCTURAL SOILS
18 Frogmore Road
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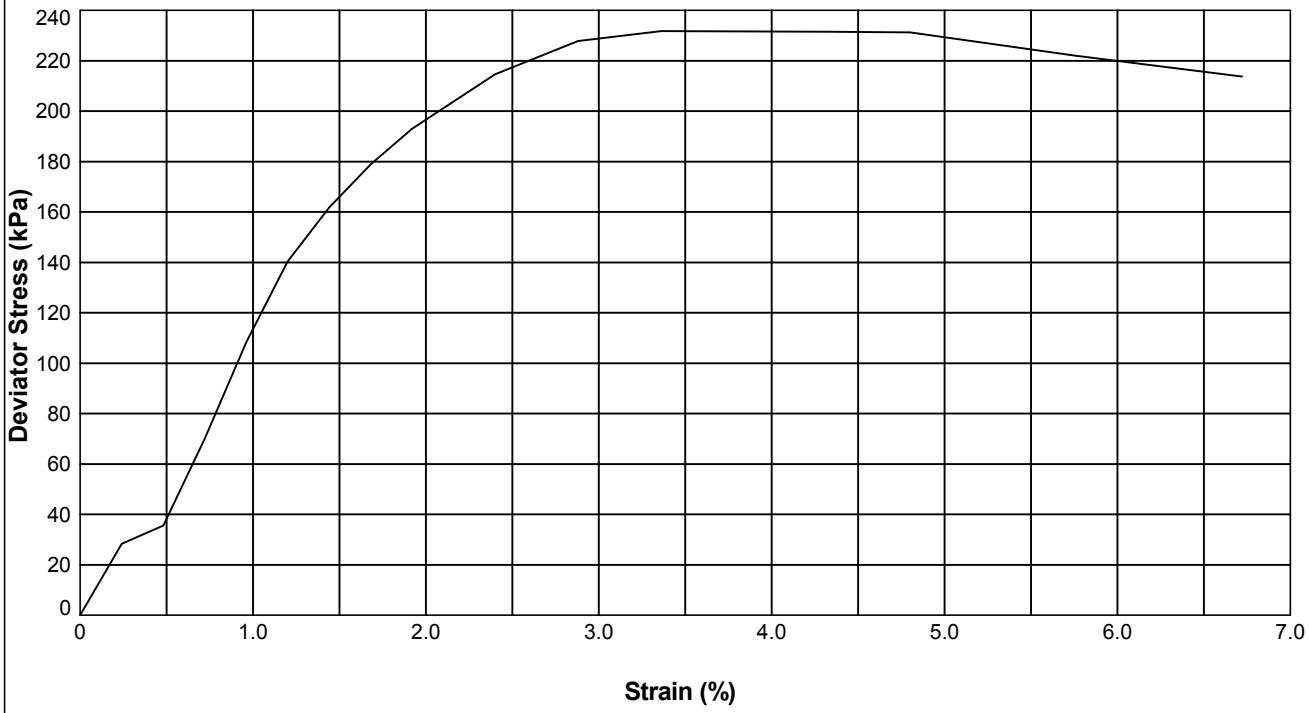
UNCONSOLIDATED QUICK UNDRAINED (SINGLE STAGE) TRIAXIAL COMPRESSION TEST

In accordance with BS1377:Part 7:1990, Clause 8

Borehole: **BH1** Sample Ref: **3** Sample Type: **U** Depth (m): **7.50**

Description : **Brown slightly sandy CLAY**

STAGE NUMBER			1	2	3
SAMPLE DETAILS	Sample Condition		Undisturbed		
	Orientation of sample		Vertical		
	Diameter	(mm)	104.00		
	Height	(mm)	208.42		
	Moisture Content	(%)	28		
	Bulk Density	(Mg/m^3)	1.97		
	Dry Density	(Mg/m^3)	1.53		
TEST DETAILS	Membrane Thickness	(mm)	0.23		
	Rate of Axial Displacement	(%/min)	1.39		
	Cell Pressure	(kPa)	150		
	Membrane Correction	(kPa)	0.21		
	Corrected Deviator Stress	(kPa)	232		
	Undrained Shear Strength	(kPa)	116		
	Strain at Failure	(%)	3.4		
	Mode of Failure		Brittle		



STRUCTURAL SOILS
18 Frogmore Road
Hemel Hempstead
Hertfordshire
HP3 9RT

Compiled By		Date
MDStrowger	MICHAEL STROWGER	27/07/16

Contract	Contract Ref:
The Hope Project	583462

AGS

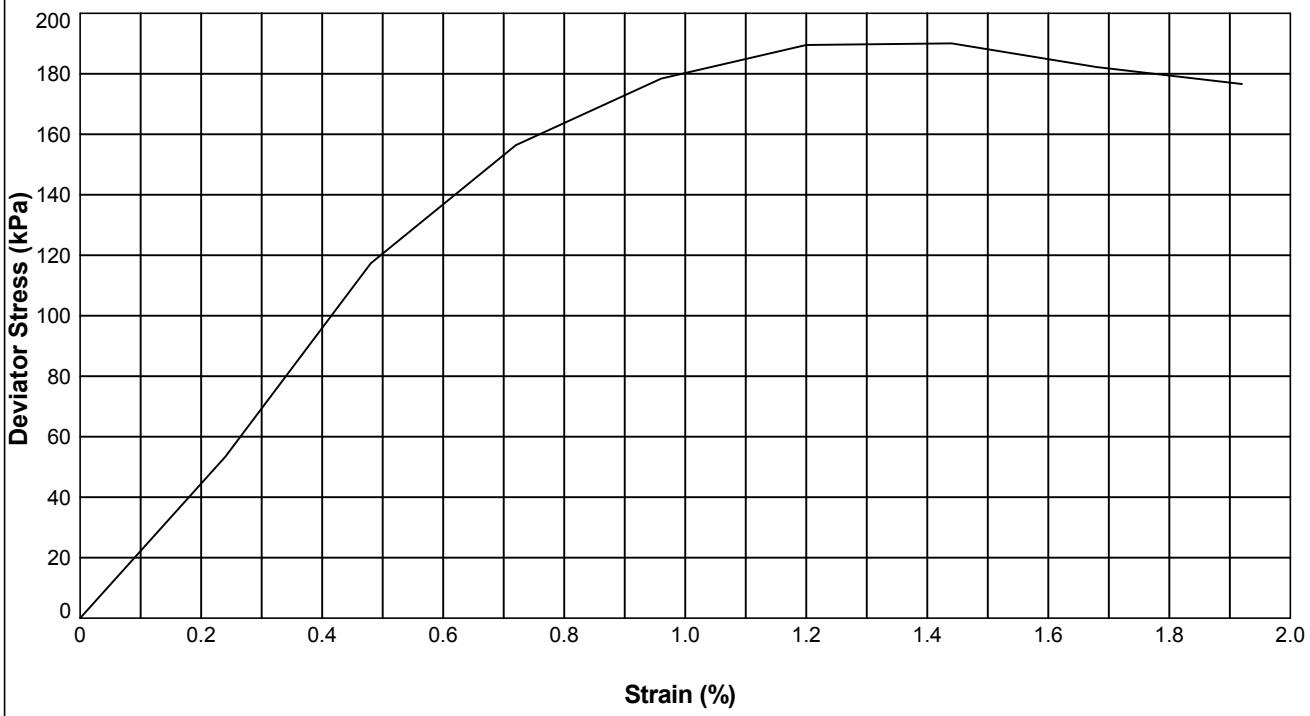
UNCONSOLIDATED QUICK UNDRAINED (SINGLE STAGE) TRIAXIAL COMPRESSION TEST

In accordance with BS1377:Part 7:1990, Clause 8

Borehole: **BH1** Sample Ref: **5** Sample Type: **U** Depth (m): **13.50**

Description : **Brown slightly sandy CLAY**

STAGE NUMBER			1	2	3
SAMPLE DETAILS	Sample Condition		Undisturbed		
	Orientation of sample		Vertical		
	Diameter	(mm)	103.06		
	Height	(mm)	208.21		
	Moisture Content	(%)	29		
	Bulk Density	(Mg/m^3)	1.98		
	Dry Density	(Mg/m^3)	1.53		
TEST DETAILS	Membrane Thickness	(mm)	0.24		
	Rate of Axial Displacement	(%/min)	1.20		
	Cell Pressure	(kPa)	270		
	Membrane Correction	(kPa)	0.10		
	Corrected Deviator Stress	(kPa)	190		
	Undrained Shear Strength	(kPa)	95		
	Strain at Failure	(%)	1.4		
	Mode of Failure		Brittle		



STRUCTURAL SOILS
18 Frogmore Road
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Hertfordshire
HP3 9RT

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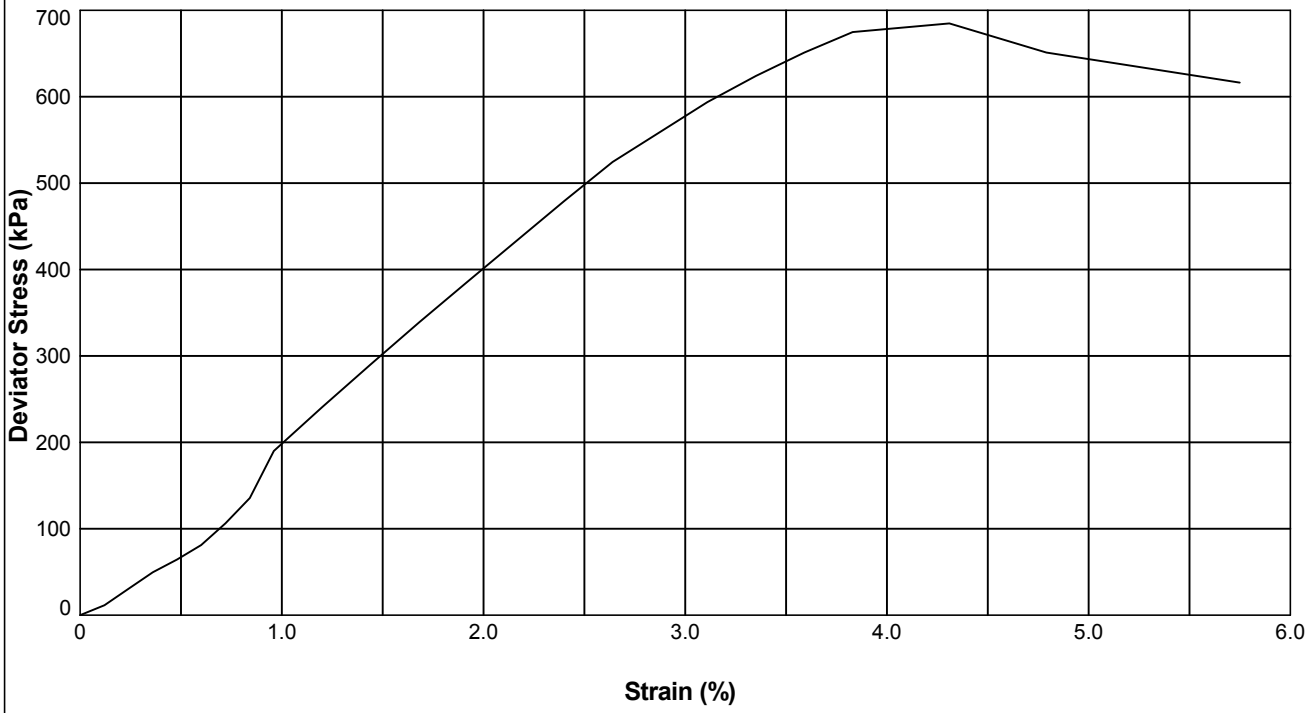
UNCONSOLIDATED QUICK UNDRAINED (SINGLE STAGE) TRIAXIAL COMPRESSION TEST

In accordance with BS1377:Part 7:1990, Clause 8

Borehole: **BH1** Sample Ref: **6** Sample Type: **U** Depth (m): **16.50**

Description : **Dark grey slightly sandy CLAY**

STAGE NUMBER			1	2	3
SAMPLE DETAILS	Sample Condition		Undisturbed		
	Orientation of sample		Vertical		
	Diameter	(mm)	103.62		
	Height	(mm)	208.67		
	Moisture Content	(%)	24		
	Bulk Density	(Mg/m^3)	2.02		
	Dry Density	(Mg/m^3)	1.63		
TEST DETAILS	Membrane Thickness	(mm)	0.23		
	Rate of Axial Displacement	(%/min)	0.79		
	Cell Pressure	(kPa)	330		
	Membrane Correction	(kPa)	0.26		
	Corrected Deviator Stress	(kPa)	685		
	Undrained Shear Strength	(kPa)	342		
	Strain at Failure	(%)	4.3		
	Mode of Failure		Brittle		



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The Hope Project	583462

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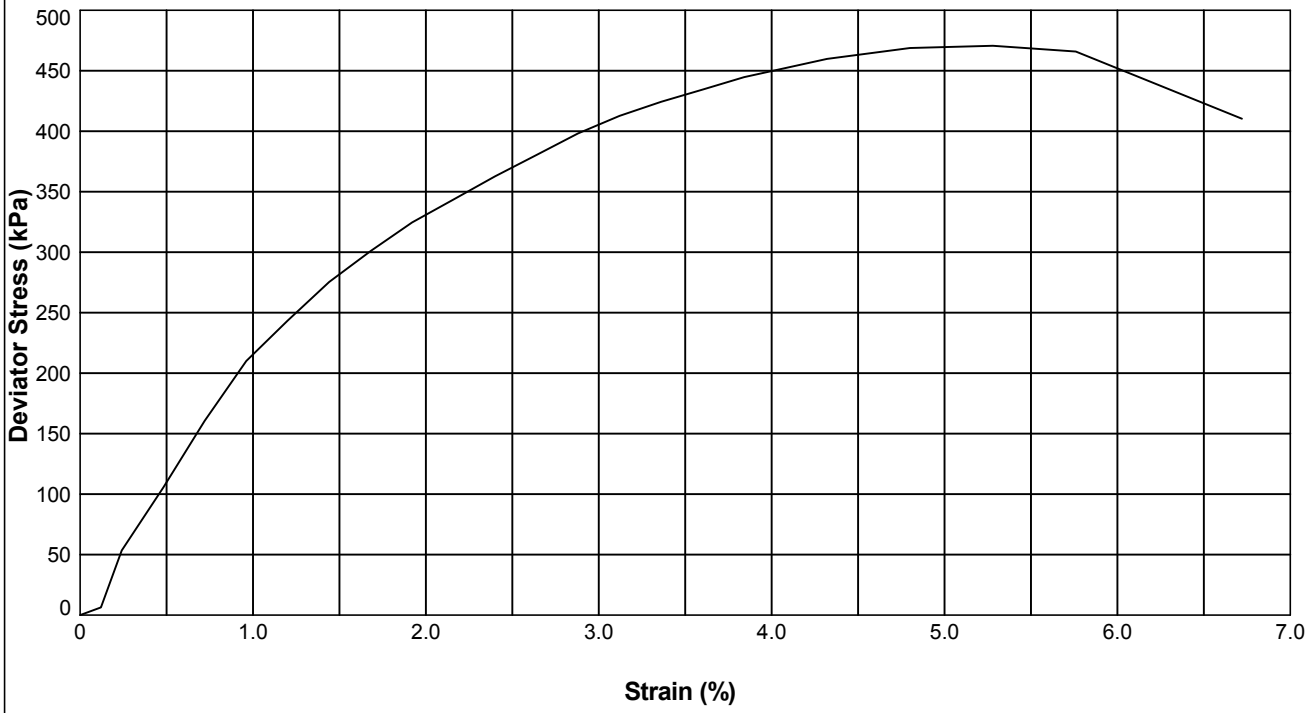
UNCONSOLIDATED QUICK UNDRAINED (SINGLE STAGE) TRIAXIAL COMPRESSION TEST

In accordance with BS1377:Part 7:1990, Clause 8

Borehole: **BH1** Sample Ref: **7** Sample Type: **U** Depth (m): **19.50**

Description : **Dark grey slightly sandy CLAY**

STAGE NUMBER			1	2	3
SAMPLE DETAILS	Sample Condition		Undisturbed		
	Orientation of sample		Vertical		
	Diameter	(mm)	103.19		
	Height	(mm)	208.30		
	Moisture Content	(%)	21		
	Bulk Density	(Mg/m^3)	2.05		
	Dry Density	(Mg/m^3)	1.70		
TEST DETAILS	Membrane Thickness	(mm)	0.25		
	Rate of Axial Displacement	(%/min)	0.79		
	Cell Pressure	(kPa)	390		
	Membrane Correction	(kPa)	0.34		
	Corrected Deviator Stress	(kPa)	471		
	Undrained Shear Strength	(kPa)	235		
	Strain at Failure	(%)	5.3		
	Mode of Failure		Brittle		



STRUCTURAL SOILS
18 Frogmore Road
Hemel Hempstead
Hertfordshire
HP3 9RT

Compiled By		Date
MDStrowger	MICHAEL STROWGER	27/07/16

Contract	Contract Ref:
The Hope Project	583462

AGS

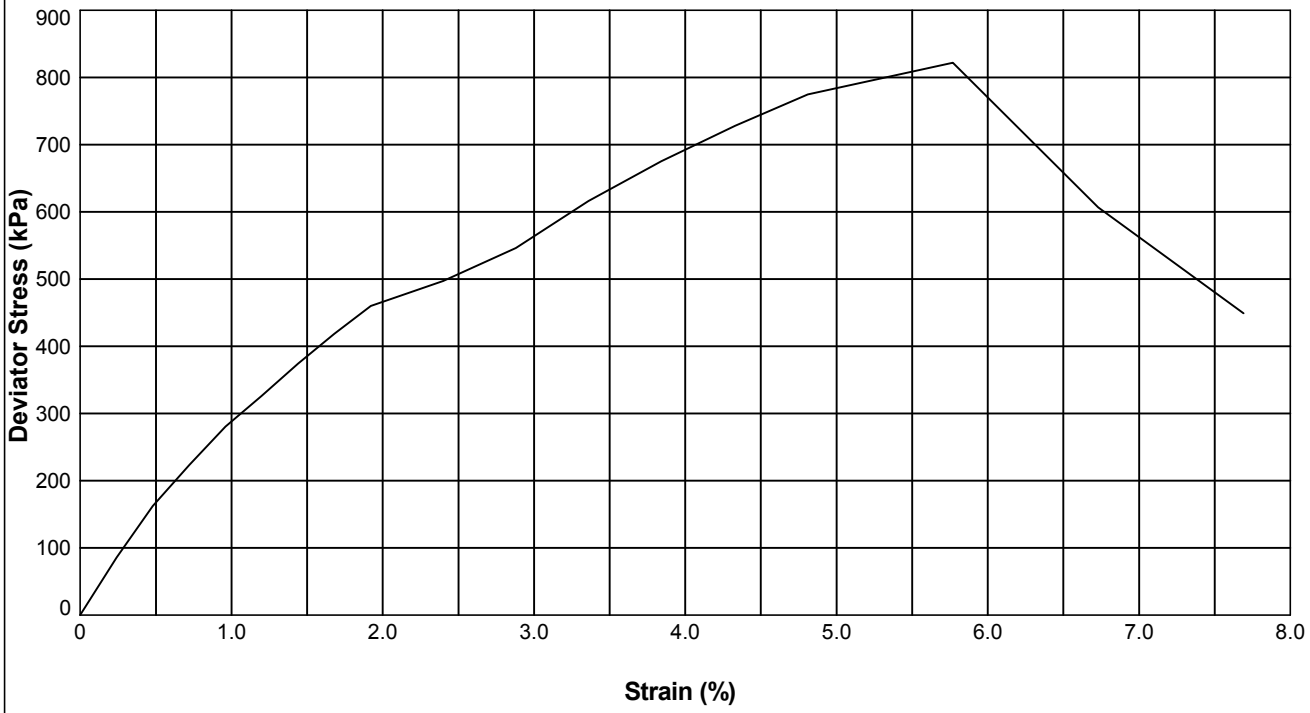
UNCONSOLIDATED QUICK UNDRAINED (SINGLE STAGE) TRIAXIAL COMPRESSION TEST

In accordance with BS1377:Part 7:1990, Clause 8

Borehole: **BH1** Sample Ref: **8** Sample Type: **U** Depth (m): **22.50**

Description : **Dark greyish brown slightly sandy CLAY**

STAGE NUMBER			1	2	3
SAMPLE DETAILS	Sample Condition		Undisturbed		
	Orientation of sample		Vertical		
	Diameter	(mm)	103.57		
	Height	(mm)	208.09		
	Moisture Content	(%)	21		
	Bulk Density	(Mg/m^3)	2.04		
	Dry Density	(Mg/m^3)	1.69		
TEST DETAILS	Membrane Thickness	(mm)	0.35		
	Rate of Axial Displacement	(%/min)	1.11		
	Cell Pressure	(kPa)	450		
	Membrane Correction	(kPa)	0.51		
	Corrected Deviator Stress	(kPa)	822		
	Undrained Shear Strength	(kPa)	411		
	Strain at Failure	(%)	5.8		
	Mode of Failure		Brittle		



STRUCTURAL SOILS
18 Frogmore Road
Hemel Hempstead
Hertfordshire
HP3 9RT

Compiled By		Date
A.D. Frost	ALAN FROST	27/07/16

Contract	Contract Ref:
The Hope Project	583462

AGS

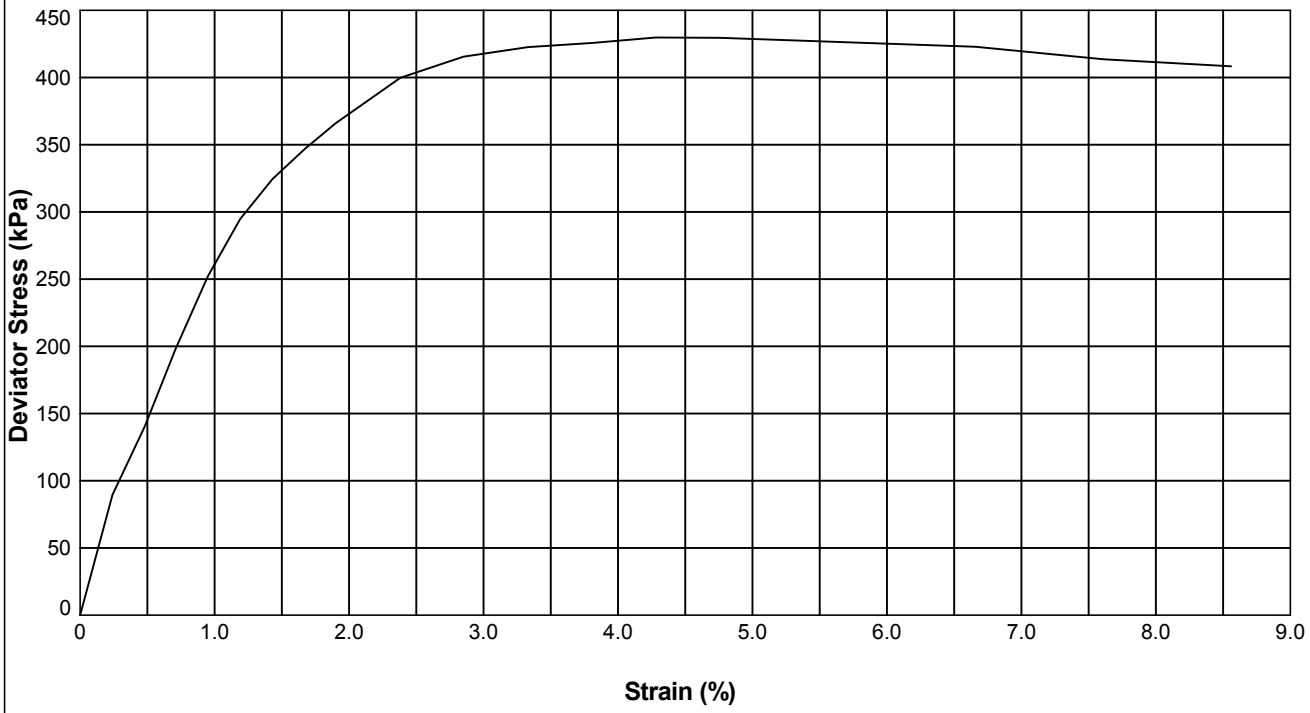
UNCONSOLIDATED QUICK UNDRAINED (SINGLE STAGE) TRIAXIAL COMPRESSION TEST

In accordance with BS1377:Part 7:1990, Clause 8

Borehole: **BH1** Sample Ref: **9** Sample Type: **U** Depth (m): **25.50**

Description : **Brown mottled grey slightly sandy CLAY**

STAGE NUMBER			1	2	3
SAMPLE DETAILS	Sample Condition		Undisturbed		
	Orientation of sample		Vertical		
	Diameter	(mm)	103.18		
	Height	(mm)	210.18		
	Moisture Content	(%)	26		
	Bulk Density	(Mg/m^3)	2.04		
	Dry Density	(Mg/m^3)	1.62		
TEST DETAILS	Membrane Thickness	(mm)	0.30		
	Rate of Axial Displacement	(%/min)	0.59		
	Cell Pressure	(kPa)	510		
	Membrane Correction	(kPa)	0.34		
	Corrected Deviator Stress	(kPa)	430		
	Undrained Shear Strength	(kPa)	215		
	Strain at Failure	(%)	4.3		
	Mode of Failure		Brittle		



STRUCTURAL SOILS
18 Frogmore Road
Hemel Hempstead
Hertfordshire
HP3 9RT

Compiled By		Date
MDStrowger	MICHAEL STROWGER	27/07/16

Contract	Contract Ref:
The Hope Project	583462

AGS

APPENDIX K
LABORATORY CERTIFICATES FOR SOIL ANALYSIS

envirolab
Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 16/03976
Issue Number: 1 **Date:** 06 July, 2016

Client: RSK Environment Ltd Hemel
18 Frogmore Road
Hemel Hempstead
Hertfordshire
UK
HP3 9RT

Project Manager: Claire Siberry/Nigel Austin
Project Name: The Hope Project, Camden
Project Ref: 371475
Order No: N/A
Date Samples Received: 29/06/16
Date Instructions Received: 29/06/16
Date Analysis Completed: 05/07/16

Prepared by:

Danielle Brierley
Administrative Assistant

Approved by:

Lianne Bromiley
Senior Client Manager

mCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME
UKAS TESTING 1247

Envirolab Job Number: 16/03976

Client Project Name: The Hope Project, Camden

Client Project Ref: 371475

Lab Sample ID	16/03976/1								Units	Method ref
Client Sample No	1									
Client Sample ID	BH1									
Depth to Top	1.10									
Depth To Bottom										
Date Sampled	27-Jun-16									
Sample Type	Soil - ES									
Sample Matrix Code	6A									
% Stones >10mm$_A^{\#}$	3.6								% w/w	A-T-044
Organic matter$_D^{M\#}$	4.8								% w/w	A-T-032 OM
Arsenic$_D^{M\#}$	13								mg/kg	A-T-024s
Cadmium$_D^{M\#}$	1.2								mg/kg	A-T-024s
Copper$_D^{M\#}$	115								mg/kg	A-T-024s
Chromium$_D^{M\#}$	16								mg/kg	A-T-024s
Lead$_D^{M\#}$	300								mg/kg	A-T-024s
Mercury$_D$	0.69								mg/kg	A-T-024s
Nickel$_D^{M\#}$	22								mg/kg	A-T-024s
Selenium$_D$	<1								mg/kg	A-T-024s
Zinc$_D^{M\#}$	84								mg/kg	A-T-024s

Envirolab Job Number: 16/03976

Client Project Name: The Hope Project, Camden

Client Project Ref: 371475

Lab Sample ID	16/03976/1								Units	Method ref
Client Sample No	1									
Client Sample ID	BH1									
Depth to Top	1.10									
Depth To Bottom										
Date Sampled	27-Jun-16									
Sample Type	Soil - ES									
Sample Matrix Code	6A									
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_A^\#$	NAD									A-T-045
Asbestos ACM - Suitable for Water Absorption Test?$_D$	N/A									Gravimetry

Envirolab Job Number: 16/03976

Client Project Name: The Hope Project, Camden

Client Project Ref: 371475

Lab Sample ID	16/03976/1								Units	Method ref
Client Sample No	1									
Client Sample ID	BH1									
Depth to Top	1.10									
Depth To Bottom										
Date Sampled	27-Jun-16									
Sample Type	Soil - ES									
Sample Matrix Code	6A									
PAH 16										
Acenaphthene$_A^{M\#}$	<0.01								mg/kg	A-T-019s
Acenaphthylene$_A^{M\#}$	<0.01								mg/kg	A-T-019s
Anthracene$_A^{M\#}$	<0.02								mg/kg	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	<0.04								mg/kg	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	<0.04								mg/kg	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	<0.05								mg/kg	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	<0.05								mg/kg	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	<0.07								mg/kg	A-T-019s
Chrysene$_A^{M\#}$	<0.06								mg/kg	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	<0.04								mg/kg	A-T-019s
Fluoranthene$_A^{M\#}$	<0.08								mg/kg	A-T-019s
Fluorene$_A^{M\#}$	<0.01								mg/kg	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	<0.03								mg/kg	A-T-019s
Naphthalene$_A^{M\#}$	<0.03								mg/kg	A-T-019s
Phenanthrene$_A^{M\#}$	<0.03								mg/kg	A-T-019s
Pyrene$_A^{M\#}$	<0.07								mg/kg	A-T-019s
PAH (total 16)$_A^{M\#}$	<0.08								mg/kg	A-T-019s
TPH Banded 1 with ID										
>C6-C8$_A^{\#}$	<10								mg/kg	A-T-007s
>C8-C10$_A^{\#}$	<10								mg/kg	A-T-007s
>C10-C12$_A^{\#}$	<10								mg/kg	A-T-007s
>C12-C16$_A^{\#}$	<10								mg/kg	A-T-007s
>C16-C21$_A^{\#}$	<10								mg/kg	A-T-007s
>C21-C40$_A$	<10								mg/kg	A-T-007s
TPH Total (sum of bands) (>C6-C40)$_A$	<10								mg/kg	A-T-007s
TPH ID (for FID characterisations)$_A$	N/A									A-T-007s

REPORT NOTES

Notes - Soil chemical analysis
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones and brick and concrete fragments >10mm are removed or excluded from the sample prior to analysis and reported results corrected to a whole sample basis. For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis.

Notes - General
This report shall not be reproduced, except in full, without written approval from Envirolab.
Subscript "A" indicates analysis performed on the sample as received. "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve, unless asbestos is found to be present in which case all analysis is performed on the sample as received.
All analysis is performed on the dried and crushed sample for samples with Matrix Code 7 and this supersedes any "A" subscripts.
All analysis is performed on the sample as received for soil samples which are positive for asbestos and/or if they are from outside the European Union and this supercedes any "D" subscripts.
Superscript "M" indicates method accredited to MCERTS.
If results are in italic font they are associated with an AQC failure. These are not accredited and are unreliable.
A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

TPH analysis of water by method A-T-007
Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Asbestos in soil
Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if present as discrete fibres/fragments. Stones etc. are not removed from the sample prior to analysis.
Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:
1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.
Samples with Matrix Code 7 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations.

Secondary Matrix Codes:
A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

IS indicates Insufficient Sample for analysis.
US indicates Unsuitable Sample for analysis.
NDP indicates No Determination Possible.
NAD indicates No Asbestos Detected.
N/A indicates Not Applicable.
Superscript # indicates method accredited to ISO 17025.
Analytical results reflect the quality of the sample at the time of analysis only. Opinions and interpretations expressed are outside the scope of our accreditation.

Please contact us if you need any further information.

envirolab
Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 16/04010
Issue Number: 1 **Date:** 07 July, 2016

Client: RSK Environment Ltd Hemel
18 Frogmore Road
Hemel Hempstead
Hertfordshire
UK
HP3 9RT

Project Manager: Claire Siberry/Nigel Austin
Project Name: The Hope Project, Camden
Project Ref: 371475
Order No: N/A
Date Samples Received: 30/06/16
Date Instructions Received: 30/06/16
Date Analysis Completed: 07/07/16

Prepared by:

Kate Ellison
Administrative Assistant

Approved by:

Iain Haslock
Analytical Consultant

Envirolab Job Number: 16/04010

Client Project Name: The Hope Project, Camden

Client Project Ref: 371475

Lab Sample ID	16/04010/1	16/04010/2							Units	Method ref
Client Sample No	1	1								
Client Sample ID	TP2	TP4								
Depth to Top	0.50	0.60								
Depth To Bottom										
Date Sampled	28-Jun-16	28-Jun-16								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	4AB	5AB								
% Stones >10mm$_A^{\#}$	3.2	22.3							% w/w	A-T-044
Organic matter$_D^{M\#}$	-	2.8							% w/w	A-T-032 OM
Arsenic$_D^{M\#}$	19	12							mg/kg	A-T-024s
Cadmium$_D^{M\#}$	1.5	1.5							mg/kg	A-T-024s
Copper$_D^{M\#}$	75	45							mg/kg	A-T-024s
Chromium$_D^{M\#}$	16	19							mg/kg	A-T-024s
Lead$_D^{M\#}$	501	308							mg/kg	A-T-024s
Mercury$_D$	1.19	0.99							mg/kg	A-T-024s
Nickel$_D^{M\#}$	22	19							mg/kg	A-T-024s
Selenium$_D$	<1	<1							mg/kg	A-T-024s
Zinc$_D^{M\#}$	60	51							mg/kg	A-T-024s

Envirolab Job Number: 16/04010

Client Project Name: The Hope Project, Camden

Client Project Ref: 371475

Lab Sample ID	16/04010/1	16/04010/2							Units	Method ref
Client Sample No	1	1								
Client Sample ID	TP2	TP4								
Depth to Top	0.50	0.60								
Depth To Bottom										
Date Sampled	28-Jun-16	28-Jun-16								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	4AB	5AB								
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_A^{\#}$	NAD	NAD								A-T-045
Asbestos ACM - Suitable for Water Absorption Test?$_D$	N/A	N/A								Gravimetry

Envirolab Job Number: 16/04010

Client Project Name: The Hope Project, Camden

Client Project Ref: 371475

Lab Sample ID	16/04010/1	16/04010/2							Units	Method ref
Client Sample No	1	1								
Client Sample ID	TP2	TP4								
Depth to Top	0.50	0.60								
Depth To Bottom										
Date Sampled	28-Jun-16	28-Jun-16								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	4AB	5AB								
PAH 16										
Acenaphthene$_A^{M\#}$	<0.01	<0.01							mg/kg	A-T-019s
Acenaphthylene$_A^{M\#}$	<0.01	<0.01							mg/kg	A-T-019s
Anthracene$_A^{M\#}$	<0.02	<0.02							mg/kg	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	<0.04	0.06							mg/kg	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	<0.04	0.07							mg/kg	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	<0.05	0.09							mg/kg	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	<0.05	0.06							mg/kg	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	<0.07	<0.07							mg/kg	A-T-019s
Chrysene$_A^{M\#}$	<0.06	0.06							mg/kg	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	<0.04	<0.04							mg/kg	A-T-019s
Fluoranthene$_A^{M\#}$	<0.08	0.12							mg/kg	A-T-019s
Fluorene$_A^{M\#}$	<0.01	<0.01							mg/kg	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	<0.03	0.06							mg/kg	A-T-019s
Naphthalene$_A^{M\#}$	<0.03	<0.03							mg/kg	A-T-019s
Phenanthrene$_A^{M\#}$	<0.03	0.05							mg/kg	A-T-019s
Pyrene$_A^{M\#}$	<0.07	0.09							mg/kg	A-T-019s
PAH (total 16)$_A^{M\#}$	<0.08	0.68							mg/kg	A-T-019s
TPH Banded 1 with ID										
>C6-C8$_A^{\#}$	<10	<10							mg/kg	A-T-007s
>C8-C10$_A^{\#}$	<10	<10							mg/kg	A-T-007s
>C10-C12$_A^{\#}$	<10	<10							mg/kg	A-T-007s
>C12-C16$_A^{\#}$	<10	<10							mg/kg	A-T-007s
>C16-C21$_A^{\#}$	<10	<10							mg/kg	A-T-007s
>C21-C40$_A$	<10	<10							mg/kg	A-T-007s
TPH Total (sum of bands) (>C6-C40)$_A$	<10	<10							mg/kg	A-T-007s
TPH ID (for FID characterisations)$_A$	N/A	N/A								A-T-007s

REPORT NOTES

Notes - Soil chemical analysis
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones and brick and concrete fragments >10mm are removed or excluded from the sample prior to analysis and reported results corrected to a whole sample basis. For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis.

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All analysis is performed on the sample as received for soil samples which are positive for asbestos and/or if they are from outside the European Union and this supercedes any "D" subscripts.
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TPH analysis of water by method A-T-007
Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Asbestos in soil
Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if present as discrete fibres/fragments. Stones etc. are not removed from the sample prior to analysis.
Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

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Samples with Matrix Code 7 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations.

Secondary Matrix Codes:
A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

IS indicates Insufficient Sample for analysis.
US indicates Unsuitable Sample for analysis.
NDP indicates No Determination Possible.
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Superscript # indicates method accredited to ISO 17025.
Analytical results reflect the quality of the sample at the time of analysis only. Opinions and interpretations expressed are outside the scope of our accreditation.

Please contact us if you need any further information.

envirolab
Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

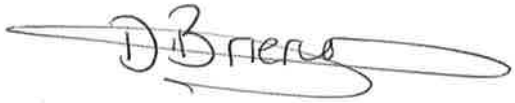
FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 16/04078
Issue Number: 1 **Date:** 14 July, 2016

Client: RSK Environment Ltd Hemel
18 Frogmore Road
Hemel Hempstead
Hertfordshire
UK
HP3 9RT

Project Manager: Claire Siberry/Nigel Austin
Project Name: The Hope Project, Camden
Project Ref: 371475
Order No: N/A
Date Samples Received: 04/07/16
Date Instructions Received: 04/07/16
Date Analysis Completed: 12/07/16

Prepared by:



Danielle Brierley
Administrative Assistant

Approved by:

Georgia King
Client Service Manager

Envirolab Job Number: 16/04078

Client Project Name: The Hope Project, Camden

Client Project Ref: 371475

Lab Sample ID	16/04078/1	16/04078/2	16/04078/3						Units	Method ref
Client Sample No	1	1	1							
Client Sample ID	TP5	TP6	TP9							
Depth to Top	0.50	0.80	0.40							
Depth To Bottom										
Date Sampled	30-Jun-16	30-Jun-16	29-Jun-16							
Sample Type	Soil - ES	Soil - ES	Soil - ES							
Sample Matrix Code	4A	6A	4A							
% Stones >10mm$_A^{\#}$	3.4	<0.1	16.7						% w/w	A-T-044
Organic matter$_D^{M\#}$	7.4	0.6	-						% w/w	A-T-032 OM
Arsenic$_D^{M\#}$	20	11	6						mg/kg	A-T-024s
Cadmium$_D^{M\#}$	1.8	2.2	1.2						mg/kg	A-T-024s
Copper$_D^{M\#}$	84	24	22						mg/kg	A-T-024s
Chromium$_D^{M\#}$	22	30	20						mg/kg	A-T-024s
Lead$_D^{M\#}$	928	68	73						mg/kg	A-T-024s
Mercury$_D$	1.49	<0.17	<0.17						mg/kg	A-T-024s
Nickel$_D^{M\#}$	20	32	17						mg/kg	A-T-024s
Selenium$_D$	<1	<1	<1						mg/kg	A-T-024s
Zinc$_D^{M\#}$	74	58	38						mg/kg	A-T-024s

Envirolab Job Number: 16/04078

Client Project Name: The Hope Project, Camden

Client Project Ref: 371475

Lab Sample ID	16/04078/1	16/04078/2	16/04078/3						Units	Method ref
Client Sample No	1	1	1							
Client Sample ID	TP5	TP6	TP9							
Depth to Top	0.50	0.80	0.40							
Depth To Bottom										
Date Sampled	30-Jun-16	30-Jun-16	29-Jun-16							
Sample Type	Soil - ES	Soil - ES	Soil - ES							
Sample Matrix Code	4A	6A	4A							
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_A^{\#}$	NAD	NAD	NAD							A-T-045
Asbestos ACM - Suitable for Water Absorption Test?$_D$	N/A	N/A	N/A							Gravimetry

Envirolab Job Number: 16/04078

Client Project Name: The Hope Project, Camden

Client Project Ref: 371475

Lab Sample ID	16/04078/1	16/04078/2	16/04078/3						Units	Method ref
Client Sample No	1	1	1							
Client Sample ID	TP5	TP6	TP9							
Depth to Top	0.50	0.80	0.40							
Depth To Bottom										
Date Sampled	30-Jun-16	30-Jun-16	29-Jun-16							
Sample Type	Soil - ES	Soil - ES	Soil - ES							
Sample Matrix Code	4A	6A	4A							
PAH 16										
Acenaphthene$_A^{M\#}$	<0.01	<0.01	<0.01						mg/kg	A-T-019s
Acenaphthylene$_A^{M\#}$	<0.01	<0.01	<0.01						mg/kg	A-T-019s
Anthracene$_A^{M\#}$	<0.02	<0.02	<0.02						mg/kg	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	0.08	<0.04	<0.04						mg/kg	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	0.10	<0.04	<0.04						mg/kg	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	0.12	<0.05	<0.05						mg/kg	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	<0.05	<0.05	<0.05						mg/kg	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	<0.07	<0.07	<0.07						mg/kg	A-T-019s
Chrysene$_A^{M\#}$	0.08	<0.06	<0.06						mg/kg	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	<0.04	<0.04	<0.04						mg/kg	A-T-019s
Fluoranthene$_A^{M\#}$	<0.08	<0.08	<0.08						mg/kg	A-T-019s
Fluorene$_A^{M\#}$	<0.01	<0.01	<0.01						mg/kg	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	0.06	<0.03	<0.03						mg/kg	A-T-019s
Naphthalene$_A^{M\#}$	<0.03	<0.03	<0.03						mg/kg	A-T-019s
Phenanthrene$_A^{M\#}$	<0.03	<0.03	<0.03						mg/kg	A-T-019s
Pyrene$_A^{M\#}$	<0.07	<0.07	<0.07						mg/kg	A-T-019s
PAH (total 16)$_A^{M\#}$	0.44	<0.08	<0.08						mg/kg	A-T-019s
TPH Banded 1 with ID										
>C6-C8$_A^{\#}$	<10	-	<10						mg/kg	A-T-007s
>C8-C10$_A^{\#}$	<10	-	<10						mg/kg	A-T-007s
>C10-C12$_A^{\#}$	<10	-	<10						mg/kg	A-T-007s
>C12-C16$_A^{\#}$	<10	-	<10						mg/kg	A-T-007s
>C16-C21$_A^{\#}$	<10	-	<10						mg/kg	A-T-007s
>C21-C40$_A$	<10	-	<10						mg/kg	A-T-007s
TPH Total (sum of bands) (>C6-C40)$_A$	<10	-	<10						mg/kg	A-T-007s
TPH ID (for FID characterisations)$_A$	N/A	-	N/A							A-T-007s

Lab Sample ID	16/04078/1	16/04078/2	16/04078/3						Units	Method ref
Client Sample No	1	1	1							
Client Sample ID	TP5	TP6	TP9							
Depth to Top	0.50	0.80	0.40							
Depth To Bottom										
Date Sampled	30-Jun-16	30-Jun-16	29-Jun-16							
Sample Type	Soil - ES	Soil - ES	Soil - ES							
Sample Matrix Code	4A	6A	4A							
VOC										
Dichlorodifluoromethane$_{A}^{\#}$	-	-	<1						µg/kg	A-T-006s
Chloromethane$_{A}^{\#}$	-	-	*<10*						µg/kg	A-T-006s
Vinyl Chloride$_{A}^{\#}$	-	-	<0.2						µg/kg	A-T-006s
Bromomethane$_{A}^{\#}$	-	-	<1						µg/kg	A-T-006s
Chloroethane$_{A}^{\#}$	-	-	<1						µg/kg	A-T-006s
Trichlorofluoromethane$_{A}^{\#}$	-	-	<1						µg/kg	A-T-006s
1,1-Dichloroethene$_{A}^{\#}$	-	-	<1						µg/kg	A-T-006s
Carbon Disulphide$_{A}^{\#}$	-	-	<1						µg/kg	A-T-006s
Dichloromethane $_{A}$	-	-	<5						µg/kg	A-T-006s
trans 1,2-Dichloroethene$_{A}^{\#}$	-	-	<1						µg/kg	A-T-006s
1,1-Dichloroethane$_{A}^{\#}$	-	-	<1						µg/kg	A-T-006s
cis 1,2-Dichloroethene$_{A}^{\#}$	-	-	<1						µg/kg	A-T-006s
2,2-Dichloropropane$_{A}^{\#}$	-	-	<1						µg/kg	A-T-006s
Bromochloromethane$_{A}^{\#}$	-	-	<5						µg/kg	A-T-006s
Chloroform$_{A}^{\#}$	-	-	<1						µg/kg	A-T-006s
1,1,1-Trichloroethane$_{A}^{\#}$	-	-	<1						µg/kg	A-T-006s
1,1-Dichloropropene$_{A}^{\#}$	-	-	<1						µg/kg	A-T-006s
Carbon Tetrachloride$_{A}^{\#}$	-	-	<1						µg/kg	A-T-006s
1,2-Dichloroethane$_{A}^{\#}$	-	-	<2						µg/kg	A-T-006s
Benzene $_{A}^{\#}$	-	-	<1						µg/kg	A-T-006s
Trichloroethene$_{A}^{\#}$	-	-	<1						µg/kg	A-T-006s
1,2-Dichloropropane$_{A}^{\#}$	-	-	<1						µg/kg	A-T-006s
Dibromomethane$_{A}^{\#}$	-	-	<1						µg/kg	A-T-006s
Bromodichloromethane$_{A}^{\#}$	-	-	<10						µg/kg	A-T-006s
cis 1,3-Dichloropropene$_{A}^{\#}$	-	-	<1						µg/kg	A-T-006s
Toluene $_{A}^{\#}$	-	-	<1						µg/kg	A-T-006s
trans 1,3-Dichloropropene$_{A}^{\#}$	-	-	<1						µg/kg	A-T-006s
1,1,2-Trichloroethane$_{A}^{\#}$	-	-	<1						µg/kg	A-T-006s
1,3-Dichloropropane$_{A}^{\#}$	-	-	<1						µg/kg	A-T-006s
Tetrachloroethene$_{A}^{\#}$	-	-	<1						µg/kg	A-T-006s
Dibromochloromethane$_{A}^{\#}$	-	-	<3						µg/kg	A-T-006s
1,2-Dibromoethane$_{A}^{\#}$	-	-	<1						µg/kg	A-T-006s

Envirolab Job Number: 16/04078

Client Project Name: The Hope Project, Camden

Client Project Ref: 371475

Lab Sample ID	16/04078/1	16/04078/2	16/04078/3						Units	Method ref
Client Sample No	1	1	1							
Client Sample ID	TP5	TP6	TP9							
Depth to Top	0.50	0.80	0.40							
Depth To Bottom										
Date Sampled	30-Jun-16	30-Jun-16	29-Jun-16							
Sample Type	Soil - ES	Soil - ES	Soil - ES							
Sample Matrix Code	4A	6A	4A							
Chlorobenzene$_A^\#$	-	-	<1						µg/kg	A-T-006s
1,1,1,2-Tetrachloroethane$_A$	-	-	<1						µg/kg	A-T-006s
Ethylbenzene$_A^\#$	-	-	<1						µg/kg	A-T-006s
m & p Xylene$_A^\#$	-	-	<1						µg/kg	A-T-006s
o-Xylene$_A^\#$	-	-	<1						µg/kg	A-T-006s
Styrene$_A^\#$	-	-	<1						µg/kg	A-T-006s
Bromoform$_A^\#$	-	-	<1						µg/kg	A-T-006s
Isopropylbenzene$_A^\#$	-	-	<1						µg/kg	A-T-006s
1,1,2,2-Tetrachloroethane$_A$	-	-	*<1*						µg/kg	A-T-006s
1,2,3-Trichloropropane$_A^\#$	-	-	<1						µg/kg	A-T-006s
Bromobenzene$_A^\#$	-	-	<1						µg/kg	A-T-006s
n-Propylbenzene$_A^\#$	-	-	<1						µg/kg	A-T-006s
2-Chlorotoluene$_A^\#$	-	-	<1						µg/kg	A-T-006s
1,3,5-Trimethylbenzene$_A^\#$	-	-	<1						µg/kg	A-T-006s
4-Chlorotoluene$_A^\#$	-	-	<1						µg/kg	A-T-006s
tert-Butylbenzene$_A^\#$	-	-	<2						µg/kg	A-T-006s
1,2,4-Trimethylbenzene$_A^\#$	-	-	<1						µg/kg	A-T-006s
sec-Butylbenzene$_A^\#$	-	-	<1						µg/kg	A-T-006s
4-Isopropyltoluene$_A^\#$	-	-	<1						µg/kg	A-T-006s
1,3-Dichlorobenzene$_A$	-	-	<1						µg/kg	A-T-006s
1,4-Dichlorobenzene$_A^\#$	-	-	<1						µg/kg	A-T-006s
n-Butylbenzene$_A^\#$	-	-	<1						µg/kg	A-T-006s
1,2-Dichlorobenzene$_A^\#$	-	-	<1						µg/kg	A-T-006s
1,2-Dibromo-3-chloropropane$_A$	-	-	<2						µg/kg	A-T-006s
1,2,4-Trichlorobenzene$_A$	-	-	<3						µg/kg	A-T-006s
Hexachlorobutadiene$_A^\#$	-	-	<1						µg/kg	A-T-006s
1,2,3-Trichlorobenzene$_A$	-	-	<3						µg/kg	A-T-006s

REPORT NOTES

Notes - Soil chemical analysis
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones and brick and concrete fragments >10mm are removed or excluded from the sample prior to analysis and reported results corrected to a whole sample basis. For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis.

Notes - General
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Subscript "A" indicates analysis performed on the sample as received. "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve, unless asbestos is found to be present in which case all analysis is performed on the sample as received.
All analysis is performed on the dried and crushed sample for samples with Matrix Code 7 and this supersedes any "A" subscripts.
All analysis is performed on the sample as received for soil samples which are positive for asbestos and/or if they are from outside the European Union and this supercedes any "D" subscripts.
Superscript "M" indicates method accredited to MCERTS.
If results are in italic font they are associated with an AQC failure. These are not accredited and are unreliable.
A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

TPH analysis of water by method A-T-007
Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Asbestos in soil
Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if present as discrete fibres/fragments. Stones etc. are not removed from the sample prior to analysis.
Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:
1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.
Samples with Matrix Code 7 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations.

Secondary Matrix Codes:
A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

IS indicates Insufficient Sample for analysis.
US indicates Unsuitable Sample for analysis.
NDP indicates No Determination Possible.
NAD indicates No Asbestos Detected.
N/A indicates Not Applicable.
Superscript # indicates method accredited to ISO 17025.
Analytical results reflect the quality of the sample at the time of analysis only. Opinions and interpretations expressed are outside the scope of our accreditation.

Please contact us if you need any further information.

envirolab
Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 16/04167
Issue Number: 1 **Date:** 20 July, 2016

Client: RSK Environment Ltd Hemel
18 Frogmore Road
Hemel Hempstead
Hertfordshire
UK
HP3 9RT

Project Manager: Claire Siberry/Nigel Austin
Project Name: The Hope Project, Camden
Project Ref: 371475
Order No: N/A
Date Samples Received: 07/07/16
Date Instructions Received: 07/07/16
Date Analysis Completed: 15/07/16

Prepared by:

Kate Ellison
Administrative Assistant

Approved by:

Lianne Bromiley
Senior Client Manager

mCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME
UKAS TESTING 1247

Envirolab Job Number: 16/04167

Client Project Name: The Hope Project, Camden

Client Project Ref: 371475

Lab Sample ID	16/04167/1								Units	Method ref
Client Sample No	1									
Client Sample ID	TP7									
Depth to Top	0.35									
Depth To Bottom										
Date Sampled	05-Jul-16									
Sample Type	Soil - ES									
Sample Matrix Code	6A									
% Stones >10mm$_A^{\#}$	6.6								% w/w	A-T-044
Organic matter$_D^{M\#}$	9.8								% w/w	A-T-032 OM
Arsenic$_D^{M\#}$	9								mg/kg	A-T-024s
Cadmium$_D^{M\#}$	2.1								mg/kg	A-T-024s
Copper$_D^{M\#}$	39								mg/kg	A-T-024s
Chromium$_D^{M\#}$	30								mg/kg	A-T-024s
Lead$_D^{M\#}$	218								mg/kg	A-T-024s
Mercury$_D$	0.37								mg/kg	A-T-024s
Nickel$_D^{M\#}$	24								mg/kg	A-T-024s
Selenium$_D$	<1								mg/kg	A-T-024s
Zinc$_D^{M\#}$	70								mg/kg	A-T-024s

Envirolab Job Number: 16/04167

Client Project Name: The Hope Project, Camden

Client Project Ref: 371475

Lab Sample ID	16/04167/1								Units	Method ref
Client Sample No	1									
Client Sample ID	TP7									
Depth to Top	0.35									
Depth To Bottom										
Date Sampled	05-Jul-16									
Sample Type	Soil - ES									
Sample Matrix Code	6A									
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_A^\#$	NAD									A-T-045
Asbestos ACM - Suitable for Water Absorption Test?$_D$	N/A									Gravimetry

Envirolab Job Number: 16/04167

Client Project Name: The Hope Project, Camden

Client Project Ref: 371475

Lab Sample ID	16/04167/1								Units	Method ref
Client Sample No	1									
Client Sample ID	TP7									
Depth to Top	0.35									
Depth To Bottom										
Date Sampled	05-Jul-16									
Sample Type	Soil - ES									
Sample Matrix Code	6A									
PAH 16										
Acenaphthene$_A^{M\#}$	<0.01								mg/kg	A-T-019s
Acenaphthylene$_A^{M\#}$	0.01								mg/kg	A-T-019s
Anthracene$_A^{M\#}$	<0.02								mg/kg	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	<0.04								mg/kg	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	0.09								mg/kg	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	0.12								mg/kg	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	<0.05								mg/kg	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	<0.07								mg/kg	A-T-019s
Chrysene$_A^{M\#}$	<0.06								mg/kg	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	<0.04								mg/kg	A-T-019s
Fluoranthene$_A^{M\#}$	<0.08								mg/kg	A-T-019s
Fluorene$_A^{M\#}$	<0.01								mg/kg	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	0.06								mg/kg	A-T-019s
Naphthalene$_A^{M\#}$	<0.03								mg/kg	A-T-019s
Phenanthrene$_A^{M\#}$	<0.03								mg/kg	A-T-019s
Pyrene$_A^{M\#}$	0.10								mg/kg	A-T-019s
PAH (total 16)$_A^{M\#}$	0.38								mg/kg	A-T-019s
TPH Banded 1 with ID										
>C6-C8$_A^{\#}$	<10								mg/kg	A-T-007s
>C8-C10$_A^{\#}$	<10								mg/kg	A-T-007s
>C10-C12$_A^{\#}$	<10								mg/kg	A-T-007s
>C12-C16$_A^{\#}$	<10								mg/kg	A-T-007s
>C16-C21$_A^{\#}$	<10								mg/kg	A-T-007s
>C21-C40$_A$	<10								mg/kg	A-T-007s
TPH Total (sum of bands) (>C6-C40)$_A$	<10								mg/kg	A-T-007s
TPH ID (for FID characterisations)$_A$	N/A									A-T-007s

REPORT NOTES

Notes - Soil chemical analysis
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones and brick and concrete fragments >10mm are removed or excluded from the sample prior to analysis and reported results corrected to a whole sample basis. For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis.

Notes - General
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All analysis is performed on the dried and crushed sample for samples with Matrix Code 7 and this supersedes any "A" subscripts.
All analysis is performed on the sample as received for soil samples which are positive for asbestos and/or if they are from outside the European Union and this supercedes any "D" subscripts.
Superscript "M" indicates method accredited to MCERTS.
If results are in italic font they are associated with an AQC failure. These are not accredited and are unreliable.
A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

TPH analysis of water by method A-T-007
Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Asbestos in soil
Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if present as discrete fibres/fragments. Stones etc. are not removed from the sample prior to analysis.
Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:
1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.
Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

Secondary Matrix Codes:
A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

IS indicates Insufficient Sample for analysis.
US indicates Unsuitable Sample for analysis.
NDP indicates No Determination Possible.
NAD indicates No Asbestos Detected.
N/A indicates Not Applicable.
Superscript # indicates method accredited to ISO 17025.
Analytical results reflect the quality of the sample at the time of analysis only. Opinions and interpretations expressed are outside the scope of our accreditation.

Please contact us if you need any further information.

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Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 16/04207
Issue Number: 1 **Date:** 20 July, 2016

Client: RSK Environment Ltd Hemel
18 Frogmore Road
Hemel Hempstead
Hertfordshire
UK
HP3 9RT

Project Manager: Claire Siberry/Nigel Austin
Project Name: The Hope Project, Camden
Project Ref: 371475
Order No: N/A
Date Samples Received: 08/07/16
Date Instructions Received: 08/07/16
Date Analysis Completed: 20/07/16

Prepared by:

Kate Ellison
Administrative Assistant

Approved by:

G Walker

Gill Walker
Laboratory Manager

mCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME
UKAS TESTING 1247

Envirolab Job Number: 16/04207

Client Project Name: The Hope Project, Camden

Client Project Ref: 371475

Lab Sample ID	16/04207/1								Units	Method ref
Client Sample No	1									
Client Sample ID	TP13a									
Depth to Top	0.30									
Depth To Bottom										
Date Sampled	06-Jul-16									
Sample Type	Soil - ES									
Sample Matrix Code	5AB									
% Stones >10mm$_A^{\#}$	0.8								% w/w	A-T-044
Organic matter$_D^{M\#}$	0.8								% w/w	A-T-032 OM
Arsenic$_D^{M\#}$	9								mg/kg	A-T-024s
Cadmium$_D^{M\#}$	2.3								mg/kg	A-T-024s
Copper$_D^{M\#}$	25								mg/kg	A-T-024s
Chromium$_D^{M\#}$	33								mg/kg	A-T-024s
Lead$_D^{M\#}$	110								mg/kg	A-T-024s
Mercury$_D$	<0.17								mg/kg	A-T-024s
Nickel$_D^{M\#}$	31								mg/kg	A-T-024s
Selenium$_D$	<1								mg/kg	A-T-024s
Zinc$_D^{M\#}$	62								mg/kg	A-T-024s

Envirolab Job Number: 16/04207

Client Project Name: The Hope Project, Camden

Client Project Ref: 371475

Lab Sample ID	16/04207/1								Units	Method ref
Client Sample No	1									
Client Sample ID	TP13a									
Depth to Top	0.30									
Depth To Bottom										
Date Sampled	06-Jul-16									
Sample Type	Soil - ES									
Sample Matrix Code	5AB									
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_A^\#$	NAD									A-T-045
Asbestos ACM - Suitable for Water Absorption Test?$_D$	N/A									Gravimetry

Envirolab Job Number: 16/04207

Client Project Name: The Hope Project, Camden

Client Project Ref: 371475

Lab Sample ID	16/04207/1								Units	Method ref
Client Sample No	1									
Client Sample ID	TP13a									
Depth to Top	0.30									
Depth To Bottom										
Date Sampled	06-Jul-16									
Sample Type	Soil - ES									
Sample Matrix Code	5AB									
PAH 16										
Acenaphthene$_A^{M\#}$	<0.01								mg/kg	A-T-019s
Acenaphthylene$_A^{M\#}$	<0.01								mg/kg	A-T-019s
Anthracene$_A^{M\#}$	<0.02								mg/kg	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	<0.04								mg/kg	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	<0.04								mg/kg	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	<0.05								mg/kg	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	<0.05								mg/kg	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	<0.07								mg/kg	A-T-019s
Chrysene$_A^{M\#}$	<0.06								mg/kg	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	<0.04								mg/kg	A-T-019s
Fluoranthene$_A^{M\#}$	<0.08								mg/kg	A-T-019s
Fluorene$_A^{M\#}$	<0.01								mg/kg	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	<0.03								mg/kg	A-T-019s
Naphthalene$_A^{M\#}$	<0.03								mg/kg	A-T-019s
Phenanthrene$_A^{M\#}$	<0.03								mg/kg	A-T-019s
Pyrene$_A^{M\#}$	<0.07								mg/kg	A-T-019s
PAH (total 16)$_A^{M\#}$	<0.08								mg/kg	A-T-019s
TPH Banded 1 with ID										
>C6-C8$_A^{\#}$	<10								mg/kg	A-T-007s
>C8-C10$_A^{\#}$	<10								mg/kg	A-T-007s
>C10-C12$_A^{\#}$	<10								mg/kg	A-T-007s
>C12-C16$_A^{\#}$	<10								mg/kg	A-T-007s
>C16-C21$_A^{\#}$	<10								mg/kg	A-T-007s
>C21-C40$_A$	<10								mg/kg	A-T-007s
TPH Total (sum of bands) (>C6-C40)$_A$	<10								mg/kg	A-T-007s
TPH ID (for FID characterisations)$_A$	N/A									A-T-007s

Envirolab Job Number: 16/04207

Client Project Name: The Hope Project, Camden

Client Project Ref: 371475

Lab Sample ID	16/04207/1								Units	Method ref
Client Sample No	1									
Client Sample ID	TP13a									
Depth to Top	0.30									
Depth To Bottom										
Date Sampled	06-Jul-16									
Sample Type	Soil - ES									
Sample Matrix Code	5AB									
VOC										
Dichlorodifluoromethane$_A^\#$	<1								µg/kg	A-T-006s
Chloromethane$_A^\#$	<10								µg/kg	A-T-006s
Vinyl Chloride$_A^\#$	<0.2								µg/kg	A-T-006s
Bromomethane$_A^\#$	<1								µg/kg	A-T-006s
Chloroethane$_A^\#$	<1								µg/kg	A-T-006s
Trichlorofluoromethane$_A^\#$	<1								µg/kg	A-T-006s
1,1-Dichloroethene$_A^\#$	<1								µg/kg	A-T-006s
Carbon Disulphide$_A^\#$	<1								µg/kg	A-T-006s
Dichloromethane $_A$	<5								µg/kg	A-T-006s
trans 1,2-Dichloroethene$_A^\#$	<1								µg/kg	A-T-006s
1,1-Dichloroethane$_A^\#$	<1								µg/kg	A-T-006s
cis 1,2-Dichloroethene$_A^\#$	<1								µg/kg	A-T-006s
2,2-Dichloropropane$_A^\#$	<1								µg/kg	A-T-006s
Bromochloromethane$_A^\#$	<5								µg/kg	A-T-006s
Chloroform$_A^\#$	<1								µg/kg	A-T-006s
1,1,1-Trichloroethane$_A^\#$	<1								µg/kg	A-T-006s
1,1-Dichloropropene$_A^\#$	<1								µg/kg	A-T-006s
Carbon Tetrachloride$_A^\#$	<1								µg/kg	A-T-006s
1,2-Dichloroethane$_A^\#$	<2								µg/kg	A-T-006s
Benzene $_A^\#$	<1								µg/kg	A-T-006s
Trichloroethene$_A^\#$	<1								µg/kg	A-T-006s
1,2-Dichloropropane$_A^\#$	<1								µg/kg	A-T-006s
Dibromomethane$_A^\#$	<1								µg/kg	A-T-006s
Bromodichloromethane$_A^\#$	<10								µg/kg	A-T-006s
cis 1,3-Dichloropropene$_A^\#$	<1								µg/kg	A-T-006s
Toluene $_A^\#$	<1								µg/kg	A-T-006s
trans 1,3-Dichloropropene$_A^\#$	<1								µg/kg	A-T-006s
1,1,2-Trichloroethane$_A^\#$	<1								µg/kg	A-T-006s
1,3-Dichloropropane$_A^\#$	<1								µg/kg	A-T-006s
Tetrachloroethene$_A^\#$	<1								µg/kg	A-T-006s
Dibromochloromethane$_A^\#$	<3								µg/kg	A-T-006s
1,2-Dibromoethane$_A^\#$	<1								µg/kg	A-T-006s

Envirolab Job Number: 16/04207

Client Project Name: The Hope Project, Camden

Client Project Ref: 371475

Lab Sample ID	16/04207/1								Units	Method ref
Client Sample No	1									
Client Sample ID	TP13a									
Depth to Top	0.30									
Depth To Bottom										
Date Sampled	06-Jul-16									
Sample Type	Soil - ES									
Sample Matrix Code	5AB									
Chlorobenzene$_{A}^{\#}$	<1								µg/kg	A-T-006s
1,1,1,2-Tetrachloroethane$_{A}$	<1								µg/kg	A-T-006s
Ethylbenzene$_{A}^{\#}$	<1								µg/kg	A-T-006s
m & p Xylene$_{A}^{\#}$	<1								µg/kg	A-T-006s
o-Xylene$_{A}^{\#}$	<1								µg/kg	A-T-006s
Styrene$_{A}^{\#}$	<1								µg/kg	A-T-006s
Bromoform$_{A}^{\#}$	<1								µg/kg	A-T-006s
Isopropylbenzene$_{A}^{\#}$	<1								µg/kg	A-T-006s
1,1,2,2-Tetrachloroethane$_{A}$	<1								µg/kg	A-T-006s
1,2,3-Trichloropropane$_{A}^{\#}$	<1								µg/kg	A-T-006s
Bromobenzene$_{A}^{\#}$	<1								µg/kg	A-T-006s
n-Propylbenzene$_{A}^{\#}$	<1								µg/kg	A-T-006s
2-Chlorotoluene$_{A}^{\#}$	<1								µg/kg	A-T-006s
1,3,5-Trimethylbenzene$_{A}^{\#}$	<1								µg/kg	A-T-006s
4-Chlorotoluene$_{A}^{\#}$	<1								µg/kg	A-T-006s
tert-Butylbenzene$_{A}^{\#}$	<2								µg/kg	A-T-006s
1,2,4-Trimethylbenzene$_{A}^{\#}$	<1								µg/kg	A-T-006s
sec-Butylbenzene$_{A}^{\#}$	<1								µg/kg	A-T-006s
4-Isopropyltoluene$_{A}^{\#}$	<1								µg/kg	A-T-006s
1,3-Dichlorobenzene$_{A}$	<1								µg/kg	A-T-006s
1,4-Dichlorobenzene$_{A}^{\#}$	<1								µg/kg	A-T-006s
n-Butylbenzene$_{A}^{\#}$	<1								µg/kg	A-T-006s
1,2-Dichlorobenzene$_{A}^{\#}$	<1								µg/kg	A-T-006s
1,2-Dibromo-3-chloropropane$_{A}$	<2								µg/kg	A-T-006s
1,2,4-Trichlorobenzene$_{A}$	<3								µg/kg	A-T-006s
Hexachlorobutadiene$_{A}^{\#}$	<1								µg/kg	A-T-006s
1,2,3-Trichlorobenzene$_{A}$	<3								µg/kg	A-T-006s

REPORT NOTES

Notes - Soil chemical analysis
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones and brick and concrete fragments >10mm are removed or excluded from the sample prior to analysis and reported results corrected to a whole sample basis. For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis.

Notes - General
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Subscript "A" indicates analysis performed on the sample as received. "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve, unless asbestos is found to be present in which case all analysis is performed on the sample as received.
All analysis is performed on the dried and crushed sample for samples with Matrix Code 7 and this supersedes any "A" subscripts.
All analysis is performed on the sample as received for soil samples which are positive for asbestos and/or if they are from outside the European Union and this supercedes any "D" subscripts.
Superscript "M" indicates method accredited to MCERTS.
If results are in italic font they are associated with an AQC failure. These are not accredited and are unreliable.
A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

TPH analysis of water by method A-T-007
Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Asbestos in soil
Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if present as discrete fibres/fragments. Stones etc. are not removed from the sample prior to analysis.
Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:
1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.
Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

Secondary Matrix Codes:
A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

IS indicates Insufficient Sample for analysis.
US indicates Unsuitable Sample for analysis.
NDP indicates No Determination Possible.
NAD indicates No Asbestos Detected.
N/A indicates Not Applicable.
Superscript # indicates method accredited to ISO 17025.
Analytical results reflect the quality of the sample at the time of analysis only. Opinions and interpretations expressed are outside the scope of our accreditation.

Please contact us if you need any further information.

envirolab
Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 16/04246
Issue Number: 1 **Date:** 20 July, 2016

Client: RSK Environment Ltd Hemel
18 Frogmore Road
Hemel Hempstead
Hertfordshire
UK
HP3 9RT

Project Manager: Claire Siberry/Mike McCann/Nigel Austin
Project Name: The Hope Project, Camden
Project Ref: 371475
Order No: N/A
Date Samples Received: 11/07/16
Date Instructions Received: 11/07/16
Date Analysis Completed: 19/07/16

Prepared by:

Kate Ellison
Administrative Assistant

Approved by:

John Gustafson
Director

Envirolab Job Number: 16/04246

Client Project Name: The Hope Project, Camden

Client Project Ref: 371475

Lab Sample ID	16/04246/1								Units	Method ref
Client Sample No	1									
Client Sample ID	TP1									
Depth to Top	0.70									
Depth To Bottom										
Date Sampled	08-Jul-16									
Sample Type	Soil - ES									
Sample Matrix Code	6A									
% Stones >10mm$_A^{\#}$	22.4								% w/w	A-T-044
Arsenic$_D^{M\#}$	16								mg/kg	A-T-024s
Cadmium$_D^{M\#}$	1.9								mg/kg	A-T-024s
Copper$_D^{M\#}$	94								mg/kg	A-T-024s
Chromium$_D^{M\#}$	21								mg/kg	A-T-024s
Lead$_D^{M\#}$	353								mg/kg	A-T-024s
Mercury$_D$	1.14								mg/kg	A-T-024s
Nickel$_D^{M\#}$	24								mg/kg	A-T-024s
Selenium$_D$	<1								mg/kg	A-T-024s
Zinc$_D^{M\#}$	63								mg/kg	A-T-024s

Envirolab Job Number: 16/04246

Client Project Name: The Hope Project, Camden

Client Project Ref: 371475

Lab Sample ID	16/04246/1								Units	Method ref
Client Sample No	1									
Client Sample ID	TP1									
Depth to Top	0.70									
Depth To Bottom										
Date Sampled	08-Jul-16									
Sample Type	Soil - ES									
Sample Matrix Code	6A									
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_A^\#$	NAD									A-T-045
Asbestos ACM - Suitable for Water Absorption Test?$_D$	N/A									Gravimetry

Envirolab Job Number: 16/04246

Client Project Name: The Hope Project, Camden

Client Project Ref: 371475

Lab Sample ID	16/04246/1								Units	Method ref
Client Sample No	1									
Client Sample ID	TP1									
Depth to Top	0.70									
Depth To Bottom										
Date Sampled	08-Jul-16									
Sample Type	Soil - ES									
Sample Matrix Code	6A									
PAH 16										
Acenaphthene$_A^{M\#}$	<0.01								mg/kg	A-T-019s
Acenaphthylene$_A^{M\#}$	<0.01								mg/kg	A-T-019s
Anthracene$_A^{M\#}$	<0.02								mg/kg	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	<0.04								mg/kg	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	<0.04								mg/kg	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	<0.05								mg/kg	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	<0.05								mg/kg	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	<0.07								mg/kg	A-T-019s
Chrysene$_A^{M\#}$	<0.06								mg/kg	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	<0.04								mg/kg	A-T-019s
Fluoranthene$_A^{M\#}$	<0.08								mg/kg	A-T-019s
Fluorene$_A^{M\#}$	<0.01								mg/kg	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	<0.03								mg/kg	A-T-019s
Naphthalene$_A^{M\#}$	<0.03								mg/kg	A-T-019s
Phenanthrene$_A^{M\#}$	<0.03								mg/kg	A-T-019s
Pyrene$_A^{M\#}$	<0.07								mg/kg	A-T-019s
PAH (total 16)$_A^{M\#}$	<0.08								mg/kg	A-T-019s
TPH Banded 1 with ID										
>C6-C8$_A^{\#}$	<10								mg/kg	A-T-007s
>C8-C10$_A^{\#}$	<10								mg/kg	A-T-007s
>C10-C12$_A^{\#}$	<10								mg/kg	A-T-007s
>C12-C16$_A^{\#}$	<10								mg/kg	A-T-007s
>C16-C21$_A^{\#}$	<10								mg/kg	A-T-007s
>C21-C40$_A$	<10								mg/kg	A-T-007s
TPH Total (sum of bands) (>C6-C40)$_A$	<10								mg/kg	A-T-007s
TPH ID (for FID characterisations)$_A$	N/A									A-T-007s

REPORT NOTES

Notes - Soil chemical analysis
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones and brick and concrete fragments >10mm are removed or excluded from the sample prior to analysis and reported results corrected to a whole sample basis. For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis.

Notes - General
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All analysis is performed on the sample as received for soil samples which are positive for asbestos and/or if they are from outside the European Union and this supercedes any "D" subscripts.
Superscript "M" indicates method accredited to MCERTS.
If results are in italic font they are associated with an AQC failure. These are not accredited and are unreliable.
A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

TPH analysis of water by method A-T-007
Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Asbestos in soil
Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if present as discrete fibres/fragments. Stones etc. are not removed from the sample prior to analysis.
Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:
1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.
Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

Secondary Matrix Codes:
A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

IS indicates Insufficient Sample for analysis.
US indicates Unsuitable Sample for analysis.
NDP indicates No Determination Possible.
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N/A indicates Not Applicable.
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Analytical results reflect the quality of the sample at the time of analysis only. Opinions and interpretations expressed are outside the scope of our accreditation.

Please contact us if you need any further information.

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Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 16/04376
Issue Number: 1 **Date:** 27 July, 2016

Client: RSK Environment Ltd Hemel
18 Frogmore Road
Hemel Hempstead
Hertfordshire
UK
HP3 9RT

Project Manager: Claire Siberry/Nigel Austin
Project Name: The Hope Project, Camden
Project Ref: 371475
Order No: N/A
Date Samples Received: 18/07/16
Date Instructions Received: 18/07/16
Date Analysis Completed: 27/07/16

Prepared by:

Danielle Brierley
Administrative Assistant

Approved by:

Iain Haslock
Analytical Consultant

Envirolab Job Number: 16/04376

Client Project Name: The Hope Project, Camden

Client Project Ref: 371475

Lab Sample ID	16/04376/1								Units	Method ref
Client Sample No	1									
Client Sample ID	TP14									
Depth to Top	0.20									
Depth To Bottom										
Date Sampled	11-Jul-16									
Sample Type	Soil - ES									
Sample Matrix Code	6A									
% Stones >10mm$_A^{\#}$	<0.1								% w/w	A-T-044
Arsenic$_D^{M\#}$	9								mg/kg	A-T-024s
Cadmium$_D^{M\#}$	2.1								mg/kg	A-T-024s
Copper$_D^{M\#}$	35								mg/kg	A-T-024s
Chromium$_D^{M\#}$	39								mg/kg	A-T-024s
Lead$_D^{M\#}$	61								mg/kg	A-T-024s
Mercury$_D$	0.31								mg/kg	A-T-024s
Nickel$_D^{M\#}$	35								mg/kg	A-T-024s
Selenium$_D$	<1								mg/kg	A-T-024s
Zinc$_D^{M\#}$	66								mg/kg	A-T-024s

Envirolab Job Number: 16/04376

Client Project Name: The Hope Project, Camden

Client Project Ref: 371475

Lab Sample ID	16/04376/1								Units	Method ref
Client Sample No	1									
Client Sample ID	TP14									
Depth to Top	0.20									
Depth To Bottom										
Date Sampled	11-Jul-16									
Sample Type	Soil - ES									
Sample Matrix Code	6A									
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_A^{\#}$	NAD									A-T-045
Asbestos ACM - Suitable for Water Absorption Test?$_D$	N/A									Gravimetry

Envirolab Job Number: 16/04376

Client Project Name: The Hope Project, Camden

Client Project Ref: 371475

Lab Sample ID	16/04376/1								Units	Method ref
Client Sample No	1									
Client Sample ID	TP14									
Depth to Top	0.20									
Depth To Bottom										
Date Sampled	11-Jul-16									
Sample Type	Soil - ES									
Sample Matrix Code	6A									
PAH 16										
Acenaphthene$_A^{M\#}$	<0.01								mg/kg	A-T-019s
Acenaphthylene$_A^{M\#}$	<0.01								mg/kg	A-T-019s
Anthracene$_A^{M\#}$	<0.02								mg/kg	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	<0.04								mg/kg	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	<0.04								mg/kg	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	<0.05								mg/kg	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	<0.05								mg/kg	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	<0.07								mg/kg	A-T-019s
Chrysene$_A^{M\#}$	<0.06								mg/kg	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	<0.04								mg/kg	A-T-019s
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Pyrene$_A^{M\#}$	<0.07								mg/kg	A-T-019s
PAH (total 16)$_A^{M\#}$	<0.08								mg/kg	A-T-019s
TPH Banded 1 with ID										
>C6-C8$_A^{\#}$	<10								mg/kg	A-T-007s
>C8-C10$_A^{\#}$	<10								mg/kg	A-T-007s
>C10-C12$_A^{\#}$	<10								mg/kg	A-T-007s
>C12-C16$_A^{\#}$	<10								mg/kg	A-T-007s
>C16-C21$_A^{\#}$	<10								mg/kg	A-T-007s
>C21-C40$_A$	<10								mg/kg	A-T-007s
TPH Total (sum of bands) (>C6-C40)$_A$	<10								mg/kg	A-T-007s
TPH ID (for FID characterisations)$_A$	N/A									A-T-007s

REPORT NOTES

Notes - Soil chemical analysis
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones and brick and concrete fragments >10mm are removed or excluded from the sample prior to analysis and reported results corrected to a whole sample basis. For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis.

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Asbestos in soil
Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if present as discrete fibres/fragments. Stones etc. are not removed from the sample prior to analysis.
Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

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1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.
Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

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A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

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N/A indicates Not Applicable.
Superscript # indicates method accredited to ISO 17025.
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Please contact us if you need any further information.

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Units 7 & 8, Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

Final Test Report

Envirolab Job Number:	16/04078		
Issue Number:	1	Date:	16-Aug-16

Client: RSK Environment Ltd Hemel
18 Frogmore Road
Hemel Hempstead
Hertfordshire
UK
HP3 9RT

Project Manager:	Claire Siberry/Nigel Austin
Project Name:	The Hope Project, Camden
Project Ref:	371475
Order No:	N/A
Date Samples Received:	4-Jul-16
Date Instructions Received:	4-Jul-16
Date Analysis Completed:	16-Aug-16

Notes - Soil analysis

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones >10mm are removed or excluded from the sample prior to analysis and reported results corrected to a whole sample basis.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis.

Notes - General

This report shall not be reproduced, except in full, without written approval from Envirolab.

Subscript "A" indicates analysis performed on the sample as received. "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve, unless asbestos is found to be present in which case all analysis is performed on the sample as received.

All analysis is performed on the dried and crushed sample for samples with Matrix Code 7 and this supercedes any "A" subscripts.

All analysis is performed on the sample as received for soil samples from outside the European Union and this supercedes any "D" subscripts

Superscript "M" indicates method accredited to MCERTS.

For complex, multi-compound analysis, quality control results do not always fall within chart limits for every compound and we have criteria for reporting in these situations.

If results are in italic font they are associated with such quality control failures and may be unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid

Predominant Matrix Codes: 1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER.

Samples with Matrix Code 7 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations.

Secondary Matrix Codes: A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

IS indicates Insufficient sample for analysis, NDP indicates No Determination Possible and NAD indicates No Asbestos Detected.

Superscript # indicates method accredited to ISO 17025.

Analytical results reflect the quality of the sample at the time of analysis only. Opinions and interpretations expressed are outside the scope of our accreditation.

Please contact us if you need any further information.

Prepared by:

Melanie Marshall
Laboratory Coordinator

Approved by:

John Gustafson
Director

UKAS TESTING
No. 1247

mCERTS
THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

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Sample Details						Landfill Waste Acceptance Criteria Limits		
Lab Sample ID	Method	ISO17025	MCERTS	16/04078/1				
Client Sample Number				1		Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
Client Sample ID				TP5				
Depth to Top				0.5				
Depth to Bottom								
Date Sampled				30/06/2016				
Sample Type				Soil - ES				
Sample Matrix Code				4A				
Solid Waste Analysis								
pH (pH Units)$_D$	A-T-031	Y	Y	**9.98**		-	>6	-
ANC to pH 4 (mol/kg)$_D$	A-T-ANC	N	N	**1.53**		-	to be evaluated	to be evaluated
ANC to pH 6 (mol/kg)$_D$	A-T-ANC	N	N	**0.2**		-	to be evaluated	to be evaluated
Loss on Ignition (%)$_D$	A-T-030	Y	N	**7.1**		-	-	10
Total Organic Carbon (%)$_D$	A-T-032	Y	Y	**3.4**		3	5	6
PAH Sum of 17 (mg/kg) $_A$	A-T-019	N	N	**0.46**		100	-	-
Mineral Oil (mg/kg)$_A$	A-T-007	N	N	**<10**		500	-	-
Sum of 7 PCBs (mg/kg)$_D$	A-T-004	N	N	**<0.007**		1	-	-
Sum of BTEX (mg/kg)$_A$	A-T-022	N	N	**<0.01**		6	-	-
Eluate Analysis				**10:1** mg/l	**10:1** mg/kg	**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)**		
Arsenic	A-T-025	Y	N	0.017	**0.160**	0.5	2	25
Barium	A-T-025	Y	N	0.013	**0.130**	20	100	300
Cadmium	A-T-025	Y	N	<0.001	**<0.01**	0.04	1	5
Chromium	A-T-025	Y	N	<0.001	**<0.01**	0.5	10	70
Copper	A-T-025	Y	N	0.002	**0.030**	2	50	100
Mercury	A-T-025	Y	N	<0.0001	**<0.001**	0.01	0.2	2
Molybdenum	A-T-025	Y	N	0.003	**0.030**	0.5	10	30
Nickel	A-T-025	Y	N	0.003	**0.030**	0.4	10	40
Lead	A-T-025	Y	N	0.006	**0.060**	0.5	10	50
Antimony	A-T-025	Y	N	0.002	**0.030**	0.06	0.7	5
Selenium	A-T-025	Y	N	<0.001	**<0.01**	0.1	0.5	7
Zinc	A-T-025	Y	N	0.013	**0.130**	4	50	200
Chloride	A-T-026	Y	N	2	**15**	800	15000	25000
Fluoride	A-T-026	Y	N	0.3	**3.0**	10	150	500
Sulphate as SO_4	A-T-026	Y	N	8	**80**	1000	20000	50000
Total Dissolved Solids	A-T-035	N	N	61	**589**	4000	60000	100000
Phenol Index	A-T-050	N	N	<0.01	**<0.1**	1	-	-
Dissolved Organic Carbon	A-T-032	N	N	<0.2	**<200**	500	800	1000
Leach Test Information								
pH (pH Units)	A-T-031	N	Y	6.9				
Conductivity (µS/cm)	A-T-037	N	N	121				
Mass Sample (kg)				0.213				
Dry Matter (%)	A-T-044	N	N	76.9				

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

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Units 7 & 8, Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

Final Test Report

Envirolab Job Number:	16/04246
Issue Number:	1
Date:	16-Aug-16
Client:	RSK Environment Ltd Hemel 18 Frogmore Road Hemel Hempstead Hertfordshire UK HP3 9RT
Project Manager:	Claire Siberry/Mike McCann/Nigel Austin
Project Name:	The Hope Project, Camden
Project Ref:	371475
Order No:	N/A
Date Samples Received:	11-Jul-16
Date Instructions Received:	11-Jul-16
Date Analysis Completed:	16-Aug-16

Notes - Soil analysis

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones >10mm are removed or excluded from the sample prior to analysis and reported results corrected to a whole sample basis.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis.

Notes - General

Subscript "A" indicates analysis performed on the sample as received. "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve, unless asbestos is found to be present in which case all analysis is performed on the sample as received.

All analysis is performed on the dried and crushed sample for samples with Matrix Code 7 and this supercedes any "A" subscripts.

All analysis is performed on the sample as received for soil samples from outside the European Union and this supercedes any "D" subscripts

Superscript "M" indicates method accredited to MCERTS.

For complex, multi-compound analysis, quality control results do not always fall within chart limits for every compound and we have criteria for reporting in these situations.

If results are in italic font they are associated with such quality control failures and may be unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid

Predominant Matrix Codes: 1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER.

Samples with Matrix Code 7 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations.

Secondary Matrix Codes: A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

IS indicates Insufficient sample for analysis, NDP indicates No Determination Possible and NAD indicates No Asbestos Detected.

Superscript # indicates method accredited to ISO 17025.

Analytical results reflect the quality of the sample at the time of analysis only. Opinions and interpretations expressed are outside the scope of our accreditation.

Please contact us if you need any further information.

Prepared by:

MMarshall

Melanie Marshall
Laboratory Coordinator

Approved by:

G Walker

Gill Walker
Laboratory Manager

UKAS TESTING
No. 1247

mCERTS
THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

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Sample Details						Landfill Waste Acceptance Criteria Limits		
Lab Sample ID	Method	ISO17025	MCERTS	16/04246/1				
Client Sample Number				1		Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
Client Sample ID				TP1				
Depth to Top				0.7				
Depth to Bottom								
Date Sampled				08/07/2016				
Sample Type				Soil - ES				
Sample Matrix Code				6A				
Solid Waste Analysis								
pH (pH Units)$_D$	A-T-031	Y	Y	**8.51**		-	>6	-
ANC to pH 4 (mol/kg)$_D$	A-T-ANC	N	N	**0.78**		-	to be evaluated	to be evaluated
ANC to pH 6 (mol/kg)$_D$	A-T-ANC	N	N	**0.1**		-	to be evaluated	to be evaluated
Loss on Ignition (%)$_D$	A-T-030	Y	N	**4.7**		-	-	10
Total Organic Carbon (%)$_D$	A-T-032	Y	Y	**2.86**		3	5	6
PAH Sum of 17 (mg/kg) $_A$	A-T-019	N	N	**<0.08**		100	-	-
Mineral Oil (mg/kg)$_A$	A-T-007	N	N	**<10**		500	-	-
Sum of 7 PCBs (mg/kg)$_D$	A-T-004	N	N	**<0.007**		1	-	-
Sum of BTEX (mg/kg)$_A$	A-T-022	N	N	**<0.01**		6	-	-
Eluate Analysis				**10:1** mg/l	**10:1** mg/kg	**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)**		
Arsenic	A-T-025	Y	N	0.020	**0.160**	0.5	2	25
Barium	A-T-025	Y	N	0.009	**0.060**	20	100	300
Cadmium	A-T-025	Y	N	<0.001	**<0.01**	0.04	1	5
Chromium	A-T-025	Y	N	0.001	**<0.01**	0.5	10	70
Copper	A-T-025	Y	N	0.004	**0.030**	2	50	100
Mercury	A-T-025	Y	N	<0.0001	**<0.001**	0.01	0.2	2
Molybdenum	A-T-025	Y	N	0.002	**0.020**	0.5	10	30
Nickel	A-T-025	Y	N	<0.001	**<0.01**	0.4	10	40
Lead	A-T-025	Y	N	0.008	**0.060**	0.5	10	50
Antimony	A-T-025	Y	N	0.001	**<0.01**	0.06	0.7	5
Selenium	A-T-025	Y	N	<0.001	**<0.01**	0.1	0.5	7
Zinc	A-T-025	Y	N	0.006	**0.050**	4	50	200
Chloride	A-T-026	Y	N	<1.00	**<10**	800	15000	25000
Fluoride	A-T-026	Y	N	0.2	**2.0**	10	150	500
Sulphate as SO_4	A-T-026	Y	N	4	**33**	1000	20000	50000
Total Dissolved Solids	A-T-035	N	N	48	**372**	4000	60000	100000
Phenol Index	A-T-050	N	N	<0.01	**<0.1**	1	-	-
Dissolved Organic Carbon	A-T-032	N	N	<0.2	**<200**	500	800	1000
Leach Test Information								
pH (pH Units)	A-T-031	N	Y	7.4				
Conductivity (µS/cm)	A-T-037	N	N	96				
Mass Sample (kg)				0.171				
Dry Matter (%)	A-T-044	N	N	61.5				

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

APPENDIX L
LABORATORY CERTIFICATES FOR GROUNDWATER ANALYSIS

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Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 16/04872
Issue Number: 1 **Date:** 18 August, 2016

Client: RSK Environment Ltd Hemel
18 Frogmore Road
Hemel Hempstead
Hertfordshire
UK
HP3 9RT

Project Manager: Claire Siberry/Nigel Austin
Project Name: The Hope Project, Camden
Project Ref: 371475
Order No: N/A
Date Samples Received: 08/08/16
Date Instructions Received: 08/08/16
Date Analysis Completed: 18/08/16

Prepared by:

Melanie Marshall
Laboratory Coordinator

Approved by:

Georgia King
Client Service Manager

UKAS TESTING
1247

Envirolab Job Number: 16/04872

Client Project Name: The Hope Project, Camden

Client Project Ref: 371475

Lab Sample ID	16/04872/1								Units	Method ref
Client Sample No	1									
Client Sample ID	WS1									
Depth to Top	0.88									
Depth To Bottom										
Date Sampled	03-Aug-16									
Sample Type	Water - EW									
Sample Matrix Code	N/A									
pH (w)$_A^\#$	6.54								pH	A-T-031w
Sulphate (w)$_A^\#$	2472								mg/l	A-T-026w
Arsenic (dissolved)$_A^\#$	4								µg/l	A-T-025w
Cadmium (dissolved)$_A^\#$	<0.2								µg/l	A-T-025w
Copper (dissolved)$_A^\#$	<1								µg/l	A-T-025w
Chromium (dissolved)$_A^\#$	1								µg/l	A-T-025w
Lead (dissolved)$_A^\#$	<1								µg/l	A-T-025w
Mercury (dissolved)$_A^\#$	<0.1								µg/l	A-T-025w
Nickel (dissolved)$_A^\#$	7								µg/l	A-T-025w
Selenium (dissolved)$_A^\#$	3								µg/l	A-T-025w
Zinc (dissolved)$_A^\#$	<1								µg/l	A-T-025w

Envirolab Job Number: 16/04872

Client Project Name: The Hope Project, Camden

Client Project Ref: 371475

Lab Sample ID	16/04872/1								Units	Method ref
Client Sample No	1									
Client Sample ID	WS1									
Depth to Top	0.88									
Depth To Bottom										
Date Sampled	03-Aug-16									
Sample Type	Water - EW									
Sample Matrix Code	N/A									
PAH 16MS (w)										
Acenaphthene $(w)_A^{\#}$	<0.01								µg/l	A-T-019w
Acenaphthylene $(w)_A^{\#}$	<0.01								µg/l	A-T-019w
Anthracene $(w)_A^{\#}$	<0.01								µg/l	A-T-019w
Benzo(a)anthracene $(w)_A^{\#}$	<0.01								µg/l	A-T-019w
Benzo(a)pyrene $(w)_A^{\#}$	<0.01								µg/l	A-T-019w
Benzo(b)fluoranthene $(w)_A^{\#}$	<0.01								µg/l	A-T-019w
Benzo(ghi)perylene $(w)_A^{\#}$	<0.01								µg/l	A-T-019w
Benzo(k)fluoranthene $(w)_A^{\#}$	<0.01								µg/l	A-T-019w
Chrysene $(w)_A^{\#}$	<0.01								µg/l	A-T-019w
Dibenzo(ah)anthracene $(w)_A^{\#}$	<0.01								µg/l	A-T-019w
Fluoranthene $(w)_A^{\#}$	<0.01								µg/l	A-T-019w
Fluorene $(w)_A^{\#}$	0.01								µg/l	A-T-019w
Indeno(123-cd)pyrene $(w)_A^{\#}$	<0.01								µg/l	A-T-019w
Naphthalene $(w)_A^{\#}$	<0.01								µg/l	A-T-019w
Phenanthrene $(w)_A^{\#}$	0.02								µg/l	A-T-019w
Pyrene $(w)_A^{\#}$	<0.01								µg/l	A-T-019w
PAH (total 16) $(w)_A^{\#}$	0.03								µg/l	A-T-019w

Envirolab Job Number: 16/04872

Client Project Name: The Hope Project, Camden

Client Project Ref: 371475

Lab Sample ID	16/04872/1								Units	Method ref
Client Sample No	1									
Client Sample ID	WS1									
Depth to Top	0.88									
Depth To Bottom										
Date Sampled	03-Aug-16									
Sample Type	Water - EW									
Sample Matrix Code	N/A									
TPH CWG										
Ali >C5-C6 $(w)_A^{\#}$	<2								µg/l	A-T-022w
Ali >C6-C8 $(w)_A^{\#}$	50								µg/l	A-T-022w
Ali >C8-C10 $(w)_A^{\#}$	<1								µg/l	A-T-022w
Ali >C10-C12 $(w)_A^{\#}$	<5								µg/l	A-T-023w
Ali >C12-C16 $(w)_A^{\#}$	<5								µg/l	A-T-023w
Ali >C16-C21 $(w)_A^{\#}$	<5								µg/l	A-T-023w
Ali >C21-C35 $(w)_A^{\#}$	<5								µg/l	A-T-023w
Total Aliphatics $(w)_A$	51								µg/l	A-T-022+23w
Aro >C5-C7 $(w)_A^{\#}$	<1								µg/l	A-T-022w
Aro >C7-C8 $(w)_A^{\#}$	<1								µg/l	A-T-022w
Aro >C8-C9 $(w)_A^{\#}$	<1								µg/l	A-T-022w
Aro >C9-C10 $(w)_A^{\#}$	<1								µg/l	A-T-022w
Aro >C10-C12 $(w)_A^{\#}$	<5								µg/l	A-T-023w
Aro >C12-C16 $(w)_A^{\#}$	<5								µg/l	A-T-023w
Aro >C16-C21 $(w)_A^{\#}$	<5								µg/l	A-T-023w
Aro >C21-C35 $(w)_A^{\#}$	<5								µg/l	A-T-023w
Total Aromatics $(w)_A$	<5								µg/l	A-T-022+23w
TPH (Ali & Aro) $(w)_A$	51								µg/l	A-T-022+23w
BTEX - Benzene $(w)_A^{\#}$	<1								µg/l	A-T-022w
BTEX - Toluene $(w)_A^{\#}$	<1								µg/l	A-T-022w
BTEX - Ethyl Benzene $(w)_A^{\#}$	<1								µg/l	A-T-022w
BTEX - m & p Xylene $(w)_A^{\#}$	<1								µg/l	A-T-022w
BTEX - o Xylene $(w)_A^{\#}$	<1								µg/l	A-T-022w
MTBE $(w)_A^{\#}$	<1								µg/l	A-T-022w

REPORT NOTES

Notes - Soil chemical analysis
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'. For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis.

Notes - General
This report shall not be reproduced, except in full, without written approval from Envirolab.
Subscript "A" indicates analysis performed on the sample as received. "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve, unless asbestos is found to be present in which case all analysis is performed on the sample as received.
All analysis is performed on the dried and crushed sample for samples with Matrix Code 7 and this supersedes any "A" subscripts.
All analysis is performed on the sample as received for soil samples which are positive for asbestos and/or if they are from outside the European Union and this supercedes any "D" subscripts.
Superscript "M" indicates method accredited to MCERTS.
If results are in italic font they are associated with an AQC failure. These are not accredited and are unreliable.
A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

TPH analysis of water by method A-T-007
Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Asbestos in soil
Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if present as discrete fibres/fragments. Stones etc. are not removed from the sample prior to analysis.
Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:
1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.
Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

Secondary Matrix Codes:
A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

IS indicates Insufficient Sample for analysis.
US indicates Unsuitable Sample for analysis.
NDP indicates No Determination Possible.
NAD indicates No Asbestos Detected.
N/A indicates Not Applicable.
Superscript # indicates method accredited to ISO 17025.
Analytical results reflect the quality of the sample at the time of analysis only. Opinions and interpretations expressed are outside the scope of our accreditation.

Please contact us if you need any further information.

APPENDIX M
HUMAN HEALTH GENERIC ASSESSMENT CRITERIA

Generic assessment criteria for human health: commercial scenario

Background

RSK's generic assessment criteria (GAC) were initially prepared following the publication by the Environment Agency (EA) of soil guideline value (SGV) and toxicological (TOX) reports, and associated publications in 2009[1]. RSK GAC were updated following the publication of GAC by LQM/CIEH in 2009[2]. RSK GAC are periodically revised when updated information on toxicological, land use or receptor parameters is published.

Updates to the RSK GAC

In 2014, the publication of Category 4 Screening Levels (C4SL)[3,4], as part of the Defra-funded research project SP1010, included modifications to certain exposure assumptions documented within EA Science Report SC050221/SR3 (herein after referred to as SR3)[5] used in the generation of SGVs.

C4SL were published for six substances (cadmium, arsenic, benzene, benzo(a)pyrene, chromium VI and lead) for a sandy loam soil type with 6% soil organic matter, based on a low level of toxicological concern (LLTC; see Section 2.3 of research project report SP1010[3]). Where a C4SL has been published, the RSK GAC duplicates the C4SL published values using all input parameters within the SP1010 final project report[3] and associated appendices[6], and adopts them as GAC for these six substances.

For all other substances the only C4SL exposure modification relevant to a commercial end use are daily inhalation rates.

The RSK GAC have also been revised with updated toxicology published by LQM/CIEH in 2015[7] or by the USEPA[14], where a C4SL has not been published.

RSK GAC derivation for metals and organic compounds

Model selection

Soil assessment criteria (SAC) were calculated using the Contaminated Land Exposure Assessment (CLEA) tool v1.071, supporting EA guidance[5,8,9] and revised exposure scenarios published for the C4SL[3]. Groundwater assessment criteria (GrAC) protective of human health via the inhalation pathway were derived using the RBCA 2.51 model with the Johnson and Ettinger model for soil and groundwater volatilisation. RSK has updated the inputs within RBCA to reflect EA guidance[1,5,8,9]. The SAC and GrAC collectively are termed GAC.

Pathway selection

In accordance with SR3[5] the commercial scenario considers risks to a female worker who works from the age of 16 to 65 years. It should be noted that this end use is not suitable for a workplace nursery but may be appropriate for a sports centre or shopping centre where children are present. In accordance with Box 3.5, SR3[5] the pathways considered for production of the SAC in the commercial scenario are

- direct soil and dust ingestion
- dermal contact with soil both indoors and outdoors

- indoor air inhalation from soil and vapour and outdoor inhalation of soil and vapour.

The pathway considered in production of the GrAC is the volatilisation of compounds from groundwater and subsequent vapour inhalation by residents while indoors. Figure 2 illustrates this linkage. Although the outdoor air inhalation pathway is also valid, this contributes little to the overall risks owing to the dilution in outdoor air. Within RBCA, the solubility limit of the chemical restricts the extent of volatilisation, which in turn drives the indoor air inhalation pathway. While the same restriction is not built into the CLEA model, the CLEA model output cells are flagged red where the soil saturation limit has been exceeded.

With respect to volatilisation, the CLEA model assumes a simple linear partitioning of a chemical in the soil between the sorbed, dissolved and vapour phase[(9)]. The upper boundaries of this partitioning are represented by the maximum aqueous solubility and pure saturated vapour concentration of the chemical. The CLEA model estimates saturated soil concentrations where these limits are reached[(9)]. The CLEA software uses a traffic light system to identify when individual and/or combined assessment criteria exceed the lower of either the aqueous- or vapour-based soil saturation limits. Model output cells are flagged red where the saturated soil concentration has been exceeded and the contribution of the indoor and outdoor vapour pathway to total exposure is greater than 10%. In this case, further consideration of the following is required[(9)]:

- Free phase contamination may be present.
- Exposure from the vapour pathways will be over-predicted by the model, as in reality the vapour phase concentration will not increase at concentrations above saturation limits
- Where the vapour pathway contribution is greater than 90%, it is unlikely the relevant health criteria value (HCV) will be exceeded at soil concentrations at least a factor of ten higher than the relevant HCV.

Where the vapour pathway is the predominant pathway (contributes greater than 90% of exposure) or the only exposure route considered and the cell is highlighted red (SAC exceeds saturation limit), the risk based on the assumed conceptual model is likely to be negligible as the vapour risk is assumed to be tolerable at maximum possible soil concentrations. In such circumstances, the vapour pathway exposure should be considered based on the presence of free phase or non-aqueous phase liquid sources and the measured concentrations of volatile organic compounds (VOC) in the vapour phase. Screening could be considered based on setting the SAC as the modelled soil saturation limits. However, as stated within the CLEA handbook[(9)], this is likely to not be practical in many cases because of the very low saturation limits and, in any case, is highly conservative.

It should also be noted that for mixtures of compounds, free phase may be present where soil (or groundwater) concentrations are well below saturation limits for individual compounds.

Where the vapour pathway is only one of the exposure pathways considered, an additional approach can then be utilised as detailed within Section 4.12 of the CLEA model handbook[(9)], which explains how to calculate an effective assessment criterion manually.

SR3[(5)] states that, as a general rule of thumb, it is recognised that estimating vapour phase concentrations from dissolved and sorbed phase contamination by petroleum hydrocarbons are at least a factor of ten higher than those likely to be measured on-site. RSK has therefore applied an empirical subsurface to indoor air correction factor of 10 into the CLEA model chemical database and to outputs from the RBCA model for all petroleum hydrocarbon fractions (including

BTEX, trimethylbenzenes and the polycyclic aromatic hydrocarbons (PAH) naphthalene, acenaphthene and acenaphthylene) to reduce this conservatism.

Input selection

The most up-to-date published chemical and toxicological data was obtained from EA Report SC050021/SR7[10], the EA TOX[1] reports, the C4SL SP1010 project report and associated appendices[3,6], the 2015 LQM/CIEH report[7] or the USEPA IRIS database[14]. Where a C4SL has been published, the RSK GAC have duplicated the C4SL published values using all input parameters within the SP1010 final project report[3] and associated appendices[6], and has adopted them as GAC for these six substances. Toxicological and specific chemical parameters for aromatic hydrocarbon C_8–C_9 (styrene), 1,2,4-trimethylbenzene and methyl tertiary-butyl ether (MTBE) were obtained from the CL:AIRE Soil Generic Assessment Criteria report[11].

For TPH, aromatic hydrocarbons C_5–C_8 were not modelled, as this range comprises benzene and toluene, which are modelled separately. The aromatic C_8–C_9 hydrocarbon fraction comprises ethylbenzene, xylene and styrene. As ethylbenzene and xylene are being modelled separately, the physical, chemical and toxicological data for aromatic C_8–C_9 have been taken from styrene.

For the GrAC, the HCV used in the modelling were derived using the toxicological data for the SAC amended as follows:

- An adult weighing 70kg and breathing 15.7m^3 air per day in accordance with the revised exposure parameters used in the SP1010 final project report for the Category 4 Screening Levels (C4SL) (Table 3.2[3]) and USEPA data[12]
- Background inhalation (mean daily intake(MDI)) for an adult (Age Class 17).

Physical parameters

For the commercial end use, the CLEA default pre-1970s three-storey office building was used. SR3[5] notes this commercial building type to be the most conservative in terms of protection from vapour intrusion. The default input building parameters presented in Table 3.10 of SR3[5] have been used.

The parameters for a sandy loam soil type were used in line with Table 4.4 of SR3[5]. This includes a value of 6% for the percentage of soil organic matter (SOM) within the soil. In RSK's experience, this is rather high for many sites. To avoid undertaking site-specific risk assessments for this SOM, RSK has produced an additional set of GAC for SOM of 1% and 2.5% for all substances using the CLEA tool.

For the GrAC, the depth to groundwater was taken as 2.5m based on RSK's experience of assessing the volatilisation pathway from groundwater. The GrAC were produced using the input parameters in Table 3. Inhalation rates have not been updated.

Summary of modifications to the default CLEA SR3[5] input parameters for a commercial land use

In summary, the RSK commercial GAC were produced using the default input parameters for soil properties, the air dispersion model, building properties and the vapour model detailed in SR3[5]. Modifications to the default SR3[5] exposure scenarios based on the C4SL exposure scenarios[3]

are presented in Table 2 below. The sole modification to the default commercial input parameters is the updated inhalation rate.

The final selected GAC are presented by pathway in Table 4 with the combined GAC in Table 5.

Figure 1: Conceptual model for CLEA commercial scenario

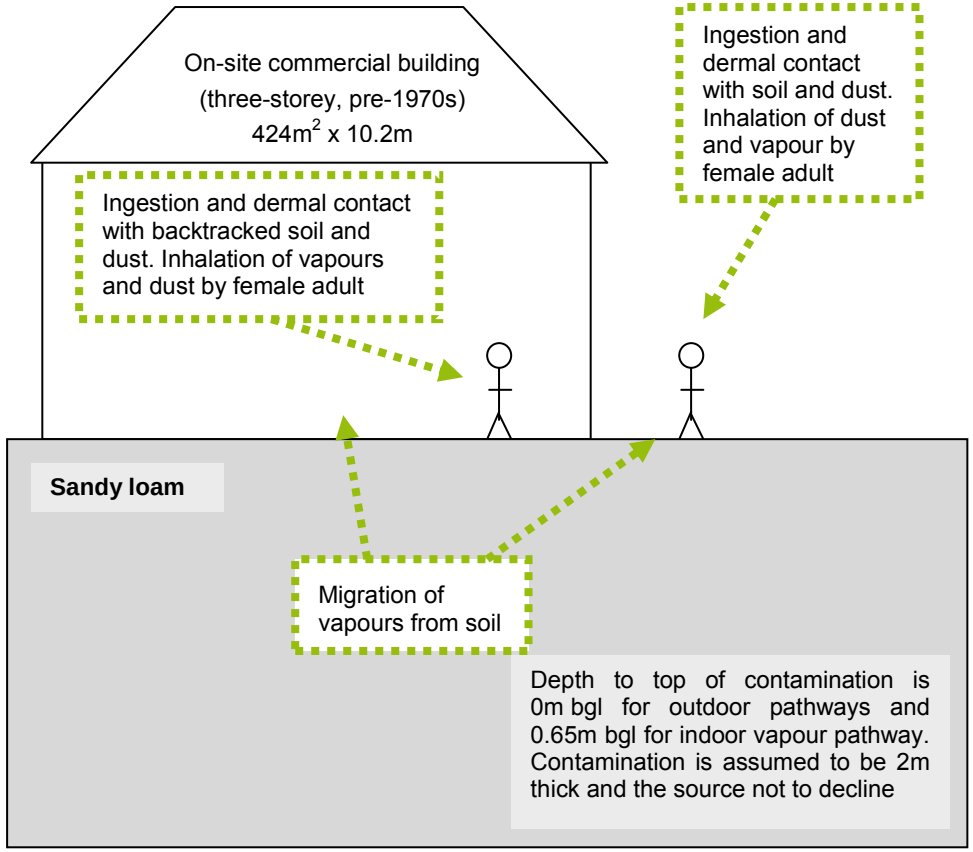

Table 1: Exposure assessment parameters for commercial scenario – inputs for CLEA model

Parameter	Value	Justification
Land use	Commercial	Chosen land use
Receptor	Female worker	Taken as female adult exposed over 49 years from age 16 to 65 years, Box 3.5, SR3[5]
Building	Office (pre-1970)	Key generic assumption given in Box 3.5, SR3[5]. Pre-1970s three-storey office building chosen as it is the most conservative in terms of protection from vapour intrusion (Section 3.4.6, SR3[5])
Soil type	Sandy loam	Most common UK soil type (Section 4.3.1, Table 4.4, SR3[5])
Start age class (AC)	17	AC corresponding to key generic assumption that the critical receptor is a working female adult exposed over a 49-year period from age 16 to 65 years. Assumption given in Box 3.5, SR3[5]
End AC	17	
SOM (%)	6	Representative of sandy loam according to EA guidance note dated January 2009 entitled 'Changes We Have Made to the CLEA Framework Documents'[13]
	1	To provide SAC for sites where SOM < 6% as often observed by RSK
	2.5	
pH	7	Model default

Table 2: Commercial – modified receptor inputs

Parameter	Unit	Value	Justification
Inhalation rate (AC17)	m^3 day^{-1}	15.7	Mean value USEPA, 2011[12]; Table 3.2, SP1010[3]

Figure 2: GrAC conceptual model for RBCA commercial scenario

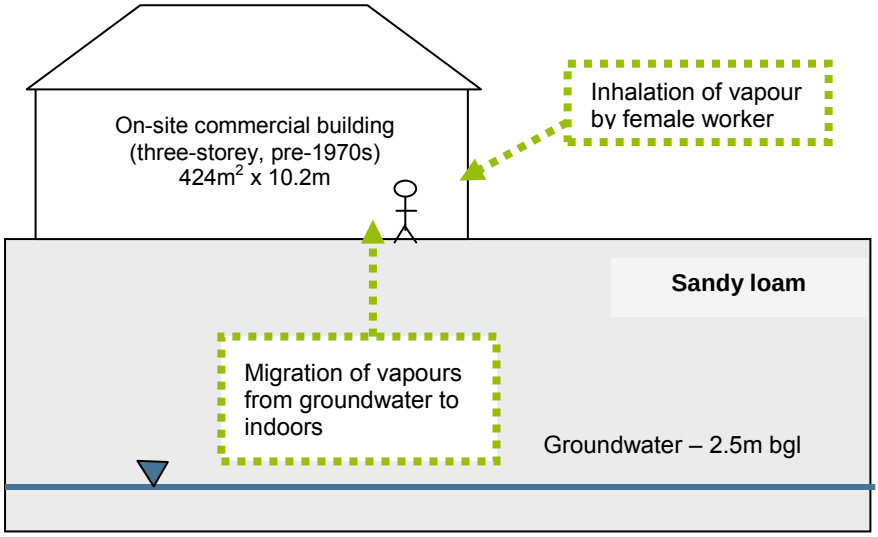

Table 3: Commercial – RBCA inputs

Parameter	Unit	Value	Justification
Receptor			
Averaging time	Years	49	From Box 3.5, SR3[5]
Receptor weight	kg	70	Female adult, Table 4.6, SR3[5]
Exposure duration	Years	49	From Box 3.5, SR3[5]
Exposure frequency	Days/yr	86.25	Weighted using occupancy period of 9 hours per day for 230 days of the year ((9hours x 230 days)/24 hours)
Soil type – sandy loam			
Total porosity	-	0.53	CLEA value for sandy loam. Parameters for sandy loam from Table 4.4, SR3[5]
Volumetric water content	-	0.33	
Volumetric air content	-	0.20	

Parameter	Unit	Value	Justification
Dry bulk density	g cm^{-3} or kg/L	1.21	
Vertical hydraulic conductivity	cm s^{-1}	3.56E-3	CLEA value for saturated conductivity of sandy loam, Table 4.4, SR3[5] equivalent to 307 cm/day
Vapour permeability	m^2	3.05E-12	Calculated for sandy loam using equations in Appendix 1, SR3[5]
Capillary zone thickness	m	0.1	Professional judgement
Building			
Building volume/area ratio	m	9.6	Table 3.10, SR3[5]
Foundation area	m^2	424	Table 3.10, SR3[5]
Foundation perimeter	m	82.40	Based on square root of building area being 20.59m
Building air exchange rate	d^{-1}	24	Table 3.10, SR3[5] Building air exchange rate equivalent to 2.8E-04 s^{-1}
Depth to bottom of foundation slab	m	0.15	
Foundation thickness	m	0.15	Table 3.10, SR3[5]
Foundation crack fraction	-	3.89E-04	Calculated from floor crack area of 0.165m^2 and building footprint of 424m^2 in Table 4.21, SR3[5]
Volumetric water content of cracks	-	0.33	Assumed equal to underlying soil type in assumption that cracks become filled with soil over time. Parameters for sandy loam from Table 4.4, SR3[5]
Volumetric air content of cracks	-	0.2	
Indoor/outdoor differential pressure	Pa	4.4	From Table 3.10, SR3[5] Equivalent to 44 g/cm/s^2

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GENERIC ASSESSMENT CRITERIA FOR HUMAN HEALTH - COMMERCIAL

Table 4

Human health generic assessment criteria by pathway for commercial scenario

Compound	Notes	GrAC (µg/l)	SAC appropriate to pathway SOM 1% (mg/kg)			Soil saturation limit (mg/kg)	SAC appropriate to pathway SOM 2.5% (mg/kg)			Soil saturation limit (mg/kg)	SAC appropriate to pathway SOM 6% (mg/kg)			Soil saturation limit (mg/kg)
			Oral	Inhalation	Combined		Oral	Inhalation	Combined		Oral	Inhalation	Combined	
Metals														
Arsenic	(a,b)	-	6.35E+02	1.25E+03	NR	NR	6.35E+02	1.25E+03	NR	NR	6.35E+02	1.25E+03	NR	NR
Cadmium	(a)	-	7.73E+02	8.57E+02	4.10E+02	NR	7.73E+02	8.57E+02	4.10E+02	NR	7.73E+02	8.57E+02	4.10E+02	NR
Chromium (III) - trivalent	(c)	-	3.31E+05	8.57E+03	NR	NR	3.31E+05	8.57E+03	NR	NR	3.31E+05	8.57E+03	NR	NR
Chromium (VI) - hexavalent	(a,d)	-	9.62E+02	4.91E+01	NR	NR	9.62E+02	4.91E+01	NR	NR	9.62E+02	4.91E+01	NR	NR
Copper		-	1.89E+05	8.96E+04	6.83E+04	NR	1.89E+05	8.96E+04	6.83E+04	NR	1.89E+05	8.96E+04	6.83E+04	NR
Lead	(a)	-	2.32E+03	NR	NR	NR	2.32E+03	NR	NR	NR	2.32E+03	NR	NR	NR
Elemental Mercury (Hg^0)	(d)	5.60E+01	NR	1.54E+01	NR	4.31E+00	NR	3.26E+01	NR	1.07E+01	NR	5.80E+01	NR	2.58E+01
Inorganic Mercury (Hg^{2+})		-	1.18E+03	1.97E+04	1.12E+03	NR	1.18E+03	1.97E+04	1.12E+03	NR	1.18E+03	1.97E+04	1.12E+03	NR
Methyl Mercury (Hg^{4+})		1.00E+05	3.38E+02	2.13E+03	2.92E+02	7.33E+01	3.38E+02	3.87E+03	3.11E+02	1.42E+02	3.38E+02	7.33E+03	3.23E+02	3.04E+02
Nickel	(d)	-	3.06E+03	9.83E+02	NR	NR	3.06E+03	9.83E+02	NR	NR	3.06E+03	9.83E+02	NR	NR
Selenium	(b)	-	1.23E+04	NR	NR	NR	1.23E+04	NR	NR	NR	1.23E+04	NR	NR	NR
Zinc	(b)	-	7.35E+05	1.97E+08	NR	NR	7.35E+05	1.97E+08	NR	NR	7.35E+05	1.97E+08	NR	NR
Cyanide (free)		-	6.56E+02	7.51E+04	6.53E+02	NR	6.56E+02	7.51E+04	6.53E+02	NR	6.56E+02	7.51E+04	6.53E+02	NR
Volatile Organic Compounds														
Benzene	(a)	1.36E+05	1.09E+03	2.79E+01	2.72E+01	1.22E+03	1.09E+03	5.19E+01	4.96E+01	2.26E+03	1.09E+03	1.08E+02	9.80E+01	4.71E+03
Toluene		5.90E+05	4.24E+05	6.49E+04	5.63E+04	8.69E+02	4.24E+05	1.43E+05	1.07E+05	1.92E+03	4.24E+05	3.24E+05	1.84E+05	4.36E+03
Ethylbenzene		1.80E+05	1.91E+05	5.89E+03	5.71E+03	5.18E+02	1.91E+05	1.38E+04	1.28E+04	1.22E+03	1.91E+05	3.21E+04	2.75E+04	2.84E+03
Xylene - m		2.00E+05	3.43E+05	6.26E+03	6.15E+03	6.25E+02	3.43E+05	1.47E+04	1.41E+04	1.47E+03	3.43E+05	3.44E+04	3.12E+04	3.46E+03
Xylene - o		1.73E+05	3.43E+05	6.73E+03	6.60E+03	4.78E+02	3.43E+05	1.57E+04	1.50E+04	1.12E+03	3.43E+05	3.65E+04	3.30E+04	2.62E+03
Xylene - p		2.00E+05	3.43E+05	6.03E+03	5.92E+03	5.76E+02	3.43E+05	1.41E+04	1.36E+04	1.35E+03	3.43E+05	3.28E+04	3.00E+04	3.17E+03
Total xylene		1.73E+05	3.43E+05	6.03E+03	5.92E+03	6.25E+02	3.43E+05	1.41E+04	1.36E+04	1.47E+03	3.43E+05	3.28E+04	3.00E+04	3.46E+03
Methyl tertiary-Butyl ether (MTBE)		4.80E+07	5.72E+05	7.54E+04	6.66E+04	2.04E+04	5.72E+05	1.22E+05	1.01E+05	3.31E+04	5.72E+05	2.31E+05	1.65E+05	6.27E+04
Trichloroethene		3.73E+03	9.53E+02	1.23E+00	1.23E+00	1.54E+03	9.53E+02	2.58E+00	2.57E+00	3.22E+03	9.53E+02	5.72E+00	5.69E+00	7.14E+03
Tetrachloroethene		3.43E+04	1.12E+04	1.86E+01	1.86E+01	4.24E+02	1.12E+04	4.17E+01	4.16E+01	9.51E+02	1.12E+04	9.57E+01	9.49E+01	2.18E+03
1,1,1-Trichloroethane		1.30E+06	1.14E+06	6.60E+02	6.60E+02	1.43E+03	1.14E+06	1.35E+03	1.35E+03	2.92E+03	1.14E+06	2.96E+03	2.95E+03	6.39E+03
1,1,1,2 Tetrachloroethane		1.60E+05	1.10E+04	1.09E+02	1.08E+02	2.60E+03	1.10E+04	2.53E+02	2.47E+02	6.02E+03	1.10E+04	5.88E+02	5.59E+02	1.40E+04
1,1,2,2-Tetrachloroethane		1.63E+05	1.10E+04	2.81E+02	2.74E+02	2.67E+03	1.10E+04	5.75E+02	5.46E+02	5.46E+03	1.10E+04	1.26E+03	1.13E+03	1.20E+04
Carbon Tetrachloride		5.47E+03	7.62E+03	2.87E+00	2.87E+00	1.52E+03	7.62E+03	6.29E+00	6.28E+00	3.32E+03	7.62E+03	1.43E+01	1.42E+01	7.54E+03
1,2-Dichloroethane		5.71E+03	2.29E+02	6.73E-01	6.71E-01	3.41E+03	2.29E+02	9.71E-01	9.67E-01	4.91E+03	2.29E+02	1.67E+00	1.65E+00	8.43E+03
Vinyl Chloride		3.82E+02	2.67E+01	5.95E-02	5.94E-02	1.36E+03	2.67E+01	7.70E-02	7.67E-02	1.76E+03	2.67E+01	1.18E-01	1.17E-01	2.69E+03
1,2,4-Trimethylbenzene		5.59E+04	NR	3.29E+02	NR	4.74E+02	NR	6.41E+02	NR	1.16E+03	NR	1.04E+03	NR	2.76E+03
1,3,5-Trimethylbenzene	(e)	-	NR	NR	NR	2.30E+02	NR	NR	NR	5.52E+02	NR	NR	NR	1.30E+03
Semi-Volatile Organic Compounds														
Acenaphthene		4.11E+03	1.10E+05	2.75E+06	1.06E+05	5.70E+01	1.10E+05	5.36E+06	1.08E+05	1.41E+02	1.10E+05	8.83E+06	1.08E+05	3.36E+02
Acenaphthylene		7.95E+03	1.10E+05	2.68E+06	1.05E+05	8.61E+01	1.10E+05	5.23E+06	1.07E+05	2.12E+02	1.10E+05	8.65E+06	1.08E+05	5.06E+02
Anthracene		-	5.49E+05	1.13E+07	5.23E+05	1.17E+00	5.49E+05	2.35E+07	5.36E+05	2.91E+00	5.49E+05	4.13E+07	5.42E+05	6.96E+00
Benzo(a)anthracene		-	2.84E+02	4.08E+02	1.67E+02	1.71E+00	2.84E+02	4.47E+02	1.74E+02	4.28E+00	2.84E+02	4.67E+02	1.76E+02	1.03E+01
Benzo(b)fluoranthene		-	7.13E+01	1.17E+02	4.43E+01	1.22E+00	7.13E+01	1.20E+02	4.47E+01	3.04E+00	7.13E+01	1.21E+02	4.49E+01	7.29E+00
Benzo(g,h,i)perylene		-	6.29E+03	1.05E+04	3.93E+03	1.54E-02	6.29E+03	1.06E+04	3.95E+03	3.85E-02	6.29E+03	1.07E+04	3.96E+03	9.23E-02
Benzo(k)fluoranthene		-	1.88E+03	3.11E+03	1.17E+03	6.87E-01	1.88E+03	3.17E+03	1.18E+03	1.72E+00	1.88E+03	3.21E+03	1.19E+03	4.12E+00
Chrysene		-	5.67E+02	8.89E+02	3.46E+02	4.40E-01	5.67E+02	9.25E+02	3.52E+02	1.10E+00	5.67E+02	9.47E+02	3.55E+02	2.64E+00
Dibenzo(a,h)anthracene		-	5.67E+00	9.32E+00	3.53E+00	3.93E-03	5.67E+00	9.52E+00	3.55E+00	9.82E-03	5.67E+00	9.64E+00	3.57E+00	2.36E-02
Fluoranthene		-	2.29E+04	1.89E+06	2.26E+04	1.89E+01	2.29E+04	2.72E+06	2.27E+04	4.73E+01	2.29E+04	3.32E+06	2.27E+04	1.13E+02
Fluorene		-	7.31E+04	4.55E+05	6.30E+04	3.09E+01	7.31E+04	1.06E+06	6.84E+04	7.65E+01	7.31E+04	2.24E+06	7.08E+04	1.83E+02
Indeno(1,2,3-cd)pyrene		-	8.10E+02	1.31E+03	5.01E+02	6.13E-02	8.10E+02	1.35E+03	5.06E+02	1.53E-01	8.10E+02	1.37E+03	5.09E+02	3.68E-01
Phenanthrene		-	2.28E+04	5.35E+05	2.19E+04	3.60E+01	2.28E+04	1.09E+06	2.24E+04	8.96E+01	2.28E+04	1.86E+06	2.25E+04	2.14E+02
Pyrene		-	5.49E+04	4.47E+06	5.42E+04	2.20E+00	5.49E+04	6.46E+06	5.44E+04	5.49E+00	5.49E+04	7.91E+06	5.45E+04	1.32E+01
Benzo(a)pyrene	(a)	-	7.68E+01	2.04E+02	5.58E+01	9.11E-01	7.68E+01	2.09E+02	5.61E+01	2.28E+00	7.68E+01	2.11E+02	5.63E+01	5.46E+00
Naphthalene		1.90E+04	3.64E+04	1.87E+03	1.78E+03	7.64E+01	3.64E+04	4.39E+03	3.92E+03	1.83E+02	3.64E+04	9.94E+03	7.81E+03	4.32E+02
Phenol		-	1.10E+06	2.65E+04	2.59E+04	2.42E+04	1.10E+06	3.04E+04	2.96E+04	3.81E+04	1.10E+06	3.46E+04	3.35E+04	7.03E+04

GENERIC ASSESSMENT CRITERIA FOR HUMAN HEALTH - COMMERCIAL

Table 4

Human health generic assessment criteria by pathway for commercial scenario

Compound	Notes	GrAC (µg/l)	SAC appropriate to pathway SOM 1% (mg/kg)			Soil saturation limit (mg/kg)	SAC appropriate to pathway SOM 2.5% (mg/kg)			Soil saturation limit (mg/kg)	SAC appropriate to pathway SOM 6% (mg/kg)			Soil saturation limit (mg/kg)
			Oral	Inhalation	Combined		Oral	Inhalation	Combined		Oral	Inhalation	Combined	
Total petroleum hydrocarbons														
Aliphatic hydrocarbons EC5-EC6		3.59E+04	4.77E+06	3.19E+03	3.19E+03	3.04E+02	4.77E+06	5.86E+03	5.86E+03	5.58E+02	4.77E+06	1.21E+04	1.21E+04	1.15E+03
Aliphatic hydrocarbons >EC6-EC8		5.37E+03	4.77E+06	7.79E+03	7.78E+03	1.44E+02	4.77E+06	1.74E+04	1.74E+04	3.22E+02	4.77E+06	3.97E+04	3.96E+04	7.36E+02
Aliphatic hydrocarbons >EC8-EC10		4.27E+02	9.53E+04	2.02E+03	2.00E+03	7.77E+01	9.53E+04	4.91E+03	4.85E+03	1.90E+02	9.53E+04	1.17E+04	1.13E+04	4.51E+02
Aliphatic hydrocarbons >EC10-EC12		3.39E+01	9.53E+04	9.97E+03	9.69E+03	4.75E+01	9.53E+04	2.47E+04	2.29E+04	1.18E+02	9.53E+04	5.89E+04	4.73E+04	2.83E+02
Aliphatic hydrocarbons >EC12-EC16		7.59E-01	9.53E+04	8.26E+04	5.88E+04	2.37E+01	9.53E+04	2.04E+05	8.17E+04	5.91E+01	9.53E+04	4.81E+05	9.02E+04	1.42E+02
Aliphatic hydrocarbons >EC16-EC35	(b)	-	1.58E+06	NR	NR	8.48E+00	1.75E+06	NR	NR	2.12E+01	1.83E+06	NR	NR	5.09E+01
Aliphatic hydrocarbons >EC35-EC44	(b)	-	1.58E+06	NR	NR	8.48E+00	1.75E+06	NR	NR	2.12E+01	1.83E+06	NR	NR	5.09E+01
Aromatic hydrocarbons >EC8-EC9 (styrene)		2.90E+05	2.29E+04	3.66E+04	1.41E+04	6.26E+02	2.29E+04	8.39E+04	1.80E+04	1.44E+03	2.29E+04	1.93E+05	2.04E+04	3.35E+03
Aromatic hydrocarbons >EC_9-EC_{10}		6.46E+04	3.81E+04	3.55E+03	3.46E+03	6.13E+02	3.81E+04	8.66E+03	8.11E+03	1.50E+03	3.81E+04	2.05E+04	1.70E+04	3.58E+03
Aromatic hydrocarbons >EC10-EC12		2.45E+04	3.81E+04	1.92E+04	1.62E+04	3.64E+02	3.81E+04	4.69E+04	2.79E+04	8.99E+02	3.81E+04	1.10E+05	3.42E+04	2.15E+03
Aromatic hydrocarbons >EC12-EC16		5.75E+03	3.81E+04	2.02E+05	3.62E+04	1.69E+02	3.81E+04	4.76E+05	3.73E+04	4.19E+02	3.81E+04	1.03E+06	3.78E+04	1.00E+03
Aromatic hydrocarbons >EC16-EC21	(b)	-	2.82E+04	NR	NR	5.37E+01	2.83E+04	NR	NR	1.34E+02	2.84E+04	NR	NR	3.21E+02
Aromatic hydrocarbons >EC21-EC35	(b)	-	2.84E+04	NR	NR	4.83E+00	2.84E+04	NR	NR	1.21E+01	2.84E+04	NR	NR	2.90E+01
Aromatic hydrocarbons >EC35-EC44	(b)	-	2.84E+04	NR	NR	4.83E+00	2.84E+04	NR	NR	1.21E+01	2.84E+04	NR	NR	2.90E+01

Notes:

EC - equivalent carbon. GrAC - groundwater screening value. SAC - soil screening value.

The CLEA model output is colour coded depending upon whether the soil saturation limit has been exceeded.

Calculated SAC exceeds soil saturation limit and may significantly affect the interpretation of any exceedances as the contribution of the indoor and outdoor vapour pathway to total exposure is >10%. This shading has also been used for the RBCA output where the theoretical solubility limit has been exceeded.

Calculated SAC exceeds soil saturation limit but the exceedance will not affect the SAC significantly as the contribution of the indoor and outdoor vapour pathway to total exposure is <10%.

Calculated SAC does not exceed the soil saturation limit.

For consistency where the theoretical solubility limit within RBCA has been exceeded in production of the GrAC, these cellls have also been hatched red and the GrAC set at the solubility limit.

The SAC for organic compounds are dependant upon soil organic matter (SOM) (%) content. To obtain SOM from total organic carbon (TOC) (%) divide by 0.58. 1% SOM is 0.58% TOC. DL Rowell Soil Science: Methods and Applications, Longmans, 1994.

SAC for TPH fractions, PAHs napthalene, acenaphthene and acenaphthylene, MTBE, BTEX and trimethylbenzene compounds were produced using an attenuation factor for the indoor air inhalation pathway of 10 to reduce conservatism associated with the vapour inhalation pathway (Section 10.1.1, SR3)

(a) SAC for arsenic, benzene, benzo(a)pyrene, cadmium, chromium VI and lead are derived using the C4SL toxicology data.

(b) SAC for selenium should not include the inhalation pathway as no expert group HCV has been derived; aliphatic and aromatic hydrocarbons >EC16 should not include inhalation pathway due to their non-volatile nature and inhalation exposure being minimal (oral, dermal and inhalation exposure is compared to the oral HCV); arsenic should only be based on oral contribution (rather than combined) owing to the relative small contribution from inhalation in accordance with the SGV report. The Oral SAC should be adopted for zinc and benzo(a)pyrene.

(c) SAC for CrIII should be based on the lower of the oral and inhalation SAC (see LQM/CIEH 2015 Section 6.8)

(d) SAC for elemental mercury, chromium VI and nickel should be based on the inhalation pathway only.

(e) SAC for 1,3,5-trimethylbenzene is not recorded owing to the lack of toxicological data, SAC for 1,2,4 trimethylbenzene may be used.

GENERIC ASSESSMENT CRITERIA FOR HUMAN HEALTH - COMMERCIAL

Table 5
Human Health Generic Assessment Criteria for Commercial Scenario

Compound	GrAC for Groundwater (µg/l)	SAC for Soil SOM 1% (mg/kg)	SAC for Soil SOM 2.5% (mg/kg)	SAC for Soil SOM 6% (mg/kg)
Metals				
Arsenic	-	640	640	640
Cadmium	-	410	410	410
Chromium (III) - trivalent	-	8,600	8,600	8,600
Chromium (VI) - hexavalent	-	49	49	49
Copper	-	68,000	68,000	68,000
Lead	-	2,300	2,300	2,300
Elemental Mercury (Hg^0)	56	15 (4)	33 (11)	58 (26)
Inorganic Mercury (Hg^{2+})	-	1,120	1,120	1,120
Methyl Mercury (Hg^{4+})	100000	290 (73)	310 (142)	320
Nickel	-	980	980	980
Selenium	-	12,000	12,000	12,000
Zinc	-	740,000	740,000	740,000
Cyanide (free)	-	650	650	650
Volatile Organic Compounds				
Benzene	136190	27	50	98
Toluene	590000	56,000 (869)	107,000 (1,916)	184,000 (4,357)
Ethylbenzene	180000	6,000 (518)	13,000 (1,216)	27,000 (2,844)
Xylene - m	200000	6,200 (625)	14,100 (1,474)	31,200 (3,457)
Xylene - o	173000	6,600 (478)	15,000 (1,120)	33,000 (2,618)
Xylene - p	200000	5,900 (576)	13,600 (1,353)	30,000 (3,167)
Total xylene	173000	5,900 (625)	13,600 (1,474)	30,000 (3,457)
Methyl tertiary-Butyl ether (MTBE)	48000000	67,000 (20,400)	101,000 (33,100)	165,000 (62,700)
Trichloroethene	3730	1	3	6
Tetrachloroethene	34310	20	40	90
1,1,1-Trichloroethane	1300000	700	1,300	3,000
1,1,1,2 Tetrachloroethane	160000	110	250	560
1,1,2,2-Tetrachloroethane	162840	270	550	1,130
Carbon Tetrachloride	5470	2.9	6.3	14.2
1,2-Dichloroethane	5710	0.67	0.97	1.65
Vinyl Chloride	382	0.06	0.08	0.12
1,2,4-Trimethylbenzene	55900	330	640	1,040
1,3,5-Trimethylbenzene	-	NR	NR	NR
Semi-Volatile Organic Compounds				
Acenaphthene	4110	110,000	110,000	110,000
Acenaphthylene	7950	110,000	110,000	110,000
Anthracene	-	520,000	540,000	540,000
Benzo(a)anthracene	-	170	170	180
Benzo(b)fluoranthene	-	44	45	45
Benzo(g,h,i)perylene	-	3,900	3,900	4,000
Benzo(k)fluoranthene	-	1,200	1,200	1,200
Chrysene	-	350	350	350
Dibenzo(a,h)anthracene	-	3.5	3.6	3.6
Fluoranthene	-	23,000	23,000	23,000
Fluorene	-	63,000 (31)	68,000	71,000
Indeno(1,2,3-cd)pyrene	-	500	510	510
Phenanthrene	-	22,000	22,000	23,000
Pyrene	-	54,000	54,000	54,000
Benzo(a)pyrene	-	77	77	77
Naphthalene	19000	1,800 (76)	3,900 (183)	7,800 (432)
Phenol	-	440*	690*	1,300*
Total Petroleum Hydrocarbons				
Aliphatic hydrocarbons EC_5-EC_6	35900	3,200 (304)	5,900 (558)	12,100 (1,150)
Aliphatic hydrocarbons >EC_6-EC_8	5370	7,800 (144)	17,400 (322)	39,600 (736)
Aliphatic hydrocarbons >EC_8-EC_{10}	427	2,000 (78)	4,800 (190)	11,300 (451)
Aliphatic hydrocarbons >EC_{10}-EC_{12}	34	9,700 (48)	22,900 (118)	47,300 (283)
Aliphatic hydrocarbons >EC_{12}-EC_{16}	0.759	59,000 (24)	82,000 (59)	90,000 (142)
Aliphatic hydrocarbons >EC_{16}-EC_{35}	-	1,000,000**	1,000,000**	1,000,000**
Aliphatic hydrocarbons >EC_{35}-EC_{44}	-	1,000,000**	1,000,000**	1,000,000**
Aromatic hydrocarbons >EC_8-EC_9 (styrene)	290000	14,000 (626)	18,000 (1,440)	20,000 (3,350)
Aromatic hydrocarbons >EC_9-EC_{10}	64600	3,500 (613)	8,100 (1,503)	17,000 (3,580)
Aromatic hydrocarbons >EC_{10}-EC_{12}	24500	16,000 (364)	28,000 (899)	34,000 (2,150)
Aromatic hydrocarbons >EC_{12}-EC_{16}	5750	36,000 (169)	37,000	38,000
Aromatic hydrocarbons >EC_{16}-EC_{21}	-	28,000	28,000	28,000
Aromatic hydrocarbons >EC_{21}-EC_{35}	-	28,000	28,000	28,000
Aromatic hydrocarbons >EC_{35}-EC_{44}	-	28,000	28,000	28,000

Notes:

'-' Generic assessment criteria not calculated owing to low volatility of substance and therefore no pathway, or an absence of toxicological data.

NR - SAC for 1,3,5-trimethylbenzene is not recorded owing to the lack of toxicological data, SAC for 1,2,4 trimethylbenzene may be used

EC - equivalent carbon. GrAC - groundwater assessment criteria. SAC - soil assessment criteria.

* The GAC for Phenol is based on a threshold which is protective of direct contact (SC050021/Phenol SGV report)

** Denoted SAC calculated exceeds 100% contaminant, hence 100% (1,000,000mg/kg) has been taken as SAC

The SAC for organic compounds are dependent on Soil Organic Matter (SOM) (%) content. To obtain SOM from total organic carbon (TOC) (%) divide by 0.58.
1% SOM is 0.58% TOC. DL Rowell Soil Science: Methods and Applications, Longmans, 1994.

SAC and GrAC for TPH fractions, PAHs napthalene, acenaphthene and acenaphthylene, MTBE, BTEX and trimethylbenzene compounds were produced using an attenuation factor for the indoor air inhalation pathway of 10 to reduce conservatism associated with the vapour inhalation pathway, section 10.1.1, SR3.

(VALUE IN BRACKETS) The SAC has been set as the model calculated SAC with the saturation limit shown in brackets.
RSK has adopted an approach for petroleum hydrocarbons in accordance with LQM/CIEH whereby the concentration modelled for each petroleum hydrocarbon fraction has been tabulated as the SAC with the corresponding solubility or vapour saturation limits given in brackets.

For consistency where the GrAC exceeds the solubility limit, GrAC has been set at the solubility limit. The GrAC is conservative since concentrations of the chemical are very unlikely to be at sufficient concentration to result in an exceedance of the health criteria value at the point of exposure (i.e. indoor air) provided free-phase product is absent.

APPENDIX N
GENERIC ASSESSMENT CRITERIA FOR POTABLE WATER SUPPLY PIPES

A range of pipe materials is available and careful selection, design and installation is required to ensure that water supply pipes are satisfactorily installed and meet the requirements of the Water Supply (Water Fittings) Regulations 1999 in England and Wales, the Byelaws 2000 in Scotland and the Northern Ireland Water Regulations. The regulations include a requirement to use only suitable materials when laying water pipes and laying water pipes without protection is not permitted at contaminated sites. The water supply company has a statutory duty to enforce the regulations.

Contaminants in the ground can pose a risk to human health by permeating potable water supply pipes. To fulfil their statutory obligation, UK water supply companies require robust evidence from developers to demonstrate either that the ground in which new plastic supply pipes will be laid is free from specific contaminants, or that the proposed remedial strategy will mitigate any existing risk. If these requirements cannot be demonstrated to the satisfaction of the relevant water company, it becomes necessary to specify an alternative pipe material on the whole development or in specific zones.

In 2010, UK Water Industry Research (UKWIR) published *Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites* (Report Ref. No. 10/WM/03/21). This report reviewed previously published industry guidelines and threshold concentrations adopted by individual water supply companies.

The focus of the UKWIR research project was to develop clear and concise procedures, which provide consistency in the pipe selection decision process. It was intended to provide guidance that can be used to ensure compliance with current regulations and to prevent water supply pipe failing prematurely due to the presence of contamination.

The report concluded that in most circumstances only organic contaminants pose a potential risk to plastic pipe materials and Table 3.1 of the report provides threshold concentrations for polyethylene (PE) and polyvinyl chloride (PVC) pipes for the organic contaminants of concern. The report also makes recommendations for the procedures to be adopted in the design of site investigations and sampling strategies, and the assessment of data, to ensure that the ground through which water supply pipes will be laid is adequately characterised.

Risks to water supply pipes have therefore been assessed against the threshold concentrations for PE and PVC pipe specified in Table 3.1 of Report 10/WM/03/21, which have been adopted as the GAC for this linkage and are reproduced in Table A3 below.

Since water supply pipes are typically laid at a minimum depth of 0.75m below finished ground levels, sample results from depths between 0.5m and 1.5m below finished level are generally considered suitable for assessing risks to water supply. Samples outside these depths can be used, providing the stratum is the same as that in which water supply pipes are likely to be located. The report specifies that sampling should characterise the ground conditions to a minimum of 0.5m below the proposed depth of the pipe.

It should be noted that the assessment provided in this report is a guide and the method of assessment and recommendations should be checked with the relevant water supply company.

Table A3: Generic assessment criteria for water supply pipes

		Pipe material	
		GAC (mg/kg)	
	Parameter group	**PE**	**PVC**
1	Extended VOC suite by purge and trap or head space and GC-MS with TIC (Not including compounds within group 1a)	0.5	0.125
1a	• BTEX + MTBE	0.1	0.03
2	SVOCs TIC by purge and trap or head space and GC-MS with TIC (aliphatic and aromatic C_5–C_{10}) (Not including compounds within group 2e and 2f)	2	1.4
2e	• Phenols	2	0.4
2f	• Cresols and chlorinated phenols	2	0.04
3	Mineral oil C_{11}–C_{20}	10	Suitable
4	Mineral oil C_{21}–C_{40}	500	Suitable
5	Corrosive (conductivity, redox and pH)	Suitable	Suitable
Specific suite identified as relevant following site investigation			
2a	Ethers	0.5	1
2b	Nitrobenzene	0.5	0.4
2c	Ketones	0.5	0.02
2d	Aldehydes	0.5	0.02
6	Amines	Not suitable	Suitable
Notes: where indicated as 'suitable', the material is considered resistant to permeation or degradation and no threshold concentration has been specified by UKWIR.			

APPENDIX O
COMPARISON OF WATER LABORATORY DATA TO CONTROLLED WATERS GAC

GENERIC ASSESSMENT CRITERIA FOR CONTROLLED WATERS

Protection of the water environment

The water environment in the United Kingdom is protected under a number of regulatory regimes. The relevant environmental regulator is consulted where there may be a risk that pollution of 'controlled waters' may occur or may have occurred in the past.

The term 'controlled waters' refers to coastal waters, inland freshwaters and groundwater. The EU Water Framework Directive (WFD) (2000/60/EC) is implemented via domestic regulations and guidance, covering aspects of groundwater and surface water protection as well as drinking water supply policy. Domestic legislation and guidance will vary across the United Kingdom. Therefore, the relevant legislation for England, Wales, Northern Ireland and Scotland should be reviewed, alongside guidance provided by the Environment Agency (EA), Natural Resource Wales (NRW), the Scottish Environmental Protection Agency (SEPA) or the Northern Ireland Environment Agency (NIEA), as appropriate.

The main objectives of the protection and remediation of groundwater under threat from land contamination are set out in the Environment Agency's Groundwater Protection: Principles and Practice (GP3) guidance document[(1)]. When assessing risks to groundwater the following need to be taken into consideration:

- Where pollutants have not yet entered groundwater, all necessary and reasonable measures must be taken to:
    - ***prevent*** *the input of* ***hazardous*** *substances into groundwater (see description of hazardous substances below)*
    - ***limit*** *the entry of other (non-hazardous) pollutants into groundwater so as to avoid pollution, and to avoid deterioration of the status of groundwater bodies or sustained, upward trends in pollutant concentration.*
- Where hazardous substances or non-hazardous pollutants have already entered groundwater, the priority is to
    - ***minimise*** *further entry of* ***hazardous substances*** *and non-hazardous pollutants into groundwater*
    - *take* ***necessary and reasonable measures*** *to* ***limit the pollution*** *of groundwater or impact on the status of the groundwater body from the future expansion of a contaminant 'plume', if necessary by actively reducing its extent if the economic, social and environmental benefits of doing so outweigh the costs.*

DEFINITIONS AND SUBSTANCE CLASSIFICATIONS

Risks to surface waters:

When assessing risks to surface waters, the following list of definitions should be understood:

Priority substances (PS) are harmful substances originally identified under the Water Framework Directive (WFD) 2000/60/EC as substances 'presenting a significant risk to or via the aquatic environment' at a European level. Member States are required to incorporate the identified **PS** into their country-wide monitoring programmes. There are currently 33 **PS** defined within the Priority Substances Directive (2013/39/EU; Annex 1), with a further 12 additional substances due to come into force from 22 December 2018. Directive 2013/39/EU has been transposed into domestic legislation for England and Wales by The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015.

Under the umbrella of **PS**, there is a sub-set of substances identified as being "hazardous", and these are referred to as **Priority hazardous substances (PHS).** The list of **PHS** is defined at EU level within the Priority Substances Directive (2013/39/EU). The WFD defines hazardous substances as 'substances (or groups of substances) that are toxic, persistent and liable to bio-accumulate, and other substances or groups of substances that give rise to an equivalent level of concern.' There are currently 15 **PHS**, with a further 6 additional substances due to come into force from 22 December 2018.

There is also another group of substances defined at EU level and which are referred to as **other pollutants (OP)** in Directive 2013/39/EU**.** These are additional substances which although not **priority substances**, have EQS which are identical to those laid down in the legislation which applied prior to 13 January 2009 (Directive 2008/105/EU). The **OP** are listed along with the **priority substance (PS)** within the Priority Substances Directive (2013/39/EU),and their associated EQS are also listed therein. There are 6 **OP** defined within the Priority Substances Directive (2013/39/EU).

In addition to the EU level substances, there are also a group of pollutants defined at a Member State level, referred to as **Specific pollutants (SP)**. These substances are pollutants which are released in significant quantities into water bodies in each of the individual European Member States. Under the WFD, Member States are required to set their own EQS for these substances. An indicative list of **SP** is given in Annex VIII of the WFD. Many of the substances categorised as **SP** in the UK were formerly List 2 substances under the old Groundwater Directive (80/68/EEC). The **SP** are defined within Part 2 (Table 1) of The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015.

Risks to groundwater:

When assessing risks to groundwater, the following definitions should be understood:

Under the requirements of the Groundwater Daughter Directive (2006/118/EU), the UK has published a list of substances it considers to be **hazardous substances** with respect to groundwater. In their advisory capacity to the government, this list has been derived by the UK Joint Agencies Groundwater Directive Advisory Group (JAGDAG), of which the Environment Agency is a member. Although currently under review, the existing list of groundwater hazardous substances is largely based on the former List 1 substances which were defined under the (now repealed) Groundwater Directive (80/68/EEC), with the addition of radioactive substances which are also now classed as **hazardous substances**. The JAGDAG list of **hazardous substances** is extensive, and can be found in full at:
http://www.wfduk.org/sites/default/files/Media/Substances%20transferred%20from%20List%20I%20%26%20II%20to%20hazardous%20or%20non%20hazardous.pdf

Given the above classifications**,** any other pollutant which has not been classified as a hazardous substance by JAGDAG**,** is referred to as a **non-hazardous pollutant (NHP).**

Selecting the appropriate assessment criteria

When assessing the risks to controlled waters, various assessment criteria apply, depending on the nature of the assessment and the conceptual site model.

Where a surface water body is involved, then Environmental Quality Standards (EQS) are the relevant assessment criteria as they are designed to be protective of surface water ecology.

Where a public water supply or a Principal aquifer is involved, then the standards defined in The Water Supply (Water Quality) Regulations[(2)] are the primary source of assessment criteria. The Private Water Supplies Regulations[(3)] may also be applicable in some cases. For instances where there are no UK assessment criteria, then the World Health Organisation (WHO) drinking water guidelines[(4)] may be used.

This appendix presents the generic assessment criteria (GAC) that RSK considers suitable for assessing risks to controlled waters for our most commonly encountered determinants. A full list of EQS for England and Wales are included in The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015.

The RSK GAC for controlled waters are presented in **Table 1**. In line with the Environment Agency's Remedial Targets Methodology, the GAC for controlled waters are termed 'target concentrations'.

The appropriate target concentrations should be selected with consideration to:

- the site conceptual model (i.e. the receptor at potential risk);
- whether the substance is already present in groundwater at the site;
- whether or not the substance is classified as a priority hazardous substance under the Priority Substances Directive (2013/39/EC) (see above), or as a hazardous substance according to the current list of JAGDAG determinations[(5)]; and
- background concentrations in the aquifer (if applicable).

It is important to remember that the WFD and GP3[(1)] guidance allow a risk-based and a cost-benefit approach to be applied to groundwater contamination. Exceedance of any target concentration does not necessarily imply that an unacceptable risk exists or that remediation is required either on a technical or cost-benefit basis.

Table 1: Target concentrations for controlled waters

Target concentrations shaded in green are statutory values	Target concentrations shaded in orange are non-statutory values

Note: Units µg/l throughout

Substance classification		Determinant	Target concentrations (µg/l)			
Groundwater receptors[5]	Surface water receptors[6]		Minimum reporting value	UK drinking water standard (or best equivalent)	EQS or best equivalent	
					Freshwater	Transitional (estuaries) and coastal waters
Metals & other inorganics						
-	Specific pollutant	Arsenic	-	10[2]	50[6a]	25[6a]
Hazardous substance	Priority substance	Cadmium	0.1[7]	5[2]	≤0.08, 0.08, 0.09, 0.15, 0.25 [6b]	0.2[6a]
-	-	Chromium (total)	-	50[2]	Sum values for chromium III and VI	
-	Specific pollutant	Chromium (III)	-	Use value for total chromium	4.7[6a]	-
-	Specific pollutant	Chromium (VI)			3.4[6a]	0.6[6a]
-	Specific pollutant	Copper	-	2,000[2]	1 bioavailable[6a]	3.76 dissolved, where DOC ≤1mg/l[6a]
						3.76µg/l + (2.677µg/l x ((DOC/2) – 0.5µg/l)) dissolved, where DOC >1mg/l[6a]