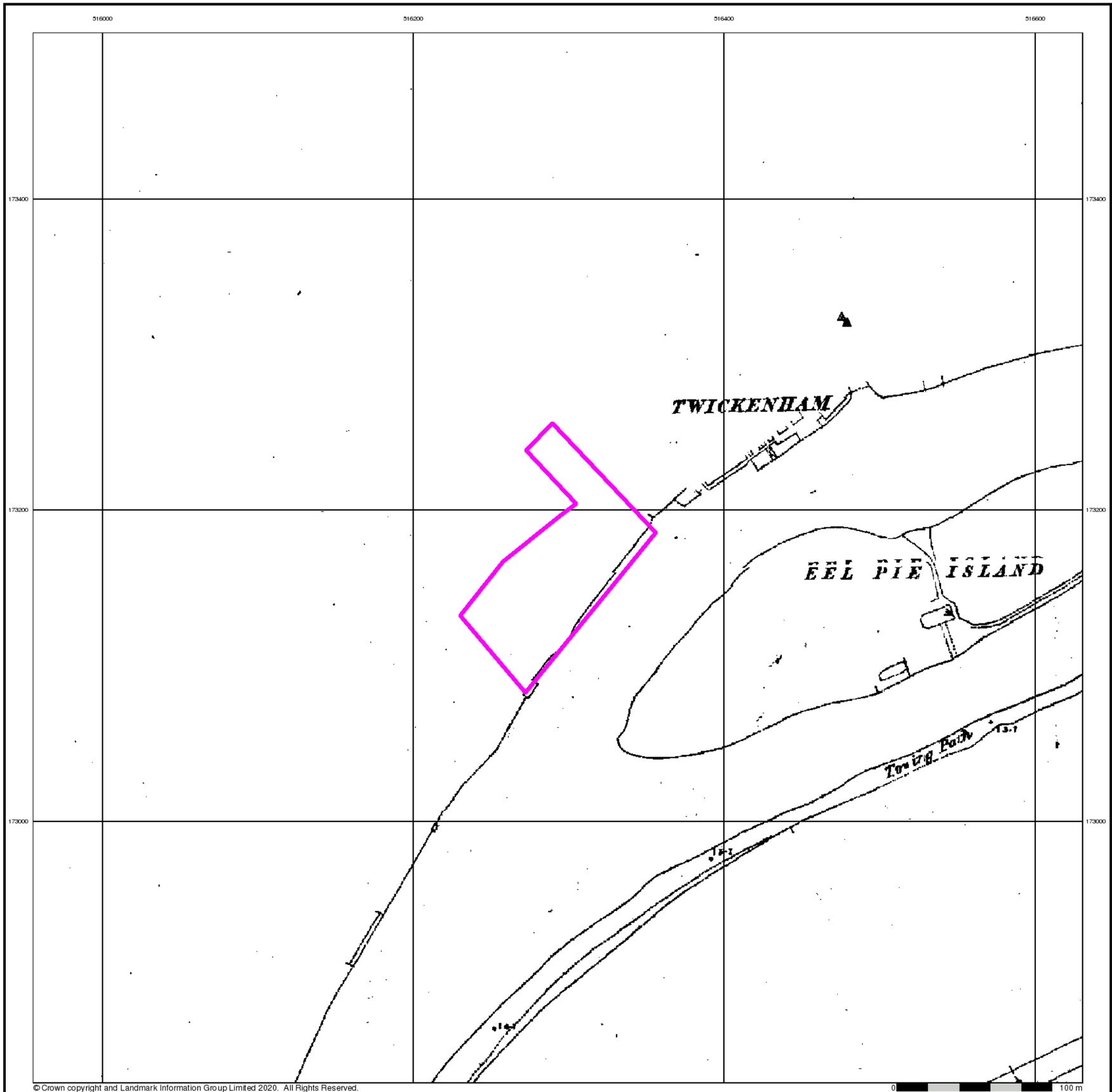


Envirocheck®

LANDMARK INFORMATION GROUP®

London

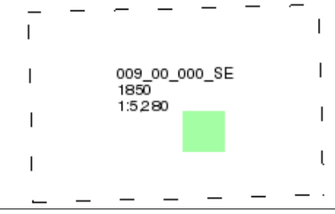
Published 1850

Source map scale - 1:5,280

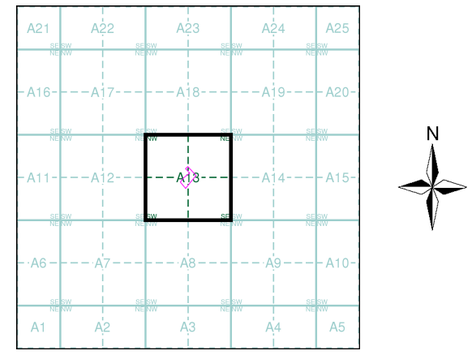
The historical town plans shown derive from Ordnance Survey mapping from the early to mid 1850s. The 1:2640 scale was introduced in the early 1850s, to survey districts covered by the Local Boards of Health and for a map of the Osborne Estate of Queen Victoria. The general style is similar to that of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

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

Map Name(s) and Date(s)



Historical Town Plan - Segment A13



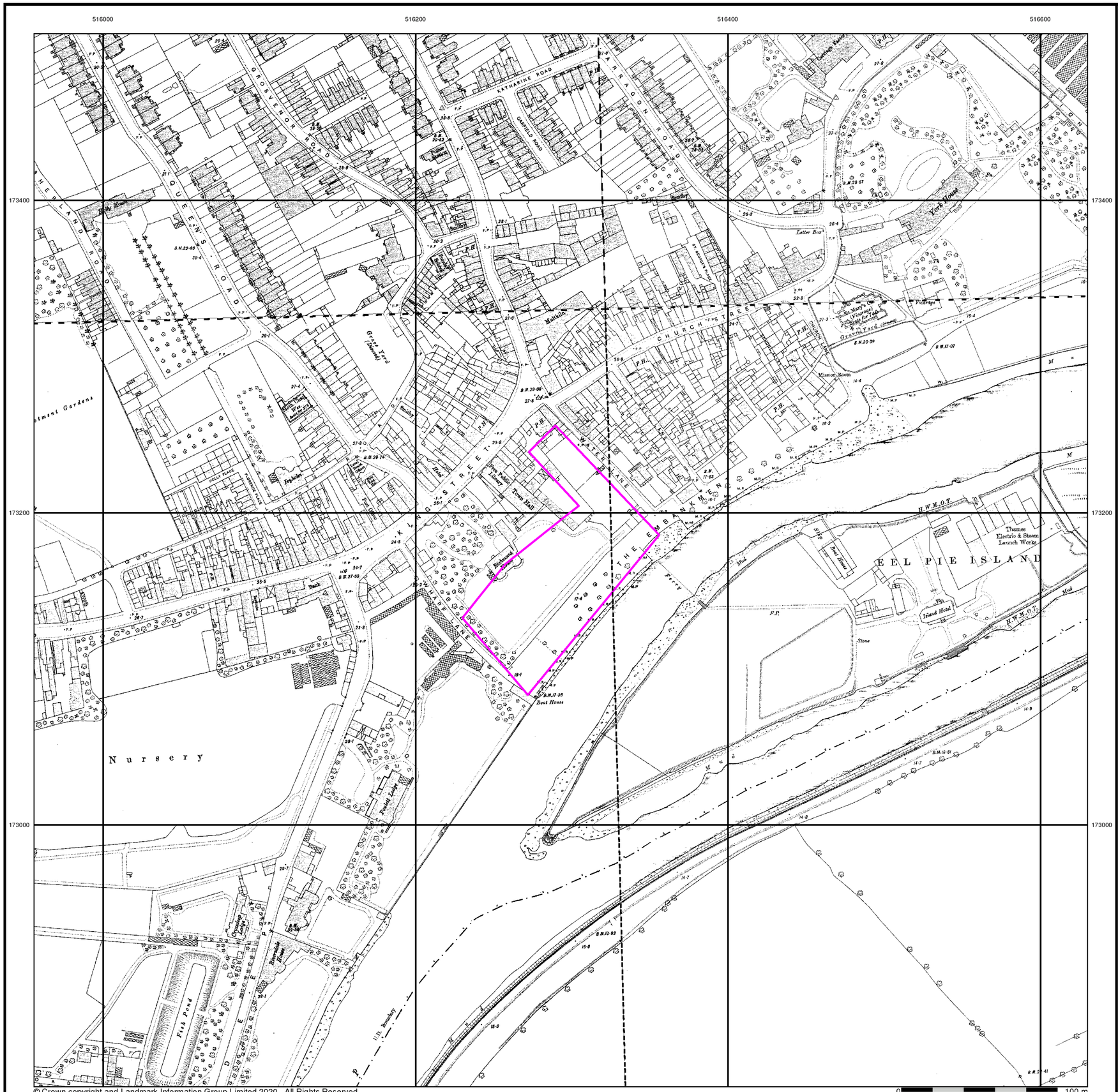
Order Details

Order Number:	253856302_1_1
Customer Ref:	4955,GI
National Grid Reference:	516290, 173170
Slice:	A
Site Area (Ha):	0.89
Search Buffer (m):	0

Site Details

Diamond Jubilee Gardens site, Twickenham Riverside, off Wharf Lane, TWICKENHAM, TW1 4QH

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



Envirocheck®

LANDMARK INFORMATION GROUP®

London

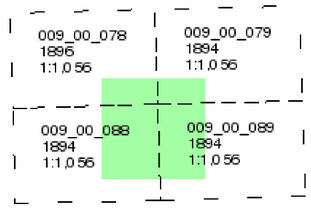
Published 1894 - 1896

Source map scale - 1:1,056

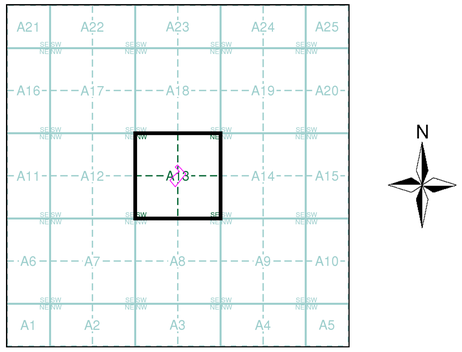
The 1:1056 scale of Ordnance Survey mapping was adopted from Ireland in 1848 and was used to survey towns with a population of over 4000, plus county towns of lesser population, in those counties mapped at the six-inch scale in 1841-55. The scale was the largest scale at which London was mapped by the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

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

Map Name(s) and Date(s)



Historical Town Plan - Segment A13



Order Details

Order Number:	253856302_1_1
Customer Ref:	4955,GI
National Grid Reference:	516290, 173170
Slice:	A
Site Area (Ha):	0.89
Search Buffer (m):	0

Site Details

Diamond Jubilee Gardens site, Twickenham Riverside, off Wharf Lane, TWICKENHAM, TW1 4QH

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CLIENT: LB of Richmond Upon Thames	PROJECT: Twickenham Riverside	GROUND LEVEL 8.1m	HOLE No. BH01
LOGGED BY: DT FIELDWORK BY: DTX TEMPLATE REF: GEL AGS BH BETA CHECKED BY: JD DATE: 10/11/2020	EXCAVATION METHOD: Cable Percussion (shell and auger) 200mm cased from 0.0 to 10.0m 150mm cased from 10.0 to 25.0m	Grid Reference: DATES 24/08/2020 - 25/08/2020	SHEET 1 OF 3 PROJECT NO. 4955,SI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²	Additional Tests and Notes
				MADE GROUND (Dark brown and grey, speckled orange, gravelly clayey SAND (fine to medium). Gravel is fine to coarse angular to subangular flint and brick; rare concrete and brick cobbles)			0.00													Hand dug starter pit from ground level to 1.2m
									1.20	D	1	1 1 1 0 1 2	4							
				Dark yellow-ish and orange-brown gravelly fine to medium SAND. Gravel is fine to coarse subangular to rounded flint and chert			1.70		2.00	D	2	1 0 1 1 4 4	10							
									3.00	D	3	2 4 5 10 10 14	39							
									4.00	D	4	1 2 5 6 6 6	23							
				Brown silty CLAY			5.50		5.00	D	5	1 1 2 2 3 2	9							
				Stiff to very stiff grey silty fissured CLAY			5.60		5.00-5.40	B	6									
									6.00	D	7	1 1 1 2 5 6	14							
									7.50	U100 U100	8 9									
									9.00	D	10	1 3 2 5 6 6	19							

*WATER ▼ Standing water level ▽ Water strikes

PIEZOMETER Upper seal, Response zone, Lower seal

SAMPLE AND TEST KEY

D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample

S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

Geosphere Environmental Ltd
Unit 11 Brightwell Barns
Brightwell, Ipswich, IP10 0BJ
Telephone: 01603 298 076

HOLE No. BH01 | SHEET 1 OF 3 | PROJECT No. 4955,SI

GEL AGS BH BETA 4955,SI TWICKENHAM RIVERSIDE.GPJ GINT STD AGS 3 1.GDT 13/11/20

CLIENT: LB of Richmond Upon Thames	PROJECT: Twickenham Riverside	GROUND LEVEL 8.1m	HOLE No. BH01
LOGGED BY: DT FIELDWORK BY: DTX TEMPLATE REF: GEL AGS BH BETA CHECKED BY: JD DATE: 10/11/2020	EXCAVATION METHOD: Cable Percussion (shell and auger) 200mm cased from 0.0 to 10.0m 150mm cased from 10.0 to 25.0m	Grid Reference: DATES 24/08/2020 - 25/08/2020	SHEET 2 OF 3 PROJECT NO. 4955,SI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²	Additional Tests and Notes
				Stiff to very stiff grey silty fissured CLAY *(continued)*					10.50	U100	11									
									10.50-11.00	B	12									
									12.00	D	13	4 3 5 8 7 8	28							
									13.50	U100	14									
										U100	15									
									15.00	D	16	3 5 4 6 8 8	26							
									16.50	U100	17									
										U100	18									
									18.00	D	19	3 4 8 8 8 9	33							
									19.50	U100	20									
										U100	21									

*WATER ▼ Standing water level ▽ Water strikes

PIEZOMETER Upper seal / Response zone / Lower seal

SAMPLE AND TEST KEY
D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample
S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

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HOLE No. BH01 | SHEET 2 OF 3 | PROJECT No. 4955,SI

GEL AGS BH BETA 4955,SI TWICKENHAM RIVERSIDE.GPJ GINT STD AGS 3 1.GDT 13/11/20

CLIENT: LB of Richmond Upon Thames	PROJECT: Twickenham Riverside	GROUND LEVEL 8.1m	HOLE No. BH01
LOGGED BY: DT FIELDWORK BY: DTX TEMPLATE REF: GEL AGS BH BETA CHECKED BY: JD DATE: 10/11/2020	EXCAVATION METHOD: Cable Percussion (shell and auger) 200mm cased from 0.0 to 10.0m 150mm cased from 10.0 to 25.0m	Grid Reference: DATES 24/08/2020 - 25/08/2020	SHEET 3 OF 3 PROJECT NO. 4955,SI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²	Additional Tests and Notes
				Stiff to very stiff grey silty fissured CLAY *(continued)*																
				20.80 - 20.90 Claystone band or fragment					20.80	D	22									
									21.00	D	23	2 4 3 9 8 10	30							
									22.50	D	24	4 3 4 8 9 11	32							
									24.00	U100	25									
										U100	26									
							25.00		25.00	D	27									Borehole completed at 25.0m

*WATER ▼ Standing water level ▽ Water strikes

PIEZOMETER Upper seal / Response zone / Lower seal

SAMPLE AND TEST KEY
- D Small disturbed sample
- B Bulk disturbed sample
- U Undisturbed sample
- P Piston sample
- J Disturbed jar sample
- ES Environmental soil sample
- W Water Sample
- S Standard penetration test
- C Cone penetration test
- K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count

SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating

<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

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HOLE No. BH01 | SHEET 3 OF 3 | PROJECT No. 4955,SI

GEL AGS BH BETA 4955,SI TWICKENHAM RIVERSIDE.GPJ GINT STD AGS 3 1.GDT 13/11/20

CLIENT: LB of Richmond Upon Thames	PROJECT: Twickenham Riverside	GROUND LEVEL m	HOLE No. BH01A
LOGGED BY: PC FIELDWORK BY: DTX TEMPLATE REF: GEL AGS BH BETA CHECKED BY: JD DATE: 10/11/2020	EXCAVATION METHOD: Hand Pit Uncased to 1.0 m	Grid Reference: DATES 24/08/2020 -	SHEET 1 OF 1 PROJECT NO. 4955,SI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²	Additional Tests and Notes
				MADE GROUND: Paving slab underlain by orange and brown gravelly sand			0.00													
				MADE GROUND: Brown, speckled grey, orange and black, silty very gravelly SAND; gravel is fine to coarse angular to subrounded brick, mortar / masonry, flint, chert and occasional concrete. Occasional angular cobbles of brick and concrete			0.12		0.20- 0.80	D J	1 1									
				0.12 - 0.18 Many roots and rootlets 0.25 Orange plastic mesh layer																
				Ceramic pipe encountered at base of pit. Hand dug pit terminated and alternative drilling location (BH1B) attempted			1.00													Hand dug starter pit terminated at 1.0m due to ceramic pipe

*WATER ▼ Standing water level ▽ Water strikes

PIEZOMETER Upper seal / Response zone / Lower seal

SAMPLE AND TEST KEY
D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample
S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

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Telephone: 01603 298 076

HOLE No. BH01A | SHEET 1 OF 1 | PROJECT No. 4955,SI

GEL AGS BH BETA 4955,SI TWICKENHAM RIVERSIDE.GPJ GINT STD AGS 3 1.GDT 13/11/20

CLIENT: LB of Richmond Upon Thames	PROJECT: Twickenham Riverside	GROUND LEVEL m	HOLE No. BH01B
LOGGED BY: PC FIELDWORK BY: DTX TEMPLATE REF: GEL AGS BH BETA CHECKED BY: JD DATE: 10/11/2020	EXCAVATION METHOD: Hand Pit Uncased to 1.0 m	Grid Reference: DATES 24/08/2020 -	SHEET 1 OF 1 PROJECT NO. 4955,SI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²	Additional Tests and Notes
				MADE GROUND: Paving slab underlain by orange gravelly sand			0.00													
				MADE GROUND: Brown, speckled grey, orange and black, locally pink, silty very gravelly SAND; gravel is fine to coarse angular to subrounded brick, mortar / masonry, flint, chert and occasional concrete. Occasional angular cobbles of brick and concrete 0.25 Orange plastic mesh layer 0.30 - 0.45 occasional rootlets 0.40 - 1.00 becoming very cobbly: multiple angular brick and concrete cobbles			0.15		0.20- 0.80	D J	1 1								
				Impenetrable blue-painted concrete obstruction encountered at base of pit. Hand dug pit terminated and alternative drilling location (BH1) attempted			1.00												Hand dug starter pit terminated at 1.0m due to obstruction

*WATER ▼ Standing water level ▽ Water strikes PIEZOMETER Upper seal Response zone Lower seal

SAMPLE AND TEST KEY
D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample
S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

Geosphere Environmental Ltd
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HOLE No. BH01B | SHEET 1 OF 1 | PROJECT No. 4955,SI

GEL AGS BH BETA 4955,SI TWICKENHAM RIVERSIDE.GPJ GINT STD AGS 3 1.GDT 13/11/20

CLIENT: LB of Richmond Upon Thames	PROJECT: Twickenham Riverside	GROUND LEVEL m	HOLE No. WS01
LOGGED BY: PC FIELDWORK BY: GEL TEMPLATE REF: GEL AGS BH BETA CHECKED BY: JD DATE: 13/11/2020	EXCAVATION METHOD: Windowless sampler Uncased to 1.0 m	Grid Reference: DATES 27/08/2020 -	SHEET 1 OF 1 PROJECT NO. 4955,SI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²	Additional Tests and Notes
				MADE GROUND (Dark brown silty slightly gravelly organic fine and medium SAND with active roots and plant bulbs. Gravel is fine and medium angular to subrounded flint with brick fragments) (TOPSOIL)			0.00		0											
				MADE GROUND (Brown gravelly fine and medium SAND. Gravel is fine to coarse angular to subrounded flint and red brick) 0.90 With a cobble of brick			0.35													
							1.00		1											Borehole terminated at 1.0m due to refusal

*WATER ▼ Standing water level; ▽ Water strikes

PIEZOMETER: Upper seal; Response zone; Lower seal

SAMPLE AND TEST KEY

D Small disturbed sample; B Bulk disturbed sample; U Undisturbed sample; P Piston sample; J Disturbed jar sample; ES Environmental soil sample; W Water Sample

S Standard penetration test; C Cone penetration test; K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count

SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating

<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

Geosphere Environmental Ltd
Unit 11 Brightwell Barns
Brightwell, Ipswich, IP10 0BJ
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HOLE No. WS01 | SHEET 1 OF 1 | PROJECT No. 4955,SI

GEL AGS BH BETA 4955,SI TWICKENHAM RIVERSIDE.GPJ GINT STD AGS 3 1.GDT 13/11/20

CLIENT: LB of Richmond Upon Thames	PROJECT: Twickenham Riverside	GROUND LEVEL m	HOLE No. WS01A
LOGGED BY: PC FIELDWORK BY: GEL TEMPLATE REF: GEL AGS BH BETA CHECKED BY: JD DATE: 13/11/2020	EXCAVATION METHOD: Windowless sampler Uncased to 1.0 m	Grid Reference: DATES 27/08/2020 -	SHEET 1 OF 1 PROJECT NO. 4955,SI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²	Additional Tests and Notes
				MADE GROUND (Dark brown silty slightly gravelly organic fine and medium SAND with active roots. Gravel is fine and medium angular to subrounded flint with brick fragments) (TOPSOIL)			0.00		0												
									0.20	J	1									
				MADE GROUND (Brown gravelly fine and medium SAND. Gravel is fine to coarse angular to subrounded flint and red brick)			0.35													
									0.60	J	2									
							1.00		1											Borehole terminated at 1.0m due to refusal

*WATER ▼ Standing water level ▽ Water strikes

PIEZOMETER Upper seal / Response zone / Lower seal

SAMPLE AND TEST KEY
- D Small disturbed sample
- B Bulk disturbed sample
- U Undisturbed sample
- P Piston sample
- J Disturbed jar sample
- ES Environmental soil sample
- W Water Sample
- S Standard penetration test
- C Cone penetration test
- K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

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Brightwell, Ipswich, IP10 0BJ
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HOLE No. WS01A | SHEET 1 OF 1 | PROJECT No. 4955,SI

GEL AGS BH BETA 4955,SI TWICKENHAM RIVERSIDE.GPJ GINT STD AGS 3 1.GDT 13/11/20

CLIENT: LB of Richmond Upon Thames	PROJECT: Twickenham Riverside	GROUND LEVEL m	HOLE No. WS01B
LOGGED BY: PC FIELDWORK BY: GEL TEMPLATE REF: GEL AGS BH BETA CHECKED BY: JD DATE: 13/11/2020	EXCAVATION METHOD: Windowless sampler Uncased to 1.0 m	Grid Reference: DATES 27/08/2020 -	SHEET 1 OF 1 PROJECT NO. 4955,SI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²	Additional Tests and Notes
				MADE GROUND (Dark brown silty slightly gravelly organic fine and medium SAND with active roots. Gravel is fine and medium angular to subrounded flint with brick fragments) (TOPSOIL)			0.00		0												
				MADE GROUND (Brown gravelly fine and medium SAND. Gravel is fine to coarse angular to subrounded flint and red brick)			0.35													
							1.00		1											Borehole terminated at 1.0m due to refusal

*WATER ▼ Standing water level ▽ Water strikes

PIEZOMETER Upper seal / Response zone / Lower seal

SAMPLE AND TEST KEY
- D Small disturbed sample
- B Bulk disturbed sample
- U Undisturbed sample
- P Piston sample
- J Disturbed jar sample
- ES Environmental soil sample
- W Water Sample
- S Standard penetration test
- C Cone penetration test
- K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

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Brightwell, Ipswich, IP10 0BJ
Telephone: 01603 298 076

HOLE No. WS01B | SHEET 1 OF 1 | PROJECT No. 4955,SI

GEL AGS BH BETA 4955,SI TWICKENHAM RIVERSIDE.GPJ GINT STD AGS 3 1.GDT 13/11/20

CLIENT: LB of Richmond Upon Thames	PROJECT: Twickenham Riverside	GROUND LEVEL m	HOLE No. WS02
LOGGED BY: PC FIELDWORK BY: GEL TEMPLATE REF: GEL AGS BH BETA CHECKED BY: JD DATE: 13/11/2020	EXCAVATION METHOD: Windowless sampler Uncased to 1.0 m	Grid Reference: DATES 27/08/2020 -	SHEET 1 OF 1 PROJECT NO. 4955,SI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²	Additional Tests and Notes
				Dark brown silty gravelly fine and medium organic SAND with active roots. Gravel is fine to coarse subangular and subrounded flint (TOPSOIL)			0.00		0												
									0.20	J	1									
				MADE GROUND (Brown gravelly fine and medium SAND. Gravel is fine to coarse subangular and subrounded flint with occasional brick and active roots)			0.30														
									0.50	J	2									
				MADE GROUND (Greyish brown sandy GRAVEL of angular to subrounded concrete and flint with occasional brick)			0.65														
							1.00		1											Borehole terminated at 1.0m due to refusal

*WATER ▼ Standing water level ▽ Water strikes

PIEZOMETER Upper seal, Response zone, Lower seal

SAMPLE AND TEST KEY
D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample
S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

Geosphere Environmental Ltd
Unit 11 Brightwell Barns
Brightwell, Ipswich, IP10 0BJ
Telephone: 01603 298 076

HOLE No. WS02 | SHEET 1 OF 1 | PROJECT No. 4955,SI

GEL AGS BH BETA 4955,SI TWICKENHAM RIVERSIDE.GPJ GINT STD AGS 3 1.GDT 13/11/20

CLIENT: LB of Richmond Upon Thames	PROJECT: Twickenham Riverside	GROUND LEVEL m	HOLE No. WS02A
LOGGED BY: PC FIELDWORK BY: GEL TEMPLATE REF: GEL AGS BH BETA CHECKED BY: JD DATE: 13/11/2020	EXCAVATION METHOD: Windowless sampler Uncased to 1.0 m	Grid Reference: DATES 27/08/2020 -	SHEET 1 OF 1 PROJECT NO. 4955,SI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²	Additional Tests and Notes
				Dark brown silty gravelly fine and medium organic SAND with active roots. Gravel is fine to coarse subangular and subrounded flint (TOPSOIL)			0.00		0												
				MADE GROUND (Brown gravelly fine and medium SAND. Gravel is fine to coarse subangular and subrounded flint with occasional brick and active roots)			0.30														
				MADE GROUND (Greyish brown sandy GRAVEL of angular to subrounded concrete and flint with occasional brick)			0.65														
							1.00		1											Borehole terminated at 1.0m due to refusal

*WATER ▼ Standing water level ▽ Water strikes

PIEZOMETER Upper seal / Response zone / Lower seal

SAMPLE AND TEST KEY

D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample
S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

Geosphere Environmental Ltd
Unit 11 Brightwell Barns
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Telephone: 01603 298 076

HOLE No. WS02A | SHEET 1 OF 1 | PROJECT No. 4955,SI

GEL AGS BH BETA 4955,SI TWICKENHAM RIVERSIDE.GPJ GINT STD AGS 3 1.GDT 13/11/20

CLIENT: LB of Richmond Upon Thames	PROJECT: Twickenham Riverside	GROUND LEVEL m	HOLE No. WS02B
LOGGED BY: PC FIELDWORK BY: GEL TEMPLATE REF: GEL AGS BH BETA CHECKED BY: JD DATE: 13/11/2020	EXCAVATION METHOD: Windowless sampler Uncased to 1.0 m	Grid Reference: DATES 27/08/2020 -	SHEET 1 OF 1 PROJECT NO. 4955,SI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²	Additional Tests and Notes
				Dark brown silty gravelly fine and medium organic SAND with active roots. Gravel is fine to coarse subangular and subrounded flint (TOPSOIL)			0.00		0												
				MADE GROUND (Brown gravelly fine and medium SAND. Gravel is fine to coarse subangular and subrounded flint with occasional brick and active roots)			0.30														
				MADE GROUND (Greyish brown sandy GRAVEL of angular to subrounded concrete and flint with occasional brick)			0.65														
							1.00		1											Borehole terminated at 1.0m due to refusal

*WATER ▼ Standing water level ▽ Water strikes

PIEZOMETER Upper seal / Response zone / Lower seal

SAMPLE AND TEST KEY

D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample
S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

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HOLE No. WS02B | SHEET 1 OF 1 | PROJECT No. 4955,SI

GEL AGS BH BETA 4955,SI TWICKENHAM RIVERSIDE.GPJ GINT STD AGS 3 1.GDT 13/11/20

CLIENT: LB of Richmond Upon Thames	PROJECT: Twickenham Riverside	GROUND LEVEL m	HOLE No. WS03
LOGGED BY: PC FIELDWORK BY: GEL TEMPLATE REF: GEL AGS BH BETA CHECKED BY: JD DATE: 13/11/2020	EXCAVATION METHOD: Windowless sampler Uncased to 0.5 m	Grid Reference: DATES 27/08/2020 -	SHEET 1 OF 1 PROJECT NO. 4955,SI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²	Additional Tests and Notes
				MADE GROUND (Brown silty gravelly fine and medium SAND with active roots. Gravel is fine and medium flint and brick fragments.)			0.00		0											
									0.30	J	1									
							0.50													Borehole terminated at 0.5m due to refusal
									1											

*WATER ▼ Standing water level ▽ Water strikes

PIEZOMETER Upper seal / Response zone / Lower seal

SAMPLE AND TEST KEY
D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample
S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

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HOLE No. WS03 | SHEET 1 OF 1 | PROJECT No. 4955,SI

GEL AGS BH BETA 4955,SI TWICKENHAM RIVERSIDE.GPJ GINT STD AGS 3 1.GDT 13/11/20

CLIENT: LB of Richmond Upon Thames	PROJECT: Twickenham Riverside	GROUND LEVEL m	HOLE No. WS03A
LOGGED BY: PC FIELDWORK BY: GEL TEMPLATE REF: GEL AGS BH BETA CHECKED BY: JD DATE: 13/11/2020	EXCAVATION METHOD: Windowless sampler Uncased to 0.5 m	Grid Reference: DATES 27/08/2020 -	SHEET 1 OF 1 PROJECT NO. 4955,SI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²	Additional Tests and Notes
				MADE GROUND (Brown silty gravelly fine and medium SAND with active roots. Gravel is fine and medium flint and brick fragments.)			0.00		0											
							0.50													Borehole terminated at 0.5m due to refusal
									1											

*WATER: Standing water level; Water strikes

PIEZOMETER: Upper seal; Response zone; Lower seal

SAMPLE AND TEST KEY

D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample
S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

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HOLE No. WS03A | SHEET 1 OF 1 | PROJECT No. 4955,SI

GEL AGS BH BETA 4955,SI TWICKENHAM RIVERSIDE.GPJ GINT STD AGS 3 1.GDT 13/11/20

CLIENT: LB of Richmond Upon Thames	PROJECT: Twickenham Riverside	GROUND LEVEL m	HOLE No. WS03B
LOGGED BY: PC FIELDWORK BY: GEL TEMPLATE REF: GEL AGS BH BETA CHECKED BY: JD DATE: 13/11/2020	EXCAVATION METHOD: Windowless sampler Uncased to 0.5 m	Grid Reference: DATES 27/08/2020 -	SHEET 1 OF 1 PROJECT NO. 4955,SI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²	Additional Tests and Notes
				MADE GROUND (Brown silty gravelly fine and medium SAND with active roots. Gravel is fine and medium flint and brick fragments.)			0.00		0											
							0.50													Borehole terminated at 0.5m due to refusal
									1											

*WATER ▼ Standing water level; ▽ Water strikes

PIEZOMETER: Upper seal; Response zone; Lower seal

SAMPLE AND TEST KEY

D Small disturbed sample; B Bulk disturbed sample; U Undisturbed sample; P Piston sample; J Disturbed jar sample; ES Environmental soil sample; W Water Sample

S Standard penetration test; C Cone penetration test; K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count

SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating

<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

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HOLE No. WS03B | SHEET 1 OF 1 | PROJECT No. 4955,SI

GEL AGS BH BETA 4955,SI TWICKENHAM RIVERSIDE.GPJ GINT STD AGS 3 1.GDT 13/11/20

CLIENT: LB of Richmond Upon Thames	PROJECT: Twickenham Riverside	GROUND LEVEL m	HOLE No. WS04
LOGGED BY: PC FIELDWORK BY: GEL TEMPLATE REF: GEL AGS BH BETA CHECKED BY: JD DATE: 13/11/2020	EXCAVATION METHOD: Windowless sampler Uncased to 1.5 m	Grid Reference: DATES 28/08/2020 -	SHEET 1 OF 1 PROJECT NO. 4955,SI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²	Additional Tests and Notes
				MADE GROUND: Grey slightly sandy fine gravel (surfacing to Petanque pitch)			0.00		0											
				MADE GROUND: Brown and grey-brown fine sandy ORGANIC CLAY (TOPSOIL, Imported)			0.10													
				MADE GROUND: Pale brown speckled orange and black silty gravelly SAND. Gravel is fine to coarse subrounded to angular brick, concrete and flint/quartz. 0.70 - 0.71 Orange plastic mesh as layer between soils 0.71 - 0.85 Orange brick boulder or solid foundation in northern side of pit. Pink sandy gravel pocket in eastern side of pit. 1.20 - 1.45 Windowless sample barrel inserted. Penetration to 1.45mbgl only: impenetrable and unidentified obstruction encountered.			0.70		1										
							1.45													Borehole terminated at 1.45m due to obstruction

*WATER ▼ Standing water level ▽ Water strikes

PIEZOMETER Upper seal / Response zone / Lower seal

SAMPLE AND TEST KEY
D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample
S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

Geosphere Environmental Ltd
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HOLE No. WS04 | SHEET 1 OF 1 | PROJECT No. 4955,SI

GEL AGS BH BETA 4955,SI TWICKENHAM RIVERSIDE.GPJ GINT STD AGS 3 1.GDT 13/11/20

CLIENT: LB of Richmond Upon Thames

PROJECT: Twickenham Riverside

GROUND LEVEL 5m

HOLE No. BH02

LOGGED BY: DT
FIELDWORK BY: DTX
TEMPLATE REF: GEL AGS BH BETA

CHECKED BY: JD
DATE: 10/11/2020

EXCAVATION METHOD: Cable Percussion (shell and auger)
200mm cased from 0.0 to 10.5m

Grid Reference:

DATES 26/08/2020 - 27/08/2020

SHEET 1 OF 3

PROJECT NO. 4955,SI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²	Additional Tests and Notes
				MADE GROUND (Flexible surfacing)			0.00													Hand dug starter pit from ground level to 1.2m
				MADE GROUND (Dark brown and grey sandy GRAVEL (type one sub-base))			0.10													
				Dark brown and orange-brown gravelly fine to medium SAND. Gravel is fine to coarse subangular to rounded flint and chert			1.00		1.20	D	1	1 0 1 0 2 1	4							
									2.00	D	2	1 7 6 8 10 10	34							
									3.00	D	3	1 0 1 1 1 2	5							
				Stiff to very stiff grey and dark grey fissured CLAY			3.60		4.00	D	4	2 2 3 4 4 4	15							
									5.00	U100 U100	5 6									
									6.00	D	7	1 2 4 8 5 6	23							
									7.50 7.50- 8.00	U100 U100D B	8 8 9									
									9.00	D	10	1 2 2 5 4 6	17							

*WATER ▼ Standing water level ▽ Water strikes

PIEZOMETER Upper seal, Response zone, Lower seal

SAMPLE AND TEST KEY

D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample

S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

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HOLE No. BH02 | SHEET 1 OF 3 | PROJECT No. 4955,SI

GEL AGS BH BETA 4955,SI TWICKENHAM RIVERSIDE.GPJ GINT STD AGS 3 1.GDT 13/11/20

CLIENT: LB of Richmond Upon Thames	PROJECT: Twickenham Riverside	GROUND LEVEL 5m	HOLE No. BH02
LOGGED BY: DT FIELDWORK BY: DTX TEMPLATE REF: GEL AGS BH BETA CHECKED BY: JD DATE: 10/11/2020	EXCAVATION METHOD: Cable Percussion (shell and auger) 200mm cased from 0.0 to 10.5m	Grid Reference: DATES 26/08/2020 - 27/08/2020	SHEET 2 OF 3 PROJECT NO. 4955,SI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²	Additional Tests and Notes
				Stiff to very stiff grey and dark grey fissured CLAY *(continued)*					10.50	U100 U100	11 12									
									12.00	D	13	2 4 4 6 7 8	25							
									13.50	U100 U100D	14 15									
									15.00	D	16	2 5 4 7 8 9	28							
									16.50	U100 U100D	17 18									
									18.00	D	19	3 5 8 6 10 12	36							
									19.50	U100 U100D	20 21									

*WATER ▼ Standing water level ▽ Water strikes

PIEZOMETER Upper seal / Response zone / Lower seal

SAMPLE AND TEST KEY

D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample
S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

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HOLE No. BH02 | SHEET 2 OF 3 | PROJECT No. 4955,SI

GEL AGS BH BETA 4955,SI TWICKENHAM RIVERSIDE.GPJ GINT STD AGS 3 1.GDT 13/11/20

CLIENT: LB of Richmond Upon Thames	PROJECT: Twickenham Riverside	GROUND LEVEL 5m	HOLE No. BH02
LOGGED BY: DT FIELDWORK BY: DTX TEMPLATE REF: GEL AGS BH BETA CHECKED BY: JD DATE: 10/11/2020	EXCAVATION METHOD: Cable Percussion (shell and auger) 200mm cased from 0.0 to 10.5m	Grid Reference: DATES 26/08/2020 - 27/08/2020	SHEET 3 OF 3 PROJECT NO. 4955,SI

Date/Time and Depth	Depth of Casing	Depth* of Water	Piez.	Description of Strata	Strata: Leg	Strata: Reduced Level	Strata: Depth	Graphical Representation: SPT 'N' Value (0 10 20 30 40)	Sampling/In-Situ Testing: Depths	Type	No.	Blows	SPT N	Laboratory Testing: <425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²	Additional Tests and Notes
				Stiff to very stiff grey and dark grey fissured CLAY *(continued)*					21.00	D	22	3 6 5 9 12 13	39							
									22.50	D	23	4 5 6 8 10 13	37							
									24.00	U100 U100D	24 25									
							25.00		25.00	D	26									Borehole completed at 25.0m

*WATER ▼ Standing water level ▽ Water strikes

PIEZOMETER Upper seal / Response zone / Lower seal

SAMPLE AND TEST KEY

D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample
P Piston sample
J Disturbed jar sample
ES Environmental soil sample
W Water Sample
S Standard penetration test
C Cone penetration test
K Permeability test

Blows SPT blows for each 75mm increment (35) Undisturbed sample blow count
SPT N N = SPT N value (blows after seating) N*120 = Total blows/penetration including seating
<425 Sample % passing 425 micron sieve

DEPTH All depths, level and thicknesses in metres

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HOLE No. BH02 | SHEET 3 OF 3 | PROJECT No. 4955,SI

GEL AGS BH BETA 4955,SI TWICKENHAM RIVERSIDE.GPJ GINT STD AGS 3 1.GDT 13/11/20

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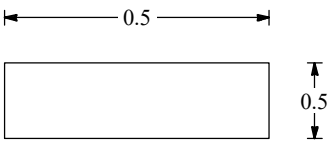
TRIAL PIT LOG

Project	Client	TRIAL PIT No
Twickenham Riverside	LB of Richmond Upon Thames	**HP01**

Job No	Date	Ground Level (m)	Grid Reference ()
4955,SI	25-08-20		

Fieldwork By	Logged By	Sheet
GEL	PC	1 of 1

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.25	MADE GROUND (Dark brown silty gravelly fine and medium SAND. Gravel is fine to coarse subangular to subrounded flint and brick)		0.00-0.25	1WAC	
0.25-1.20	MADE GROUND (Yellowish brown gravelly fine and medium SAND. Gravel is fine to coarse subangular to subrounded flint with occasional brick fragments)		0.25-1.20	2WAC	



Shoring/Support: None
Stability: Stable

All dimensions in metres Scale 1:12.5	Method Hand Pit	Plant Used HAND	Checked By JD

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Telephone: 01603 298 076

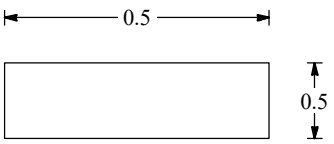
TRIAL PIT LOG

Project	Client	TRIAL PIT No
Twickenham Riverside	LB of Richmond Upon Thames	**HP02**

Job No	Date	Ground Level (m)	Grid Reference ()
4955,SI	25-08-20		

Fieldwork By	Logged By	Sheet
GEL	PC	1 of 1

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.20	MADE GROUND (Flexible surfacing)				
0.20-0.70	MADE GROUND (Brown and yellowish brown very gravelly fine and medium SAND. Gravel is whole and partial red brick, concrete, yellow and purple brick)				
0.70-0.80	CONCRETE (Assumed foundation)				Hand dug pit terminated at 0.8m due to concrete obstruction



Shoring/Support: None
Stability: Stable

All dimensions in metres Scale 1:12.5	Method Hand Pit	Plant Used HAND	Checked By JD

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Brightwell, Ipswich, IP10 0BJ
Telephone: 01603 298 076

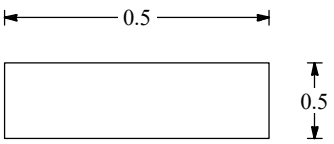
TRIAL PIT LOG

Project	Client	TRIAL PIT No
Twickenham Riverside	LB of Richmond Upon Thames	**HP02A**

Job No	Date	Ground Level (m)	Grid Reference ()
4955,SI	25-08-20		

Fieldwork By	Logged By	Sheet
GEL	PC	1 of 1

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.10	MADE GROUND (Flexible surfacing)				
0.10-0.40	Concrete and brick layer				
0.40-0.80	Brown slightly gravelly sandy CLAY. Gravel is subangular fine and medium flint with active rootlets				Hand dug pit completed at 0.8m



Shoring/Support: None
Stability: Stable

All dimensions in metres Scale 1:12.5	Method Hand Pit	Plant Used HAND	Checked By JD

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Telephone: 01603 298 076

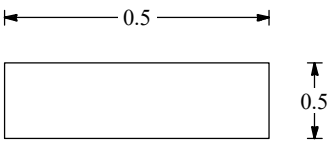
TRIAL PIT LOG

Project	Client	TRIAL PIT No
Twickenham Riverside	LB of Richmond Upon Thames	**HP03**

Job No	Date	Ground Level (m)	Grid Reference ()
4955,SI	28-08-20		

Fieldwork By	Logged By	Sheet
GEL	PC	1 of 1

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.10	MADE GROUND (Asphalt)				
0.10-0.12	CONCRETE with rebar				Hand dug pit terminated due to void



Shoring/Support: None
Stability: Stable

All dimensions in metres Scale 1:12.5	Method Hand Pit	Plant Used HAND	Checked By JD

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Telephone: 01603 298 076

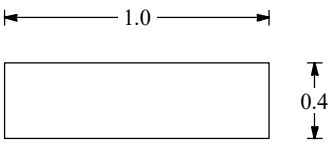
TRIAL PIT LOG

Project	Client	TRIAL PIT No
Twickenham Riverside	LB of Richmond Upon Thames	**TP101**

Job No	Date	Ground Level (m)	Grid Reference ()
4955,SI	26-08-20	8.10	

Fieldwork By	Logged By	Sheet
GEL	PC	1 of 1

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.10	MADE GROUND (Flexible surfacing)				
0.10-0.30	MADE GROUND (Red brick)				
0.30-1.10	MADE GROUND (Dark brown gravelly clayey fine and medium SAND. Gravel is fine to coarse flint and red brick)				
1.10-1.40	Dark yellowish brown gravelly fine and medium SAND				
1.40-2.20	Yellowish brown gravelly fine and medium SAND. Gravel is fine to coarse subangular to rounded flint				Trial pit completed at 2.2m. Infiltration testing undertaken



Shoring/Support: None
Stability: Stable

All dimensions in metres Scale 1:25	Method Trial Pit/trench	Plant Used MECHANICAL EXCAVATOR	Checked By JD

Geosphere Environmental Ltd
Unit 11 Brightwell Barns
Brightwell, Ipswich, IP10 0BJ
Telephone: 01603 298 076

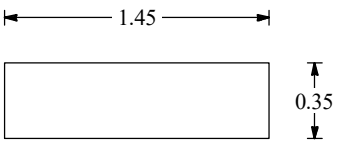
TRIAL PIT LOG

Project	Client	TRIAL PIT No
Twickenham Riverside	LB of Richmond Upon Thames	**TP102**

Job No	Date	Ground Level (m)	Grid Reference ()
4955,SI	26-08-20	7.20	

Fieldwork By	Logged By	Sheet
GEL	PC	1 of 1

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-1.70	MADE GROUND (Dark brown and grey, speckled orange, gravelly clayey SAND (fine to medium). Gravel is fine to coarse angular to subangular flint and brick; rare concrete and brick cobbles)				
1.70-2.30	Dark yellow-ish and orange-brown gravelly fine to medium SAND. Gravel is fine to coarse subangular to rounded flint and chert				Trial pit completed at 2.3m. Infiltration testing undertaken



Shoring/Support: None
Stability: Stable

All dimensions in metres Scale 1:25	Method Trial Pit/trench	Plant Used MECHANICAL EXCAVATOR	Checked By JD

TRIAL PIT INFILTRATION TEST - BRE DIGEST 365

Project Number: 4955,GI

Date: 14/09/2020

Project Name: Diamond Jubilee Gardens/ Twickenham Riverside

Time [min]	Depth to Water [mbgl]
0	1.81
1	1.88
2	1.89
3	1.90
4	1.92
5	1.93
10	1.95
15	1.98
20	2.02
30	2.07
45	2.16
60	2.20

Pit Size [m]		
Length	**Width**	**Depth**
1.45	0.35	2.30

Infiltration Rate Calculations		
Parameter	**Unit**	**Result**
height		
h_{75}	[m]	2.178
h_{25}	[m]	1.933
h_{75}-h_{25}	[m]	0.245
time		
t_{75}	[s]	3000.00
t_{25}	[s]	300.00
t_{75} - t_{25}	[s]	2700.00
effective volume, with gravel allowance		
v_{75-25}	[m^3]	0.124
effective area		
ap_{50}	[m^2]	1.390
soil infiltration rate		
f	[m/s]	3.31E-05

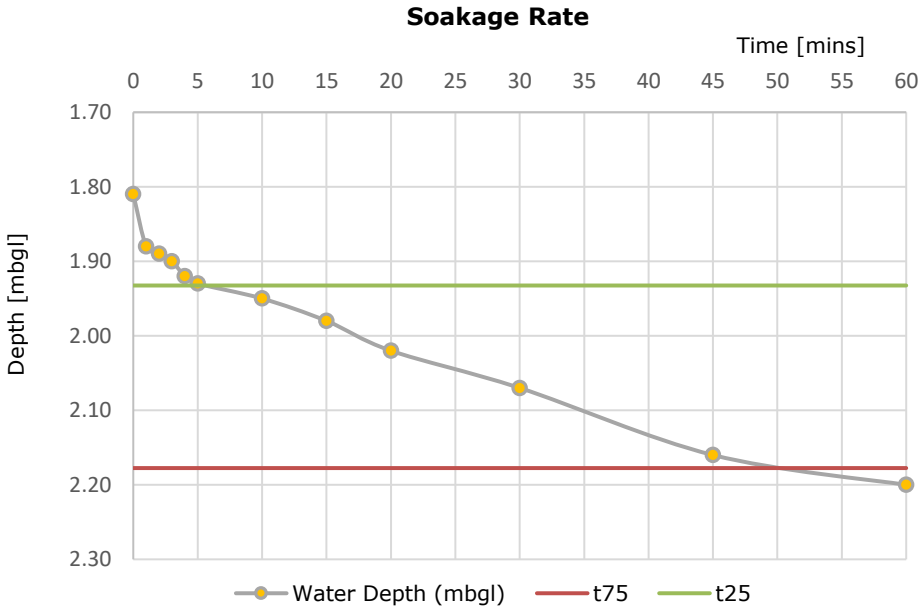
Trial Pit TP/SK101

Run 1 of 3

Test Date 27/08/2020

Groundwater Encountered: N/A

Remarks:



Calculated by JD

Checked by:

TRIAL PIT INFILTRATION TEST - BRE DIGEST 365

Project Number: 4955,GI

Date: 14/09/2020

Project Name: Diamond Jubilee Gardens/ Twickenham Riverside

Time [min]	Depth to Water [mbgl]
0	1.77
1	1.78
2	1.78
3	1.79
4	1.80
5	1.81
10	1.85
15	1.88
20	1.91
30	1.94
45	2.00
60	2.04
75	2.10
90	2.16

Pit Size [m]		
Length	Width	Depth
1.45	0.35	2.26

Infiltration Rate Calculations		
Parameter	Unit	Result
height		
h_{75}	[m]	2.138
h_{25}	[m]	1.893
h_{75}-h_{25}	[m]	0.245
time		
t_{75}	[s]	5040.00
t_{25}	[s]	1020.00
t_{75} - t_{25}	[s]	4020.00
effective volume, with gravel allowance		
v_{75-25}	[m^3]	0.124
effective area		
ap_{50}	[m^2]	1.390
soil infiltration rate		
f	[m/s]	2.23E-05

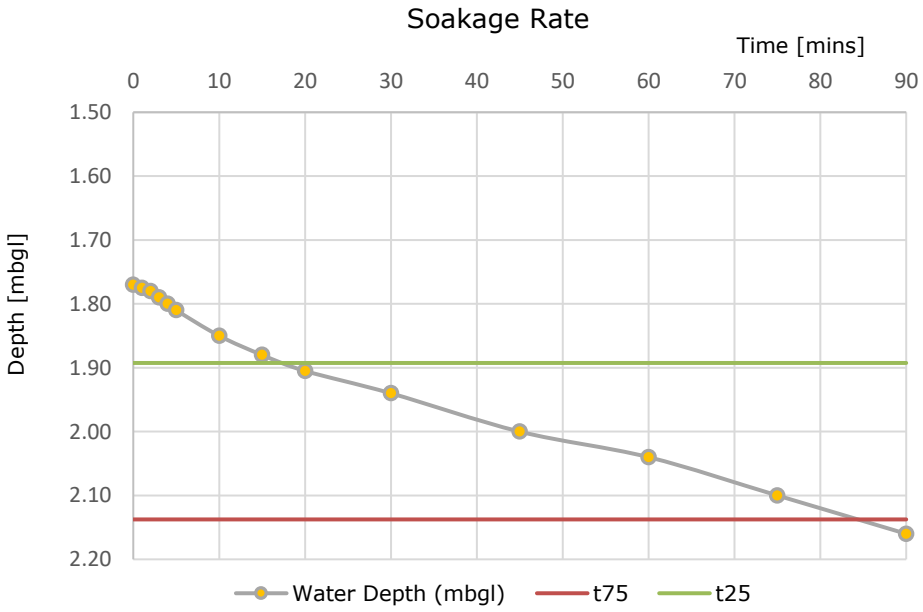
Trial Pit TP/SK101

Run 2 of 3

Test Date 27/08/2020

Groundwater Encountered: N/A

Remarks: pit collapsed / infilled slightly to 2.26mbgl



Calculated by JD

Checked by:

TRIAL PIT INFILTRATION TEST - BRE DIGEST 365

Project Number: 4955,GI

Date: 14/09/2020

Project Name: Diamond Jubilee Gardens/ Twickenham Riverside

Time [min]	Depth to Water [mbgl]
0	1.75
1	1.76
2	1.77
3	1.78
4	1.79
5	1.80
10	1.82
15	1.85
20	1.90
30	1.92
60	1.99
70	2.01
90	2.08
100	2.13

Pit Size [m]		
Length	Width	Depth
1.45	0.35	2.24

Infiltration Rate Calculations		
Parameter	Unit	Result
height		
h_{75}	[m]	2.118
h_{25}	[m]	1.873
h_{75}-h_{25}	[m]	0.245
time		
t_{75}	[s]	5880.00
t_{25}	[s]	1080.00
t_{75} - t_{25}	[s]	4800.00
effective volume, with gravel allowance		
v_{75-25}	[m^3]	0.124
effective area		
ap_{50}	[m^2]	1.390
soil infiltration rate		
f	[m/s]	1.86E-05

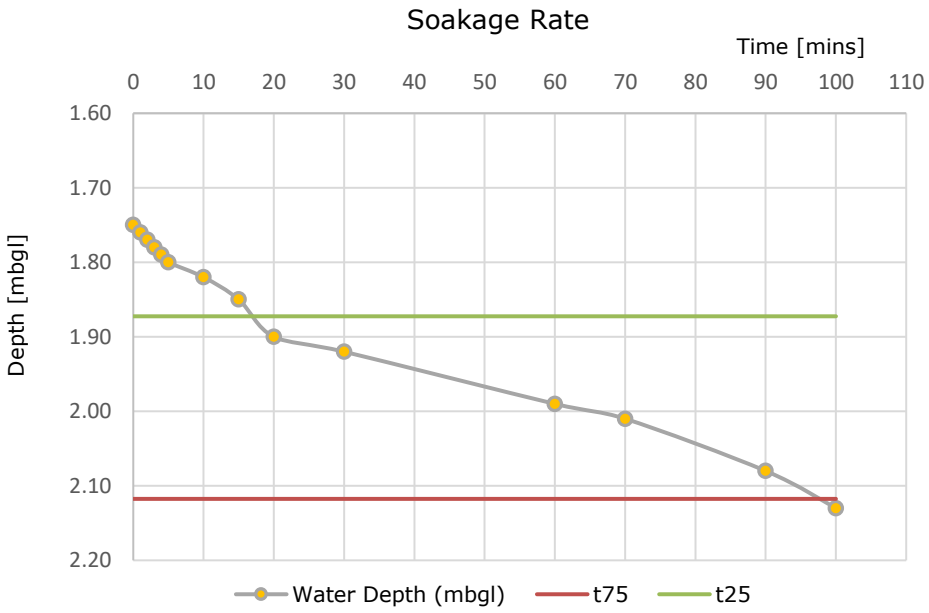
Trial Pit TP/SK101

Run 3 of 3

Test Date 27/08/2020

Groundwater Encountered: N/A

Remarks: pit collapsed / infilled slightly to 2.24mbgl



Calculated by JD

Checked by:

TRIAL PIT INFILTRATION TEST - BRE DIGEST 365

Project Number: 4955,GI

Date: 14/09/2020

Project Name: Diamond Jubilee Gardens/ Twickenham Riverside

Time [min]	Depth to Water [mbgl]
0	1.48
1	1.55
2	1.58
3	1.60
4	1.62
5	1.64
10	1.73
15	1.76

Pit Size [m]		
Length	**Width**	**Depth**
1.00	0.40	2.15

Infiltration Rate Calculations		
Parameter	**Unit**	**Result**
height		
h_{75}	[m]	1.983
h_{25}	[m]	1.648
h_{75}-h_{25}	[m]	0.335
time		
t_{75}	[s]	0.00
t_{25}	[s]	300.00
t_{75} - t_{25}	[s]	-300.00
effective volume, with gravel allowance		
v_{75-25}	[m^3]	0.134
effective area		
ap_{50}	[m^2]	1.338
soil infiltration rate		
f	[m/s]	no result

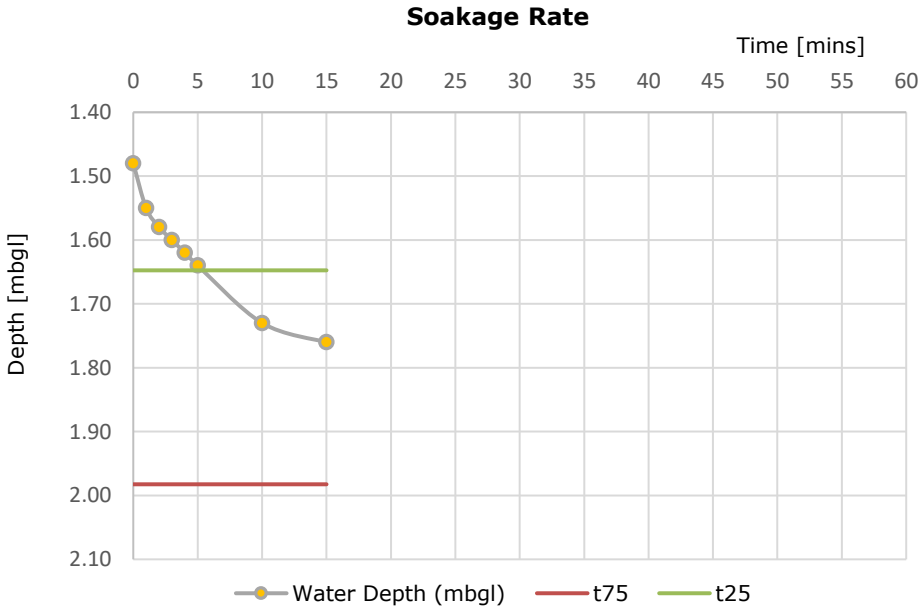
Trial Pit TP/SK102

Run 1 of 3

Test Date 27/08/2020

Groundwater Encountered: N/A

Remarks: pit collpaed up to 1.76: re-excavated for the next run/test



Calculated by JD

Checked by:

TRIAL PIT INFILTRATION TEST - BRE DIGEST 365

Project Number: 4955,GI

Date: 14/09/2020

Project Name: Diamond Jubilee Gardens/ Twickenham Riverside

Time [min]	Depth to Water [mbgl]
0	1.68
1	1.70
2	1.73
3	1.74
4	1.75
5	1.77
10	1.84
15	1.90
20	1.96
30	2.02
45	2.08

Pit Size [m]		
Length	**Width**	**Depth**
1.00	0.40	2.20

Infiltration Rate Calculations		
Parameter	**Unit**	**Result**
height		
h_{75}	[m]	2.070
h_{25}	[m]	1.810
h_{75}-h_{25}	[m]	0.260
time		
t_{75}	[s]	2460.00
t_{25}	[s]	480.00
t_{75} - t_{25}	[s]	1980.00
effective volume, with gravel allowance		
v_{75-25}	[m^3]	0.104
effective area		
ap_{50}	[m^2]	1.128
soil infiltration rate		
f	[m/s]	4.66E-05

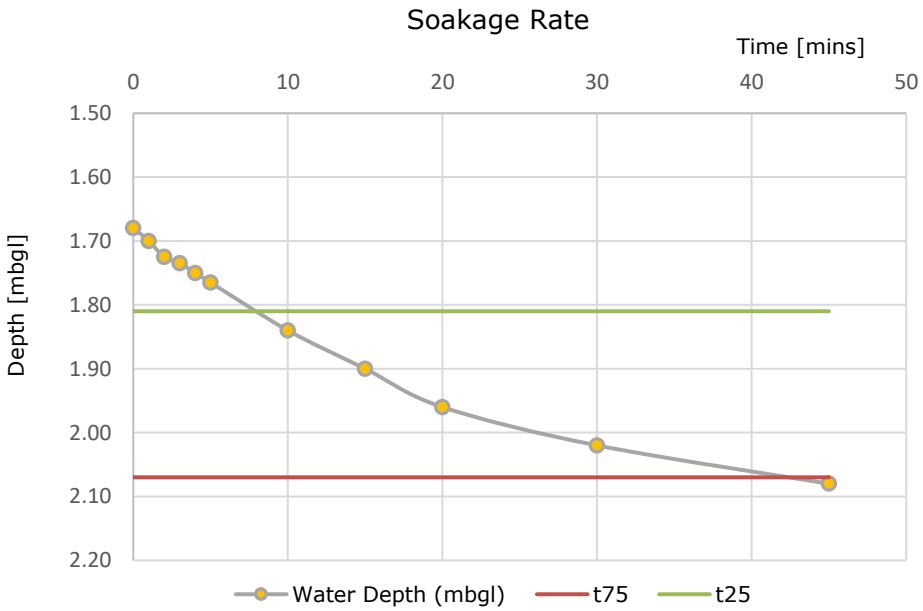
Trial Pit TP/SK102

Run 2 of 3

Test Date 27/08/2020

Groundwater Encountered: N/A

Remarks: pit collapsed / infilled to 1.93mbgl: re-excavated for the next test



Calculated by JD

Checked by:

TRIAL PIT INFILTRATION TEST - BRE DIGEST 365

Project Number: 4955,GI

Date: 14/09/2020

Project Name: Diamond Jubilee Gardens/ Twickenham Riverside

Time [min]	Depth to Water [mbgl]
0	1.64
1	1.65
2	1.66
3	1.68
4	1.69
5	1.71
10	1.78
15	1.85
20	1.88
30	1.92

Pit Size [m]		
Length	**Width**	**Depth**
1.00	0.40	2.00

Infiltration Rate Calculations		
Parameter	**Unit**	**Result**
height		
h_{75}	[m]	1.910
h_{25}	[m]	1.730
h_{75}-h_{25}	[m]	0.180
time		
t_{75}	[s]	1620.00
t_{25}	[s]	420.00
t_{75} - t_{25}	[s]	1200.00
effective volume, with gravel allowance		
$v_{75\text{-}25}$	[m^3]	0.072
effective area		
ap_{50}	[m^2]	0.904
soil infiltration rate		
f	[m/s]	6.64E-05

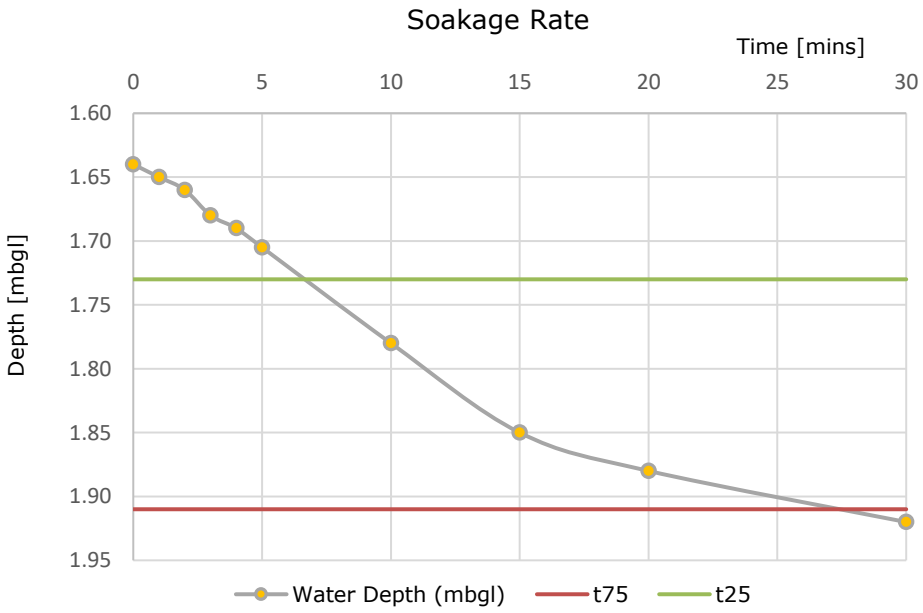
Trial Pit TP/SK102

Run 3 of 3

Test Date 27/08/2020

Groundwater Encountered: N/A

Remarks: pit collapsed to 1.88; extrapolated value to 75%



Calculated by JD

Checked by:

GROUND GAS AND GROUNDWATER MONITORING DATA

GEOSPHERE ENVIRONMENTAL

Project Number: 4955,SI

Project Name: Twickenham Riverside, Diamond Jubilee Gardens, Twickenham

Date: 17.09.20

Exploratory Hole Location **BH01 (Shallow install'n)** **Date of Installation** 26/08/2020

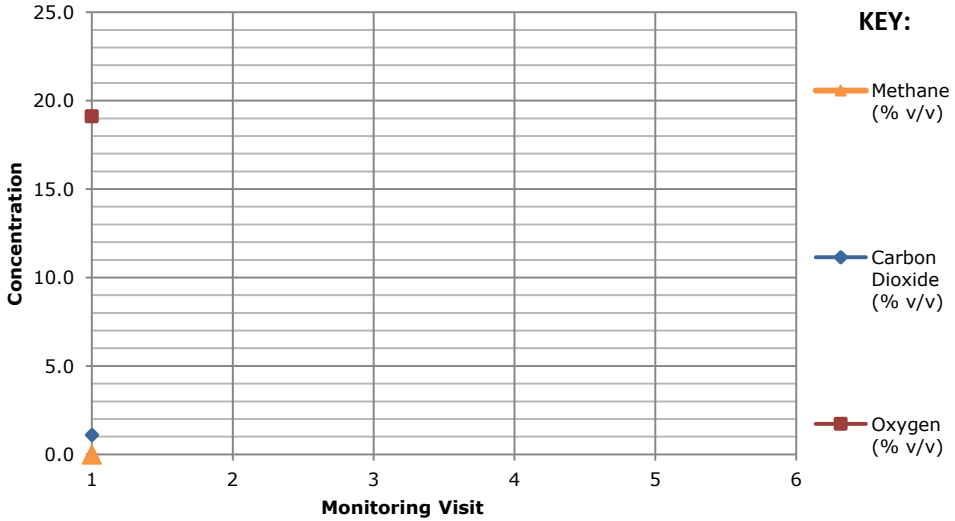
Return Visit #	Monitoring Date	Atmospheric Pressure (mb)	Methane Content (% v/v)	Methane Content (% LEL)	Carbon Dioxide (% v/v)	Oxygen (% v/v)	Flow Rate (l/hr)	H2S (ppm)	CO (ppm)	VOC (ppm)	Water Level (mbgl)	Base of Well (mbgl)	Weather Conditions	Comments / Pressure Rise or Fall
1st visit	17/09/2020	1028	<0.1	<2	1.1	19.1	<0.1	0	0	2	5.30	6.30	warm, cloudy, dry, breezy	falling

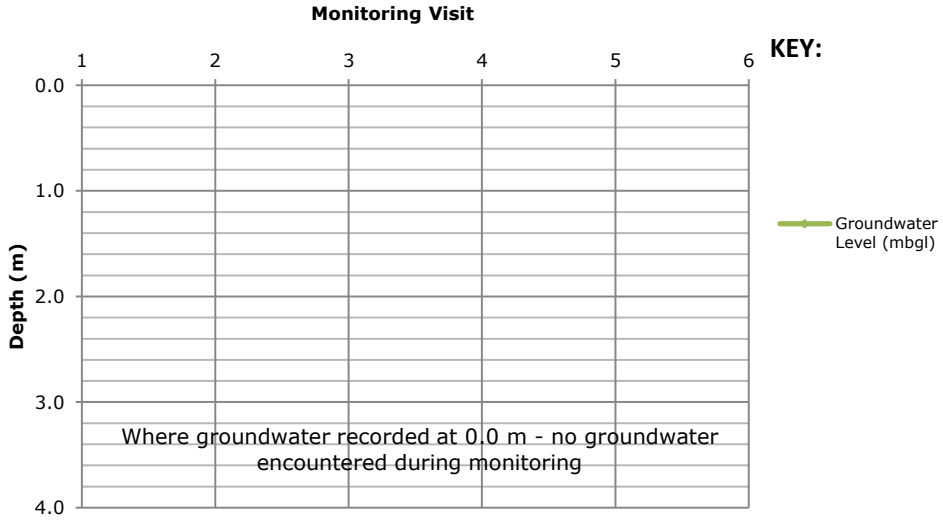
Instruments Used: GFM436 gas analyser / PID MultiRAE lite

REMARKS: Groundwater samples taken using bailer

NOTE: **n/a** Not applicable

nm Not measured





GROUND GAS AND GROUNDWATER MONITORING DATA

Project Number: 4955,SI

Project Name: Twickenham Riverside, Diamond Jubilee Gardens, Twickenham

Date: 17.09.20

Exploratory Hole Location **BH01 (deep install'n)** **Date of Installation** 26/08/2020

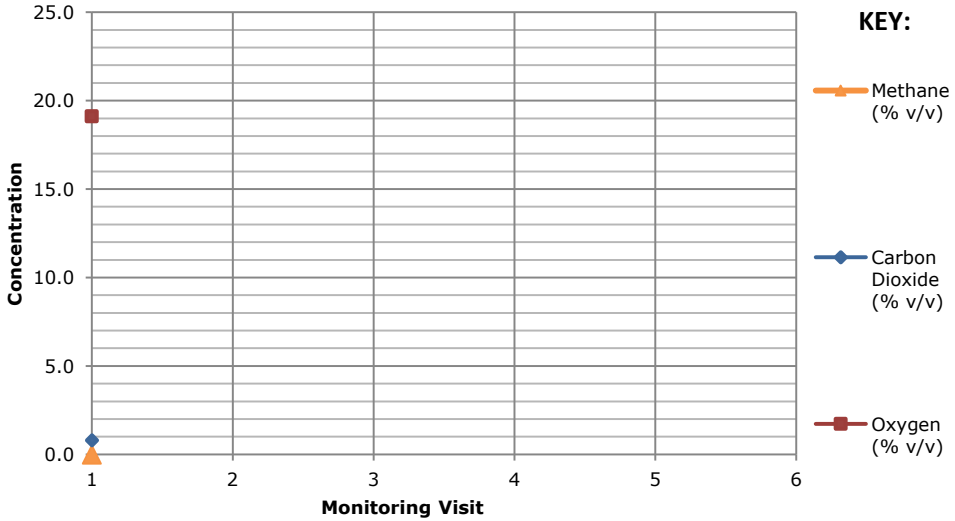
Return Visit #	Monitoring Date	Atmospheric Pressure (mb)	Methane Content (% v/v)	Methane Content (% LEL)	Carbon Dioxide (% v/v)	Oxygen (% v/v)	Flow Rate (l/hr)	H2S (ppm)	CO (ppm)	VOC (ppm)	Water Level (mbgl)	Base of Well (mbgl)	Weather Conditions	Comments / Pressure Rise or Fall
1st visit	17/09/2020	1028	<0.1	<2	0.8	19.1	<0.1	0	0	1	5.05	20.35	warm, cloudy, dry, breezy	falling

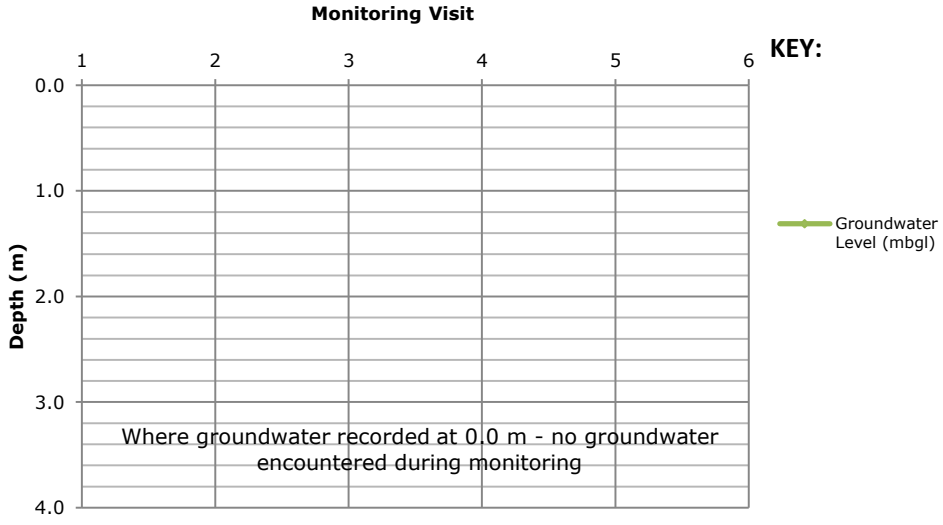
Instruments Used: GFM436 gas analyser / PID MultiRAE lite

REMARKS: Groundwater samples taken using bailer

NOTE: **n/a** Not applicable

nm Not measured





GROUND GAS AND GROUNDWATER MONITORING DATA

Project Number: 4955,SI

Project Name: Twickenham Riverside, Diamond Jubilee Gardens, Twickenham

Date: 17.09.20

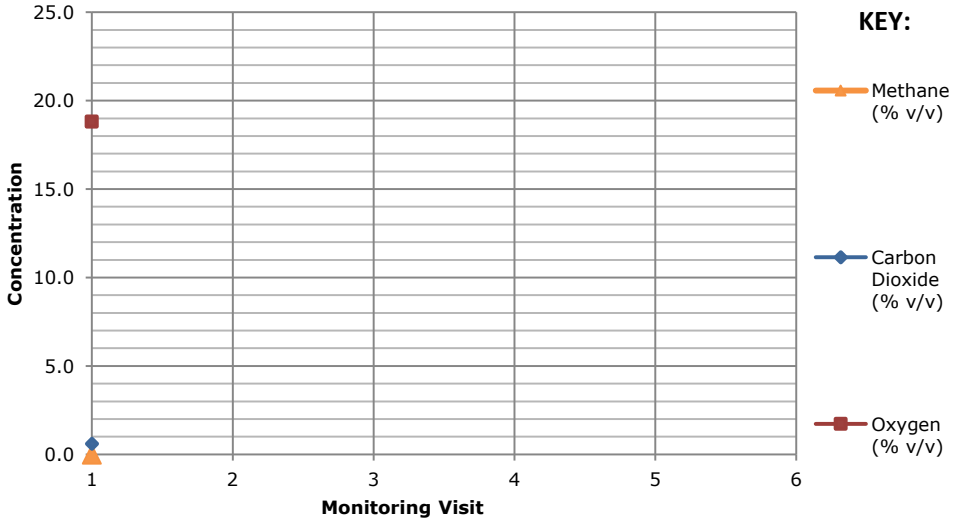
Exploratory Hole Location	**BH02 (Shallow install'n)**										**Date of Installation**		28/08/2020
Return Visit #	**Monitoring Date**	**Atmospheric Pressure (mb)**	**Methane Content**		**Carbon Dioxide**	**Oxygen**	**Flow Rate (l/hr)**	**H2S (ppm)**	**CO (ppm)**	**VOC (ppm)**	**Water Level (mbgl)**	**Base of Well (mbgl)**	**Weather Conditions**	**Comments / Pressure Rise or Fall**
			(% v/v)	**(% LEL)**	**(% v/v)**	**(% v/v)**								
1st visit	17/09/2020	1030	<0.1	<2	0.6	18.8	<0.1	0	0	0	2.47	4.21	warm, cloudy, dry, breezy	falling

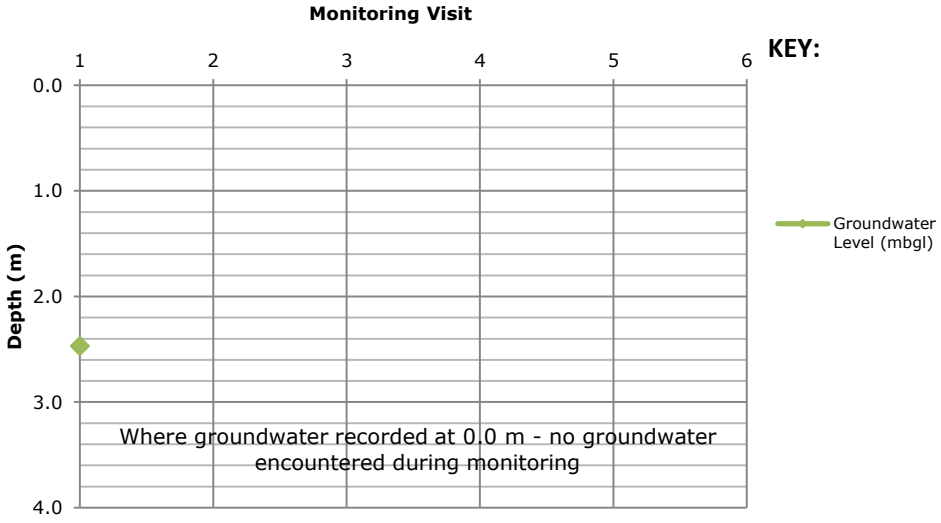
Instruments Used: GFM436 gas analyser / PID MultiRAE lite

REMARKS: Groundwater samples taken using bailer

NOTE: **n/a** Not applicable

nm Not measured





GROUND GAS AND GROUNDWATER MONITORING DATA

Project Number: 4955,SI

Project Name: Twickenham Riverside, Diamond Jubilee Gardens, Twickenham

Date: 17.09.20

Exploratory Hole Location **BH02 (deep install'n)** **Date of Installation** 28/08/2020

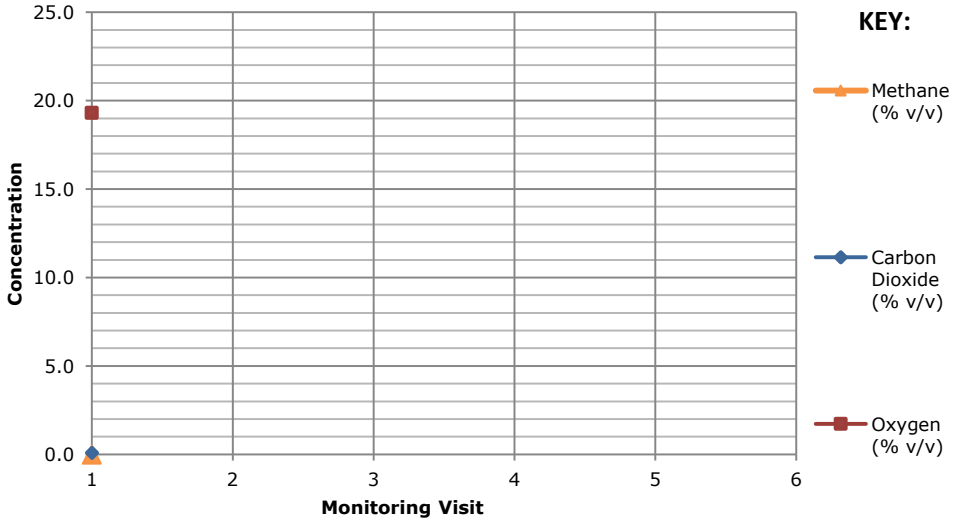
Return Visit #	Monitoring Date	Atmospheric Pressure (mb)	Methane Content (% v/v)	Methane Content (% LEL)	Carbon Dioxide (% v/v)	Oxygen (% v/v)	Flow Rate (l/hr)	H2S (ppm)	CO (ppm)	VOC (ppm)	Water Level (mbgl)	Base of Well (mbgl)	Weather Conditions	Comments / Pressure Rise or Fall
1st visit	17/09/2020	1030	<0.1	<2	0.1	19.3	0.4	0	0	1	12.24	20.72	warm, cloudy, dry, breezy	falling

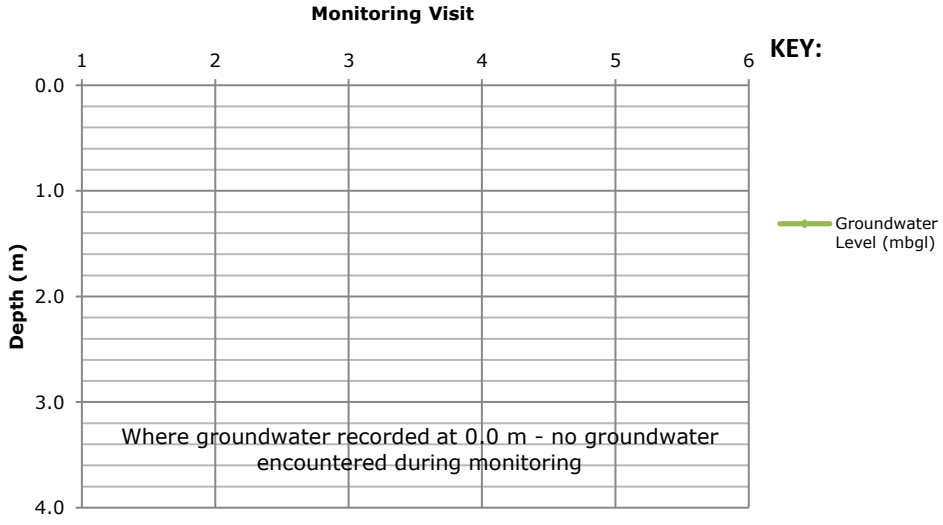
Instruments Used: GFM436 gas analyser / PID MultiRAE lite

REMARKS: Groundwater samples taken using bailer

NOTE: **n/a** Not applicable

nm Not measured





Jim Dawson
Geosphere Environmental Ltd
Brightwell Barns
Ipswich Road
Brightwell
Suffolk
IP10 0BJ

DETS Ltd
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410

UKAS TESTING
4480

DETS Report No: 20-10290

Site Reference:	Diamond Jubilee Gardens and Twickenham Riverside, Wharf Lane, TW1 4QS
Project / Job Ref:	4955, SI
Order No:	4955, GI (jd)
Sample Receipt Date:	02/09/2020
Sample Scheduled Date:	08/09/2020
Report Issue Number:	1
Reporting Date:	16/09/2020

Authorised by:

Dave Ashworth
Technical Manager

Dates of laboratory activities for each tested analyte are available upon request.

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

4480

Soil Analysis Certificate						
DETS Report No: 20-10290	**Date Sampled**	25/08/20	25/08/20	25/08/20		
Geosphere Environmental Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied		
Site Reference: Diamond Jubilee Gardens and Twickenham Riverside, Wharf Lane, TW1 4QS	**TP / BH No**	HP01 WAC2	WS01A and WS2, J1 Combined	WS01A J2		
Project / Job Ref: 4955, SI	**Additional Refs**	None Supplied	None Supplied	None Supplied		
Order No: 4955, GI (jd)	**Depth (m)**	0.25 - 1.20	0.20	0.60		
Reporting Date: 16/09/2020	**DETS Sample No**	497061	497062	497063		

Determinand	**Unit**	**RL**	**Accreditation**					
Asbestos Screen (S)	N/a	N/a	**ISO17025**	Not Detected	Not Detected	Not Detected		
pH	pH Units	N/a	**MCERTS**	8.1	7.6	8.2		
Total Cyanide	mg/kg	< 2	NONE	< 2	2	< 2		
Complex Cyanide	mg/kg	< 2	NONE	< 2	2	< 2		
Free Cyanide	mg/kg	< 2	NONE	< 2	< 2	< 2		
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	**MCERTS**	12	16	15		
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	**MCERTS**	0.01	0.02	0.01		
Organic Matter	%	< 0.1	**MCERTS**	0.9	6	1.8		
Arsenic (As)	mg/kg	< 2	**MCERTS**	16	11	16		
Barium (Ba)	mg/kg	< 2.5	**MCERTS**	35	58	63		
Beryllium (Be)	mg/kg	< 0.5	**MCERTS**	0.6	< 0.5	0.6		
W/S Boron	mg/kg	< 1	NONE	< 1	< 1	< 1		
Cadmium (Cd)	mg/kg	< 0.2	**MCERTS**	< 0.2	< 0.2	< 0.2		
Chromium (Cr)	mg/kg	< 2	**MCERTS**	20	15	21		
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2		
Copper (Cu)	mg/kg	< 4	**MCERTS**	15	20	19		
Lead (Pb)	mg/kg	< 3	**MCERTS**	51	70	72		
Mercury (Hg)	mg/kg	< 1	**MCERTS**	< 1	< 1	< 1		
Molybdenum (Mo)	mg/kg	< 1	**MCERTS**	< 1	1	< 1		
Nickel (Ni)	mg/kg	< 3	**MCERTS**	14	9	15		
Selenium (Se)	mg/kg	< 2	**MCERTS**	< 3	< 3	< 3		
Vanadium (V)	mg/kg	< 1	**MCERTS**	42	30	44		
Zinc (Zn)	mg/kg	< 3	**MCERTS**	45	67	83		

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Samples Descriptions page describes if the test is performed on the dried or as-received portion
Subcontracted analysis (S)

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

4480

Soil Analysis Certificate - Speciated PAHs							
DETS Report No: 20-10290	**Date Sampled**	25/08/20	25/08/20	25/08/20		
Geosphere Environmental Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied		
Site Reference: Diamond Jubilee Gardens and Twickenham Riverside, Wharf Lane, TW1 4QS	**TP / BH No**	HP01 WAC2	WS01A and WS2, J1 Combined	WS01A J2		
Project / Job Ref: 4955, SI	**Additional Refs**	None Supplied	None Supplied	None Supplied		
Order No: 4955, GI (jd)	**Depth (m)**	0.25 - 1.20	0.20	0.60		
Reporting Date: 16/09/2020	**DETS Sample No**	497061	497062	497063		

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1	0.27	0.11		
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	0.76	0.32		
Pyrene	mg/kg	< 0.1	MCERTS	< 0.1	0.69	0.28		
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	0.48	0.18		
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1	0.40	0.17		
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	0.66	0.24		
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	0.22	< 0.1		
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	0.50	0.18		
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	0.31	0.11		
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	0.30	0.11		
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	4.6	1.7		

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Soil Analysis Certificate - TPH CWG Banded							
DETS Report No: 20-10290	**Date Sampled**	25/08/20	25/08/20	25/08/20		
Geosphere Environmental Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied		
Site Reference: Diamond Jubilee Gardens and Twickenham Riverside, Wharf Lane, TW1 4QS	**TP / BH No**	HP01 WAC2	WS01A and WS2, J1 Combined	WS01A J2		
Project / Job Ref: 4955, SI	**Additional Refs**	None Supplied	None Supplied	None Supplied		
Order No: 4955, GI (jd)	**Depth (m)**	0.25 - 1.20	0.20	0.60		
Reporting Date: 16/09/2020	**DETS Sample No**	497061	497062	497063		

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

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Soil Analysis Certificate - BTEX / MTBE							
DETS Report No: 20-10290	Date Sampled	25/08/20	25/08/20	25/08/20		
Geosphere Environmental Ltd	Time Sampled	None Supplied	None Supplied	None Supplied		
Site Reference: Diamond Jubilee Gardens and Twickenham Riverside, Wharf Lane, TW1 4QS	TP / BH No	HP01 WAC2	WS01A and WS2, J1 Combined	WS01A J2		
Project / Job Ref: 4955, SI	Additional Refs	None Supplied	None Supplied	None Supplied		
Order No: 4955, GI (jd)	Depth (m)	0.25 - 1.20	0.20	0.60		
Reporting Date: 16/09/2020	DETS Sample No	497061	497062	497063		

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

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Waste Acceptance Criteria Analytical Certificate - BS EN 12457/2

DETS Report No: 20-10290	**Date Sampled**	25/08/20
Geosphere Environmental Ltd	**Time Sampled**	None Supplied
Site Reference: Diamond Jubilee Gardens and Twickenham Riverside, Wharf Lane, TW1 4QS	**TP / BH No**	HP01 WAC2
Project / Job Ref: 4955, SI	**Additional Refs**	None Supplied
Order No: 4955, GI (jd)	**Depth (m)**	0.25 - 1.20
Reporting Date: 16/09/2020	**DETS Sample No**	497061

Determinand	**Unit**	**MDL**		**Landfill Waste Acceptance Criteria Limits**		
				Inert Waste Landfill	**Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
TOC[MU]	%	< 0.1	0.5	3%	5%	6%
Loss on Ignition	%	< 0.01	1.80	--	--	10%
BTEX[MU]	mg/kg	< 0.05	< 0.05	6	--	--
Sum of PCBs	mg/kg	< 0.1	< 0.1	1	--	--
Mineral Oil[MU]	mg/kg	< 10	< 10	500	--	--
Total PAH[MU]	mg/kg	< 1.7	< 1.7	100	--	--
pH[MU]	pH Units	N/a	8.1	--	>6	--
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	1.1	--	To be evaluated	To be evaluated

Eluate Analysis	**10:1 mg/l**			**Cumulative 10:1 mg/kg**	**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)**		
Arsenic[U]	< 0.01			< 0.1	0.5	2	25
Barium[U]	< 0.02			< 0.2	20	100	300
Cadmium[U]	< 0.0005			< 0.005	0.04	1	5
Chromium[U]	< 0.005			< 0.05	0.5	10	70
Copper[U]	< 0.01			< 0.1	2	50	100
Mercury[U]	< 0.0005			< 0.005	0.01	0.2	2
Molybdenum[U]	0.005			0.05	0.5	10	30
Nickel[U]	< 0.007			< 0.07	0.4	10	40
Lead[U]	< 0.005			< 0.05	0.5	10	50
Antimony[U]	< 0.005			< 0.05	0.06	0.7	5
Selenium[U]	< 0.005			< 0.05	0.1	0.5	7
Zinc[U]	< 0.005			< 0.05	4	50	200
Chloride[U]	2.1			21	800	15000	25000
Fluoride[U]	< 0.5			< 5	10	150	500
Sulphate[U]	1.7			17	1000	20000	50000
TDS	51			510	4000	60000	100000
Phenol Index	< 0.01			< 0.1	1	-	-
DOC	8.4			83.6	500	800	1000
Leach Test Information							
Sample Mass (kg)	0.09						
Dry Matter (%)	96.4						
Moisture (%)	3.8						
Stage 1							
Volume Eluate L10 (litres)	0.90						

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Samples Descriptions page describes if the test is performed on the dried or as-received portion
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M Denotes MCERTS accredited test
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Waste Acceptance Criteria Analytical Certificate - BS EN 12457/2

DETS Report No: 20-10290	**Date Sampled**	25/08/20	
Geosphere Environmental Ltd	**Time Sampled**	None Supplied	
Site Reference: Diamond Jubilee Gardens and Twickenham Riverside, Wharf Lane, TW1 4QS	**TP / BH No**	WS01A and WS2, J1 Combined	
Project / Job Ref: 4955, SI	**Additional Refs**	None Supplied	
Order No: 4955, GI (jd)	**Depth (m)**	0.20	
Reporting Date: 16/09/2020	**DETS Sample No**	497062	

Determinand	**Unit**	**MDL**		**Landfill Waste Acceptance Criteria Limits**		
				Inert Waste Landfill	**Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
TOC[MU]	%	< 0.1	3.5	**3%**	5%	6%
Loss on Ignition	%	< 0.01	9.20	--	--	10%
BTEX[MU]	mg/kg	< 0.05	< 0.05	6	--	--
Sum of PCBs	mg/kg	< 0.1	< 0.1	1	--	--
Mineral Oil[MU]	mg/kg	< 10	< 10	500	--	--
Total PAH[MU]	mg/kg	< 1.7	4.6	100	--	--
pH[MU]	pH Units	N/a	7.6	--	>6	--
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	< 1	--	To be evaluated	To be evaluated

Eluate Analysis	**10:1 mg/l**			**Cumulative 10:1 mg/kg**	**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)**		
Arsenic[U]	< 0.01			< 0.1	0.5	2	25
Barium[U]	< 0.02			< 0.2	20	100	300
Cadmium[U]	< 0.0005			< 0.005	0.04	1	5
Chromium[U]	< 0.005			< 0.05	0.5	10	70
Copper[U]	0.03			0.3	2	50	100
Mercury[U]	< 0.0005			< 0.005	0.01	0.2	2
Molybdenum[U]	0.005			0.05	0.5	10	30
Nickel[U]	< 0.007			< 0.07	0.4	10	40
Lead[U]	< 0.005			< 0.05	0.5	10	50
Antimony[U]	< 0.005			< 0.05	0.06	0.7	5
Selenium[U]	< 0.005			< 0.05	0.1	0.5	7
Zinc[U]	0.007			0.07	4	50	200
Chloride[U]	3.6			36	800	15000	25000
Fluoride[U]	< 0.5			< 5	10	150	500
Sulphate[U]	2.6			26	1000	20000	50000
TDS	88			880	4000	60000	100000
Phenol Index	< 0.01			< 0.1	1	-	-
DOC	18.7			187	500	800	1000
Leach Test Information							
Sample Mass (kg)	0.10						
Dry Matter (%)	92.6						
Moisture (%)	8						
Stage 1							
Volume Eluate L10 (litres)	0.89						

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Samples Descriptions page describes if the test is performed on the dried or as-received portion
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Waste Acceptance Criteria Analytical Certificate - BS EN 12457/2

DETS Report No: 20-10290	**Date Sampled**	25/08/20	
Geosphere Environmental Ltd	**Time Sampled**	None Supplied	
Site Reference: Diamond Jubilee Gardens and Twickenham Riverside, Wharf Lane, TW1 4QS	**TP / BH No**	WS01A J2	
Project / Job Ref: 4955, SI	**Additional Refs**	None Supplied	
Order No: 4955, GI (jd)	**Depth (m)**	0.60	
Reporting Date: 16/09/2020	**DETS Sample No**	497063	

Determinand	**Unit**	**MDL**		**Landfill Waste Acceptance Criteria Limits**		
				Inert Waste Landfill	**Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
TOC[MU]	%	< 0.1	1.1	3%	5%	6%
Loss on Ignition	%	< 0.01	2.40	--	--	10%
BTEX[MU]	mg/kg	< 0.05	< 0.05	6	--	--
Sum of PCBs	mg/kg	< 0.1	< 0.1	1	--	--
Mineral Oil[MU]	mg/kg	< 10	< 10	500	--	--
Total PAH[MU]	mg/kg	< 1.7	< 1.7	100	--	--
pH[MU]	pH Units	N/a	8.2	--	>6	--
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	1.2	--	To be evaluated	To be evaluated

Eluate Analysis	**10:1 mg/l**			**Cumulative 10:1 mg/kg**	**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)**		
Arsenic[U]	< 0.01			< 0.1	0.5	2	25
Barium[U]	< 0.02			< 0.2	20	100	300
Cadmium[U]	< 0.0005			< 0.005	0.04	1	5
Chromium[U]	< 0.005			< 0.05	0.5	10	70
Copper[U]	0.02			0.2	2	50	100
Mercury[U]	< 0.0005			< 0.005	0.01	0.2	2
Molybdenum[U]	0.005			0.05	0.5	10	30
Nickel[U]	< 0.007			< 0.07	0.4	10	40
Lead[U]	< 0.005			< 0.05	0.5	10	50
Antimony[U]	< 0.005			< 0.05	0.06	0.7	5
Selenium[U]	< 0.005			< 0.05	0.1	0.5	7
Zinc[U]	< 0.005			< 0.05	4	50	200
Chloride[U]	2.9			29	800	15000	25000
Fluoride[U]	< 0.5			< 5	10	150	500
Sulphate[U]	3.1			31	1000	20000	50000
TDS	60			600	4000	60000	100000
Phenol Index	< 0.01			< 0.1	1	-	-
DOC	12.8			128	500	800	1000
Leach Test Information							
Sample Mass (kg)	0.09						
Dry Matter (%)	96.9						
Moisture (%)	3.2						
Stage 1							
Volume Eluate L10 (litres)	0.90						

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Samples Descriptions page describes if the test is performed on the dried or as-received portion
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Soil Analysis Certificate - Sample Descriptions	
DETS Report No: 20-10290	
Geosphere Environmental Ltd	
Site Reference: Diamond Jubilee Gardens and Twickenham Riverside, Wharf Lane, TW1 4QS	
Project / Job Ref: 4955, SI	
Order No: 4955, GI (jd)	
Reporting Date: 16/09/2020	

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
$ 497061	HP01 WAC2	None Supplied	0.25 - 1.20	3.7	Light brown sandy clay with stones
$ 497062	WS01A and WS2, J1 Combined	None Supplied	0.20	7.4	Black loamy sand with stones and vegetation
$ 497063	WS01A J2	None Supplied	0.60	3.1	Brown sandy clay with stones and concrete

Moisture content is part of procedure E003 & is not an accredited test
Insufficient Sample I/S
Unsuitable Sample U/S

$ samples exceeded recommended holding times

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Soil Analysis Certificate - Methodology & Miscellaneous Information
DETS Report No: 20-10290
Geosphere Environmental Ltd
Site Reference: Diamond Jubilee Gardens and Twickenham Riverside, Wharf Lane, TW1 4QS
Project / Job Ref: 4955, SI
Order No: 4955, GI (jd)
Reporting Date: 16/09/2020

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

D Dried
AR As Received

Parameter	Matrix Type	Suite Reference	Expanded Uncertainity Measurement	Unit
TOC	Soil	BS EN 12457	13.49	%
Loss on Ignition	Soil	BS EN 12457	17	%
BTEX	Soil	BS EN 12457	14	%
Sum of PCBs	Soil	BS EN 12457	23	%
Mineral Oil	Soil	BS EN 12457	9	%
Total PAH	Soil	BS EN 12457	20	%
pH	Soil	BS EN 12457	0.399	Units
Acid Neutralisation Capacity	Soil	BS EN 12457	18	%
Arsenic	Leachate	BS EN 12457	16.63	%
Barium	Leachate	BS EN 12457	14.29	%
Cadmium	Leachate	BS EN 12457	14.44	%
Chromium	Leachate	BS EN 12457	18.06	%
Copper	Leachate	BS EN 12457	21.27	%
Mercury	Leachate	BS EN 12457	24.13	%
Molybdenum	Leachate	BS EN 12457	12.55	%
Nickel	Leachate	BS EN 12457	20.08	%
Lead	Leachate	BS EN 12457	13.43	%
Antimony	Leachate	BS EN 12457	18.85	%
Selenium	Leachate	BS EN 12457	18.91	%
Zinc	Leachate	BS EN 12457	13.71	%
Chloride	Leachate	BS EN 12457	16	%
Fluoride	Leachate	BS EN 12457	19.4	%
Sulphate	Leachate	BS EN 12457	19.63	%
TDS	Leachate	BS EN 12457	12	%
Phenol Index	Leachate	BS EN 12457	14	%
DOC	Leachate	BS EN 12457	10	%
Clay Content	Soil	BS 3882: 2015	15	%
Silt Content	Soil	BS 3882: 2015	14	%
Sand Content	Soil	BS 3882: 2015	13	%
Loss on Ignition	Soil	BS 3882: 2015	17	%
pH	Soil	BS 3882: 2015	0.399	Units
Carbonate	Soil	BS 3882: 2015	16	%
Total Nitrogen	Soil	BS 3882: 2015	12	%
Phosphorus (Extractable)	Soil	BS 3882: 2015	24	%
Potassium (Extractable)	Soil	BS 3882: 2015	20	%
Magnesium (Extractable)	Soil	BS 3882: 2015	26	%
Zinc	Soil	BS 3882: 2015	14.9	%
Copper	Soil	BS 3882: 2015	16	%
Nickel	Soil	BS 3882: 2015	17.7	%
Available Sodium	Soil	BS 3882: 2015	23	%
Available Calcium	Soil	BS 3882: 2015	23	%
Electrical Conductivity	Soil	BS 3882: 2015	10	%

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DETS Report No: 20-10989

Site Reference:	Twickenham Riverside
Project / Job Ref:	4955,SI
Order No:	4955,SI (JD)
Sample Receipt Date:	22/09/2020
Sample Scheduled Date:	22/09/2020
Report Issue Number:	1
Reporting Date:	02/10/2020

Authorised by:

Kevin Old
General Manager

Dates of laboratory activities for each tested analyte are available upon request.

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Soil Analysis Certificate						
DETS Report No: 20-10989	**Date Sampled**	25/08/20	25/08/20	25/08/20	25/08/20	27/08/20
Geosphere Environmental Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Twickenham Riverside	**TP / BH No**	BH1	BH1	BH1	BH1	BH2
Project / Job Ref: 4955,SI	**Additional Refs**	Disturbed	Disturbed	Disturbed	Disturbed	Disturbed
Order No: 4955,SI (JD)	**Depth (m)**	4.00	10.50	18.00	24.00	2.00
Reporting Date: 02/10/2020	**DETS Sample No**	500425	500426	500427	500428	500429

Determinand	Unit	RL	Accreditation					
Asbestos Screen (S)	N/a	N/a	ISO17025					
pH	pH Units	N/a	MCERTS	8.4	8.1	8.8	8.2	8.6
Total Cyanide	mg/kg	< 2	NONE					
Complex Cyanide	mg/kg	< 2	NONE					
Free Cyanide	mg/kg	< 2	NONE					
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	MCERTS	< 10	604	218	440	321
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	MCERTS	< 0.01	0.60	0.22	0.44	0.32
Organic Matter	%	< 0.1	MCERTS					
Arsenic (As)	mg/kg	< 2	MCERTS					
Barium (Ba)	mg/kg	< 2.5	MCERTS					
Beryllium (Be)	mg/kg	< 0.5	MCERTS					
W/S Boron	mg/kg	< 1	NONE					
Cadmium (Cd)	mg/kg	< 0.2	MCERTS					
Chromium (Cr)	mg/kg	< 2	MCERTS					
Chromium (hexavalent)	mg/kg	< 2	NONE					
Copper (Cu)	mg/kg	< 4	MCERTS					
Lead (Pb)	mg/kg	< 3	MCERTS					
Mercury (Hg)	mg/kg	< 1	MCERTS					
Molybdenum (Mo)	mg/kg	< 1	MCERTS					
Nickel (Ni)	mg/kg	< 3	MCERTS					
Selenium (Se)	mg/kg	< 2	MCERTS					
Vanadium (V)	mg/kg	< 1	MCERTS					
Zinc (Zn)	mg/kg	< 3	MCERTS					
EPH (C10 - C40)	mg/kg	< 6	MCERTS					

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Samples Descriptions page describes if the test is performed on the dried or as-received portion
Subcontracted analysis (S)

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Soil Analysis Certificate						
DETS Report No: 20-10989	**Date Sampled**	27/08/20	27/08/20	27/08/20	27/08/20	27/08/20
Geosphere Environmental Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Twickenham Riverside	**TP / BH No**	BH2	BH2	BH2	BH1 + BH2	BH01A + BH01B
Project / Job Ref: 4955,SI	**Additional Refs**	Disturbed	Disturbed	Disturbed	Composite	Composite
Order No: 4955,SI (JD)	**Depth (m)**	7.50	13.50	19.50	2.0 - 24.0	0.20 - 0.80
Reporting Date: 02/10/2020	**DETS Sample No**	500430	500431	500432	500433	500434

Determinand	Unit	RL	Accreditation					
Asbestos Screen (S)	N/a	N/a	ISO17025				Not Detected	Not Detected
pH	pH Units	N/a	MCERTS	8.1	8.4	8.8	8.1	8.3
Total Cyanide	mg/kg	< 2	NONE				< 2	< 2
Complex Cyanide	mg/kg	< 2	NONE				< 2	< 2
Free Cyanide	mg/kg	< 2	NONE				< 2	< 2
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	MCERTS	485	319	460	365	79
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	MCERTS	0.48	0.32	0.46	0.36	0.08
Organic Matter	%	< 0.1	MCERTS				0.9	0.8
Arsenic (As)	mg/kg	< 2	MCERTS				9	15
Barium (Ba)	mg/kg	< 2.5	MCERTS				50	71
Beryllium (Be)	mg/kg	< 0.5	MCERTS				0.9	0.7
W/S Boron	mg/kg	< 1	NONE				2.3	< 1
Cadmium (Cd)	mg/kg	< 0.2	MCERTS				< 0.2	< 0.2
Chromium (Cr)	mg/kg	< 2	MCERTS				31	19
Chromium (hexavalent)	mg/kg	< 2	NONE				< 2	< 2
Copper (Cu)	mg/kg	< 4	MCERTS				19	20
Lead (Pb)	mg/kg	< 3	MCERTS				10	207
Mercury (Hg)	mg/kg	< 1	MCERTS				< 1	< 1
Molybdenum (Mo)	mg/kg	< 1	MCERTS				< 1	< 1
Nickel (Ni)	mg/kg	< 3	MCERTS				29	16
Selenium (Se)	mg/kg	< 2	MCERTS				< 3	< 3
Vanadium (V)	mg/kg	< 1	MCERTS				54	38
Zinc (Zn)	mg/kg	< 3	MCERTS				78	68
EPH (C10 - C40)	mg/kg	< 6	MCERTS					< 6

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Subcontracted analysis (S)

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Soil Analysis Certificate						
DETS Report No: 20-10989	**Date Sampled**	27/08/20				
Geosphere Environmental Ltd	**Time Sampled**	None Supplied				
Site Reference: Twickenham Riverside	**TP / BH No**	BH2				
Project / Job Ref: 4955,SI	**Additional Refs**	Disturbed				
Order No: 4955,SI (JD)	**Depth (m)**	1.20				
Reporting Date: 02/10/2020	**DETS Sample No**	500435				

Determinand	Unit	RL	Accreditation					
Asbestos Screen (S)	N/a	N/a	ISO17025	Not Detected				
pH	pH Units	N/a	MCERTS	8.3				
Total Cyanide	mg/kg	< 2	NONE	< 2				
Complex Cyanide	mg/kg	< 2	NONE	< 2				
Free Cyanide	mg/kg	< 2	NONE	< 2				
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	MCERTS	44				
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	MCERTS	0.04				
Organic Matter	%	< 0.1	MCERTS	1				
Arsenic (As)	mg/kg	< 2	MCERTS	15				
Barium (Ba)	mg/kg	< 2.5	MCERTS	55				
Beryllium (Be)	mg/kg	< 0.5	MCERTS	0.6				
W/S Boron	mg/kg	< 1	NONE	< 1				
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2				
Chromium (Cr)	mg/kg	< 2	MCERTS	16				
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2				
Copper (Cu)	mg/kg	< 4	MCERTS	17				
Lead (Pb)	mg/kg	< 3	MCERTS	111				
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1				
Molybdenum (Mo)	mg/kg	< 1	MCERTS	< 1				
Nickel (Ni)	mg/kg	< 3	MCERTS	13				
Selenium (Se)	mg/kg	< 2	MCERTS	< 3				
Vanadium (V)	mg/kg	< 1	MCERTS	36				
Zinc (Zn)	mg/kg	< 3	MCERTS	38				
EPH (C10 - C40)	mg/kg	< 6	MCERTS	< 6				

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Samples Descriptions page describes if the test is performed on the dried or as-received portion
Subcontracted analysis (S)

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Soil Analysis Certificate - Speciated PAHs							
DETS Report No: 20-10989	Date Sampled	27/08/20	27/08/20	27/08/20		
Geosphere Environmental Ltd	Time Sampled	None Supplied	None Supplied	None Supplied		
Site Reference: Twickenham Riverside	TP / BH No	BH1 + BH2	BH01A + BH01B	BH2		
Project / Job Ref: 4955,SI	Additional Refs	Composite	Composite	Disturbed		
Order No: 4955,SI (JD)	Depth (m)	2.0 - 24.0	0.20 - 0.80	1.20		
Reporting Date: 02/10/2020	DETS Sample No	500433	500434	500435		

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	0.17	< 0.1		
Pyrene	mg/kg	< 0.1	MCERTS	< 0.1	0.12	< 0.1		
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	0.30	< 0.1		
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	0.52	< 0.1		
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	0.13	< 0.1		
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	0.28	< 0.1		
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	0.38	< 0.1		
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	0.21	< 0.1		
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	2.1	< 1.6		

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Soil Analysis Certificate - TPH CWG Banded						
DETS Report No: 20-10989	**Date Sampled**	27/08/20				
Geosphere Environmental Ltd	**Time Sampled**	None Supplied				
Site Reference: Twickenham Riverside	**TP / BH No**	BH1 + BH2				
Project / Job Ref: 4955,SI	**Additional Refs**	Composite				
Order No: 4955,SI (JD)	**Depth (m)**	2.0 - 24.0				
Reporting Date: 02/10/2020	**DETS Sample No**	500433				

Determinand	Unit	RL	Accreditation					
Aliphatic >C5 - C6	mg/kg	< 0.01	NONE	< 0.01				
Aliphatic >C6 - C8	mg/kg	< 0.05	NONE	< 0.05				
Aliphatic >C8 - C10	mg/kg	< 2	MCERTS	7				
Aliphatic >C10 - C12	mg/kg	< 2	MCERTS	14				
Aliphatic >C12 - C16	mg/kg	< 3	MCERTS	15				
Aliphatic >C16 - C21	mg/kg	< 3	MCERTS	< 3				
Aliphatic >C21 - C34	mg/kg	< 10	MCERTS	< 10				
Aliphatic (C5 - C34)	mg/kg	< 21	NONE	36				
Aromatic >C5 - C7	mg/kg	< 0.01	NONE	< 0.01				
Aromatic >C7 - C8	mg/kg	< 0.05	NONE	< 0.05				
Aromatic >C8 - C10	mg/kg	< 2	MCERTS	< 2				
Aromatic >C10 - C12	mg/kg	< 2	MCERTS	< 2				
Aromatic >C12 - C16	mg/kg	< 2	MCERTS	< 2				
Aromatic >C16 - C21	mg/kg	< 3	MCERTS	< 3				
Aromatic >C21 - C35	mg/kg	< 10	MCERTS	< 10				
Aromatic (C5 - C35)	mg/kg	< 21	NONE	< 21				
Total >C5 - C35	mg/kg	< 42	NONE	< 42				

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Soil Analysis Certificate - BTEX / MTBE						
DETS Report No: 20-10989	**Date Sampled**	27/08/20				
Geosphere Environmental Ltd	**Time Sampled**	None Supplied				
Site Reference: Twickenham Riverside	**TP / BH No**	BH1 + BH2				
Project / Job Ref: 4955,SI	**Additional Refs**	Composite				
Order No: 4955,SI (JD)	**Depth (m)**	2.0 - 24.0				
Reporting Date: 02/10/2020	**DETS Sample No**	500433				

Determinand	Unit	RL	Accreditation					
Benzene	ug/kg	< 2	MCERTS	< 2				
Toluene	ug/kg	< 5	MCERTS	< 5				
Ethylbenzene	ug/kg	< 2	MCERTS	< 2				
p & m-xylene	ug/kg	< 2	MCERTS	4				
o-xylene	ug/kg	< 2	MCERTS	3				
MTBE	ug/kg	< 5	MCERTS	< 5				

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Waste Acceptance Criteria Analytical Certificate - BS EN 12457/2

DETS Report No: 20-10989		**Date Sampled**	27/08/20			**Landfill Waste Acceptance Criteria Limits**		
Geosphere Environmental Ltd		**Time Sampled**	None Supplied			**Inert Waste Landfill**	**Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Site Reference: Twickenham Riverside		**TP / BH No**	BH1 + BH2					
Project / Job Ref: 4955,SI		**Additional Refs**	Composite					
Order No: 4955,SI (JD)		**Depth (m)**	2.0 - 24.0					
Reporting Date: 02/10/2020		**DETS Sample No**	500433					
Determinand	**Unit**	**MDL**						
TOC[MU]	%	< 0.1	0.5			3%	5%	6%
Loss on Ignition	%	< 0.01	0.60			--	--	10%
BTEX[MU]	mg/kg	< 0.05	< 0.05			6	--	--
Sum of PCBs	mg/kg	< 0.1	< 0.1			1	--	--
Mineral Oil[MU]	mg/kg	< 10	31			500	--	--
Total PAH[MU]	mg/kg	< 1.7	< 1.7			100	--	--
pH[MU]	pH Units	N/a	8.1			--	>6	--
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	< 1			--	To be evaluated	To be evaluated
Eluate Analysis			**10:1 mg/l**			**Cumulative 10:1 mg/kg**	**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)**	
Arsenic[U]			< 0.01			< 0.1	0.5	2	25
Barium[U]			< 0.02			< 0.2	20	100	300
Cadmium[U]			< 0.0005			< 0.005	0.04	1	5
Chromium[U]			< 0.005			< 0.05	0.5	10	70
Copper[U]			0.01			0.1	2	50	100
Mercury[U]			< 0.0005			< 0.005	0.01	0.2	2
Molybdenum[U]			0.002			0.02	0.5	10	30
Nickel[U]			< 0.007			< 0.07	0.4	10	40
Lead[U]			< 0.005			< 0.05	0.5	10	50
Antimony[U]			< 0.005			< 0.05	0.06	0.7	5
Selenium[U]			0.023			0.23	**0.1**	0.5	7
Zinc[U]			< 0.005			< 0.05	4	50	200
Chloride[U]			4.0			40	800	15000	25000
Fluoride[U]			< 0.5			< 5	10	150	500
Sulphate[U]			47.7			477	1000	20000	50000
TDS			123			1230	4000	60000	100000
Phenol Index			< 0.01			< 0.1	1	-	-
DOC			4.4			43.7	500	800	1000
Leach Test Information									
Sample Mass (kg)			0.10						
Dry Matter (%)			87.5						
Moisture (%)			14.2						
Stage 1									
Volume Eluate L10 (litres)			0.89						

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Samples Descriptions page describes if the test is performed on the dried or as-received portion
Stated limits are for guidance only and DETS Ltd cannot be held responsible for any discrepencies with current legislation
M Denotes MCERTS accredited test
U Denotes ISO17025 accredited test

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Waste Acceptance Criteria Analytical Certificate - BS EN 12457/2

					Landfill Waste Acceptance Criteria Limits		
DETS Report No: 20-10989	**Date Sampled**	27/08/20			**Inert Waste Landfill**	**Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Geosphere Environmental Ltd	**Time Sampled**	None Supplied					
Site Reference: Twickenham Riverside	**TP / BH No**	BH01A + BH01B					
Project / Job Ref: 4955,SI	**Additional Refs**	Composite					
Order No: 4955,SI (JD)	**Depth (m)**	0.20 - 0.80					
Reporting Date: 02/10/2020	**DETS Sample No**	500434					
Determinand	**Unit**	**MDL**					
TOC[MU]	%	< 0.1	0.5		3%	5%	6%
Loss on Ignition	%	< 0.01	1.90		--	--	10%
BTEX[MU]	mg/kg	< 0.05	< 0.05		6	--	--
Sum of PCBs	mg/kg	< 0.1	< 0.1		1	--	--
Mineral Oil[MU]	mg/kg	< 10	< 10		500	--	--
Total PAH[MU]	mg/kg	< 1.7	2.1		100	--	--
pH[MU]	pH Units	N/a	8.3		--	>6	--
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	< 1		--	To be evaluated	To be evaluated

Eluate Analysis	**10:1 mg/l**			**Cumulative 10:1 mg/kg**	**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)**		
Arsenic[U]	< 0.01			< 0.1	0.5	2	25
Barium[U]	< 0.02			< 0.2	20	100	300
Cadmium[U]	< 0.0005			< 0.005	0.04	1	5
Chromium[U]	< 0.005			< 0.05	0.5	10	70
Copper[U]	0.01			0.1	2	50	100
Mercury[U]	< 0.0005			< 0.005	0.01	0.2	2
Molybdenum[U]	0.003			0.03	0.5	10	30
Nickel[U]	< 0.007			< 0.07	0.4	10	40
Lead[U]	< 0.005			< 0.05	0.5	10	50
Antimony[U]	< 0.005			< 0.05	0.06	0.7	5
Selenium[U]	< 0.005			< 0.05	0.1	0.5	7
Zinc[U]	< 0.005			< 0.05	4	50	200
Chloride[U]	5.4			54	800	15000	25000
Fluoride[U]	< 0.5			< 5	10	150	500
Sulphate[U]	13.4			134	1000	20000	50000
TDS	104			1040	4000	60000	100000
Phenol Index	< 0.01			< 0.1	1	-	-
DOC	6			59.5	500	800	1000
Leach Test Information							
Sample Mass (kg)	0.10						
Dry Matter (%)	94.4						
Moisture (%)	6						
Stage 1							
Volume Eluate L10 (litres)	0.90						

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Soil Analysis Certificate - Sample Descriptions
DETS Report No: 20-10989
Geosphere Environmental Ltd
Site Reference: Twickenham Riverside
Project / Job Ref: 4955,SI
Order No: 4955,SI (JD)
Reporting Date: 02/10/2020

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
$ 500425	BH1	Disturbed	4.00	10.4	Light brown sand with stones
$ 500426	BH1	Disturbed	10.50	16.3	Brown clay
$ 500427	BH1	Disturbed	18.00	15.3	Brown clay
$ 500428	BH1	Disturbed	24.00	9.5	Brown clay
$ 500429	BH2	Disturbed	2.00	10.9	Brown sandy clay
$ 500430	BH2	Disturbed	7.50	13.7	Brown sandy clay
$ 500431	BH2	Disturbed	13.50	11.3	Brown clay
$ 500432	BH2	Disturbed	19.50	14.8	Brown sandy clay
$ 500433	BH1 + BH2	Composite	2.0 - 24.0	12.5	Brown sandy clay
$ 500434	BH01A + BH01B	Composite	0.20 - 0.80	5.6	Brown sandy gravel with stones
$ 500435	BH2	Disturbed	1.20	12.8	Brown sandy clay with stones and concrete

Moisture content is part of procedure E003 & is not an accredited test
Insufficient Sample I/S
& samples received in inappropriate containers for hydrocarbon analysis

$ samples exceeded recommended holding times

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Soil Analysis Certificate - Methodology & Miscellaneous Information
DETS Report No: 20-10989
Geosphere Environmental Ltd
Site Reference: Twickenham Riverside
Project / Job Ref: 4955,SI
Order No: 4955,SI (JD)
Reporting Date: 02/10/2020

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

D Dried
AR As Received

Parameter	Matrix Type	Suite Reference	Expanded Uncertainity Measurement	Unit
TOC	Soil	BS EN 12457	13.49	%
Loss on Ignition	Soil	BS EN 12457	17	%
BTEX	Soil	BS EN 12457	14	%
Sum of PCBs	Soil	BS EN 12457	23	%
Mineral Oil	Soil	BS EN 12457	9	%
Total PAH	Soil	BS EN 12457	20	%
pH	Soil	BS EN 12457	0.399	Units
Acid Neutralisation Capacity	Soil	BS EN 12457	18	%
Arsenic	Leachate	BS EN 12457	16.63	%
Barium	Leachate	BS EN 12457	14.29	%
Cadmium	Leachate	BS EN 12457	14.44	%
Chromium	Leachate	BS EN 12457	18.06	%
Copper	Leachate	BS EN 12457	21.27	%
Mercury	Leachate	BS EN 12457	24.13	%
Molybdenum	Leachate	BS EN 12457	12.55	%
Nickel	Leachate	BS EN 12457	20.08	%
Lead	Leachate	BS EN 12457	13.43	%
Antimony	Leachate	BS EN 12457	18.85	%
Selenium	Leachate	BS EN 12457	18.91	%
Zinc	Leachate	BS EN 12457	13.71	%
Chloride	Leachate	BS EN 12457	16	%
Fluoride	Leachate	BS EN 12457	19.4	%
Sulphate	Leachate	BS EN 12457	19.63	%
TDS	Leachate	BS EN 12457	12	%
Phenol Index	Leachate	BS EN 12457	14	%
DOC	Leachate	BS EN 12457	10	%
Clay Content	Soil	BS 3882: 2015	15	%
Silt Content	Soil	BS 3882: 2015	14	%
Sand Content	Soil	BS 3882: 2015	13	%
Loss on Ignition	Soil	BS 3882: 2015	17	%
pH	Soil	BS 3882: 2015	0.399	Units
Carbonate	Soil	BS 3882: 2015	16	%
Total Nitrogen	Soil	BS 3882: 2015	12	%
Phosphorus (Extractable)	Soil	BS 3882: 2015	24	%
Potassium (Extractable)	Soil	BS 3882: 2015	20	%
Magnesium (Extractable)	Soil	BS 3882: 2015	26	%
Zinc	Soil	BS 3882: 2015	14.9	%
Copper	Soil	BS 3882: 2015	16	%
Nickel	Soil	BS 3882: 2015	17.7	%
Available Sodium	Soil	BS 3882: 2015	23	%
Available Calcium	Soil	BS 3882: 2015	23	%
Electrical Conductivity	Soil	BS 3882: 2015	10	%

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Analytical Report Number : 20-30535

Project / Site name:	Twickenham Riverside - Diamond Jubilee Gardens, Twickenham	**Samples received on:**	17/09/2020
Your job number:	4955,SI	**Samples instructed on/ Analysis started on:**	18/09/2020
Your order number:	5218.CO V1-JD	**Analysis completed by:**	24/09/2020
Report Issue Number:	1	**Report issued on:**	24/09/2020
Samples Analysed:	4 water samples		

Signed: Karolina Marek

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

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

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

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

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

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

Analytical Report Number: 20-30535

Project / Site name: Twickenham Riverside - Diamond Jubilee Gardens, Twickenham

Your Order No: 5218.CO V1-JD

Lab Sample Number				1622471	1622472	1622473	1622474
Sample Reference				BH01 (shallow)	BH01 (deep)	BH02 (shallow)	BH02 (deep)
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				5.50	6.00	2.50	12.50
Date Sampled				17/09/2020	17/09/2020	17/09/2020	17/09/2020
Time Taken				1225	1225	1225	1225
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Accreditation Status**				
General Inorganics							
pH	pH Units	N/A	ISO 17025	7.4	-	7.2	7.9
Temperature on Receipt	oC	0.1	NONE	9.1	9.1	9.1	9.1
Total Cyanide (Low Level 1 µg/l)	µg/l	1	ISO 17025	< 1.0	-	< 1.0	< 1.0
Free Cyanide (Low Level 1 µg/l)	µg/l	1	ISO 17025	< 1	-	< 1	< 1
Chloride	mg/l	0.15	ISO 17025	39	36	50	300
Dissolved Oxygen	mg/l	1	NONE	2.7	4.1	1.8	2.4
Total Phenols							
Total Phenols (monohydric)	µg/l	10	ISO 17025	< 10	-	< 10	< 10
Speciated PAHs							
Naphthalene	µg/l	0.01	ISO 17025	< 0.01	-	< 0.01	< 0.01
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	-	< 0.01	< 0.01
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	-	< 0.01	< 0.01
Fluorene	µg/l	0.01	ISO 17025	< 0.01	-	< 0.01	< 0.01
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01	-	< 0.01	< 0.01
Anthracene	µg/l	0.01	ISO 17025	< 0.01	-	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	-	< 0.01	< 0.01
Pyrene	µg/l	0.01	ISO 17025	< 0.01	-	< 0.01	< 0.01
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	-	< 0.01	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01	-	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	-	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	-	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	-	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	< 0.01	-	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01	-	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	< 0.01	-	< 0.01	< 0.01
Total PAH							
Total EPA-16 PAHs	µg/l	0.16	ISO 17025	< 0.16	-	< 0.16	< 0.16
Heavy Metals / Metalloids							
Boron (dissolved)	µg/l	10	ISO 17025	240	-	140	1100
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0	-	< 5.0	< 5.0
Arsenic (dissolved)	µg/l	0.15	ISO 17025	< 0.15	-	0.37	2.82
Barium (dissolved)	µg/l	0.06	ISO 17025	44	-	72	72
Beryllium (dissolved)	µg/l	0.1	ISO 17025	< 0.1	-	< 0.1	< 0.1
Cadmium (dissolved)	µg/l	0.02	ISO 17025	0.03	-	0.03	0.03
Chromium (dissolved)	µg/l	0.2	ISO 17025	5.3	-	9.9	3
Copper (dissolved)	µg/l	0.5	ISO 17025	0.6	-	3.5	2.2
Lead (dissolved)	µg/l	0.2	ISO 17025	< 0.2	-	0.3	< 0.2
Mercury (dissolved)	µg/l	0.05	ISO 17025	< 0.05	-	< 0.05	< 0.05
Molybdenum (dissolved)	µg/l	0.05	ISO 17025	2.4	-	3.9	7.5
Nickel (dissolved)	µg/l	0.5	ISO 17025	7.8	-	6	4.2
Selenium (dissolved)	µg/l	0.6	ISO 17025	4.5	-	8.4	22
Vanadium (dissolved)	µg/l	0.2	ISO 17025	< 0.2	-	< 0.2	3.8
Zinc (dissolved)	µg/l	0.5	ISO 17025	6.2	-	6.8	8

Analytical Report Number: 20-30535

Project / Site name: Twickenham Riverside - Diamond Jubilee Gardens, Twickenham

Your Order No: 5218.CO V1-JD

Lab Sample Number				1622471	1622472	1622473	1622474
Sample Reference				BH01 (shallow)	BH01 (deep)	BH02 (shallow)	BH02 (deep)
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				5.50	6.00	2.50	12.50
Date Sampled				17/09/2020	17/09/2020	17/09/2020	17/09/2020
Time Taken				1225	1225	1225	1225
Analytical Parameter (Water Analysis)	**Units**	**Limit of detection**	**Accreditation Status**				
Petroleum Hydrocarbons							
TPH1 (C10 - C40)	µg/l	10	NONE	< 10	-	< 10	< 10

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

Analytical Report Number : 20-30535
Project / Site name: Twickenham Riverside - Diamond Jubilee Gardens, Twickenham

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in water by ICP-MS (dissolved)	Determination of metals in water by acidification followed by ICP-MS. Accredited Matrices: SW, GW, PW except B=SW,GW, Hg=SW,PW, Al=SW,PW.	In-house method based on USEPA Method 6020 & 200.8 "for the determination of trace elements in water by ICP-MS.	L012-PL	W	ISO 17025
Boron in water	Determination of boron in water by acidification followed by ICP-OES. Accredited matrices: SW PW GW	In-house method based on MEWAM	L039-PL	W	ISO 17025
Complex cyanide (Low level) in water	Determination of complex cyanide by calculation. Accredited matrices SW, PW, GW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
Hexavalent chromium in water	Determination of hexavalent chromium in water by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method by continuous flow analyser. Accredited Matrices SW, GW, PW.	L080-PL	W	ISO 17025
Monohydric phenols in water	Determination of phenols in water by continuous flow analyser. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
Dissolved Oxygen in water	Determination of dissolved oxygen.	In-house method	L086-PL	W	NONE
Speciated EPA-16 PAHs in water	Determination of PAH compounds in water by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards. Accredited matrices: SW PW GW	In-house method based on USEPA 8270	L102B-PL	W	ISO 17025
TPH1 (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS.	In-house method	L070-PL	W	NONE
Low level total cyanide in water	Determination of total cyanide by distillation followed by colorimetry. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
pH at 20oC in water (automated)	Determination of pH in water by electrometric measurement. Accredited matrices: SW PW GW	In house method.	L099-PL	W	ISO 17025
Free cyanide (low level) in water	Determination of free cyanide by distillation followed by colorimetry.Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
Temperature on Receipt (water)	Temperature of water upon receipt.	In-house method	L019-UK	W	NONE
Chloride in water	Determination of Chloride colorimetrically by discrete analyser.	In house based on MEWAM Method ISBN 0117516260. Accredited matrices: SW, PW, GW.	L082-PL	W	ISO 17025

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

TEST REPORT

ISSUED BY SOIL PROPERTY TESTING LTD

DATE ISSUED: 29/09/2020

0998

Contract	**Twickenham Riverside**
Serial No.	**37489_1**

Client:

Geosphere Environmental Ltd

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Suffolk
IP10 0BJ

Soil Property Testing Ltd

15, 16, 18 Halcyon Court, St Margaret's Way,
Stukeley Meadows, Huntingdon,
Cambridgeshire, PE29 6DG

Tel: 01480 455579
Email: enquiries@soilpropertytesting.com
Website: www.soilpropertytesting.com

Samples Submitted By:

Geosphere Environmental Ltd

Samples Labelled:

Twickenham Riverside

Approved Signatories:

- ☑ **J.C. Garner B.Eng (Hons) FGS** — Technical Director & Quality Manager
- ☐ **S.P. Townend** — Chairman
- ☐ **W. Johnstone** — Materials Lab Manager
- ☐ **D. Sabnis** — Operations Manager

Date Received: 14/09/2020

Samples Tested Between: 14/09/2020 **and** 29/09/2020

Remarks:

For the attention of Jim Dawson
Your Reference No: 4955,SI

Notes:

1. All remaining samples or remnants from this contract will be disposed of after 21 days from today, unless we are notified to the contrary.
2. (a) UKAS - United Kingdom Accreditation Service.
   (b) Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.
3. Tests marked "NOT UKAS ACCREDITED" in this test report are not included in the UKAS Accreditation Schedule for this testing laboratory.
4. This test report may not be reproduced other than in full except with the prior written approval of the issuing laboratory.

TEST REPORT

ISSUED BY SOIL PROPERTY TESTING LTD

DATE ISSUED: 29/09/2020

0998

Contract	**Twickenham Riverside**		
Serial No.	**37489_1**	**Target Date**	28/09/2020
Scheduled By	Geosphere Environmental Ltd		

SCHEDULE OF LABORATORY TESTS

Schedule Remarks

Bore Hole No.	Type	Sample Ref.	Top Depth	Particle Size Distribution (BS1377)	Triaxial Test	Water Content (BSEN)	Liquid/Plastic Limits															Sample Remarks
BH1	B	6	5.00	1																		
BH1	U	8	7.50		1																	
BH1	D	9	7.55			1	1															
BH1	U	14	13.50		1																	
BH1	D	15	13.55			1	1															
BH1	U	17	16.50		1																	
BH1	D	21	19.55			1	1															
BH1	U	25	24.00		1																	
BH2	D	4	4.00			1	1															
BH2	U	5	5.00		1																	
BH2	U	12	10.50		1																	
BH2	D	13	10.55			1	1															
BH2	U	18	16.50		1																	
BH2	D	19	16.55			1	1															
BH2	U	21	19.50		1																	
BH2	U	25	24.00		1																	
Totals				**1**	**9**	**6**	**6**															**End of Schedule**

TEST REPORT

ISSUED BY SOIL PROPERTY TESTING LTD

DATE ISSUED: 29/09/2020

0998

Contract	**Twickenham Riverside**
Serial No.	**37489_1**

SUMMARY OF WATER CONTENT, LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX AND LIQUIDITY INDEX

Borehole /Pit No.	Depth (m)	Type	Ref.	Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasti-city Index (%)	Liquid-ity Index	Sample Preparation				Description	Class
									Method	Ret'd 0.425mm (%)	Corr'd W/C <0.425mm	Curing Time (hrs)		
BH1	7.55	D	9	**28.5**	76	26	50	0.05	From Natural	0 (A)		67	Very stiff fissured dark greyish brown CLAY.	CV
BH1	13.55	D	15	**25.2**	72	24	48	0.03	From Natural	0 (A)		68	Very stiff fissured dark greyish brown CLAY.	CV
BH1	19.55	D	21	**26.6**	75	26	49	0.01	From Natural	0 (A)		68	Very stiff fissured dark greyish brown CLAY.	CV
BH2	4.00	D	4	**31.5**	79	27	52	0.09	From Natural	0 (A)		68	Stiff dark greyish brown CLAY.	CV
BH2	10.55	D	13	**27.2**	70	25	45	0.05	From Natural	0 (A)		67	Very stiff fissured dark greyish brown CLAY.	CH/CV
BH2	16.55	D	19	**27.4**	74	25	49	0.05	From Natural	0 (A)		68	Very stiff fissured dark greyish brown CLAY.	CV

Method Of Preparation: BS EN ISO: 17892-1: 2014 & BS 1377: Part 2:1990:4.2
Method of Test: BS EN ISO: 17892-1: 2014 & BS 1377: Part 2:1990:3.2, 4.4, 5.3, 5.4
Type of Sample Key: U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter
Comments:

Table Notation: Ret'd 0.425mm: (A) = Assumed, (M) = Measured

TEST REPORT

ISSUED BY SOIL PROPERTY TESTING LTD

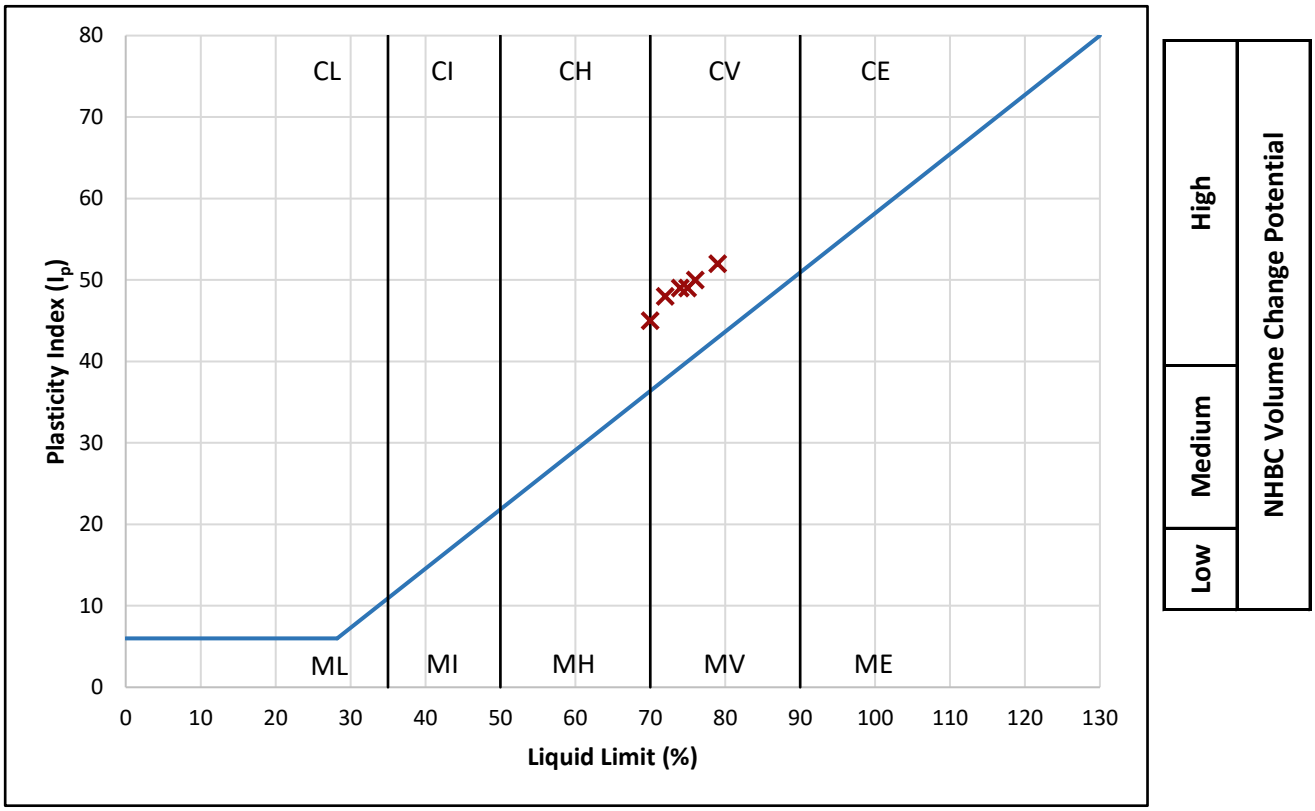
DATE ISSUED: 29/09/2020

0998

Contract	**Twickenham Riverside**
Serial No.	**37489_1**

PLOT OF PLASTICITY INDEX AGAINST LIQUID LIMIT USING CASAGRANDE CLASSIFICATION CHART

Plasticity				
Low	Medium	High	Very High	Extremely High



Plasticity Chart BS5930: 2015: Figure 8

Method of Preparation:	BS 1377: Part 2: 1990: 4.2
Method of Test:	BS1377: Part 2: 3.2, 4.4, 5.3, 5.4
Type of Sample Key:	U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter
Comments:	Volume Change Potential: NHBC Standards Chapter 4.2 Unmodified Plasticity Index

TEST REPORT

ISSUED BY SOIL PROPERTY TESTING LTD

DATE ISSUED: 29/09/2020

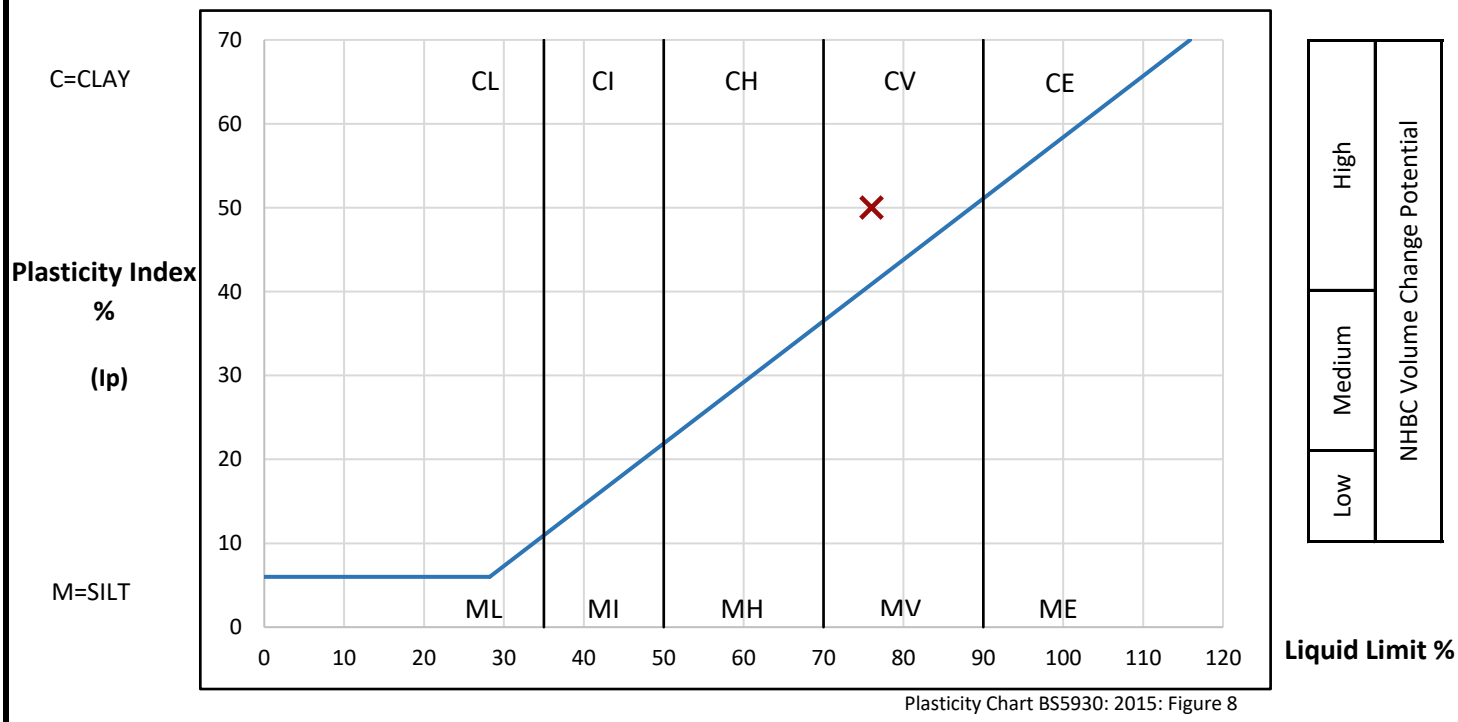
0998

Contract	**Twickenham Riverside**
Serial No.	**37489_1**

DETERMINATION OF WATER CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY INDEX AND LIQUIDITY INDEX

Borehole / Pit No.	Depth m	Sample Type	Sample Reference	Water Content (W) %	Description	Remarks
BH1	7.55	D	9	28.5	Very stiff fissured dark greyish brown CLAY.	

PREPARATION			Liquid Limit	76 %
Method of preparation		From natural	Plastic Limit	26 %
Sample retained 0.425mm sieve	(Assumed)	0 %	Plasticity Index	50 %
Corrected water content for material passing 0.425mm			Liquidity Index	0.05
Sample retained 2mm sieve	(Assumed)	0 %	NHBC Modified (I'p)	n/a
Curing time	67 hrs	Clay Content Not analysed	Derived Activity	Not analysed



Plasticity Chart BS5930: 2015: Figure 8

Method of Preparation:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 4.2
Method of Test:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 3.2, 4.4, 5.3, 5.4
Type of Sample Key:	U=Undisturbed, B=Bulk, D=Disturbed, J=Jar, W=Water, SPT=Split Spoon Sample, C=Core Cutter
Comments:	

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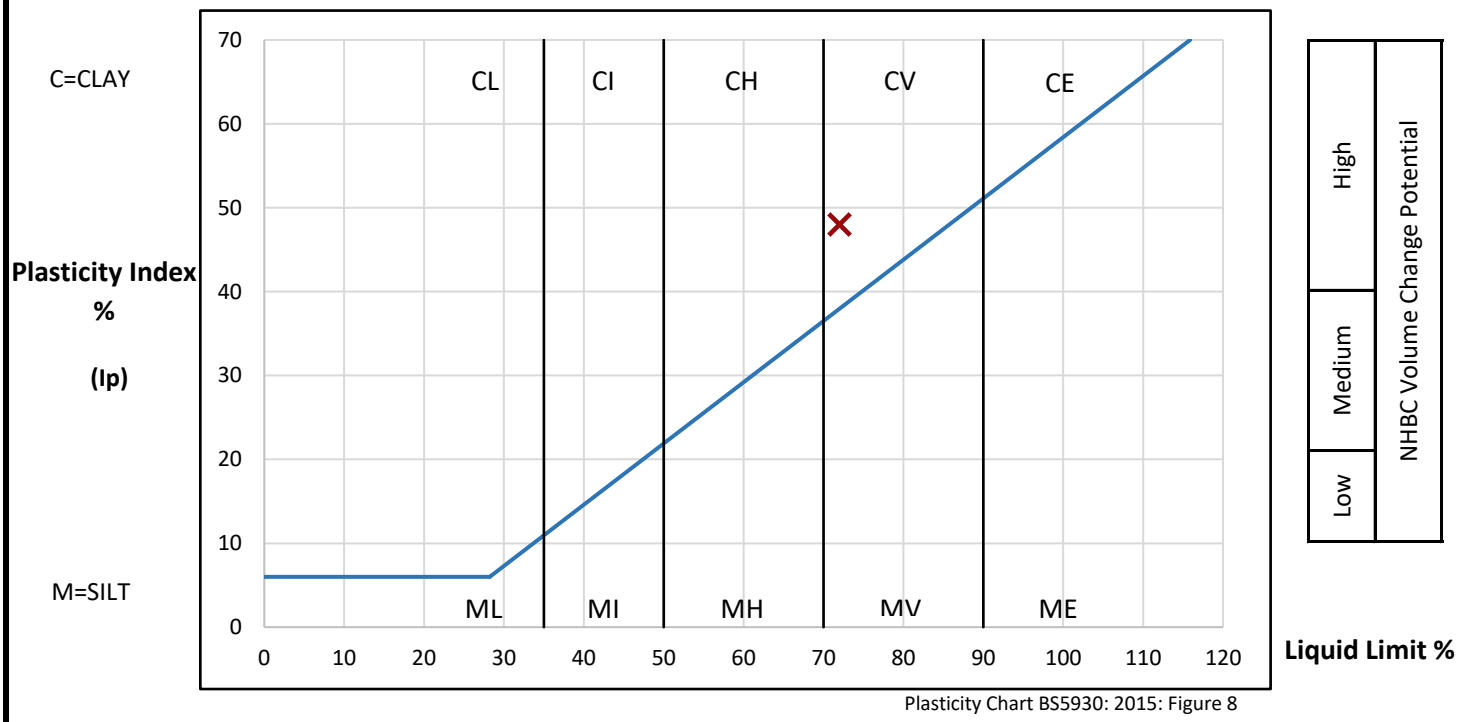
Contract	**Twickenham Riverside**
Serial No.	**37489_1**

DETERMINATION OF WATER CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY INDEX AND LIQUIDITY INDEX

Borehole / Pit No.	Depth m	Sample Type	Sample Reference	Water Content (W) %	Description	Remarks
BH1	13.55	D	15	25.2	Very stiff fissured dark greyish brown CLAY.	

PREPARATION			Liquid Limit	72 %
Method of preparation		From natural	Plastic Limit	24 %
Sample retained 0.425mm sieve	(Assumed)	0 %	Plasticity Index	48 %
Corrected water content for material passing 0.425mm			Liquidity Index	0.03
Sample retained 2mm sieve	(Assumed)	0 %	NHBC Modified (I'p)	n/a
Curing time	68 hrs	Clay Content Not analysed	Derived Activity	Not analysed



Plasticity Chart BS5930: 2015: Figure 8

Method of Preparation:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 4.2
Method of Test:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 3.2, 4.4, 5.3, 5.4
Type of Sample Key:	U=Undisturbed, B=Bulk, D=Disturbed, J=Jar, W=Water, SPT=Split Spoon Sample, C=Core Cutter
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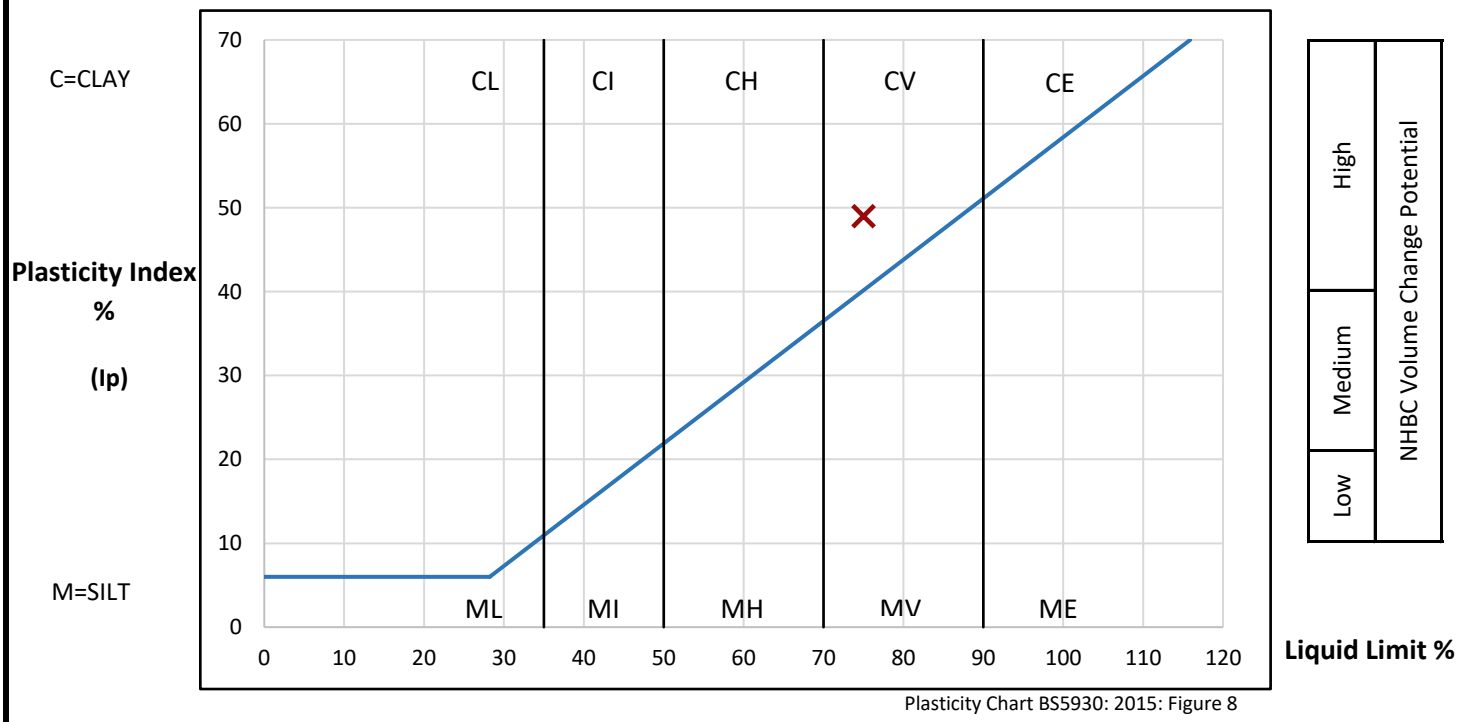
DETERMINATION OF WATER CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY INDEX AND LIQUIDITY INDEX

Borehole / Pit No.	Depth m	Sample Type	Sample Reference	Water Content (W) %	Description	Remarks
BH1	19.55	D	21	26.6	Very stiff fissured dark greyish brown CLAY.	

PREPARATION			Liquid Limit	75 %
Method of preparation		From natural	Plastic Limit	26 %
Sample retained 0.425mm sieve	(Assumed)	0 %	Plasticity Index	49 %
Corrected water content for material passing 0.425mm			Liquidity Index	0.01
Sample retained 2mm sieve	(Assumed)	0 %	NHBC Modified (I'p)	n/a
Curing time	68 hrs	Clay Content Not analysed	Derived Activity	Not analysed



Plasticity Chart BS5930: 2015: Figure 8

Method of Preparation: BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 4.2

Method of Test: BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 3.2, 4.4, 5.3, 5.4

Type of Sample Key: U=Undisturbed, B=Bulk, D=Disturbed, J=Jar, W=Water, SPT=Split Spoon Sample, C=Core Cutter

Comments:

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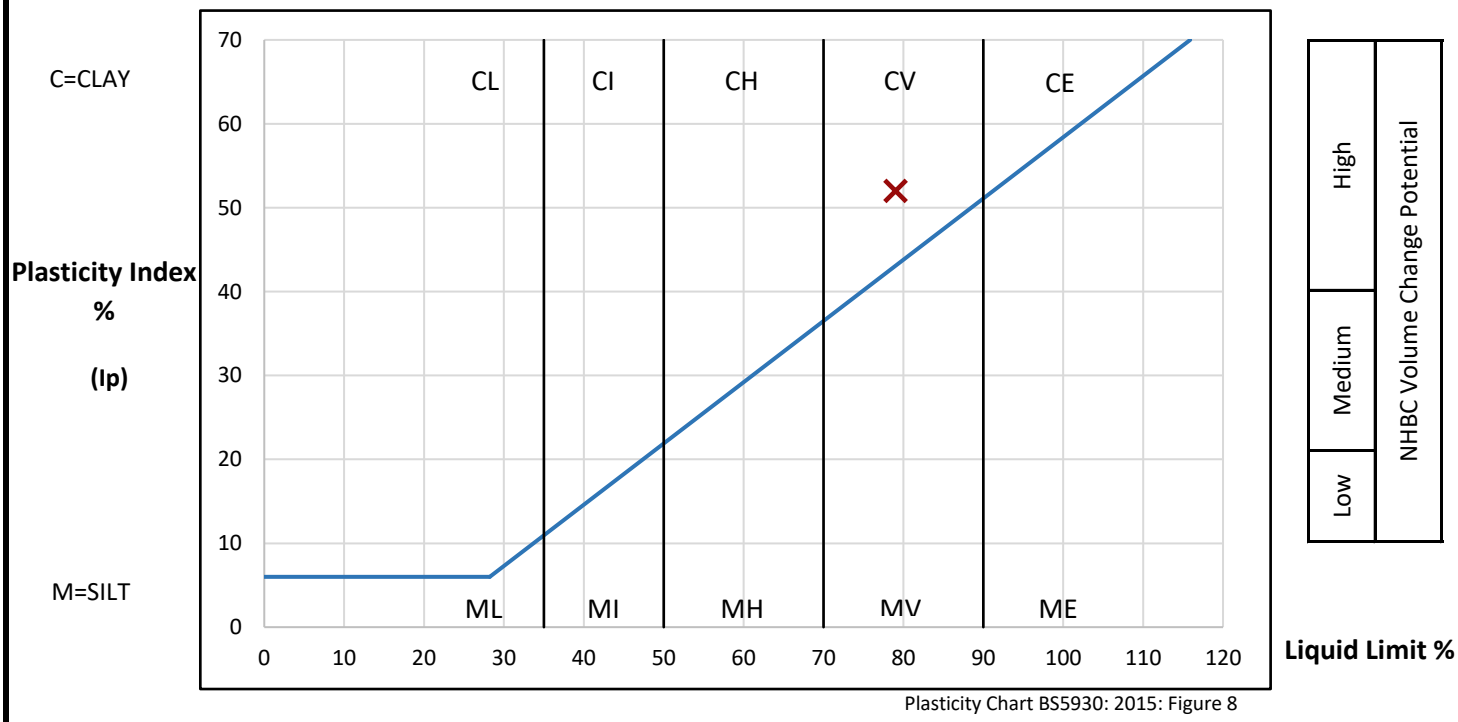
DETERMINATION OF WATER CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY INDEX AND LIQUIDITY INDEX

Borehole / Pit No.	Depth m	Sample Type	Sample Reference	Water Content (W) %	Description	Remarks
BH2	4.00	D	4	31.5	Stiff dark greyish brown CLAY.	

PREPARATION				Liquid Limit	79 %
Method of preparation		From natural		Plastic Limit	27 %
Sample retained 0.425mm sieve	(Assumed)	0 %		Plasticity Index	52 %
Corrected water content for material passing 0.425mm				Liquidity Index	0.09
Sample retained 2mm sieve	(Assumed)	0 %		NHBC Modified (I'p)	n/a
Curing time	68 hrs	Clay Content	Not analysed	Derived Activity	Not analysed



Plasticity Chart BS5930: 2015: Figure 8

Method of Preparation:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 4.2
Method of Test:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 3.2, 4.4, 5.3, 5.4
Type of Sample Key:	U=Undisturbed, B=Bulk, D=Disturbed, J=Jar, W=Water, SPT=Split Spoon Sample, C=Core Cutter
Comments:	

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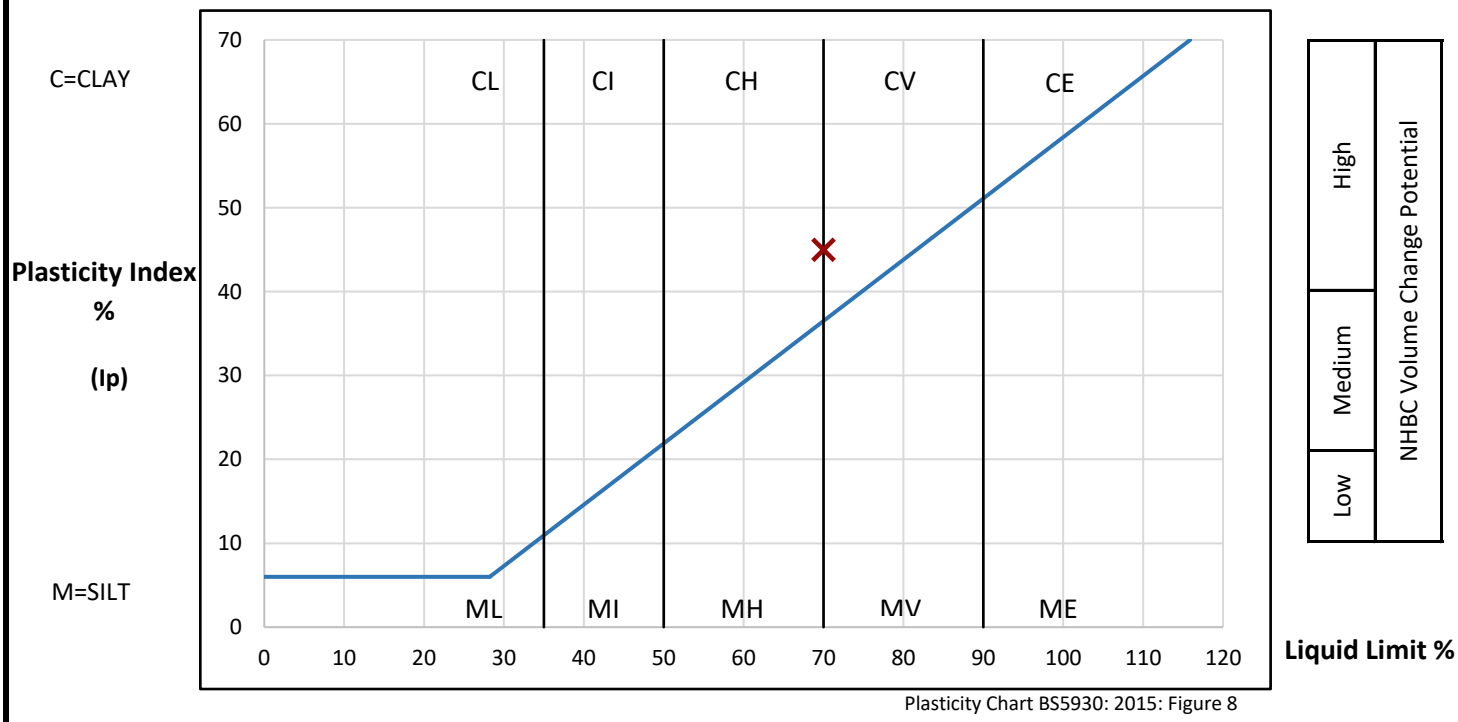
DETERMINATION OF WATER CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY INDEX AND LIQUIDITY INDEX

Borehole / Pit No.	Depth m	Sample Type	Sample Reference	Water Content (W) %	Description	Remarks
BH2	10.55	D	13	27.2	Very stiff fissured dark greyish brown CLAY.	

PREPARATION			Liquid Limit	70 %
Method of preparation		From natural	Plastic Limit	25 %
Sample retained 0.425mm sieve	(Assumed)	0 %	Plasticity Index	45 %
Corrected water content for material passing 0.425mm			Liquidity Index	0.05
Sample retained 2mm sieve	(Assumed)	0 %	NHBC Modified (I'p)	n/a
Curing time	67 hrs	Clay Content Not analysed	Derived Activity	Not analysed



Plasticity Chart BS5930: 2015: Figure 8

Method of Preparation: BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 4.2

Method of Test: BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 3.2, 4.4, 5.3, 5.4

Type of Sample Key: U=Undisturbed, B=Bulk, D=Disturbed, J=Jar, W=Water, SPT=Split Spoon Sample, C=Core Cutter

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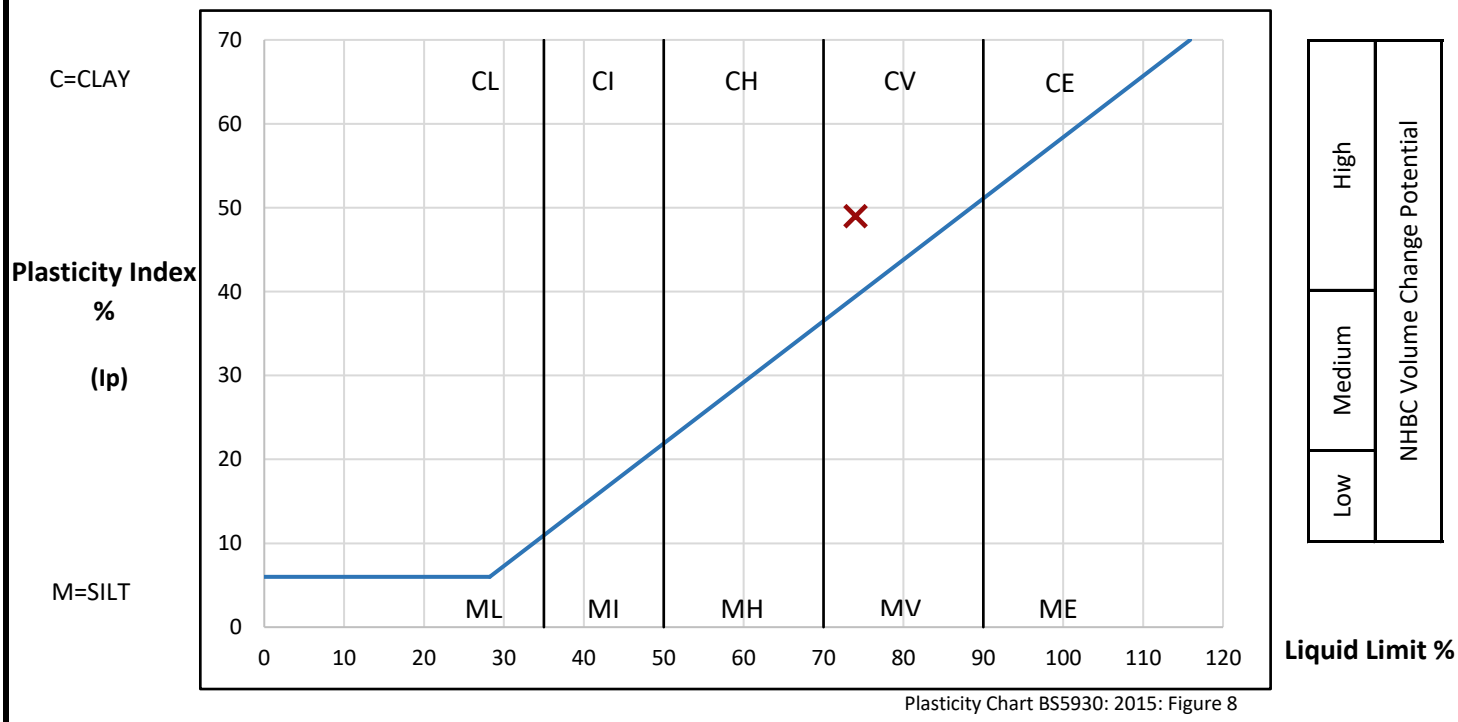
DETERMINATION OF WATER CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY INDEX AND LIQUIDITY INDEX

Borehole / Pit No.	Depth m	Sample Type	Sample Reference	Water Content (W) %	Description	Remarks
BH2	16.55	D	19	27.4	Very stiff fissured dark greyish brown CLAY.	

PREPARATION			Liquid Limit	74 %
Method of preparation		From natural	Plastic Limit	25 %
Sample retained 0.425mm sieve	(Assumed)	0 %	Plasticity Index	49 %
Corrected water content for material passing 0.425mm			Liquidity Index	0.05
Sample retained 2mm sieve	(Assumed)	0 %	NHBC Modified (I'p)	n/a
Curing time	68 hrs	Clay Content Not analysed	Derived Activity	Not analysed



Plasticity Chart BS5930: 2015: Figure 8

Method of Preparation: BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 4.2

Method of Test: BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 3.2, 4.4, 5.3, 5.4

Type of Sample Key: U=Undisturbed, B=Bulk, D=Disturbed, J=Jar, W=Water, SPT=Split Spoon Sample, C=Core Cutter

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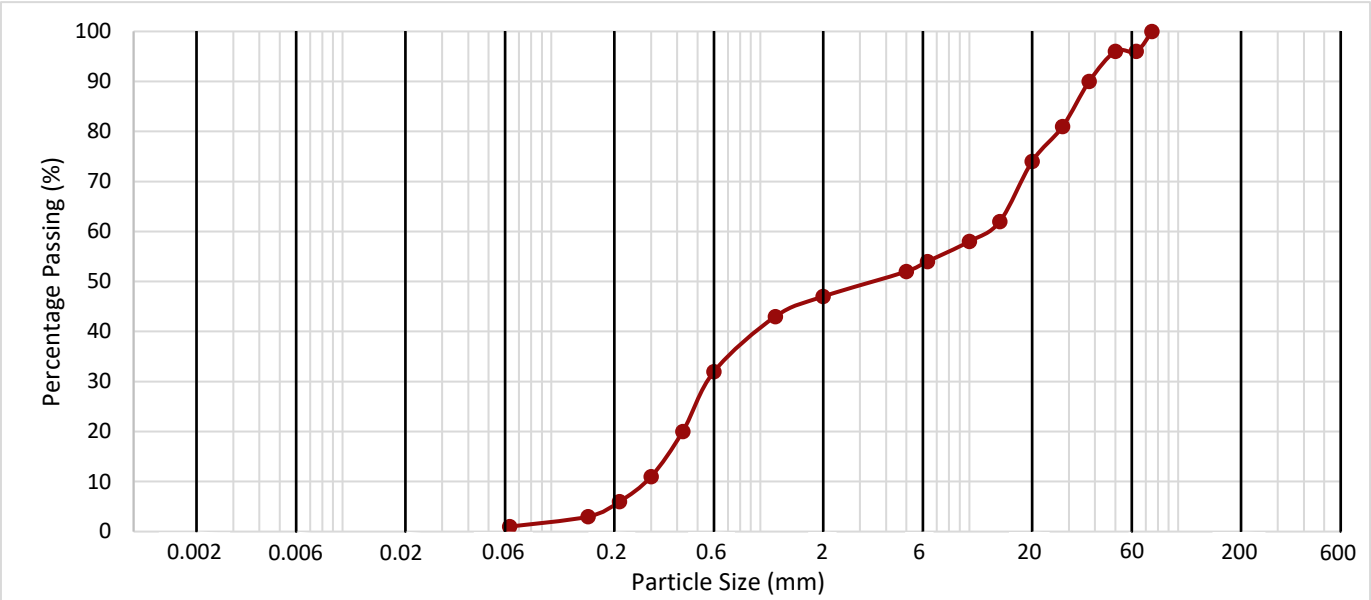
DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole / Pit No.	Depth (m)	Sample Type	Sample Reference	Description	Remarks
BH1	5.00 - 5.40	B	6	Yellowish brown slightly silty SAND and black, brown and white angular to subrounded chert with occasional yellowish brown and white quartzite GRAVEL	

Method of Test:	Wet Sieve	Method of Pretreatment:	Not required



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES	BOULDERS
	SILT			SAND			GRAVEL				

Hydrometer	Particle Size (mm)	Passing (%)	Silt by Dry Mass (%)	Clay by Dry Mass (%)

Sieve Size (mm)	Passing (%)	Sand By Dry Mass (%)
2.00	47	46
1.18	43	
0.600	32	
0.425	20	
0.300	11	
0.212	6	
0.150	3	
0.063	1	

Fines By Dry Mass (%)	
<0.063mm	1

Sieve Size (mm)	Passing (%)	2mm+ By Dry Mass (%)
300		53
125		
90		
63	96	
50	96	
37.5	90	
28	81	
20	74	
14	62	
10	58	
6.3	54	
5	52	

Method of Preparation: BS1377: Part 1: 2016: 8.3 & 8.4.5
Method of test: BS1377: Part 2: 1990: 9.2
Type of Sample Key: U=Undisturbed, B=Bulk, D=Disturbed, J=Jar, W=Water, SPT=Split Spoon Sample, C=Core Cutter
Comments:

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Contract	**Twickenham Riverside**
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DETERMINATION OF DENSITY, WATER CONTENT AND UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION WITHOUT MEASURMENT OF PORE PRESSURE

Borehole /Pit No.	Depth (m)	Type	Reference	Water Content (%)	Bulk Density (Mg/m³)	Dry Density (Mg/m³)	Lateral Pressure (kPa)	Deviator Stress (kPa)	Shear Stress (kPa)	Mohrs Circle Analysis		Description
										Cu (kPa)	Ø degrees	
BH1	7.59	U	8	31.0	1.95	1.49	147	196	98			Stiff (high strength) fissured dark greyish brown CLAY with rare silt pockets
BH1	13.61	U	14	25.4	2.02	1.61	261	276	138			Stiff (high strength) fissured dark greyish brown CLAY with rare shell/fossil fragments
BH1	16.58	U	17	27.0	2.02	1.59	320	300	150			Very stiff (very high strength) fissured dark greyish brown CLAY with rare silt pockets and iron pyrite fragments
BH1	24.12	U	25	26.5	2.00	1.58	473	517	259			Very stiff (very high strength) fissured dark greyish brown CLAY with rare silt pockets
BH2	5.11	U	5	29.1	2.00	1.55	106	184	92			Stiff (high strength) fissured dark greyish brown CLAY
BH2	10.58	U	12	25.8	2.02	1.61	200	417	209			Very stiff (very high strength) fissured dark greyish CLAY
BH2	16.59	U	18	28.5	1.96	1.53	316	160	80			Very stiff (high strength) fissured dark greyish brown CLAY with rare silt pockets

Method of Preparation:	BS 1377: Part 1: 1990: 7.4.2 & 8, Part 2: 1990: 7.2, Part 7: 1990: 8.3
Method of Test:	BS 1377: Part 2: 1990:3 Determination of Moisture Content, Part2: 1990:7 Determination of Density, Part 7: 1990: 8 Undrained Shear Strenth, 9 Multistage Loading
Type of Sample Key:	U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter
Comments:	
Remarks to Include:	Sample disturbance, loss of moisture, variation from test procedure, location and origin of test specimen within original sample, oven drying temperature if not 105-110°C

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DETERMINATION OF DENSITY, WATER CONTENT AND UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION WITHOUT MEASURMENT OF PORE PRESSURE

Borehole /Pit No.	Depth (m)	Type	Reference	Water Content (%)	Bulk Density (Mg/m³)	Dry Density (Mg/m³)	Lateral Pressure (kPa)	Deviator Stress (kPa)	Shear Stress (kPa)	Mohrs Circle Analysis		Description
										Cu (kPa)	Ø degrees	
BH2	19.61	U	21	27.7	1.97	1.54	370	269	135			Stiff (high strength) fissured dark greyish brown CLAY
BH2	24.08	U	25	26.9	1.99	1.57	466	603	302			Hard (extremely high strength) fissured dark greyish brown CLAY

Method of Preparation: BS 1377: Part 1: 1990: 7.4.2 & 8, Part 2: 1990: 7.2, Part 7: 1990: 8.3

Method of Test: BS 1377: Part 2: 1990:3 Determination of Moisture Content, Part2: 1990:7 Determination of Density, Part 7: 1990: 8 Undrained Shear Strenth, 9 Multistage Loading

Type of Sample Key: U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter

Comments:

Remarks to Include: Sample disturbance, loss of moisture, variation from test procedure, location and origin of test specimen within original sample, oven drying temperature if not 105-110°C

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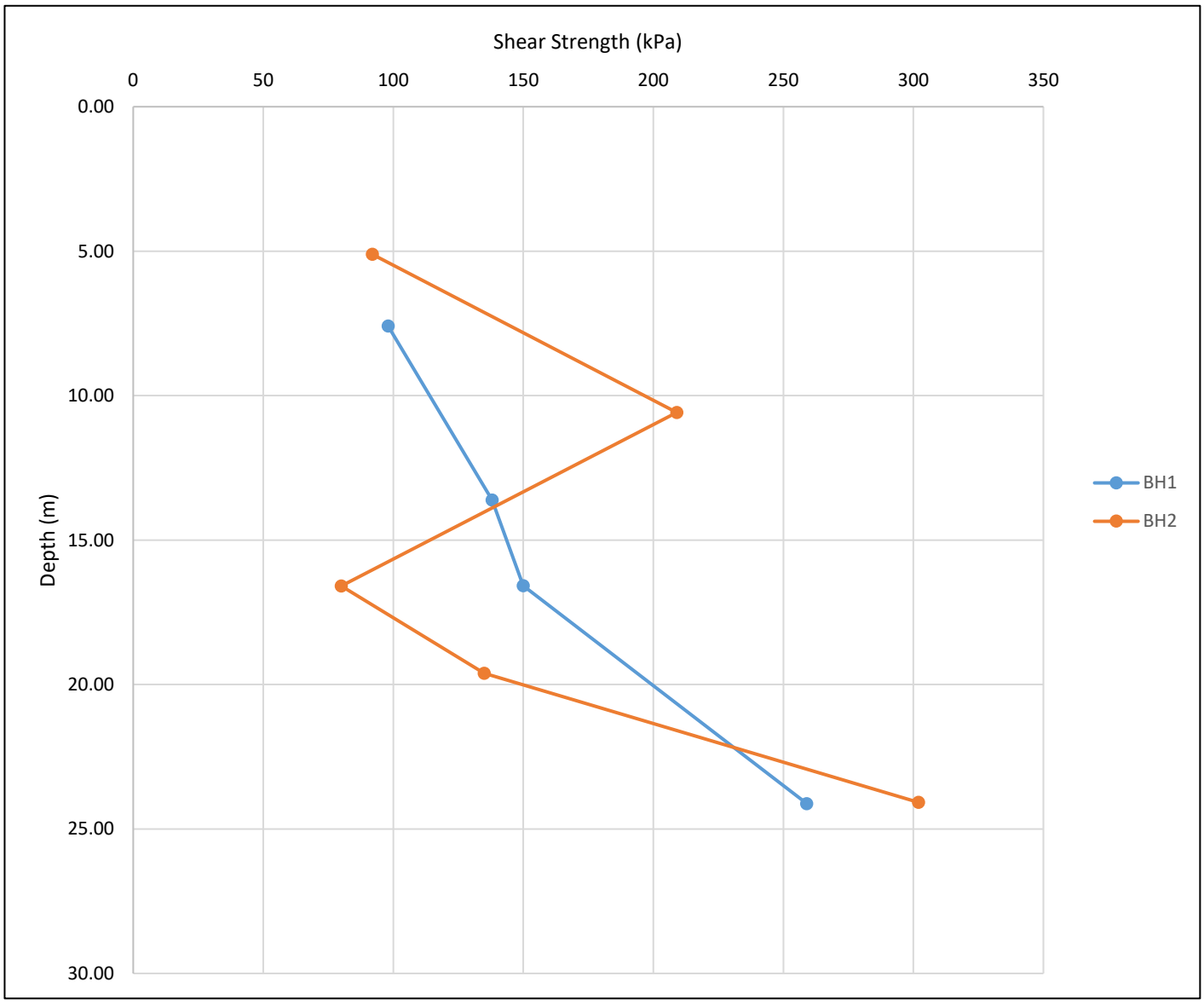
SHEAR STRENGTH VS DEPTH BELOW GROUND LEVEL



Method of Preparation:	BS 1377: Part 1: 1990
Method of Test:	BS 1377: Part7: 1990:8 Definitive Method, 1990:9 Multi-stage loading
Type of Sample Key:	U - Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter
Comments:	
Remarks to Include:	Sample disturbance, loss of water, variation from test procedure, location and origin of test specimen within original sample, oven drying temperature if not 105-110°C

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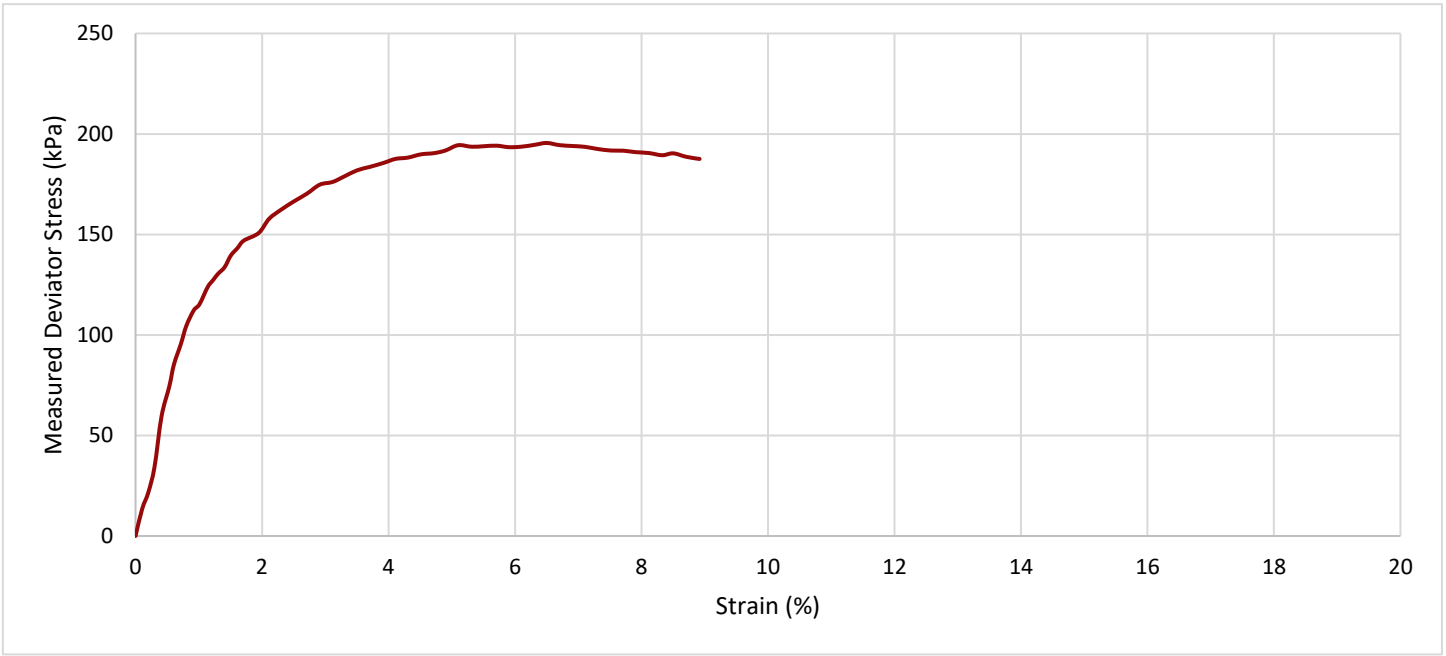
DETERMINATION OF UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION WITHOUT MEASUREMENT OF PORE PRESSURE

Borehole /Pit No.	Depth (m)	Type	Reference	Description	Remarks
BH1	7.50	U	8	Stiff (high strength) fissured dark greyish brown CLAY with rare silt pockets	

Initial Specimen	Height (mm)	Diameter (mm)	Weight (g)	Water Content (%)	Bulk Density (Mg/m³)	Dry Density (Mg/m³)
Depth of Top of Specimen (m) 7.59	199.2	102.5	3204	31.0	1.95	1.49

TEST INFORMATION	Rate of Strain	1.0	% per Min	Rubber Membrane Thickness	0.3	mm



Specimen at failure	Measured Cell Pressure, σ3 (kPa)	Strain at Failure (%)	Stress Corrections (kPa)		Corrected Max. Deviator Stress, (σ1-σ3)f (kPa)	Shear Stress Cu, ½(σ1-σ3)f (kPa)	Mohrs Circle Analysis	
			Rubber Membrane	Piston Friction			Cu (kPa)	PHI (degrees)
	147	6.5	0.5	\	196	98		

Method of Preparation:	BS 1377: Part 1: 1990
Method of Test:	BS 1377: Part 7: 1990: 8 Definitive Method, 1990: 9 Multi-stage loading
Type of Sample Key:	U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter
Comments:	Tested in Vertical Condition
	UKAS Calibration - loads from 0.2 to 10kN
Remarks to Include:	Sample disturbance, loss of moisture, variation form test procedure, location and origin of test specimen within original sample, oven drying temperature if not 105-110°C

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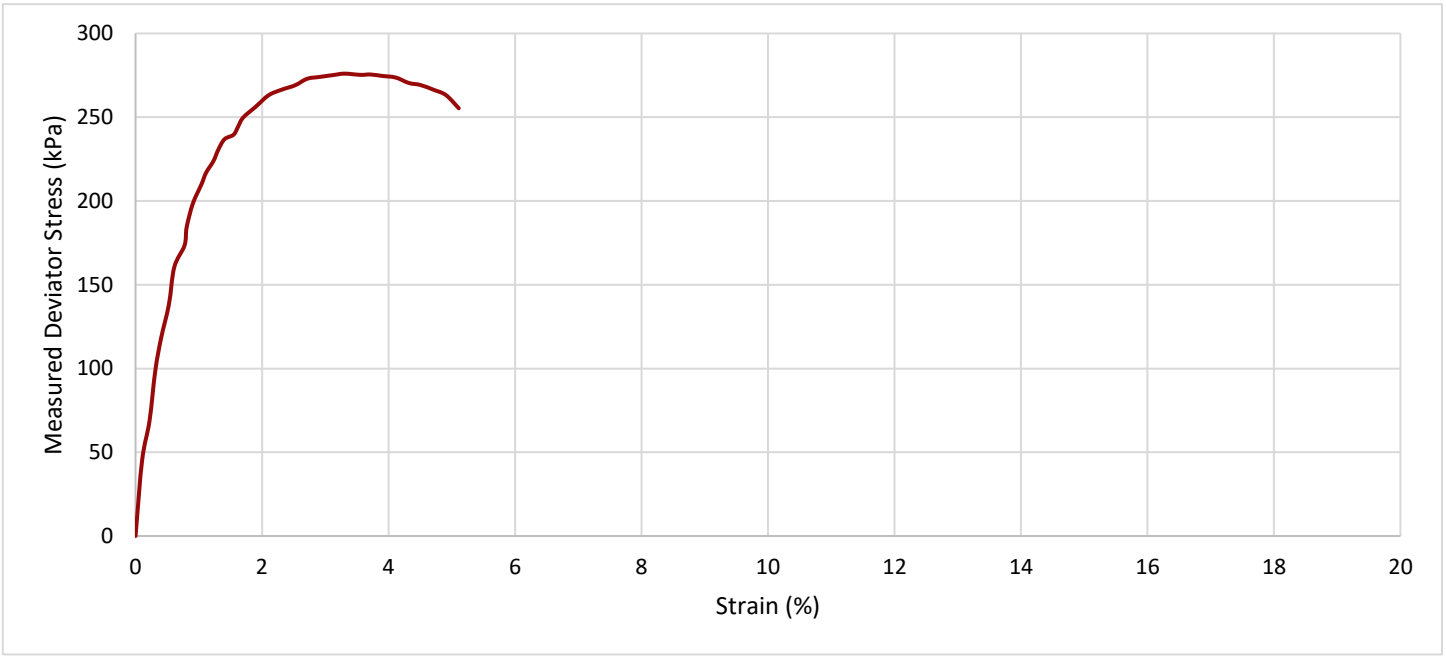
DETERMINATION OF UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION WITHOUT MEASUREMENT OF PORE PRESSURE

Borehole /Pit No.	Depth (m)	Type	Reference	Description	Remarks
BH1	13.50	U	14	Stiff (high strength) fissured dark greyish brown CLAY with rare shell/fossil fragments	Premature failure at 3.3% strain.

Initial Specimen	Height (mm)	Diameter (mm)	Weight (g)	Water Content (%)	Bulk Density (Mg/m³)	Dry Density (Mg/m³)
Depth of Top of Specimen (m) 13.61	199.4	103.0	3354	25.4	2.02	1.61

TEST INFORMATION — Rate of Strain 1.0 % per Min — Rubber Membrane Thickness 0.3 mm



Specimen at failure	Measured Cell Pressure, σ3 (kPa)	Strain at Failure (%)	Stress Corrections (kPa)		Corrected Max. Deviator Stress, (σ1-σ3)f (kPa)	Shear Stress Cu, ½(σ1-σ3)f (kPa)	Mohrs Circle Analysis	
			Rubber Membrane	Piston Friction			Cu (kPa)	PHI (degrees)
	261	3.3	0.3	\	276	138		

Method of Preparation: BS 1377: Part 1: 1990

Method of Test: BS 1377: Part 7: 1990: 8 Definitive Method, 1990: 9 Multi-stage loading

Type of Sample Key: U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter

Comments: Tested in Vertical Condition

UKAS Calibration - loads from 0.2 to 10kN

Remarks to Include: Sample disturbance, loss of moisture, variation form test procedure, location and origin of test specimen within original sample, oven drying temperature if not 105-110°C

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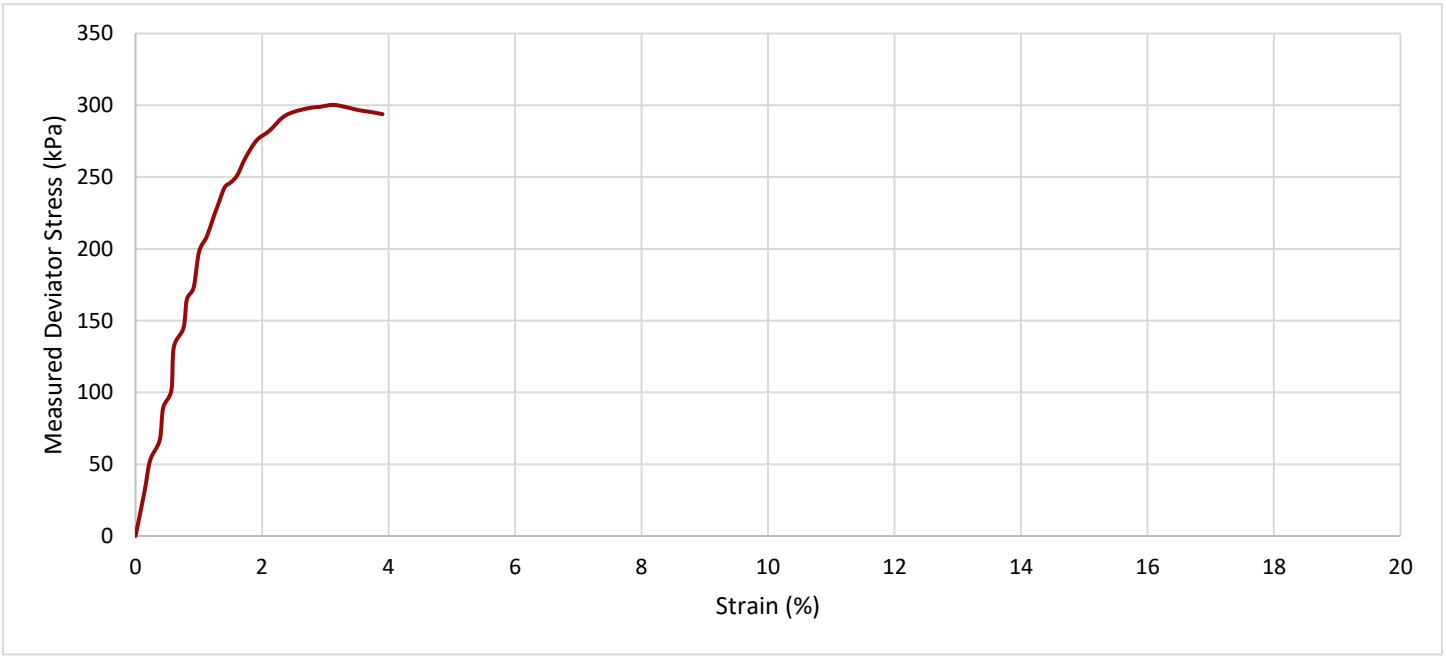
DETERMINATION OF UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION WITHOUT MEASUREMENT OF PORE PRESSURE

Borehole /Pit No.	Depth (m)	Type	Reference	Description	Remarks
BH1	16.50	U	17	Very stiff (very high strength) fissured dark greyish brown CLAY with rare silt pockets and iron pyrite fragments	Premature failure at 3.1% strain.

Initial Specimen	Height (mm)	Diameter (mm)	Weight (g)	Water Content (%)	Bulk Density (Mg/m³)	Dry Density (Mg/m³)
Depth of Top of Specimen (m) 16.58	169.6	102.7	2832	27.0	2.02	1.59

TEST INFORMATION — Rate of Strain 0.9 % per Min — Rubber Membrane Thickness 0.3 mm



Specimen at failure	Measured Cell Pressure, σ3 (kPa)	Strain at Failure (%)	Stress Corrections (kPa)		Corrected Max. Deviator Stress, (σ1-σ3)f (kPa)	Shear Stress Cu, ½(σ1-σ3)f (kPa)	Mohrs Circle Analysis	
			Rubber Membrane	Piston Friction			Cu (kPa)	PHI (degrees)
	320	3.1	0.3	\	300	150		

Method of Preparation:	BS 1377: Part 1: 1990
Method of Test:	BS 1377: Part 7: 1990: 8 Definitive Method, 1990: 9 Multi-stage loading
Type of Sample Key:	U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter
Comments:	Tested in Vertical Condition
	UKAS Calibration - loads from 0.2 to 10kN
Remarks to Include:	Sample disturbance, loss of moisture, variation form test procedure, location and origin of test specimen within original sample, oven drying temperature if not 105-110°C

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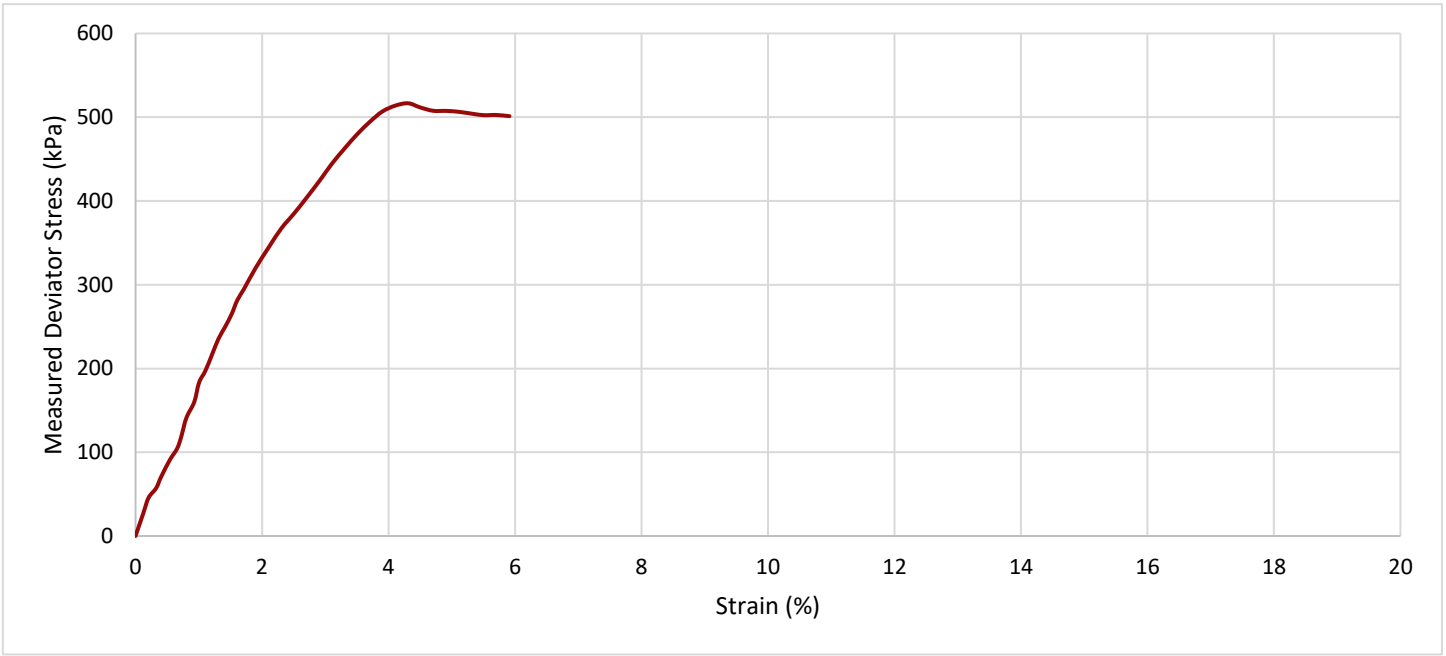
DETERMINATION OF UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION WITHOUT MEASUREMENT OF PORE PRESSURE

Borehole /Pit No.	Depth (m)	Type	Reference	Description	Remarks
BH1	24.00	U	25	Very stiff (very high strength) fissured dark greyish brown CLAY with rare silt pockets	Premature failure at 4.3% strain.

Initial Specimen	Height (mm)	Diameter (mm)	Weight (g)	Water Content (%)	Bulk Density (Mg/m³)	Dry Density (Mg/m³)
Depth of Top of Specimen (m) 24.12	169.8	102.7	2815	26.5	2.00	1.58

TEST INFORMATION — Rate of Strain 0.9 % per Min — Rubber Membrane Thickness 0.3 mm



Specimen at failure	Measured Cell Pressure, σ3 (kPa)	Strain at Failure (%)	Stress Corrections (kPa)		Corrected Max. Deviator Stress, (σ1-σ3)f (kPa)	Shear Stress Cu, ½(σ1-σ3)f (kPa)	Mohrs Circle Analysis	
			Rubber Membrane	Piston Friction			Cu (kPa)	PHI (degrees)
	473	4.3	0.3	\	517	259		

Method of Preparation:	BS 1377: Part 1: 1990
Method of Test:	BS 1377: Part 7: 1990: 8 Definitive Method, 1990: 9 Multi-stage loading
Type of Sample Key:	U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter
Comments:	Tested in Vertical Condition
	UKAS Calibration - loads from 0.2 to 10kN
Remarks to Include:	Sample disturbance, loss of moisture, variation form test procedure, location and origin of test specimen within original sample, oven drying temperature if not 105-110°C

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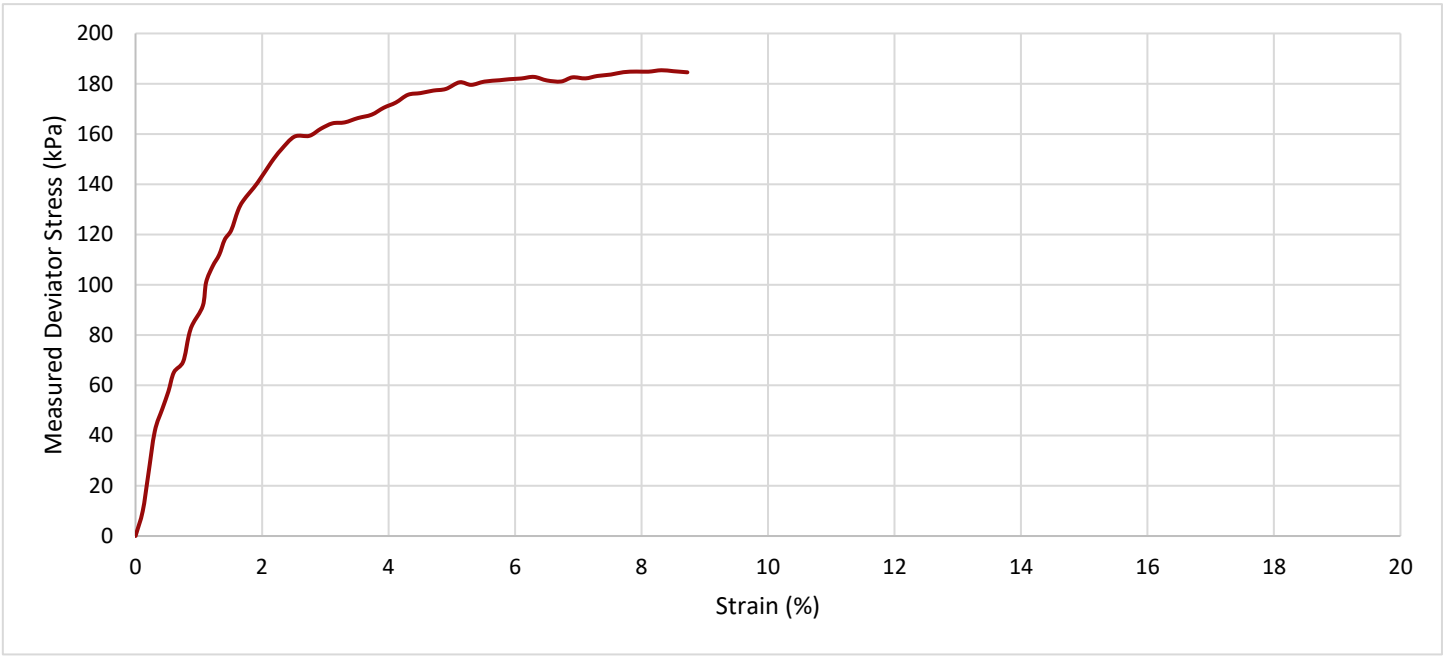
DETERMINATION OF UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION WITHOUT MEASUREMENT OF PORE PRESSURE

Borehole /Pit No.	Depth (m)	Type	Reference	Description	Remarks
BH2	5.00	U	5	Stiff (high strength) fissured dark greyish brown CLAY	

Initial Specimen	Height (mm)	Diameter (mm)	Weight (g)	Water Content (%)	Bulk Density (Mg/m³)	Dry Density (Mg/m³)
Depth of Top of Specimen (m) 5.11	150.4	102.0	2459	29.1	2.00	1.55

TEST INFORMATION	Rate of Strain	1.0	% per Min	Rubber Membrane Thickness	0.3	mm



Specimen at failure	Measured Cell Pressure, σ3 (kPa)	Strain at Failure (%)	Stress Corrections (kPa)		Corrected Max. Deviator Stress, (σ1-σ3)f (kPa)	Shear Stress Cu, ½(σ1-σ3)f (kPa)	Mohrs Circle Analysis	
			Rubber Membrane	Piston Friction			Cu (kPa)	PHI (degrees)
	106	8.3	0.6	\	184	92		

Method of Preparation:	BS 1377: Part 1: 1990
Method of Test:	BS 1377: Part 7: 1990: 8 Definitive Method, 1990: 9 Multi-stage loading
Type of Sample Key:	U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter
Comments:	Tested in Vertical Condition
	UKAS Calibration - loads from 0.2 to 10kN
Remarks to Include:	Sample disturbance, loss of moisture, variation form test procedure, location and origin of test specimen within original sample, oven drying temperature if not 105-110°C

TEST REPORT

ISSUED BY SOIL PROPERTY TESTING LTD

DATE ISSUED: 29/09/2020

0998

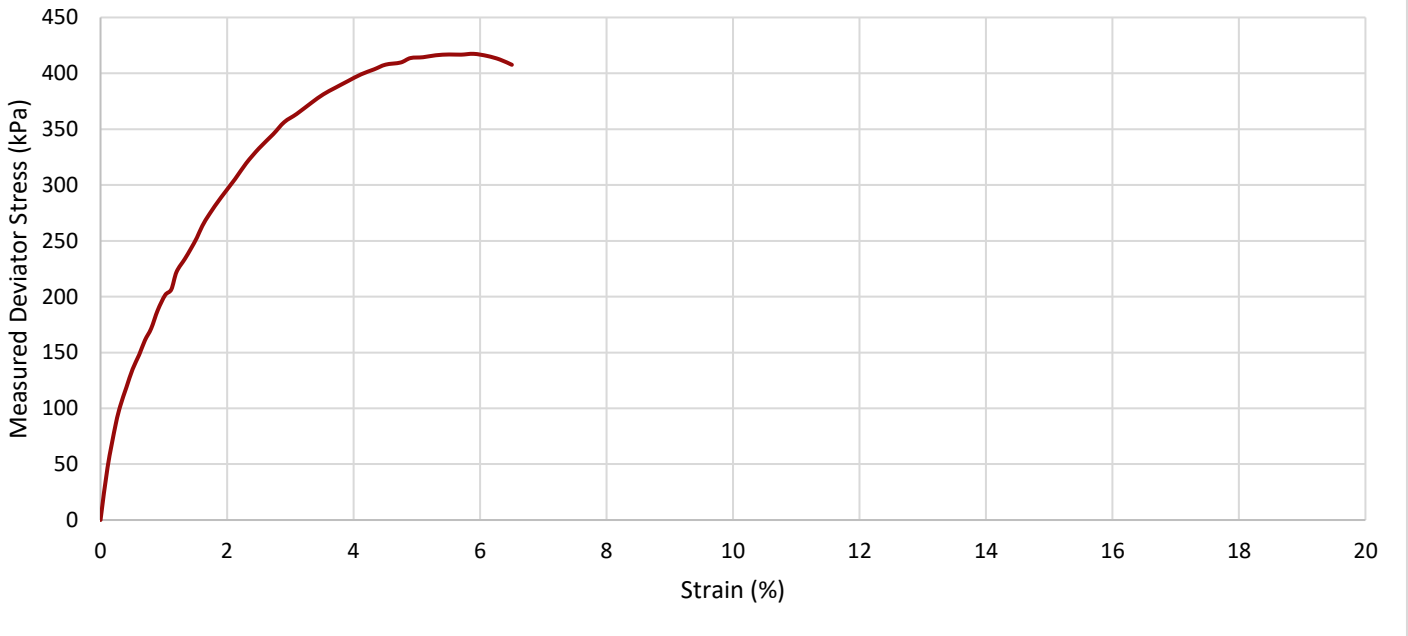
Contract	**Twickenham Riverside**
Serial No.	**37489_1**

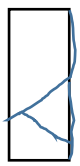
DETERMINATION OF UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION WITHOUT MEASUREMENT OF PORE PRESSURE

Borehole /Pit No.	Depth (m)	Type	Reference	Description	Remarks
BH2	10.50	U	12	Very stiff (very high strength) fissured dark greyish brown CLAY	

Initial Specimen	Height (mm)	Diameter (mm)	Weight (g)	Water Content (%)	Bulk Density (Mg/m³)	Dry Density (Mg/m³)
Depth of Top of Specimen (m) 10.58	199.7	102.4	3313	25.8	2.02	1.61

TEST INFORMATION — Rate of Strain 1.0 % per Min — Rubber Membrane Thickness 0.3 mm



Specimen at failure	Measured Cell Pressure, σ3 (kPa)	Strain at Failure (%)	Stress Corrections (kPa)		Corrected Max. Deviator Stress, (σ1-σ3)f (kPa)	Shear Stress Cu, ½(σ1-σ3)f (kPa)	Mohrs Circle Analysis	
			Rubber Membrane	Piston Friction			Cu (kPa)	PHI (degrees)
	200	5.9	0.5	\	417	209		

Method of Preparation:	BS 1377: Part 1: 1990
Method of Test:	BS 1377: Part 7: 1990: 8 Definitive Method, 1990: 9 Multi-stage loading
Type of Sample Key:	U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter
Comments:	Tested in Vertical Condition
	UKAS Calibration - loads from 0.2 to 10kN
Remarks to Include:	Sample disturbance, loss of moisture, variation form test procedure, location and origin of test specimen within original sample, oven drying temperature if not 105-110°C

TEST REPORT

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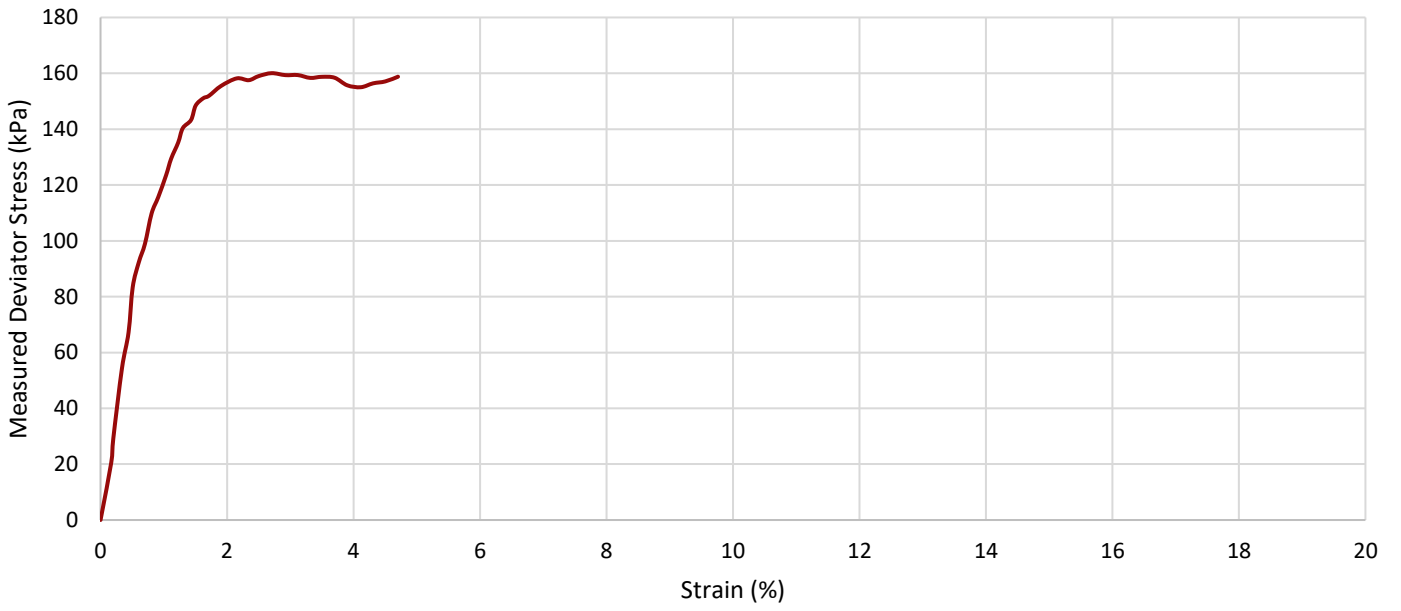
Contract	**Twickenham Riverside**
Serial No.	**37489_1**

DETERMINATION OF UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION WITHOUT MEASUREMENT OF PORE PRESSURE

Borehole /Pit No.	Depth (m)	Type	Reference	Description	Remarks
BH2	16.50	U	18	Very stiff (high strength) fissured dark greyish brown CLAY with rare silt pockets	Premature failure at 2.7% strain.

Initial Specimen	Height (mm)	Diameter (mm)	Weight (g)	Water Content (%)	Bulk Density (Mg/m³)	Dry Density (Mg/m³)
Depth of Top of Specimen (m) 16.59	199.4	102.7	3243	28.5	1.96	1.53

TEST INFORMATION — Rate of Strain 1.0 % per Min — Rubber Membrane Thickness 0.3 mm



Specimen at failure	Measured Cell Pressure, σ3 (kPa)	Strain at Failure (%)	Stress Corrections (kPa)		Corrected Max. Deviator Stress, (σ1-σ3)f (kPa)	Shear Stress Cu, ½(σ1-σ3)f (kPa)	Mohrs Circle Analysis	
			Rubber Membrane	Piston Friction			Cu (kPa)	PHI (degrees)
	316	2.7	0.2	\	160	80		

Method of Preparation:	BS 1377: Part 1: 1990
Method of Test:	BS 1377: Part 7: 1990: 8 Definitive Method, 1990: 9 Multi-stage loading
Type of Sample Key:	U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter
Comments:	Tested in Vertical Condition
	UKAS Calibration - loads from 0.2 to 10kN
Remarks to Include:	Sample disturbance, loss of moisture, variation form test procedure, location and origin of test specimen within original sample, oven drying temperature if not 105-110°C

TEST REPORT

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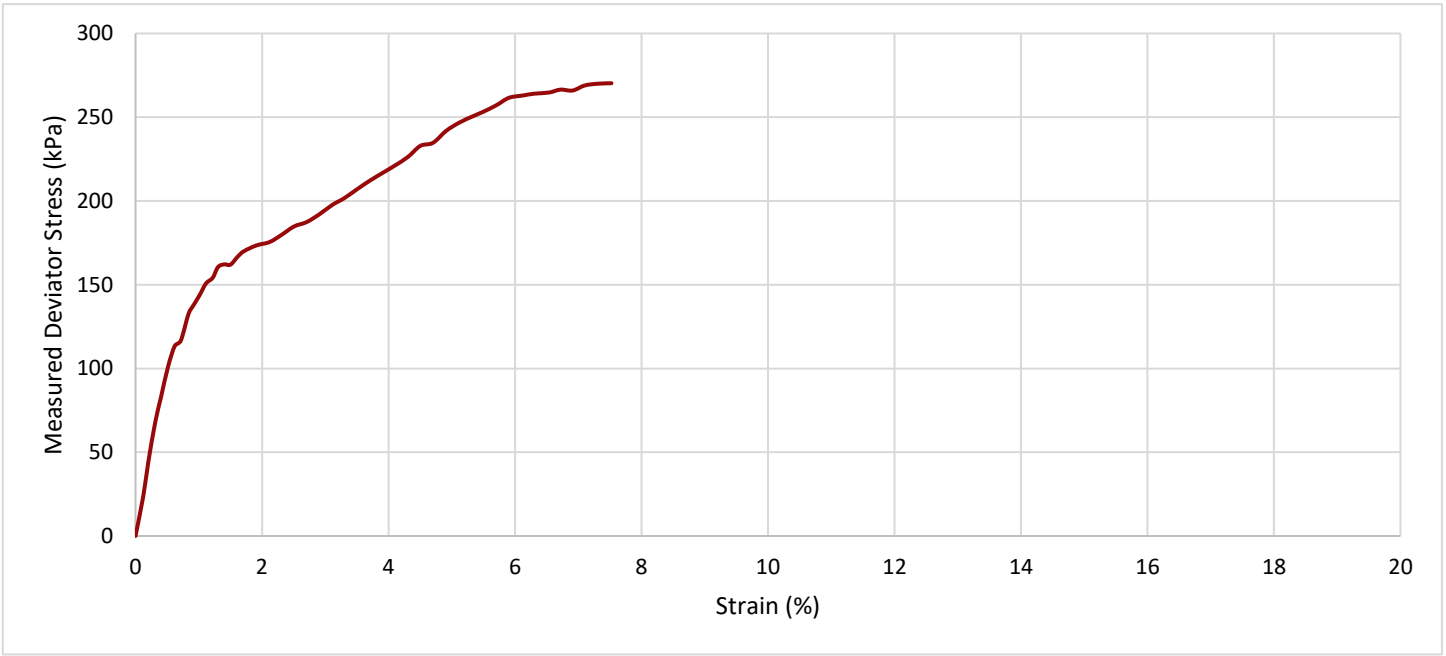
Contract	**Twickenham Riverside**
Serial No.	**37489_1**

DETERMINATION OF UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION WITHOUT MEASUREMENT OF PORE PRESSURE

Borehole /Pit No.	Depth (m)	Type	Reference	Description	Remarks
BH2	19.50	U	21	Stiff (high strength) fissured dark greyish brown CLAY	

Initial Specimen	Depth of Top of Specimen (m)	Height (mm)	Diameter (mm)	Weight (g)	Water Content (%)	Bulk Density (Mg/m³)	Dry Density (Mg/m³)
	19.61	199.4	102.9	3265	27.7	1.97	1.54

TEST INFORMATION — Rate of Strain 1.0 % per Min — Rubber Membrane Thickness 0.3 mm



Specimen at failure	Measured Cell Pressure, σ3 (kPa)	Strain at Failure (%)	Stress Corrections (kPa)		Corrected Max. Deviator Stress, (σ1-σ3)f (kPa)	Shear Stress Cu, ½(σ1-σ3)f (kPa)	Mohrs Circle Analysis	
			Rubber Membrane	Piston Friction			Cu (kPa)	PHI (degrees)
	370	7.5	0.5	\	269	135		

Method of Preparation:	BS 1377: Part 1: 1990
Method of Test:	BS 1377: Part 7: 1990: 8 Definitive Method, 1990: 9 Multi-stage loading
Type of Sample Key:	U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter
Comments:	Tested in Vertical Condition
	UKAS Calibration - loads from 0.2 to 10kN
Remarks to Include:	Sample disturbance, loss of moisture, variation form test procedure, location and origin of test specimen within original sample, oven drying temperature if not 105-110°C

TEST REPORT

ISSUED BY SOIL PROPERTY TESTING LTD

DATE ISSUED: 29/09/2020

0998

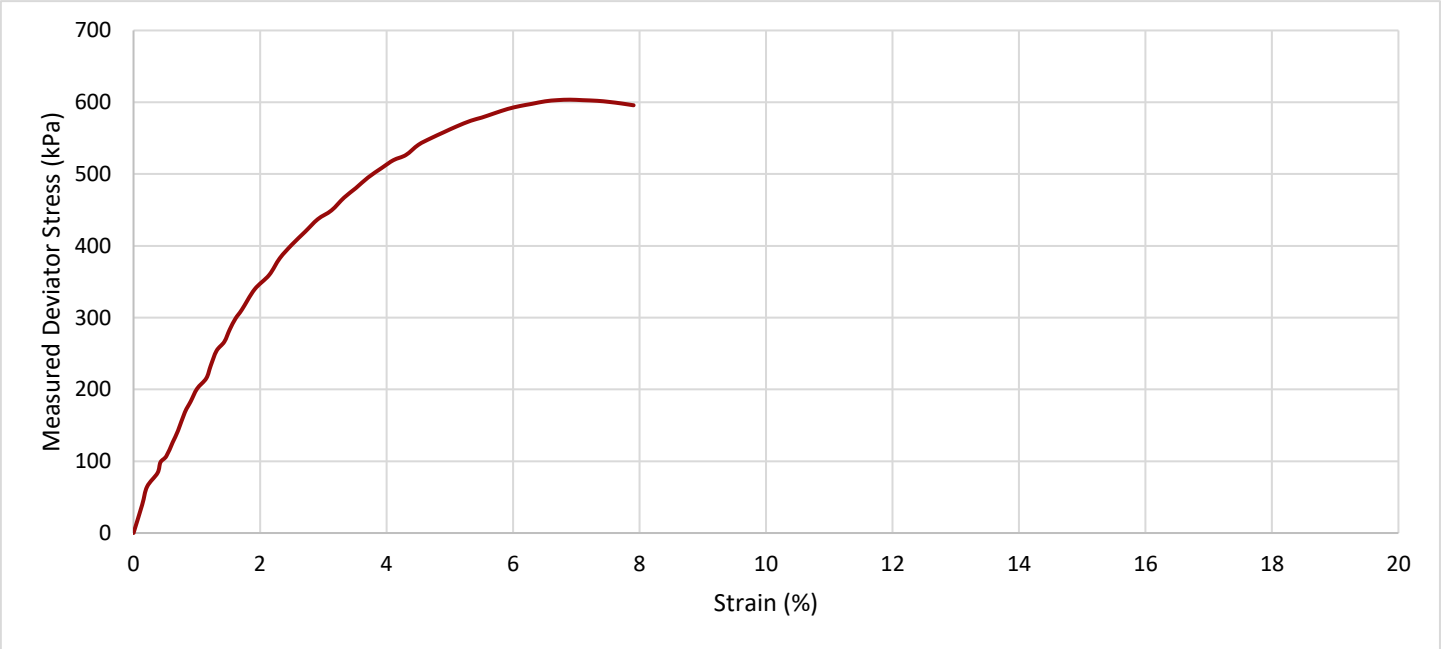
Contract	**Twickenham Riverside**
Serial No.	**37489_1**

DETERMINATION OF UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION WITHOUT MEASUREMENT OF PORE PRESSURE

Borehole /Pit No.	Depth (m)	Type	Reference	Description	Remarks
BH2	24.00	U	25	Hard (extremely high strength) fissured dark greyish brown CLAY	

Initial Specimen	Height (mm)	Diameter (mm)	Weight (g)	Water Content (%)	Bulk Density (Mg/m³)	Dry Density (Mg/m³)
Depth of Top of Specimen (m) 24.08	170.0	101.9	2751	26.9	1.99	1.57

TEST INFORMATION	Rate of Strain	0.9	% per Min	Rubber Membrane Thickness	0.3	mm



Specimen at failure	Measured Cell Pressure, σ3 (kPa)	Strain at Failure (%)	Stress Corrections (kPa)		Corrected Max. Deviator Stress, (σ1-σ3)f (kPa)	Shear Stress Cu, ½(σ1-σ3)f (kPa)	Mohrs Circle Analysis	
			Rubber Membrane	Piston Friction			Cu (kPa)	PHI (degrees)
	466	6.9	0.5	\	603	302		

Method of Preparation:	BS 1377: Part 1: 1990
Method of Test:	BS 1377: Part 7: 1990: 8 Definitive Method, 1990: 9 Multi-stage loading
Type of Sample Key:	U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter
Comments:	Tested in Vertical Condition
	UKAS Calibration - loads from 0.2 to 10kN
Remarks to Include:	Sample disturbance, loss of moisture, variation form test procedure, location and origin of test specimen within original sample, oven drying temperature if not 105-110°C

Photograph 1

Photograph 2

Photograph 3

Photograph 4

GEOSPHERE ENVIRONMENTAL

DESCRIPTION

Photograph 1

BH1B service-inspection pit with blue-painted concrete at 1mbgl

Photograph 2

Foundation inspection pit HDP03

Photograph 3

Foundation inspection pit HDP02

Photograph 4

WS02a drilling

PROJECT

Diamond Jubilee Gardens/ Wharf Lane / The Embankment, Twickenham Riverside

PROJECT NUMBER

4955,SI

TITLE

Selected Photographs of Ground Investigation

DATE

16/09/2020

Photograph 5

Photograph 6

Photograph 7

Photograph 8

GEOSPHERE ENVIRONMENTAL

DESCRIPTION

Photograph 5
WS 3 to 3B drilling area

Photograph 6
WS4 drilling and service inspection pit arisings

Photograph 7
WS4 excavation and probe to base (obstruction at 1.4mbgl)

Photograph 8
BH2 drilling

PROJECT
Diamond Jubilee Gardens/ Wharf Lane / The Embankment, Twickenham Riverside

PROJECT NUMBER
4955,SI

TITLE
Selected Photographs of Ground Investigation

DATE
16/09/2020

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E-mail: info@1stlinedefence.co.uk
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VAT No: 128 8833 79

www.1stlinedefence.co.uk

Express Preliminary UXO Risk Assessment

Client	Geosphere Environmental
Project	Twickenham Riverside
Site Address	4955 Twickenham Riverside, Twickenham
Report Reference	EP11494-00
Date	01/07/20
Originator	WH

Assessment Objective

This preliminary risk assessment is a qualitative screening exercise to assess the likely potential of encountering unexploded ordnance (UXO) at the Twickenham Riverside site. 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 Ltd 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. It should be noted that the only way to entirely negate risk from UXO to a project would be to support the works proposed with appropriate UXO risk mitigation measures. It is rarely possible to state that there is absolutely 'no' risk from UXO to a project.

Risk Assessment Considerations	
Site location and description/current use	The site is located in Twickenham, within south-west London. The site partially comprises two roadways, with a collection of structures in the north. The south of the site comprises hardstanding ground, interspersed with vegetation and a play area. A small section of the River Thames is encompassed by the site in the south-east. It is bound by King Street to the north, structures on Water Lane to the east, the River Thames to the south and structures on Wharf Lane to the west. The site is approximately centred on the OS grid reference: **TQ 16272 73165**.
Are there any indicators of current/historical military activity on/close to the site?	In-house records do not indicate that the site footprint had any former military use. No features such as WWII defensive positions, encampments or firing ranges are recorded to have been located at or in the immediate vicinity of the site. In addition, no information of ordnance being stored, produced, or disposed of within the proposed site boundary could be found. The closest recorded Heavy Anti-Aircraft (HAA) battery was situated approximately 4.2km to the east of the site. The conditions in which unexploded anti-aircraft ordnance may have fallen unrecorded within the proposed site are analogous to that of aerially delivered Luftwaffe bombs.
What was the pre- and post-WWII history of the site?	Pre-WWII OS mapping, dated 1934, indicates that the site comprised a series of structures in the north, with a *Public House* in the north-east. The south comprised areas of hardstanding with a *Swimming Bath*. Various smaller structures, likely associated with the *Swimming Bath*, are located within the centre and south of the site. Post-WWII OS mapping, dated 1959, shows minor structural alterations on site, with an area of open ground now present in the south-east, while a structure to the east of the site is no longer present. An area to the north of the aforementioned *Swimming Bath* is now recorded as *Swimming Pool,* while a *Paddling Pool* and *Lavatory* are recorded to the east. The *Public House* remains in the north-east of the site.
Was the area subject to bombing during WWII?	During WWII, the site was situated within the Municipal Borough of Twickenham which was subject to an overall moderate density of bombing, according to official Home Office statistics, with an average of 82.8 items of ordnance per 1,000 acres. This consisted of 505 HE (high explosive) bombs, two parachute mines, 25 oil bombs, 21 phosphorus bombs, 27 V-1 pilotless aircraft, and one V-2 long-range rockets, resulting in a total of 581 items of ordnance over 7,013 acres. Consolidated bomb census mapping records a bomb approximately 20m north of the site, with a further bomb located approximately 40m east of the site. Weekly bomb census mapping records one incendiary shower over the site, with a high explosive bomb recorded approximately 130m west of the site. London V-1 pilotless aircraft mapping records a V-1 pilotless aircraft in the south-eastern section of the site.

Is there any evidence of bomb damage on/close to the site?	Post-WWII OS mapping records an area of open ground in the south-east of the site which was previously occupied by a structure. MCC War Damage mapping does record several structures adjacent to the east of the site as having sustained damage ranging from "Border line areas, uncertain whether repairs possible, might have to be demolished" to "Total damage, building to be demolished".
To what degree would the site have been subject to access?	Due to the fact that the site was bound by one roadway and comprised two others, in conjunction with the fact that it housed a Public House and Swimming Baths in an urban area, it is anticipated that at the outbreak of war, access would have been very high. Following the recorded V-1 strike in the south-east of the site, access is considered to have been significantly reduced for a period while repairs and or evacuation took place. This increases the chances that items of UXO could have gone unnoticed and unreported.
To what degree has the site been developed post-WWII?	Sections in the east of the site now appear to be occupied by hardstanding, while the central section which housed the Swimming Pools is now occupied by hardstanding and vegetation.
What is the nature and extent of the intrusive works proposed?	The nature and extent of works proposed was not available at the time of writing.

Summary and Conclusions

The site was situated within the Municipal Borough of Twickenham during WWII, which sustained a moderate density of bombing at 82.8 items per 1,000 acres. London bomb census mapping indicates that a V-1 bomb fell within the south-eastern section of the site during the war. Several bombs also fell within the general vicinity of the site.

No damage was recorded on site on MCC War Damage mapping, despite the fact that a V-1 flying bomb was recorded as falling within the south-eastern section of the site. Given the recorded bombing on site, it is anticipated that access on site would have been impeded until it was deemed safe to return, increasing the likelihood that items of UXO would have gone unnoticed and unreported.

Recommendations

Following the findings of this preliminary report, it is recommended that **further action** is taken in the form of a **Detailed UXO Risk Assessment**.

Further research would include visits to local and national archives, and the acquisition of local bombing records and other archival material. Following this, a more precise assessment on the risk presented from items of UXO can be made. In addition, high-resolution aerial photography of the site would be obtained in order to understand if the site appeared damaged following the recorded incident in the south-eastern section of the site.

Prior to or in lieu of a Detailed Assessment, it is recommended that appropriate UXO Risk Mitigation Measures are provided for intrusive works proposed.

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

GEOSPHERE ENVIRONMENTAL

HazWasteOnline™

Waste Classification Report

8AH6V-L8EXD-HMN6U

Job name

4955,SI Twickenham Riverside

Description/Comments

Localised ground investigation data from GI report 4955

Project

4955,SI, Twickenham Riverside

Site

4955,SI: Diamond Jubilee Gardens, Wharf Lane, The Embankment (Twickenham Riverside project)

Related Documents

#	Name	Description
1	20-10290.1.hwol	.hwol file used to create the Job
2	20-10989.1.hwol	.hwol file for the job
3	20-10989.1.pdf	soil analysis dataset 1/2
4	20-10290.1.pdf	soil analysis dataset 2/2

Waste Stream Template

GEL HWOL 05 2020

Classified by

Name:
Jim Dawson
Date:
19 Nov 2020 13:50 GMT
Telephone:
01603 298076

Company:
Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road
Ipswich Road
Brightwell
IP10 0BJ

HazWasteOnline™ Training Record:

Course	Date
Hazardous Waste Classification	10 Mar 2020
Advanced Hazardous Waste Classification	11 Mar 2020

Report

Created by: Jim Dawson
Created date: 19 Nov 2020 13:50 GMT

Job summary

#	Sample Name	Depth [m]	Classification Result	Hazard properties	Page
1	BH1 + BH2	2.0 - 24.0	Non Hazardous		3
2	BH01A + BH01B	0.20 - 0.80	Non Hazardous		6
3	BH2	1.2	Non Hazardous		9
4	HP01 WAC2	0.25 - 1.20	Non Hazardous		12
5	WS01A and WS2, J1 Combined	0.2	Non Hazardous		15
6	WS01A J2	0.6	Non Hazardous		18

Classification of sample: BH1 + BH2

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
BH1 + BH2
Sample Depth:
2.0 - 24.0 m
Moisture content:
12.5%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 12.5% No Moisture Correction applied (MC)

#	Determinand	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number / EC Number / CAS Number							
1	arsenic { arsenic trioxide }		9 mg/kg	1.32	11.883 mg/kg	0.00119 %		
	033-003-00-0 / 215-481-4 / 1327-53-3							
2	barium { barium sulphide }		50 mg/kg	1.233	61.675 mg/kg	0.00617 %		
	016-002-00-X / 244-214-4 / 21109-95-5							
3	beryllium { beryllium oxide }		0.9 mg/kg	2.775	2.498 mg/kg	0.00025 %		
	004-003-00-8 / 215-133-1 / 1304-56-9							
4	boron { diboron trioxide; boric oxide }		2.3 mg/kg	3.22	7.406 mg/kg	0.000741 %		
	005-008-00-8 / 215-125-8 / 1303-86-2							
5	cadmium { cadmium oxide }		<0.2 mg/kg	1.142	<0.228 mg/kg	<0.0000228 %		<**LOD**
	048-002-00-0 / 215-146-2 / 1306-19-0							
6	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		31 mg/kg	1.462	45.308 mg/kg	0.00453 %		
	/ 215-160-9 / 1308-38-9							
7	chromium in chromium(VI) compounds { chromium(VI) oxide }		<2 mg/kg	1.923	<3.846 mg/kg	<0.000385 %		<**LOD**
	024-001-00-0 / 215-607-8 / 1333-82-0							
8	copper { dicopper oxide; copper (I) oxide }		19 mg/kg	1.126	21.392 mg/kg	0.00214 %		
	029-002-00-X / 215-270-7 / 1317-39-1							
9	lead { lead chromate }	1	10 mg/kg	1.56	15.598 mg/kg	0.001 %		
	082-004-00-2 / 231-846-0 / 7758-97-6							
10	mercury { mercury dichloride }		<1 mg/kg	1.353	<1.353 mg/kg	<0.000135 %		<**LOD**
	080-010-00-X / 231-299-8 / 7487-94-7							
11	nickel { nickel chromate }		29 mg/kg	2.976	86.312 mg/kg	0.00863 %		
	028-035-00-7 / 238-766-5 / 14721-18-7							
12	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }		<3 mg/kg	1.405	<4.215 mg/kg	<0.000422 %		<**LOD**
	034-002-00-8 / /							
13	vanadium { divanadium pentaoxide; vanadium pentoxide }		54 mg/kg	1.785	96.4 mg/kg	0.00964 %		
	023-001-00-8 / 215-239-8 / 1314-62-1							
14	zinc { zinc chromate }		78 mg/kg	2.774	216.383 mg/kg	0.0216 %		
	024-007-00-3 / 236-878-9 / 13530-65-9							

#		Determinand	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number / EC Number / CAS Number							
15		TPH (C6 to C40) petroleum group TPH		<42 mg/kg		<42 mg/kg	<0.0042 %		<LOD
16		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane 603-181-00-X / 216-653-1 / 1634-04-4		<5 mg/kg		<5 mg/kg	<0.0005 %		<LOD
17		benzene 601-020-00-8 / 200-753-7 / 71-43-2		<2 mg/kg		<2 mg/kg	<0.0002 %		<LOD
18		toluene 601-021-00-3 / 203-625-9 / 108-88-3		<5 mg/kg		<5 mg/kg	<0.0005 %		<LOD
19		ethylbenzene 601-023-00-4 / 202-849-4 / 100-41-4		<2 mg/kg		<2 mg/kg	<0.0002 %		<LOD
20		xylene 601-022-00-9 / 202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4] / 95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<4 mg/kg		<4 mg/kg	<0.0004 %		<LOD
21		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex } 006-007-00-5		<2 mg/kg	1.884	<3.768 mg/kg	<0.000377 %		<LOD
22		pH PH		8.1 pH		8.1 pH	8.1 pH		
23		naphthalene 601-052-00-2 / 202-049-5 / 91-20-3		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
24		acenaphthylene 205-917-1 / 208-96-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
25		acenaphthene 201-469-6 / 83-32-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
26		fluorene 201-695-5 / 86-73-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
27		phenanthrene 201-581-5 / 85-01-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
28		anthracene 204-371-1 / 120-12-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
29		fluoranthene 205-912-4 / 206-44-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
30		pyrene 204-927-3 / 129-00-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
31		benzo[a]anthracene 601-033-00-9 / 200-280-6 / 56-55-3		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
32		chrysene 601-048-00-0 / 205-923-4 / 218-01-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
33		benzo[b]fluoranthene 601-034-00-4 / 205-911-9 / 205-99-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
34		benzo[k]fluoranthene 601-036-00-5 / 205-916-6 / 207-08-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
35		benzo[a]pyrene; benzo[def]chrysene 601-032-00-3 / 200-028-5 / 50-32-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
36		indeno[123-cd]pyrene 205-893-2 / 193-39-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
37		dibenz[a,h]anthracene 601-041-00-2 / 200-181-8 / 53-70-3		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
38		benzo[ghi]perylene 205-883-8 / 191-24-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
						Total:	0.0634 %		

Key	
	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: BH01A + BH01B

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
BH01A + BH01B
Sample Depth:
0.20 - 0.80 m
Moisture content:
5.6%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 5.6% No Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		15 mg/kg	1.32	19.805 mg/kg	0.00198 %		
2	barium { barium sulphide }	016-002-00-X	244-214-4	21109-95-5		71 mg/kg	1.233	87.578 mg/kg	0.00876 %		
3	beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		0.7 mg/kg	2.775	1.943 mg/kg	0.000194 %		
4	boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		<1 mg/kg	3.22	<3.22 mg/kg	<0.000322 %		<LOD
5	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		<0.2 mg/kg	1.142	<0.228 mg/kg	<0.0000228 %		<LOD
6	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		19 mg/kg	1.462	27.77 mg/kg	0.00278 %		
7	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<2 mg/kg	1.923	<3.846 mg/kg	<0.000385 %		<LOD
8	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		20 mg/kg	1.126	22.518 mg/kg	0.00225 %		
9	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	207 mg/kg	1.56	322.882 mg/kg	0.0207 %		
10	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<1 mg/kg	1.353	<1.353 mg/kg	<0.000135 %		<LOD
11	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		16 mg/kg	2.976	47.62 mg/kg	0.00476 %		
12	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<3 mg/kg	1.405	<4.215 mg/kg	<0.000422 %		<LOD
13	vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1		38 mg/kg	1.785	67.837 mg/kg	0.00678 %		
14	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		68 mg/kg	2.774	188.642 mg/kg	0.0189 %		

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
15		TPH (C6 to C40) petroleum group		TPH		<6	mg/kg		<6	mg/kg	<0.0006 %		<LOD
16		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	216-653-1	1634-04-4		<5	mg/kg		<5	mg/kg	<0.0005 %		<LOD
		603-181-00-X											
17		benzene	200-753-7	71-43-2		<2	mg/kg		<2	mg/kg	<0.0002 %		<LOD
		601-020-00-8											
18		toluene	203-625-9	108-88-3		<5	mg/kg		<5	mg/kg	<0.0005 %		<LOD
		601-021-00-3											
19		ethylbenzene	202-849-4	100-41-4		<2	mg/kg		<2	mg/kg	<0.0002 %		<LOD
		601-023-00-4											
20		xylene	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<4	mg/kg		<4	mg/kg	<0.0004 %		<LOD
		601-022-00-9											
21		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<2	mg/kg	1.884	<3.768	mg/kg	<0.000377 %		<LOD
		006-007-00-5											
22		pH		PH		8.3	pH		8.3	pH	8.3 pH		
23		naphthalene	202-049-5	91-20-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-052-00-2											
24		acenaphthylene	205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
25		acenaphthene	201-469-6	83-32-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
26		fluorene	201-695-5	86-73-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
27		phenanthrene	201-581-5	85-01-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
28		anthracene	204-371-1	120-12-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
29		fluoranthene	205-912-4	206-44-0		0.17	mg/kg		0.17	mg/kg	0.000017 %		
30		pyrene	204-927-3	129-00-0		0.12	mg/kg		0.12	mg/kg	0.000012 %		
31		benzo[a]anthracene	200-280-6	56-55-3		0.3	mg/kg		0.3	mg/kg	0.00003 %		
		601-033-00-9											
32		chrysene	205-923-4	218-01-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-048-00-0											
33		benzo[b]fluoranthene	205-911-9	205-99-2		0.52	mg/kg		0.52	mg/kg	0.000052 %		
		601-034-00-4											
34		benzo[k]fluoranthene	205-916-6	207-08-9		0.13	mg/kg		0.13	mg/kg	0.000013 %		
		601-036-00-5											
35		benzo[a]pyrene; benzo[def]chrysene	200-028-5	50-32-8		0.28	mg/kg		0.28	mg/kg	0.000028 %		
		601-032-00-3											
36		indeno[123-cd]pyrene	205-893-2	193-39-5		0.38	mg/kg		0.38	mg/kg	0.000038 %		
37		dibenz[a,h]anthracene	200-181-8	53-70-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-041-00-2											
38		benzo[ghi]perylene	205-883-8	191-24-2		0.21	mg/kg		0.21	mg/kg	0.000021 %		
										Total:	0.0714 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: BH2

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
BH2
Sample Depth:
1.2 m
Moisture content:
12.8%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 12.8% No Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		15 mg/kg	1.32	19.805 mg/kg	0.00198 %		
2	barium { barium sulphide }	016-002-00-X	244-214-4	21109-95-5		55 mg/kg	1.233	67.842 mg/kg	0.00678 %		
3	beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		0.6 mg/kg	2.775	1.665 mg/kg	0.000167 %		
4	boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		<1 mg/kg	3.22	<3.22 mg/kg	<0.000322 %		<LOD
5	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		<0.2 mg/kg	1.142	<0.228 mg/kg	<0.0000228 %		<LOD
6	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		16 mg/kg	1.462	23.385 mg/kg	0.00234 %		
7	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<2 mg/kg	1.923	<3.846 mg/kg	<0.000385 %		<LOD
8	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		17 mg/kg	1.126	19.14 mg/kg	0.00191 %		
9	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	111 mg/kg	1.56	173.139 mg/kg	0.0111 %		
10	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<1 mg/kg	1.353	<1.353 mg/kg	<0.000135 %		<LOD
11	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		13 mg/kg	2.976	38.691 mg/kg	0.00387 %		
12	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<3 mg/kg	1.405	<4.215 mg/kg	<0.000422 %		<LOD
13	vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1		36 mg/kg	1.785	64.267 mg/kg	0.00643 %		
14	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		38 mg/kg	2.774	105.418 mg/kg	0.0105 %		

#		Determinand	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number / EC Number / CAS Number									
15		TPH (C6 to C40) petroleum group TPH		<6	mg/kg		<6	mg/kg	<0.0006 %		<LOD
16		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane 603-181-00-X / 216-653-1 / 1634-04-4		<5	mg/kg		<5	mg/kg	<0.0005 %		<LOD
17		benzene 601-020-00-8 / 200-753-7 / 71-43-2		<2	mg/kg		<2	mg/kg	<0.0002 %		<LOD
18		toluene 601-021-00-3 / 203-625-9 / 108-88-3		<5	mg/kg		<5	mg/kg	<0.0005 %		<LOD
19		ethylbenzene 601-023-00-4 / 202-849-4 / 100-41-4		<2	mg/kg		<2	mg/kg	<0.0002 %		<LOD
20		xylene 601-022-00-9 / 202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4] / 95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<4	mg/kg		<4	mg/kg	<0.0004 %		<LOD
21		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex } 006-007-00-5		<2	mg/kg	1.884	<3.768	mg/kg	<0.000377 %		<LOD
22		pH PH		8.3	pH		8.3	pH	8.3 pH		
23		naphthalene 601-052-00-2 / 202-049-5 / 91-20-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
24		acenaphthylene 205-917-1 / 208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
25		acenaphthene 201-469-6 / 83-32-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
26		fluorene 201-695-5 / 86-73-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
27		phenanthrene 201-581-5 / 85-01-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
28		anthracene 204-371-1 / 120-12-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
29		fluoranthene 205-912-4 / 206-44-0		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
30		pyrene 204-927-3 / 129-00-0		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
31		benzo[a]anthracene 601-033-00-9 / 200-280-6 / 56-55-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
32		chrysene 601-048-00-0 / 205-923-4 / 218-01-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
33		benzo[b]fluoranthene 601-034-00-4 / 205-911-9 / 205-99-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
34		benzo[k]fluoranthene 601-036-00-5 / 205-916-6 / 207-08-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
35		benzo[a]pyrene; benzo[def]chrysene 601-032-00-3 / 200-028-5 / 50-32-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
36		indeno[123-cd]pyrene 205-893-2 / 193-39-5		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
37		dibenz[a,h]anthracene 601-041-00-2 / 200-181-8 / 53-70-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
38		benzo[ghi]perylene 205-883-8 / 191-24-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
								Total:	0.0493 %		

Key	
	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: HP01 WAC2

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
HP01 WAC2
Sample Depth:
0.25 - 1.20 m
Moisture content:
3.7%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 3.7% No Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		16 mg/kg	1.32	21.125 mg/kg	0.00211 %		
2	barium { barium sulphide }	016-002-00-X	244-214-4	21109-95-5		35 mg/kg	1.233	43.172 mg/kg	0.00432 %		
3	beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		0.6 mg/kg	2.775	1.665 mg/kg	0.000167 %		
4	boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		<1 mg/kg	3.22	<3.22 mg/kg	<0.000322 %		<LOD
5	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		<0.2 mg/kg	1.142	<0.228 mg/kg	<0.0000228 %		<LOD
6	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		20 mg/kg	1.462	29.231 mg/kg	0.00292 %		
7	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<2 mg/kg	1.923	<3.846 mg/kg	<0.000385 %		<LOD
8	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		15 mg/kg	1.126	16.888 mg/kg	0.00169 %		
9	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	51 mg/kg	1.56	79.551 mg/kg	0.0051 %		
10	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<1 mg/kg	1.353	<1.353 mg/kg	<0.000135 %		<LOD
11	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		14 mg/kg	2.976	41.668 mg/kg	0.00417 %		
12	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<3 mg/kg	1.405	<4.215 mg/kg	<0.000422 %		<LOD
13	vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1		42 mg/kg	1.785	74.978 mg/kg	0.0075 %		
14	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		45 mg/kg	2.774	124.837 mg/kg	0.0125 %		

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
15		TPH (C6 to C40) petroleum group				<42	mg/kg		<42	mg/kg	<0.0042 %		<**LOD**
				TPH									
16		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<5	mg/kg		<5	mg/kg	<0.0005 %		<**LOD**
		603-181-00-X	216-653-1	1634-04-4									
17		benzene				<2	mg/kg		<2	mg/kg	<0.0002 %		<**LOD**
		601-020-00-8	200-753-7	71-43-2									
18		toluene				<5	mg/kg		<5	mg/kg	<0.0005 %		<**LOD**
		601-021-00-3	203-625-9	108-88-3									
19		ethylbenzene				<2	mg/kg		<2	mg/kg	<0.0002 %		<**LOD**
		601-023-00-4	202-849-4	100-41-4									
20		xylene				<4	mg/kg		<4	mg/kg	<0.0004 %		<**LOD**
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
21		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<2	mg/kg	1.884	<3.768	mg/kg	<0.000377 %		<**LOD**
		006-007-00-5											
22		pH				8.1	pH		8.1	pH	8.1 pH		
				PH									
23		naphthalene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-052-00-2	202-049-5	91-20-3									
24		acenaphthylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			205-917-1	208-96-8									
25		acenaphthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			201-469-6	83-32-9									
26		fluorene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			201-695-5	86-73-7									
27		phenanthrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			201-581-5	85-01-8									
28		anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			204-371-1	120-12-7									
29		fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			205-912-4	206-44-0									
30		pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			204-927-3	129-00-0									
31		benzo[a]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-033-00-9	200-280-6	56-55-3									
32		chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-048-00-0	205-923-4	218-01-9									
33		benzo[b]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-034-00-4	205-911-9	205-99-2									
34		benzo[k]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-036-00-5	205-916-6	207-08-9									
35		benzo[a]pyrene; benzo[def]chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-032-00-3	200-028-5	50-32-8									
36		indeno[123-cd]pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			205-893-2	193-39-5									
37		dibenz[a,h]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-041-00-2	200-181-8	53-70-3									
38		benzo[ghi]perylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			205-883-8	191-24-2									
										Total:	0.0483 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS01A and WS2, J1 Combined

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WS01A and WS2, J1 Combined
Sample Depth:
0.2 m
Moisture content:
7.4%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 7.4% No Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		11 mg/kg	1.32	14.524 mg/kg	0.00145 %		
2	barium { barium sulphide }	016-002-00-X	244-214-4	21109-95-5		58 mg/kg	1.233	71.543 mg/kg	0.00715 %		
3	beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		<0.5 mg/kg	2.775	<1.388 mg/kg	<0.000139 %		<LOD
4	boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		<1 mg/kg	3.22	<3.22 mg/kg	<0.000322 %		<LOD
5	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		<0.2 mg/kg	1.142	<0.228 mg/kg	<0.0000228 %		<LOD
6	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		15 mg/kg	1.462	21.923 mg/kg	0.00219 %		
7	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<2 mg/kg	1.923	<3.846 mg/kg	<0.000385 %		<LOD
8	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		20 mg/kg	1.126	22.518 mg/kg	0.00225 %		
9	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	70 mg/kg	1.56	109.187 mg/kg	0.007 %		
10	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<1 mg/kg	1.353	<1.353 mg/kg	<0.000135 %		<LOD
11	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		9 mg/kg	2.976	26.786 mg/kg	0.00268 %		
12	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<3 mg/kg	1.405	<4.215 mg/kg	<0.000422 %		<LOD
13	vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1		30 mg/kg	1.785	53.556 mg/kg	0.00536 %		
14	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		67 mg/kg	2.774	185.868 mg/kg	0.0186 %		

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
15		TPH (C6 to C40) petroleum group			TPH		<42	mg/kg		<42	mg/kg	<0.0042 %		<LOD
16		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<5	mg/kg		<5	mg/kg	<0.0005 %		<LOD
17		benzene	601-020-00-8	200-753-7	71-43-2		<2	mg/kg		<2	mg/kg	<0.0002 %		<LOD
18		toluene	601-021-00-3	203-625-9	108-88-3		<5	mg/kg		<5	mg/kg	<0.0005 %		<LOD
19		ethylbenzene	601-023-00-4	202-849-4	100-41-4		<2	mg/kg		<2	mg/kg	<0.0002 %		<LOD
20		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<4	mg/kg		<4	mg/kg	<0.0004 %		<LOD
21		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<2	mg/kg	1.884	<3.768	mg/kg	<0.000377 %		<LOD
22		pH			PH		7.6	pH		7.6	pH	7.6 pH		
23		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
24		acenaphthylene		205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
25		acenaphthene		201-469-6	83-32-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
26		fluorene		201-695-5	86-73-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
27		phenanthrene		201-581-5	85-01-8		0.27	mg/kg		0.27	mg/kg	0.000027 %		
28		anthracene		204-371-1	120-12-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
29		fluoranthene		205-912-4	206-44-0		0.76	mg/kg		0.76	mg/kg	0.000076 %		
30		pyrene		204-927-3	129-00-0		0.69	mg/kg		0.69	mg/kg	0.000069 %		
31		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.48	mg/kg		0.48	mg/kg	0.000048 %		
32		chrysene	601-048-00-0	205-923-4	218-01-9		0.4	mg/kg		0.4	mg/kg	0.00004 %		
33		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.66	mg/kg		0.66	mg/kg	0.000066 %		
34		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.22	mg/kg		0.22	mg/kg	0.000022 %		
35		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.5	mg/kg		0.5	mg/kg	0.00005 %		
36		indeno[123-cd]pyrene		205-893-2	193-39-5		0.31	mg/kg		0.31	mg/kg	0.000031 %		
37		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
38		benzo[ghi]perylene		205-883-8	191-24-2		0.3	mg/kg		0.3	mg/kg	0.00003 %		
											Total:	0.055 %		

Key	
	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS01A J2

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
WS01A J2
Sample Depth:
0.6 m
Moisture content:
3.1%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 3.1% No Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		16 mg/kg	1.32	21.125 mg/kg	0.00211 %		
2	barium { barium sulphide }	016-002-00-X	244-214-4	21109-95-5		63 mg/kg	1.233	77.71 mg/kg	0.00777 %		
3	beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		0.6 mg/kg	2.775	1.665 mg/kg	0.000167 %		
4	boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		<1 mg/kg	3.22	<3.22 mg/kg	<0.000322 %		<**LOD**
5	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		<0.2 mg/kg	1.142	<0.228 mg/kg	<0.0000228 %		<**LOD**
6	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		21 mg/kg	1.462	30.693 mg/kg	0.00307 %		
7	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<2 mg/kg	1.923	<3.846 mg/kg	<0.000385 %		<**LOD**
8	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		19 mg/kg	1.126	21.392 mg/kg	0.00214 %		
9	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	72 mg/kg	1.56	112.307 mg/kg	0.0072 %		
10	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<1 mg/kg	1.353	<1.353 mg/kg	<0.000135 %		<**LOD**
11	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		15 mg/kg	2.976	44.644 mg/kg	0.00446 %		
12	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<3 mg/kg	1.405	<4.215 mg/kg	<0.000422 %		<**LOD**
13	vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1		44 mg/kg	1.785	78.548 mg/kg	0.00785 %		
14	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		83 mg/kg	2.774	230.254 mg/kg	0.023 %		

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
15		TPH (C6 to C40) petroleum group		TPH		<42	mg/kg		<42	mg/kg	<0.0042 %		<**LOD**
16		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane 603-181-00-X	216-653-1	1634-04-4		<5	mg/kg		<5	mg/kg	<0.0005 %		<**LOD**
17		benzene 601-020-00-8	200-753-7	71-43-2		<2	mg/kg		<2	mg/kg	<0.0002 %		<**LOD**
18		toluene 601-021-00-3	203-625-9	108-88-3		<5	mg/kg		<5	mg/kg	<0.0005 %		<**LOD**
19		ethylbenzene 601-023-00-4	202-849-4	100-41-4		<2	mg/kg		<2	mg/kg	<0.0002 %		<**LOD**
20		xylene 601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<4	mg/kg		<4	mg/kg	<0.0004 %		<**LOD**
21		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex } 006-007-00-5				<2	mg/kg	1.884	<3.768	mg/kg	<0.000377 %		<**LOD**
22		pH		PH		8.2	pH		8.2	pH	8.2 pH		
23		naphthalene 601-052-00-2	202-049-5	91-20-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
24		acenaphthylene	205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
25		acenaphthene	201-469-6	83-32-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
26		fluorene	201-695-5	86-73-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
27		phenanthrene	201-581-5	85-01-8		0.11	mg/kg		0.11	mg/kg	0.000011 %		
28		anthracene	204-371-1	120-12-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
29		fluoranthene	205-912-4	206-44-0		0.32	mg/kg		0.32	mg/kg	0.000032 %		
30		pyrene	204-927-3	129-00-0		0.28	mg/kg		0.28	mg/kg	0.000028 %		
31		benzo[a]anthracene 601-033-00-9	200-280-6	56-55-3		0.18	mg/kg		0.18	mg/kg	0.000018 %		
32		chrysene 601-048-00-0	205-923-4	218-01-9		0.17	mg/kg		0.17	mg/kg	0.000017 %		
33		benzo[b]fluoranthene 601-034-00-4	205-911-9	205-99-2		0.24	mg/kg		0.24	mg/kg	0.000024 %		
34		benzo[k]fluoranthene 601-036-00-5	205-916-6	207-08-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
35		benzo[a]pyrene; benzo[def]chrysene 601-032-00-3	200-028-5	50-32-8		0.18	mg/kg		0.18	mg/kg	0.000018 %		
36		indeno[123-cd]pyrene	205-893-2	193-39-5		0.11	mg/kg		0.11	mg/kg	0.000011 %		
37		dibenz[a,h]anthracene 601-041-00-2	200-181-8	53-70-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
38		benzo[ghi]perylene	205-883-8	191-24-2		0.11	mg/kg		0.11	mg/kg	0.000011 %		
										Total:	0.0657 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Appendix A: Classifier defined and non CLP determinands

barium sulphide (EC Number: 244-214-4, CAS Number: 21109-95-5)

CLP index number: 016-002-00-X
Description/Comments:
Data source: Regulation 1272/2008/EC - Classification, labelling and packaging of substances and mixtures. (CLP)
Additional Hazard Statement(s): EUH031 >= 0.8 %
Reason for additional Hazards Statement(s):
14 Dec 2015 - EUH031 >= 0.8 % hazard statement sourced from: WM3, Table C12.2

chromium(III) oxide (worst case) (EC Number: 215-160-9, CAS Number: 1308-38-9)

Conversion factor: 1.462
Description/Comments: Data from C&L Inventory Database
Data source: https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/33806
Data source date: 17 Jul 2015
Hazard Statements: Acute Tox. 4 H332 , Acute Tox. 4 H302 , Eye Irrit. 2 H319 , STOT SE 3 H335 , Skin Irrit. 2 H315 , Resp. Sens. 1 H334 , Skin Sens. 1 H317 , Repr. 1B H360FD , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

TPH (C6 to C40) petroleum group (CAS Number: TPH)

Description/Comments: Hazard statements taken from WM3 1st Edition 2015; Risk phrases: WM2 3rd Edition 2013
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: Flam. Liq. 3 H226 , Asp. Tox. 1 H304 , STOT RE 2 H373 , Muta. 1B H340 , Carc. 1B H350 , Repr. 2 H361d , Aquatic Chronic 2 H411

ethylbenzene (EC Number: 202-849-4, CAS Number: 100-41-4)

CLP index number: 601-023-00-4
Description/Comments:
Data source: Commission Regulation (EU) No 605/2014 – 6th Adaptation to Technical Progress for Regulation (EC) No 1272/2008. (ATP6)
Additional Hazard Statement(s): Carc. 2 H351
Reason for additional Hazards Statement(s):
03 Jun 2015 - Carc. 2 H351 hazard statement sourced from: IARC Group 2B (77) 2000

salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex

CLP index number: 006-007-00-5
Description/Comments: Conversion factor based on a worst case compound: sodium cyanide
Data source: Commission Regulation (EC) No 790/2009 - 1st Adaptation to Technical Progress for Regulation (EC) No 1272/2008. (ATP1)
Additional Hazard Statement(s): EUH032 >= 0.2 %
Reason for additional Hazards Statement(s):
14 Dec 2015 - EUH032 >= 0.2 % hazard statement sourced from: WM3, Table C12.2

pH (CAS Number: PH)

Description/Comments: Appendix C4
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: None.

acenaphthylene (EC Number: 205-917-1, CAS Number: 208-96-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Acute Tox. 4 H302 , Acute Tox. 1 H330 , Acute Tox. 1 H310 , Eye Irrit. 2 H319 , STOT SE 3 H335 , Skin Irrit. 2 H315

acenaphthene (EC Number: 201-469-6, CAS Number: 83-32-9)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Eye Irrit. 2 H319 , STOT SE 3 H335 , Skin Irrit. 2 H315 , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410 , Aquatic Chronic 2 H411

- **fluorene** (EC Number: 201-695-5, CAS Number: 86-73-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

- **phenanthrene** (EC Number: 201-581-5, CAS Number: 85-01-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Acute Tox. 4 H302 , Eye Irrit. 2 H319 , STOT SE 3 H335 , Carc. 2 H351 , Skin Sens. 1 H317 , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410 , Skin Irrit. 2 H315

- **anthracene** (EC Number: 204-371-1, CAS Number: 120-12-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Eye Irrit. 2 H319 , STOT SE 3 H335 , Skin Irrit. 2 H315 , Skin Sens. 1 H317 , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

- **fluoranthene** (EC Number: 205-912-4, CAS Number: 206-44-0)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Acute Tox. 4 H302 , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

- **pyrene** (EC Number: 204-927-3, CAS Number: 129-00-0)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 2014
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Skin Irrit. 2 H315 , Eye Irrit. 2 H319 , STOT SE 3 H335 , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

- **indeno[123-cd]pyrene** (EC Number: 205-893-2, CAS Number: 193-39-5)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Carc. 2 H351

- **benzo[ghi]perylene** (EC Number: 205-883-8, CAS Number: 191-24-2)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 28/02/2015
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 23 Jul 2015
Hazard Statements: Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

Appendix B: Rationale for selection of metal species

arsenic {arsenic trioxide}

Reasonable case CLP species based on hazard statements/molecular weight and most common (stable) oxide of arsenic. Industrial sources include: smelting; main precursor to other arsenic compounds (edit as required);

barium {barium sulphide}

In the absence of significant chromium concentrations in samples, chromate species not possible; barium sulphide utilised as applicable

beryllium {beryllium oxide}

Reasonable case CLP species based on hazard statements/molecular weight. Industrial sources include: most common (non alloy) form, used in ceramics (edit as required);

boron {diboron trioxide; boric oxide}

Reasonable case CLP species based on hazard statements/ molecular weight, physical form and low solubility. Industrial sources include: fluxing agent for glass/enamels; additive for fibre optics, borosilicate glass (edit as required);

cadmium {cadmium oxide}

Reasonable case CLP species based on hazard statements/molecular weight, very low solubility in water. Industrial sources include: electroplating baths, electrodes for storage batteries, catalysts, ceramic glazes, phosphors, pigments and nematocides. (edit as required) Worst case compounds in CLP: cadmium sulphate, chloride, fluoride & iodide not expected as either very soluble and/or compound's industrial usage not related to site history (edit as required);

chromium in chromium(III) compounds {chromium(III) oxide (worst case)}

Reasonable case species based on hazard statements/molecular weight. Industrial sources include: tanning, pigment in paint, inks and glass (edit as required);

chromium in chromium(VI) compounds {chromium(VI) oxide}

Worst case CLP species based on hazard statements/molecular weight. Industrial sources include: production stainless steel, electroplating, wood preservation, anti-corrosion agents or coatings, pigments (edit as required);

copper {dicopper oxide; copper (I) oxide}

Reasonable case CLP species based on hazard statements/molecular weight and insolubility in water. Industrial sources include: oxidised copper metal, brake pads, pigments, antifouling paints, fungicide. (edit as required) Worse case copper sulphate is very soluble and likely to have been leached away if ever present and/or not enough soluble sulphate detected. (edit as required);

lead {lead chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required);

mercury {mercury dichloride}

Worst case CLP species based on hazard statements/molecular weight (edit as required);

nickel {nickel chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required);

selenium {selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex}

Harmonised group entry used as most reasonable case. Pigment cadmium sulphoselenide not likely to be present in this soil. No evidence for the other CLP entries: sodium selenite, nickel II selenite and nickel selenide, to be present in this soil. (edit as required);

vanadium {divanadium pentaoxide; vanadium pentoxide}

Applicable for this waaste stream

zinc {zinc chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required);

cyanides {salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex}

Harmonised group entry used as most reasonable case as complex cyanides and those specified elsewhere in the annex are not likely to be present in this soil: [Note conversion factor based on a worst case compound: sodium cyanide] (edit as required);

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.1, May 2018
HazWasteOnline Classification Engine Version: 2020.315.4525.8798 (10 Nov 2020)
HazWasteOnline Database: 2020.315.4525.8798 (10 Nov 2020)

This classification utilises the following guidance and legislation:
WM3 v1.1 - Waste Classification - 1st Edition v1.1 - May 2018
CLP Regulation - Regulation 1272/2008/EC of 16 December 2008
1st ATP - Regulation 790/2009/EC of 10 August 2009
2nd ATP - Regulation 286/2011/EC of 10 March 2011
3rd ATP - Regulation 618/2012/EU of 10 July 2012
4th ATP - Regulation 487/2013/EU of 8 May 2013
Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013
5th ATP - Regulation 944/2013/EU of 2 October 2013
6th ATP - Regulation 605/2014/EU of 5 June 2014
WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014
Revised List of Waste 2014 - Decision 2014/955/EU of 18 December 2014
7th ATP - Regulation 2015/1221/EU of 24 July 2015
8th ATP - Regulation (EU) 2016/918 of 19 May 2016
9th ATP - Regulation (EU) 2016/1179 of 19 July 2016
10th ATP - Regulation (EU) 2017/776 of 4 May 2017
HP14 amendment - Regulation (EU) 2017/997 of 8 June 2017
13th ATP - Regulation (EU) 2018/1480 of 4 October 2018
14th ATP - Regulation (EU) 2020/217 of 4 October 2019
15th ATP - Regulation (EU) 2020/1182 of 19 May 2020
POPs Regulation 2019 - Regulation (EU) 2019/1021 of 20 June 2019

GEOSPHERE ENVIRONMENTAL

Ec Ecology.

Fr Flood Risk.

Ge Geotechnical.

En Environmental.

Kw Knotweed.

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