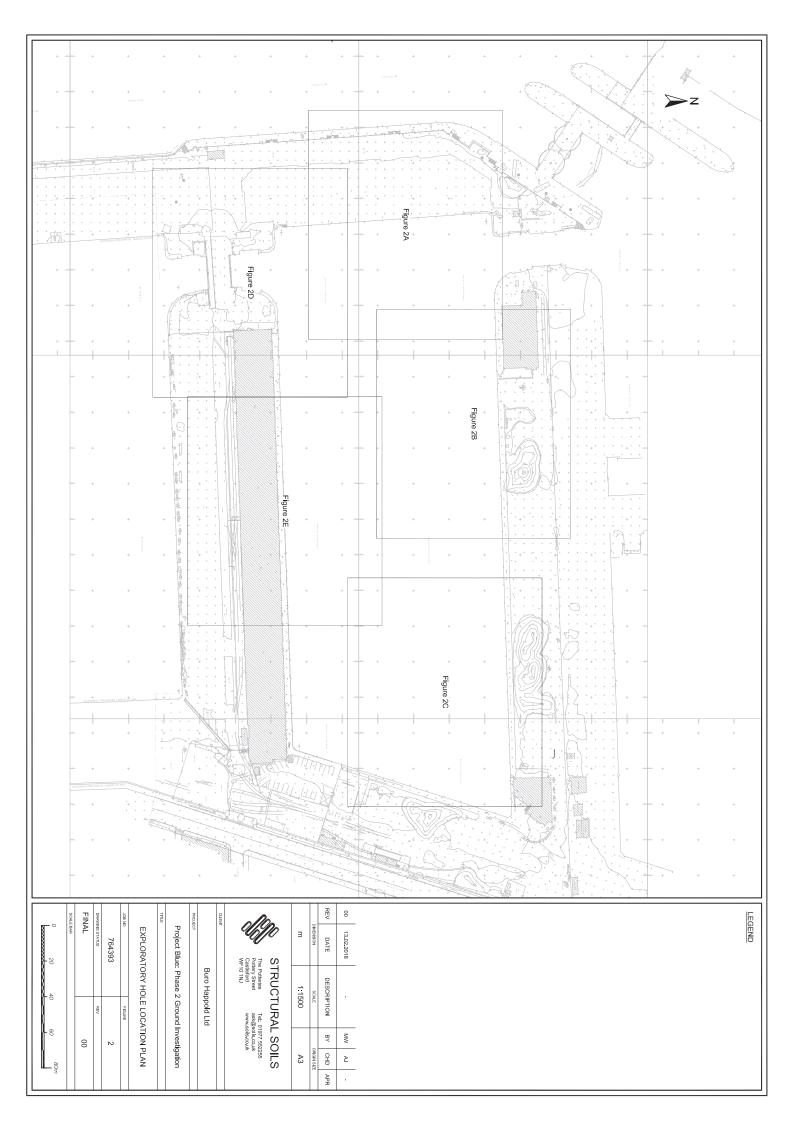
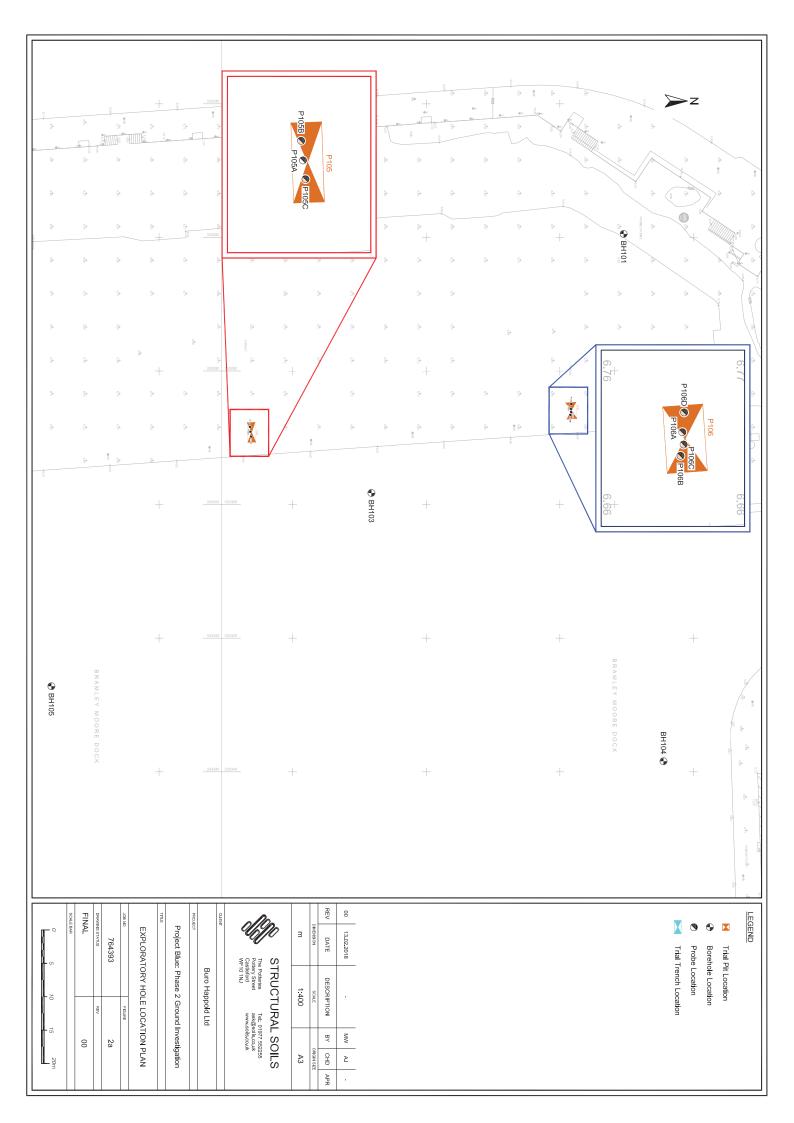
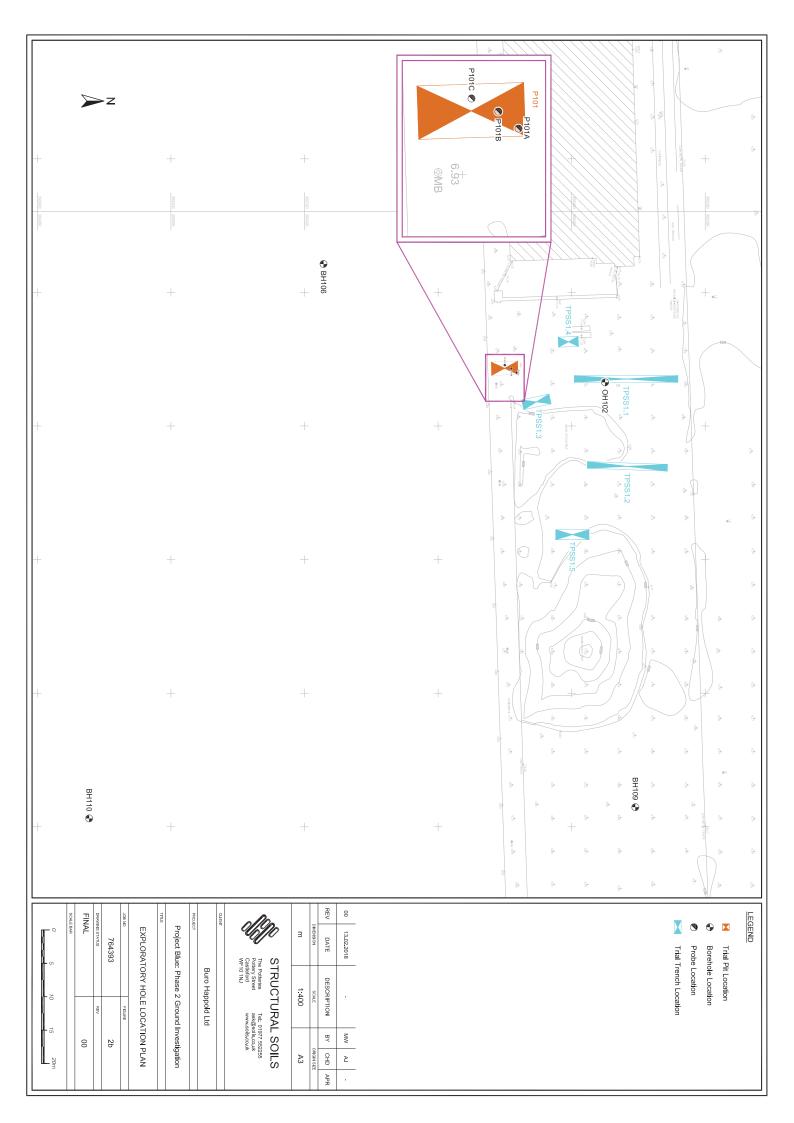


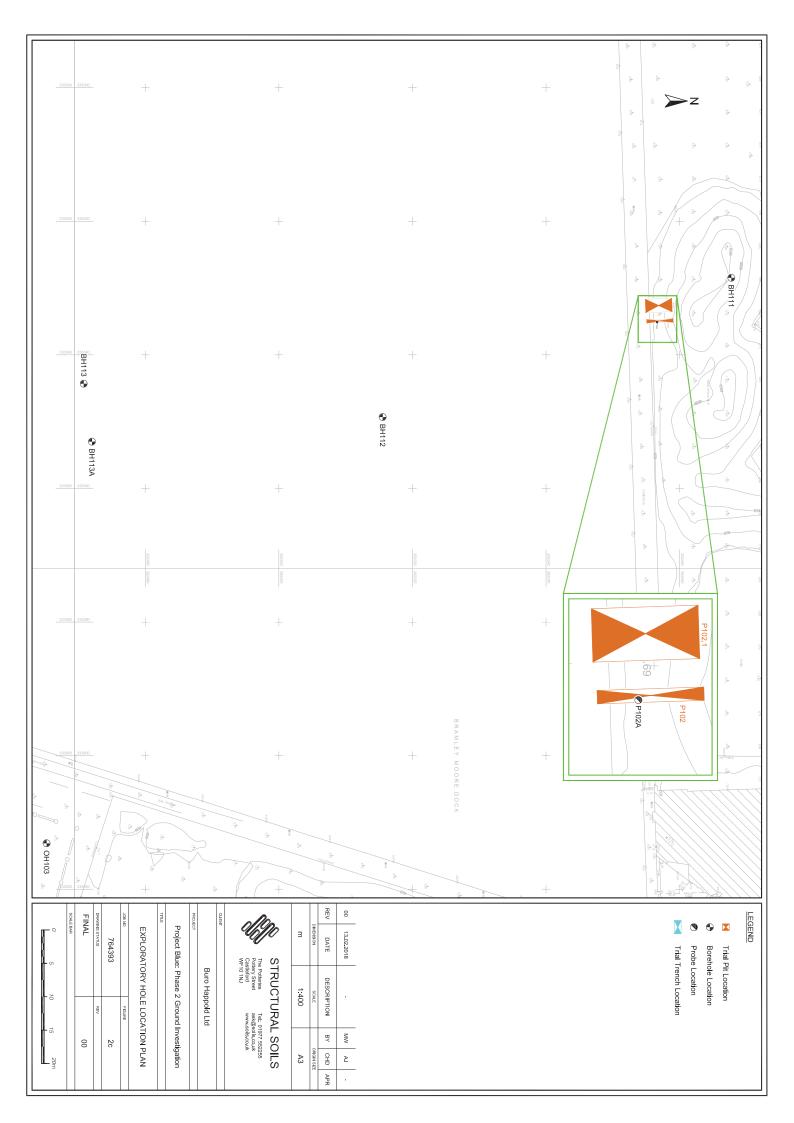
Contains Ordnance Survey data © Crown copyright and database right 2013

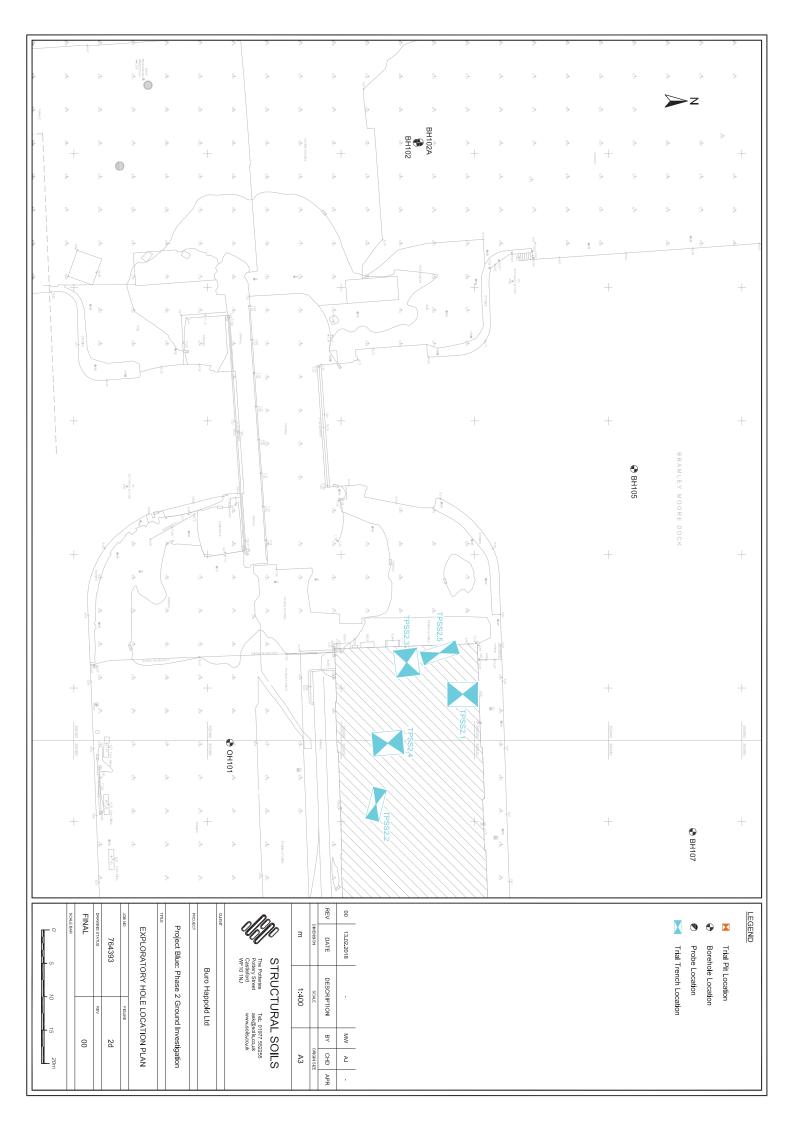
1							CLIENT				
	2		STRUCTURA	LSC	OILS				Buro Happold Ltd		
	11.			າ1977 552 soi l s.co.ເ			PROJECT				
	(<i>(1)</i>		soils.co.u				Project E	Blue: Phase 2 Ground Investigation		
							TITLE				
'	00	13.02.2018	-	MW	AJ	-					
R	EV.	DATE	DESCRIPTION	BY	CHD.	APR.			SITE LOCATION MAP		
'``		DATE	DECORAL FIGH	"	OI ID.	/	JOB NO	GRID REF	SCALE BAR	ORIGIN SIZE	FIGURE
	D	DIMENSION SCALE DRAWING STATE	TUS								
	m	m	1:25,000		FINAL		764393	SJ 334 924	0 250 500 750 1,000m	A4	1

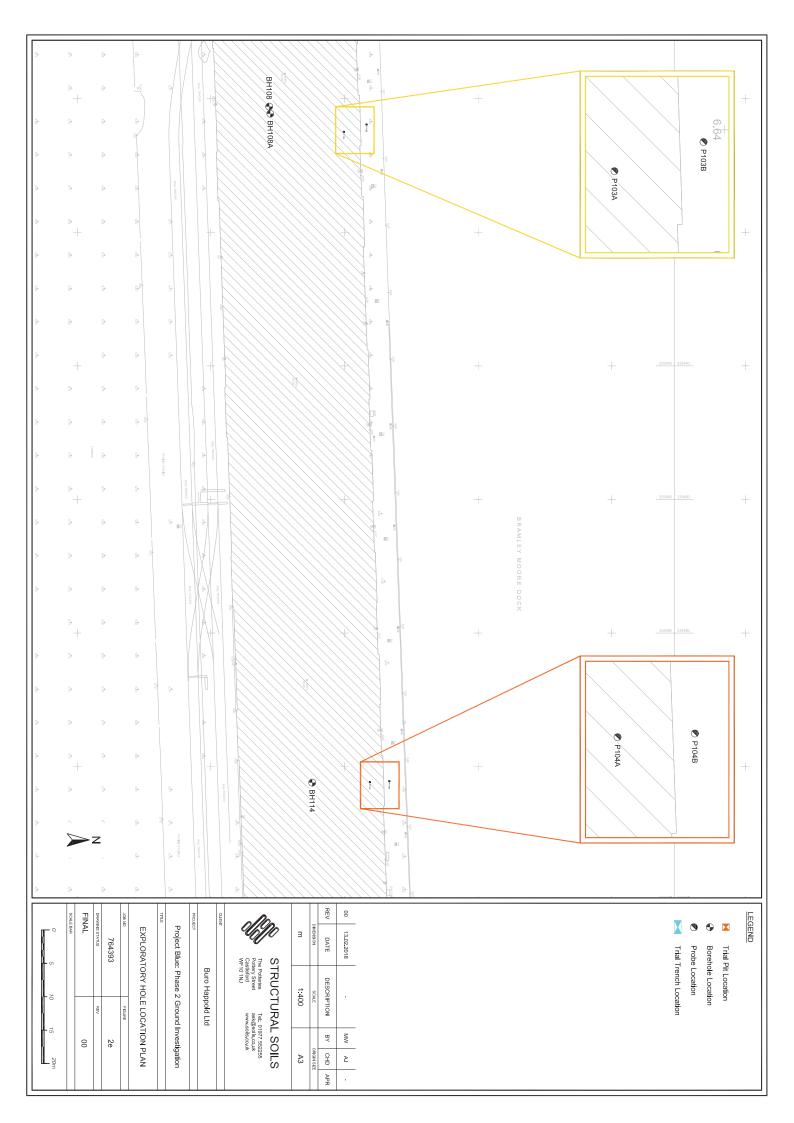














APPENDIX B - EXPLORATORY HOLE RECORDS

- (i) Key to Exploratory Hole Logs
- (ii) Borehole Logs
- (iii) Probe Borehole Logs and Cross Sections
- (iv) Trial Pit Logs
- (v) Site Strip Logs
- (vi) Standpipe Summary Table
- (vii) Ground Level and Co-Ordinate Summary Table

Contract Reference: 764393

KEY TO EXPLORATORY HOLE LOGS - SUMMARY OF ABBREVIATIONS

SAMPLING

Sample type codes

B = Bulk disturbed sample.

C = Core sample.

D = Small disturbed sample.

DSPT = Small disturbed sample originating from SPT test.

ES = Soil sample for environmental testing. EW = Water sample for environmental testing.

P = Undisturbed pushed piston sample - 102 mm diameter, 1000 mm long. % recovery reported.

UT = Undisturbed thin-walled driven tube sample - Number of blows indicated. % recovery

reported.

Undisturbed sample detail codes

 $U_{(UT100)}$ = Undisturbed sample UT100

IN-SITU TESTING

SPT_(c) = Standard Penetration Test using a solid 60 degree cone.

SPT = Standard Penetration Test using split spoon sampler. (SPT_(NR) indicates 'No Sample

Recovery').

details).

* denotes extrapolated N value. NP denotes 'No Penetration'.

PID = Photo Ionisation Detector Results, in ppm.

ROTARY DRILLING INFORMATION

W = Water flush returns (%)
TCR = Total core recovery (%)
SCR = Solid core recovery (%)
RQD = Rock quality designations (%)

If = Fracture spacing (mm).

In the fracture column (i) denotes discontinuity is infilled (refer to Fracture Table for

Where variable the minimum - average - maximum spacing may be quoted. 'NI' denotes non-intact core. 'NA' denotes not applicable.

All lengths used to determine rock core mechanical properties taken along the centre line of the core. Obvious induced fractures have been ignored.

The assessment of solid core is based on lengths that show a full diameter and not necessarily a full circumference.

AZCL = Assessed zone of core loss.

ADDITIONAL NOTES

- 1. All soil and rock descriptions and legends in general accordance with BS EN ISO 14688-1, 14688-2, 14689-1, and BS5930:2015.
- 2. Material types divided by a broken line (- -) indicates an unclear boundary.
- 3. The data on any sheet within the report showing the AGS icon is available in the AGS format.

3. 06. GLBIGrfcText G - LEGEND - 1 OF 2 | 764393 - PROJECT BLUE.GPJ - v8_06 | 13/04/18 - 15:30 | AJ4.
Branch Office - Castleford: The Potteries, Pottery Street, Castleford, West Yorkshire, WF10 1NJ. Tel: 01977-552255, Fax: 01977-552299, Web: www.soils.co.uk, Email:north@soils.co.uk GINT_LIBRARY_V8 Structural Soils Ltd, E

Contract Reference: 764393

KEY TO EXPLORATORY HOLE LOGS - SUMMARY OF GRAPHIC SYMBOLS

WATER COLUMN SYMBOLS



First water strike, second water strike etc.

Standing water level following first strike, standing water level following second strike etc.

Seepage.

Standing water level recorded at documented date.

MATERIAL GRAPHIC LEGENDS

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l .	. 7	٠.١
١. ١	$\overline{}$	٠.
_	•	_

Clayey gravelly SAND



Clayey SAND



Gravelly CLAY



Gravelly SAND



Gravelly SILT



MADE GROUND



Possible MADE GROUND



SAND



Sandstone



Sandy CLAY



Sandy gravelly CLAY



Sandy gravelly SILT



Siltstone



Sandy SILT



SILT



Silty gravelly SAND



MADE GROUND



CONCRETE



Clayey SAND



SANDSTONE

INSTRUMENTATION SYMBOLS



Backfill



Bentonite seal



Concrete



Gravel filter



Sand filter



Stopcock cover



Flush cover



Upstanding cover



Piezometer tip



Plain pipe



Slotted pipe

GINT LIBRARY V8 06.GLB!GrfcText G - LEGEND - 2 OF 2 | 764393 - PROJECT BLUE.GPJ - v8 06 | 13/04/18 - 15:30 | AJ4.
Structural Soils Litd, Branch Office - Castleford: The Potteries, Potteries, Pottery Street, Castleford, West Yorkshire, WF10 1NJ. Tel: 01977-552255, Fax: 01977-552299, Web: www.soils.co.uk, Email:north@soils.co.uk.



BOREHOLE LOG

Contract:							Client:						Boreho	le:	
		Pro	ject Blue						R	uro Hap	pold		5110		3H1
Contract Re	f.	110		01.12	2 47	Groun	d Level (r	٥).			d Co-ordinate:		Sheet:		,,,,
						Groun	•	•	- '				Officet.		
	7643		End:	18.12			6.55			□: 3332	59.5 N:392529	J.b	-	1	of
Depth		Sample	s & Testing			anical L	og Flush	Backfill & Instru-	Water				Reduced Level	Depth	Ma
(m)	No	Туре	Results	TCR (%)	SCR (%)	RQD	If fs in it	3ack Inst	Wa	Des	scription of Strata		educe Level	(Thick ness)	Gra Le
				(70)	(70)	(70) (1	1111) IL IE 8			h MADE GF	ROUND: ASPHALT.		6.50	0.05	XX
								ШШ			ROUND: CONCRE		(0.00)		\bigotimes
											natrix ratio: 65:45.		6.30	0.25	\boxtimes
										11	lasts are subrour o coarse gravel si		C 1E	0.40	\bigotimes
											ally cobble sized.		6.15	0.40	\bowtie
0.50	1 1	В									ROUND: CONCRE matrix ratio: 65:45.	- 11		ŀ	\bigotimes
0.50	101	ES	x6								asts are subangula			ŀ	\bowtie
0.50		PID	0.3ppm							rounded	and fine to med			ŀ	\otimes
										gravel size	ed. GROUND: Dark br	rown		(0.90)	\bowtie
											y clayey subangular			ŀ	\bowtie
1.00	102	ES	х6							to coars	e GRAVEL of m	nixed -	-	<u> </u>	\bowtie
1.00	2	В						目:			including brick, cli stone with high co			ŀ	
1.00 1.20-1.65	3	PID SPT	0.3ppm N=4		A	\vdash		: :		content. S	Sand is fine to med	dium.	5 OF	4.00	\bowtie
1.20-1.65	4	D	14-4					目			are subangular and brick.	of _	5.25	1.30	\bowtie
1.20	5	D									ROUND: Dark br	rown		ŀ	
1.50	103	ES	x6	Wii	ndow i	run		:目:		gravelly of	clayey fine to med	dium 🕂		ŀ	\bigotimes
1.50		PID	10.6ppm		5mm (with medium co Gravel is subangula	obble L		(0.80)	\otimes
				(10	00% re	ec)				subrounde	ed fine to mediun	n of		L (0.80)	\bowtie
								1 1		mixed lith	ologies including b	orick,		ŀ	\bigotimes
											e, clinker, concrete Cobbles are subanc			r	\bowtie
2.00-2.45	6	SPT	N=5		- X -					of sandsto		-			
2.00	104	ES	x6							MADE GE	ROUND: Reddish br	rown	4.45	2.10	\times
2.00-2.45 2.00	7	D PID	0.8ppm							gravelly	very clayey med	dium -		ŀ	\bowtie
2.20	8	D	о.оррін							SAND. G	ravel is subangular one and concrete.	fine		r	\otimes
2.30	9	В		Wii	ndow i	run				Or Sariusio	one and concrete.	-		(0.00)	\otimes
				11:	5mm o	dia						-		(0.80)	\bowtie
				(10	00% re	ec)						-		ŀ	\bigotimes
												-			\bowtie
												-	2.05	2.90	\otimes
										MADE G	ROUND: Dark br	rown	3.65	2.90	\bowtie
3.00-3.45	10	SPT	N=5		- X -						ghtly clayey subang		-	(0.30)	\bowtie
3.00	105	ES	x6							including	VEL of mixed litholo clinker, siltst		3.35	2 20	\bowtie
3.00-3.45 3.00	11	D PID	0.3ppm							sandstone	e and brick. Sand		J.JO	3.20	\bigotimes
3.30		EW								medium.	DOLIND: Orașid-le l			Ī	\bowtie
3.40	12	D			ndow i				11		ROUND: Greyish br slightly clayey med			(0.50)	
3.50		EW			5mm ()0% re			-	÷	SAND. G	ravel is subangular	fine			\bowtie
				(10		,					n of brick, concrete e. Occasional fine		2.85	3.70	
										∖medium	gravel sized	shell	۷.00	0.70	
3.80	13	D								fragments					\bowtie
					ļ						ROUND: Dark gre y gravelly medium	eyisn			
				-			<u>'</u>			1					
Bor	ring P	rogress	and Water Ol							Cor	neral Remar	·ke			
	Time	Bore		Boreh Diame	eter	Water				<u> </u>		1/3			
Date		Dep		(mm		Depth					xploratory hole locati	ion.			
	16:00 08:00	0.4	-	300		Dry Dry	2. Co	ncrete c	ore	from GL to (0.40m.				
01/12/17 1		13/12/17 16:00 4.00 4.00 150 3.9				3.90					ted to 1.20m. ned during borehole	formati	ion with	າ test se	ectio
01/12/17 1 13/12/17 0		7.0	14/12/17 08:00 4.00 4.00 150 2.9				bet	ween 3.	30m	n and 4.30m					
01/12/17 1 13/12/17 0 13/12/17 1 14/12/17 0	16:00 08:00	4.0			. 1	F F0	II E On		4:						sno
01/12/17 1 13/12/17 (13/12/17 1 13/12/17 (14/12/17 (14/12/17 1	16:00 08:00 16:00	4.0 17.	50 13.00	146		5.50					neter standpipe insta	alled to	3.50m,	with re	opo
01/12/17 1 13/12/17 (13/12/17 1 14/12/17 1 14/12/17 1 18/12/17 (16:00 08:00	4.0	50 13.00 50 13.00	146 146 146	6	6.10 4.70				, 50mm dian ∂m to 3.50m.				, with re	,opo
01/12/17 1 13/12/17 (13/12/17 1 14/12/17 1 14/12/17 1 18/12/17 (16:00 08:00 16:00 08:00 16:00	4.0 17. 17.	50 13.00 50 13.00 00 13.00	146 146	6	6.10	zor	e from (0.50			,	3.50m, 1:22 Checke		П

	Boring Progress and Water Observations													
Date	Time	Borehole	Casing	Borehole Diameter	Water									
2 410		Depth	Depth	(mm)	Depth									
01/12/17	16:00	0.40	None	300	Dry									
13/12/17	08:00	0.40	None	300	Dry									
13/12/17	16:00	4.00	4.00	150	3.90									
14/12/17	08:00	4.00	4.00	150	2.90									
14/12/17	16:00	17.50	13.00	146	5.50									
18/12/17	08:00	17.50	13.00	146	6.10									
18/12/17	16:00	25.00	13.00	146	4.70									

General Remarks

- 1. CAT scan undertaken at exploratory hole location.
- 2. Concrete core from GL to 0.40m.
- 3. Inspection pit hand excavated to 1.20m.
- 4. Variable Head Test performed during borehole formation with test section between 3.30m and 4.30m.
- 5. On completion, 50mm diameter standpipe installed to 3.50m, with response zone from 0.50m to 3.50m.





BOREHOLE LOG

Op									BOKEH	UL		.UG
Contract:						Clie	ent:			Boreho	ole:	
		Pro	ject Blue					Е	Buro Happold		В	H101
Contract Re	f:		Start:	01.12.17	Ground	d Le	evel (m):		National Grid Co-ordinate:	Sheet:		
7	'64	393	End:	18.12.17			6.55		E:333259.5 N:392529.6		2	of 13
Depth (m)	No	Sample Type	s & Testing Results	Mecha	RQD	og If	Flush Returns & Details Backfill & Instru- mentation	Water	Description of Strata	Reduced	Depth (Thick ness)	Material Graphic Legend
4.00-4.45 - 4.00 - 4.00-4.45 - 4.00 - 4.30-4.70	14 106 15	SPT ES D PID B	N=13 x6 2.5ppm	Window 115mm (80% re	run dia	1111)	<u>r</u> κ≪ α ⊢		SAND. Gravel is subangular to subrounded fine to medium of concrete, sandstone and brick.		(1.10)	
5.00-5.45 - 5.00 - 5.00 - 5.00-5.45 - 5.00	17 107 18	SPT ES D PID D	N=8 x6 1.2ppm	*					MADE GROUND: Dark brownish grey sandy clayey subangular fine to coarse GRAVEL of brick and sandstone with low cobble content. Sand is medium. Cobbles are subangular of sandstone and brick.	1.75	4.80	
5.40-5.90	20	В		Window I 115mm ((90% re	dia				MADE GROUND: Dark grey gravelly clayey medium SAND. Gravel is subangular medium to coarse of clinker, sandstone and brick.	-	- - - -	
6.00 6.00-6.45 6.00	108 21	ES UT _(UT100) PID	x6 22 blows 100% recovery 0.8ppm							- - -	(1.80)	
6.45-6.60	22	D								_	_	
6.60-7.05	23	SPT _(NR)	N=3	Window I						-	-	
7.00	109		x6 0.6ppm	(100% re						- - -0.55	- - 7.10	
7.10-7.55 7.60-8.15	25 26	UT _(UT100)	45 blows 100% recovery						MADE GROUND: Dark grey gravelly medium to coarse SAND with low cobble content. Gravel is subangular fine to medium of brick and sandstone. Cobbles are subangular of sandstone. Occasional fine to medium gravel sized shell fragments.	-	- - -	
7.70-8.15 7.70-8.15	27 28	SPT D	N=27	Window of 98mm do (70% re	lia					-	(1.70)	

	Boring Pro	gress and	Water Ob	servations	6			Col	neral Remarks				
Date	Time	Borehole	Casing	Borehole Diameter	Water			Gei	nerai	Remarks	1		
		Depth	Depth	(mm)	Depth	6. SPT	hamme	er JT.01 2017 ($(E_{\rm r} = 72.0$	0%) used.			
						А	ll dimer	nsions in metre	s	Scale:	1:22		
Method Used:	Inspection pit +				Hand tools +		Drilled By:	Jonathan Newby	Logged By:	TBeeson	Checked A	S AGS	



BOREHOLE LOG

									BOKEH	UL		UG
Contract:						Cli	ent:			Boreho		
		Pro	ject Blue						suro Happold		В	H101
Contract Re	f:		Start:	01.12.17	G rou	und Le	evel (m):		National Grid Co-ordinate:	Sheet:		
7	'64 3	393	End:	18.12.17			6.55		E:333259.5 N:392529.6		3	of 13
Depth	,	Sample	s & Testing	Mech TCR SCI	anical	Log	Flush Returns & Details Backfill & Instru- mentation	Water	Description of Strata	Reduced	Depth (Thick	Material Graphic
(m)	No	Туре	Results	(%) (%)	(%)	(mm)	Flus Retu & De Bacl Ins	Š	Description of otrata	Red	ness)	Legend
8.00	110	ES PID	x6 2.3ppm							-	-	
-				Window 98mm (70% r	dia					- - -	-	
8.60 8.70-9.15 8.70-9.15	29 30 31	D SPT D	N=24	X						-2.25	8.80	
9.00	111	ES PID	x6 6.7ppm	Window 98mm (70% r	dia				Medium dense dark brown very gravelly silty fine to medium SAND. Gravel is subangular to subrounded fine to coarse of sandstone, siltstone and quartzite. Some fine to medium	- - -	- -	0 0
9.30-9.68	33	SPT	25,15/11,9,8 for 75mm	*					gravel sized shell fragments from 9.30m, becoming very dense.	- -	-	0.0
9.30-9.68 9.40 9.60-10.10	34 35 36	D D B		Window 89mm	dia					-	(1.50)	0. O.
- - -				(100%	rec)					-	-	0.0.0
10.30-11.50 10.30-10.71	37	SPT 8	8,10/16,24,35,2 for 30mm	25	A	 	1		Extremely weak reddish brown medium grained SANDSTONE. Recovered as a cemented sand.	-3.75	(0.40)	0
10.30-10.71	38	D	101 00111111						from 10.30m to 10.65m, assumed zone of core loss.	- 445		
-				92 75		NI 20 30			Very weak locally weak reddish brown medium grained SANDSTONE. Discontinuities: 1)	-4.15	10.70	
-						X	90-100% return Air+Mist (Red)		very closely spaced 0-10° planar rough clean locally clay smeared from 10.70m to 10.85m, 1 No thin bed of medium strong light grey fine grained sandstone.	-	(0.70)	
44.50.40.00					<u> </u>	l l	06		one from 11.00m to 11.25m, 3 No 90° fractures undulating rough clay smeared. Weak reddish brown medium	-4.85	11.40	
11.50-13.00				100 42	27	60 200			grained SANDSTONE with rare fine to medium gravel sized inclusions of siltstone and	-	_	
-				1.50 42					mudstone. Discontinuities: 1) very closely to closely spaced 5-15° planar rough clean locally infilled	-	-	

E	Boring Pro	ogress and	Water Ob	servations	3		Co	noral	Remarks		
Date	Time	Borehole	Casing	Borehole Diameter	Water		Ge	IIEIAI	Remains		
		Depth	Depth	(mm)	Depth						
									ı		
						A	II dimensions in metre	es	Scale:	1:22	
Method		crete core + ection pit +	Plan		Concrete Core	er+	Drilled	Logged		Checked 1	
Used:	Dynami	ic sampling + ary Cored	Used		Hand tools + nacchio GEO 2	205	By: Jonathan Newby	By:	TBeeson	By:	AGS



BOREHOLE LOG

Contract:							Cli	lien	t:			Boreho	ole:	
oonada.		Pro	ject Blue							В	Buro Happold	Borone		H101
Contract Re	f:			01.1	2 17	Grou	und L	eve	el (m):		National Grid Co-ordinate:	Sheet:		
		393	End:	18.1					55		E:333259.5 N:392529.6		4	of 13
	_		s & Testing			ı anical					E:000203:3 N:002020:0	<u> </u>	I	I
Depth (m)	No	Туре	Results	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush	- Returns & Details Backfill & Instrumentation	Water	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
12.01-12.20 - - - 12.37-12.48		С		100	42	27					with soft reddish brown clay (<10mm) from 11.50m to 11.61m, recovered as non-intact core (medium to coarse gravel sized fragments).	-	-	
- - -											at 12.60m, 1 No 50° fracture planar rough clean.	-	- -	
- 13.00-14.50 - - -				*	X	X	_				from 12.85m to 12.90m, recovered as non-intact core (fine to medium sand) from 13.00m to 13.15m, recovered as non-intact core (medium to coarse gravel sized fragments).	-	(3.50)	
13.50-13.60	203	С		100	56	16	NI 60 200		. Air+Mist (Red)		at 13.74m, rounded inclusion of mudstone.	-	-	
- - -								90-100	Air+ (Re		from 14.11 to 14.27m, 1 No thin bed of medium strong greyish yellow medium grained sandstone.	- - -	-	
14.50-16.00 14.57-14.77		С			X	X					from 14.50m to 14.94m, 1 No medium bed of medium strong thickly laminated light grey, orangish and reddish brown medium grained sandstone from 14.80m to 14.90m,	-8.35	14.90	
- - - - - 15.46-15.57	205	С		100	56	32	NI 45 300				recovered as non-intact core (fine to coarse gravel sized fragments). Weak locally medium strong reddish brown medium grained SANDSTONE. Discontinuities: 1) closely locally medium and very closely spaced 5-15° planar rough clean locally clay smeared.	-	-	
- - -											from 15.57m to 15.65m, 2 No 80° fractures undulating rough clay smeared from 15.59m to 17.45m, with 4 No closely to medium spaced very thin and thin beds of medium	-	(1.60)	

	E	Boring Pro	gress and	Water Ob	servations	3		Co	noral	Remarks	
יומוסומי.	Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth		Ge	Herai	Remarks	
olls Ltd, branch Ollice - Cas			2-2011	_ span	()	2.50					4.22
<i>n</i> ≅							A	Il dimensions in metre	es	Scale:	1:22
ollactaic	Method Used:	Inspe Dynami	rete core + ection pit + c sampling + ary Cored	Plan Use	۸.	Concrete Core Hand tools + nacchio GEO 2		Drilled By: Jonathan Newby	Logged By:	TBeeson	Checked AG

GINT_LIBRARY_V8_06.GLB LibVersion: v8_06_018 PrjVersion: v8_06 - Core+Full Castleford SI - 008 | Log COMPOSITE LOG - A4P | 764393 - PROJECT BLUE.GPJ - v8_06. SIGN. Sign



BOREHOLE LOG

Op													BUREIN	JLI		.UG
Contract:								Cli	ient	:				Boreho	ole:	
		Pro	ject E	Blue								В	Buro Happold		В	H101
Contract Ref	f:			Start:	01.1	2.17	Gro	und L	eve	l (m):		National Grid Co-ordinate:	Sheet:		
7	'64 3	393		End:	18.1	2.17			6.	55			E:333259.5 N:392529.6		5	of 13
		Sample	s & Tes	ting	1	Mech	anical	Log		s <u>s</u>	∞ ' iº			b —	Depth	Material
Depth (m)	No	Туре	Res	sults	TCR (%)	SCR (%)	RQD (%)	Log If (mm)	Flush	Return & Deta	Backfill & Instru- mentation	Water	Description of Strata	Reduced Level	(Thick ness)	
16.00-17.50					1	1	1						strong light grey fine to medium grained sandstone.	-	-	
-													gramed canacteries	-	-	
		_												-	-	
16.32-16.50	206	С														
-													Weak locally medium strong	-9.95	16.50	
-								NI 45					reddish brown medium to coarse	-	-	
-					100	83	79	300					grained SANDSTONE. Discontinuities: 1) closely to	-	-	
-					100	83	/9						medium spaced 5-20° planar	-	-	
-													rough clean locally infilled with reddish brown fine to medium	-	-	
- 17.02-17.27	207	С											sand (<5mm).	-	-	
17.02-17.27	201	O											from 16.85m to 16.90m and 16.98m to 17.02m, extremely	-	-	
-								↓					weak and recovered as non-intact	-	-	
								A	1				core (sandy angular fine to coarse gravel sized fragments).	-	-	
-						↓	↓						graver sized fragments).	-	-	
17.50-19.00		_			1	1	1	1						-	-	
17.50-17.64	208	С														
-														-		
									ını					-	-	
									o ref	- Air+Mist (Red)				-	-	
									00%	<u> </u>			from 18.02m to 19.00m, 4 No	_		
[- 18.16-18.34	200	С							90-1				closely to medium spaced very thin beds of medium strong light			
10.10-10.34	209	C			100	97	61						grey fine to medium grained			
					1 1	lт							sandstone.			
_														_	_	
_								150					from 18.60m to 18.64m, recovered as non-intact core	_	_	
_								310					(sandy angular fine to coarse	_	_	
-													gravel sized fragments).	-	-	
					<u> </u>	<u> </u>	<u> </u>							_	_	
19.00-20.50					1	│	1							-	-	
-														-	-	
-														-	-	::::::::::::::::::::::::::::::::::::::
-														-	-	
-					100	98	95							-	-	
19.57-19.88	210	С												-	-	[::::::::::::::::::::::::::::::::::::::
-														-	-	
-													at 19.80m, stained yellowish	-	-	[::::::::::::::::::::::::::::::::::::::
-													brown.	-	-	[::::::::::::::::::::::::::::::::::::::

E	Boring Pro	ogress and	Water Ob	servations	3	General Remarks						
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth		Ge	llerai	Remarks			
		Берит	Берит	(11111)	Борит							
						A	II dimensions in metre	es	Scale:	1:22		
 Method Used:	Inspection pit + Lond to als				Hand tools +		Drilled By: Jonathan Newby	Logged By:	TBeeson	Checked AGS		



Contract:								Cli	ent:				Boreho	ole:	
		Pro	ject E	Blue							В	Buro Happold		В	H101
Contract Ref	f:			Start:	01.1	2.17	Gro	und L	evel	(m):		National Grid Co-ordinate:	Sheet:		
7	'64 3	393		End:	18.1	2.17			6.5	55		E:333259.5 N:392529.6		6	of 13
		Samples	s & Test	ting	1	Mecha	anical	l Log		si ⊗ ro	<u></u>		be d	Depth	Materia
Depth (m)	No	Туре	Res	sults	TCR (%)	SCR (%)	RQD (%)	lf (mm)	Flush	& Details Backfill & Instrumentation	Water	Description of Strata	Reduced	(Thick ness)	
20.50-22.00					100	98	95	NI 150 310	_			from 19.94m to 20.09m, 1 Nothin bed of medium strong light grey locally stained yellow fine to medium grained sandstone.	: -	(8.50)	
21.14-21.29	211	С			100	99	55					at 21.29m. 1 No 80° fracture planar rough clean (possibly		-	
21.54-21.73	212	С							6 return Mist	(pe		drilling induced).	-	-	
22.00-23.50							Å	60 170 440	90-100% return	(<u>8</u>		from 22.29m to 23.50m, with		-	
22.50-22.94	213	С			100	100	86					frequent very closely to mediun spaced very thin and thin beds o medium strong light grey and yellowish brown fine to mediun grained sandstone.	; -	-	
23.50-25.00					X	V	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	_					-	-	
					100	98	73						-	-	

E	Boring Pro	gress and	Water Ob	servations	3		Co	noral	Remarks	
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth		Ge	nerai	Remarks	
						A	Il dimensions in metre	es	Scale:	1:22
 ethod sed:	Inspe Dynami	rete core + ection pit + ic sampling + ary Cored	Plan Use	۸.	Concrete Core Hand tools + nacchio GEO 2		Drilled By: Jonathan Newby	Logged By:	TBeeson	Checked AGS AGS



Contract:								Cli	ent:				Boreho	ole:	
		Proj	ject E									uro Happold		В	H101
Contract Re	ef:			Start:	01.1	2.17	Grou		evel (m):	1	National Grid Co-ordinate:	Sheet:		
	7643	393		End:	18.1				6.55			E:333259.5 N:392529.6		7	of 13
Depth (m)	No	Samples Type		ting sults	_	Mecha SCR (%)	RQD (%)	Log If (mm)	Flush Returns & Details	Backfill & Instru-mentation	Water	Description of Strata	Reduced	Depth (Thick ness)	Materia Graphi Legend
24.31-24.5	8 214	C			100	98	73	60 170 440	90-100% return ▲ Air+Mist (Red)			from 24.70m to 24.80m, 1 No 70° fracture planar rough clean. Borehole terminated at 25.00m depth.			

	Boring Pro	gress and	Water Ob	servations	3		Col	norol	Domorko	
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter	Water Depth		Ge	nerai	Remarks	
		Берип	Берип	(mm)	Берип					
						Α	II dimensions in metre	s	Scale:	1:22
Method Used:	Inspe Dynami	rete core + ection pit + c sampling + ary Cored	Plan Used	4.	Concrete Core Hand tools + nacchio GEO 2		Drilled By: Jonathan Newby	Logged By:	TBeeson	Checked AG



Contract:				Client:			Borehole	e:		
Project E	Blue				E	Buro Happold		I	BH′	101
Contract Ref:	Start:	01.12.17	Groun	d Level (m):		National Grid Co-ordinate:	Sheet:			
764393	End:	18.12.17		6.55		E:333259.5 N:392529.6		8	of	13

BH101 - Concrete Core





BH101 - Box 1

Method Used:

Plant Used: Hilti Concrete Corer + Hand tools + Comacchio GEO 205

Drilled Jonathan Newby

Logged

TBeeson

Checked





Contract:				Client:			Borehole	e:		
Project E	Blue				E	Buro Happold		ı	BH	101
Contract Ref:	Start:	01.12.17	Groun	d Level (m):		National Grid Co-ordinate:	Sheet:			
764393	End:	18.12.17		6.55		E:333259.5 N:392529.6		9	of	13

BH101 - Box 2





BH101 - Box 3

Method Used:

Plant Used: Hilti Concrete Corer + Hand tools + Comacchio GEO 205

Drilled

Logged Jonathan Newby

TBeeson

Checked





Contract:				Client:			Borehol	e:
Project E	Blue				E	Buro Happold		BH101
Contract Ref:	Start:	01.12.17	Groun	d Level (m):		National Grid Co-ordinate:	Sheet:	
764393	End:	18.12.17		6.55		E:333259.5 N:392529.6		10 of 13

BH101 - Box 4





BH101 - Box 5

Method

Plant Used: Hilti Concrete Corer + Hand tools + Comacchio GEO 205

Drilled

Logged

Checked



GINT_LIBRARY V8 06.GLB LibVersion: v8 06 018 Pt/Version: v8 06 - Core+Full Castleford SI - 008 | Log COMPOSITE LOG - A4P | 764393 - PROJECT BLUE.GPJ - v8 06.
Structural Soils Lid, Branch Office - Castleford: The Potteries, Pottery Street, Castleford, West Yorkshire, WF10 1NJ. Tel: 01977-552255, Fax: 01977-552299, Web: www.soils.co.uk, Email: ask@soils.co.uk. | 31/05/18 - 16:31 | AJ4 |

Used:

Jonathan Newby

TBeeson



Contract:				Client:			Borehol	e:		
Project E	Blue				E	Buro Happold		E	3H1	101
Contract Ref:	Start:	01.12.17	Groun	d Level (m):		National Grid Co-ordinate:	Sheet:			
764393	End:	18.12.17		6.55		E:333259.5 N:392529.6		11	of	13

BH101 - Box 6





BH101 - Box 7

Method Used:

Plant Used: Hilti Concrete Corer + Hand tools + Comacchio GEO 205

Drilled Jonathan Newby Logged

TBeeson

Checked





Contract:			(Client:			Borehol	e:
Project E	Blue				E	Buro Happold		BH101
Contract Ref:	Start:	01.12.17	Ground	Level (m):		National Grid Co-ordinate:	Sheet:	
764393	End:	18.12.17		6.55		E:333259.5 N:392529.6		12 of 13

BH101 - Box 8





BH101 - Box 9

Method Used:

Plant Used: Hilti Concrete Corer + Hand tools + Comacchio GEO 205

Drilled Jonathan Newby

Logged

Checked

TBeeson





Contract:			C	Client:			Borehol	e:
Project E	Blue				E	Buro Happold		BH101
Contract Ref:	Start:	01.12.17	Ground	Level (m):		National Grid Co-ordinate:	Sheet:	
764393	End:	18.12.17		6.55		E:333259.5 N:392529.6		13 of 13

BH101 - Box 10





TBeeson







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Structural Soils Lid, Branch Office - Castleford: The Potteries, Pottery Street, Castleford, West Yorkshire, WF10 1NJ. Tel: 01977-552255, Fax: 01977-552299, Web: www.soils.co.uk, Email: ask@soils.co.uk, | 31/05/18 - 16:31 | AJ4 |

STRUCTURAL SOILS

BUDEHUI E I UC

Contract:								Cli	ent:				Boreho		
		Pro	ject E	Blue								uro Happold		E	3H102
Contract Re	ef:			Start:	01.1	2.17	Gro	und L	evel (m	1):		National Grid Co-ordinate:	Sheet:		
-	7643	393		End:	13.1	2.17			6.73			E:333278.4 N:392411.3		1	of 14
Б		Sample	s & Tes	ting			anical	Log	SI S	≡ v Tion	e		ced	Depth	Materia
Depth (m)	No	Туре	Res	sults	TCR (%)	SCR (%)	RQD (%)	lf (mm)	Flush Returns & Details	Backfi Instr menta	Water	Description of Strata	Reduced	(Thick ness)	Graphic
												MADE GROUND: ASPHALT.	6.67	0.06	
												MADE GROUND: CONCRETE. Clast to matrix ratio: 45:55. 10%	6.53	0.20	
												voids. Clasts are generally subangular to subrounded fine to	6.43	0.30	
												coarse gravel sized and	6.28	0.45	
0.50-1.00 0.50 0.50	1 101	B ES PID		c6 ppm								occasionally cobble sized. MADE GROUND: CONCRETE. Clasts to matrix ratio: 65:35. 15% voids. Clasts are generally subangular to subrounded fine to coarse gravel sized. MADE GROUND: CONCRETE.	-	- - -(0.75)	
1.00 1.00	102	ES PID		(6 ppm								Clasts to matrix ratio: 65:35. 50% voids. Clasts are rounded coarse gravel sized. Matrix mainly void	5.53	1.20	
1.20 1.20-1.65 1.20-1.65 1.30-1.80 1.50	2 3 4 5	D SPT D B ES		=10	Wi	ndow	run					space. Brick fragments to one side. MADE GROUND: Reddish brown gravelly medium SAND. Gravel is subangular fine to coarse of	-	-	
1.50		PID		Sppm		5mm 00% r						sandstone and brick. MADE GROUND: Reddish brown very sandy silty angular to subrounded medium to coarse GRAVEL of mixed lithologies including sandstone, clinker, coal	- - -	(1.30)	
2.00-2.45 2.00 2.00-2.45 2.00 2.30	6 104 7 8	SPT ES D PID D	×	=7 66 ppm							<u>1</u>	and brick with low cobble content. Sand is fine to coarse. Cobbles are angular to subangular of sandstone and brick.	-	-	
						ndow 5mm							4.23	2.50	
2.50-3.00	9	В				00% re						MADE GROUND: Reddish brown slightly sandy slightly gravelly CLAY. Sand is medium. Gravel is subrounded fine to medium of sandstone and clinker.	- - -	(0.70)	
3.00-3.45 3.00 3.00	10 105	SPT _(NR) ES PID	×	=3 (6 ppm				-					3.53	3.20	
3.40 3.45-3.90	11 12	D B	0.3	Α ΡΙΙΙ	11	ndow 5mm 15% re	dia					MADE GROUND: Reddish brown gravelly very clayey medium SAND with low cobble content. Gravel is subangular fine to coarse of sandstone. Cobbles are angular of brick and sandstone.	-	(0.70)	

1	Boring Pro	gress and	Water Ob	servations	3
Date	Time	Borehole	Casing	Borehole Diameter	Water
Date	Tille	Depth	Depth	(mm)	Depth
01/12/17	16:00	0.45	None	300	Dry
11/12/17	08:00	0.45	None	300	Dry
11/12/17	16:00	7.00	7.00	150	2.50
12/12/17	08:00	7.00	7.00	150	4.10
12/12/17	16:00	18.70	10.20	146	4.90
13/12/17	08:00	18.70	10.20	146	4.90
13/12/17	16:00	26.20	10.20	146	8.10

General Remarks

Description on next sheet

- 1. CAT scan undertaken at exploratory hole location.
- 2. Concrete core from GL to 0.45m.
- 3. Inspection pit hand excavated to 1.20m.
- Variable Head Test performed during borehole formation with test section between 6.50m and 7.00m.
- 5. On completion, 19mm diameter piezometer installed with tip at 4.50m and response zone from 0.50m to 5.50m.

All dimensions in metres 1:22 Scale:

Method Plant Used: Used:

Hilti Concrete Corer + Hand tools + Comacchio GEO 305

Drilled Joseph Taylor Logged By: **TBeeson**

By:

2.83

Checked





BOREHOLE LOG

On											BOKEH	ULI		.UG
Contract:							Cli	ent:				Boreho	le:	
		Pro	ject E	Blue						В	uro Happold		В	H102
Contract Re	f:			Start:	01.12.17	Grou	und L	evel (m):	١	National Grid Co-ordinate:	Sheet:		
7	764	393		End:	13.12.17			6.73			E:333278.4 N:392411.3		2	of 14
Depth		Samples			Mecha TCR SCR	anical RQD	Log	Flush Returns & Details	ickfill & nstru- intation	Water	Description of Strata	Reduced	Depth (Thick	Material Graphic
(m)	No	''		sults	(%) (%)	(%)	(mm)	드움~	m Ba	1	MADE COOLIND: Dade brewnish	Re	ness)	Legend
4.00-4.45 - 4.00 - 4.00	13 106	SPT _(NR) ES PID	Х	=1 :6 ppm	Window 115mm (90% re	dia					MADE GROUND: Dark brownish grey gravelly very clayey fine to coarse SAND with low cobble content. Gravel is subangular fine of mixed lithologies including sandstone, brick and clinker. Cobbles are subangular of sandstone and brick.	-	- - (0.90) - -	
-											MADE GROUND: Grey sandy locally very sandy CLAY. Sand is medium.	1.93	4.80	
5.00-5.45 5.00 5.00-5.45 5.00 5.10-5.60	15 107 16 17	SPT ES D PID B	Х	=4 :6 ppm	1							- - -	(0.70) - -	
6.00-6.45	18	SPT _(NR)	N=	=13	Window 115mm (100% r	dia	_				MADE GROUND: Dark grey sandy subangular medium to coarse GRAVEL of mixed lithologies including sandstone, clinker, concrete and brick. Sand is fine to medium. Occasional fine to medium gravel sized shell fragments.	1.23	5.50	
6.00 6.00	108	ES PID		6 nnm								0.53	6.20	\bowtie
6.10 6.30-6.80	19 20	D B	3.0	ppm	Window 115mm (100% r	dia					MADE GROUND: Dark grey gravelly very clayey fine to coarse SAND. Gravel is subangular fine to medium of sandstone and brick.	-	(0.80)	
7.00 7.45		CDT	k :	-05	¥						MADE ODOLIND Ded	-0.27	7.00	
7.00-7.45 7.00 7.00-7.45 7.00	21 109 22	SPT ES D PID	Х	=25 :6 ppm	Window 115mm (50% re	dia					MADE GROUND: Dark grey gravelly silty fine to medium SAND. Gravel is subangular fine to medium of sandstone and brick.	-	- - - _(1.00)	
-					(30%)							-1.27	- - - 8.00	

	Boring Pro	gress and	Water Ob	servations	3			Co	norol	Remarks		
Date	Time	Borehole	Casing	Borehole Diameter	Water			Ge	nerai	Remarks		
		Depth	Depth	(mm)	Depth	6. SPT	hamme	er JT.01 2017	$(E_{\rm r} = 72.0$	0%) used.		
						A	ll dimen	sions in metre	es	Scale:	1:22	
Method Used:	Inspection pit +						Drilled By:	Joseph Taylor	Logged By:	TBeeson	Checked By:	AGS AGS



110												BOKER	OLI		.UG
Contract:								Cli	ent:				Boreho	le:	
		Pro	ject E	3lue							В	uro Happold		В	H102
Contract Re	f:		<u>-</u>	Start:	01.1	2.17	Grou	und Le	evel (m	1):	1	National Grid Co-ordinate:	Sheet:		
7	'64	393		End:	13.1	2.17			6.73			E:333278.4 N:392411.3		3	of 14
		Sample	s & Tes	ting	ı	Mecha	anical	Log	s is	& - lei	Ē		pec el	Depth	Material
Depth (m)	No	Туре		sults	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Return & Deta	Backfill & Instru- mentation	Water	Description of Strata	Reduced	(Thick ness)	Graphic Legend
8.00-8.45 8.00 8.00-8.45 8.00 8.30-8.80	23 110 24 26	SPT ES D PID B	>	=9 <6 ppm	1	indow	run					Loose dark grey very gravelly very silty fine to medium SAND with medium cobble content. Gravel is angular to subangular fine to coarse of sandstone. Cobbles are angular of sandstone.	-	-	× σ × σ × σ × σ × σ × σ × σ × σ × σ × σ
8.50	25	D ES		« 6		5mm 00% r							-	- - (1.40) - -	×0 × × × × × × × × × × × × × × × × × ×
9.00-9.20		UT _{(UT100}	100	blows covery									-	-	×
9.00-9.20 9.00 - 9.20-10.20	28	B PID		ppm				1	1			from 9.20m, very dense and weakly cemented. Assumed zone of core loss from rotary core run.	-2.67	9.40	× · · · × · · × · · × · · · × · · · × · · · · × ·
9.20 9.20 9.20-9.54 9.20-9.54	29 30 31	D SPT D		36,35,39 60mm	90	60	10	NI 25 100				Very weak to weak reddish brown fine to medium grained SANDSTONE. Discontinuities: 1) very closely to closely spaced 5-10° planar rough clean locally infilled with reddish brown fine sand (<5mm).		-	
-9.95-10.05 - 10.20-11.20		С			X	X	X	X				thin bed of very weak grey and brown fine to medium grained sandstone. from 10.20m to 10.30m,	-	¯(1.30) - -	
-									% return r+Mist —— Red)			assumed zone of core loss.	-	-	
-					90	84	42		100% rei 			recovered as non-intact core (very sandy angular fine to medium gravel sized fragments).	-3.97	10.70	
10.90-11.05	202	С						NI 120 180				Weak locally medium strong reddish brown fine to medium grained SANDSTONE. Discontinuities: 1) very closely to closely locally medium spaced	- - -	- -	
11.20-12.70						Å	i i					5-10° planar rough clean locally clay smeared or infilled with reddish brown gravelly fine sand (<5mm)	_	-	
-					100	90	21					from 11.35m to 11.40m, recovered as non-intact core (very sandy angular fine to medium gravel sized fragments).	-	- -	
L	I	1	1										L	L	[

	E	Boring Pro	gress and	Water Ob	servations	3			Col	noral	Domarka		
	Date	Time	Borehole	Casing	Borehole Diameter	Water			Gei	nerai	Remarks		
			Depth	Depth	(mm)	Depth							
							Α	ll dimen	sions in metre	es .	Scale:	1:22	
- 1	Method Used:	Inspection bit +						Drilled By:	Joseph Taylor	Logged By:	TBeeson	Checked A	AGS

GINT_LIBRARY_V8_06.GLB LibVersion: v8_06_018 PrjVersion: v8_06 - Core+Full Castleford SI - 008 | Log COMPOSITE LOG - A4P | 764393 - PROJECT BLUE.GPJ - v8_06.
Structural Solis Ltd, Branch Office - Castleford: The Potteries, Pottery Street, Castleford, West Yorkshire, WF10 1NJ. Tel: 01977-552255, Fax: 01977-552299, Web: www.solis.co.uk, Email: ask@solis.co.uk. | 31/05/18 - 16:32 | AJ4 |

Used:



Op													BOKEH	ULI		UG
Contract:								Cli	ient:	:				Boreho	le:	
		Pro	ject E	Blue								В	Suro Happold		В	H102
Contract Ref	f:			Start:	01.1	2.17	Gro	und L	eve	I (m)):		National Grid Co-ordinate:	Sheet:		
7	'64 3	393		End:	13.1	2.17			6.7	73			E:333278.4 N:392411.3		4	of 14
5		Sample	s & Tes	ting	N	Mecha	anical	Log		SI	lion ⊢ ⊗	Ē		ced	Depth	Material
Depth (m)	No	Туре	Res	sults	TCR (%)	SCR (%)	RQD (%)	lf (mm)	Flush	Returr & Deta	Backfill & Instru- mentation	Water	Description of Strata	Reduced	(Thick ness)	Graphic Legend
- - - - 12.45-12.65	203	С			100	90	21						locally very weak from 12.15m to 12.20m and 12.35m to 12.40m, extremely weak and recovered as non-intact core (gravelly silty fine to medium sand).	-	- - -	
12.70-14.20						X	X						from 12.70m to 12.80m, recovered as non-intact core (coarse gravel sized fragments). Drilling induced.	- - -	- - -	
13.05-13.20					100	93	37						from 13.10m to 13.70m, 3 No closely spaced very thin to thin beds of weak to medium strong grey and brown fine to medium grained sandstone.	-	-	
-		-				V	V	NI 120 180	100% return	Air+Mist (Red)			from 13.80m to 14.00m, 1 No 60 to 80° fracture undulating rough infilled with red fine to medium sand (<3mm).	-	- - - -	
14.20-15.70					1	1	1							_	_	
- 14.35-14.50 -	206	С												-	-	
-					100	80	42						thin bed of weak to medium strong grey stained orangish brown fine to medium grained sandstone.	-	-	
15.00-15.20	207	С											recovered as non-intact core (sandy fine to medium gravel sized fragments). Localised orangish brown staining from 15.30m to 15.38m, with localised orangish brown staining.	-	- - - - - (9.70)	
15.70-17.20					100	97	62	NI 120 400	-				from 15.65m to 15.70, recovered as non-intact core (angular coarse gravel sized fragments).	- - -	- - -	

	Boring Pro	gress and	Water Ob	servations	5			Co	noral	Remarks		
Date	Time	Borehole		Borehole Diameter	Water			Ge	nerai	Remarks		
		Depth	Depth	(mm)	Depth							
						Д	II dimens	ions in metre	es	Scale:	1:22	
Method Used:	Inspe Dynami	rete core + ection pit + ic sampling + ary Cored	Plan Use	4.	Concrete Core Hand tools + nacchio GEO 3		Drilled By:	Joseph Taylor	Logged By:	TBeeson	Checked A	AGS



and													BOREH	OLI	EL	.OG
Contract:								С	lient	:				Boreho	le:	
		Pro	ject E	3lue								В	uro Happold		В	H102
Contract Re	f:			Start:	01.1	2.17	Gro	und l	_eve	el (m	1):	1	National Grid Co-ordinate:	Sheet:		
7	764	393		End:	13.1	2.17	'		6.	73			E:333278.4 N:392411.3		5	of 14
Б 11		Sample	s & Tes	ting		Mech	anica	l Log		Sils	u- tion	e		ced		Material
Depth (m)	No	Туре	Res	sults	TCR (%)	SCF (%)	RQE (%)) If (mm	Flush	Returr & Deta	Backfill & Instru-mentation	Water	Description of Strata	Reduced	(Thick ness)	
16.20-16.60	208	С			100		62						from 16.51 to 16.55m, 1 No very thin bed of weak grey and brown fine to medium grained sandstone.	-	-	
47.20.40.70					X		L X	_					from 16.75m to 16.80m, recovered as non-intact core (sandy fine to medium gravel sized fragments) from 17.15m to 17.17m, 1 No	-	- - - -	
17.20-18.70	J												thick lamination of grey and brown fine to medium grained sandstone. from 17.50m to 17.95m, 1 No	-	-	
-									un.	tt			medium bed of weak grey and brown fine to medium grained sandstone.	-	-	
-					100	93	43	NI 120 400	100% ret	—— Air+Mis (Red)			from 17.95m to 18.30m, locally extremely weak to very weak 2 No 60° fractures planar rough clay smeared.	-	- - -	
18.30-18.50		С				, v								-	-	
18.70-20.20													from 18.80m to 18.85m 1 No very thin bed of weak grey and brown fine to medium grained sandstone.	- -	- - -	
19.10-19.35	210	С			100	90	50							-	- - -	
														-	-	

	Вс	oring Pro	gress and	Water Ol	servations	3			Col	noral	Remarks		
Dat	te	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth			Gei	ilerai	Remarks		
			Берип	Берш	(11111)	Берш							
							А	ll dimens	sions in metre	s	Scale:	1:22	
Meth- Used		Inspection pit + Land to						Drilled By:	Joseph Taylor	Logged By:	TBeeson	Checked By:	AS AGS



BOREHOLE LOG

100												BOKER	OL		.UG
Contract:								Cli	ent:				Boreho	le:	
		Pro	ject Blu	ue							В	uro Happold		В	BH102
Contract Re	f:		S	tart: 01	.12	.17	Grou	und Le	evel ((m):		National Grid Co-ordinate:	Sheet:		
7	'64 3	393	E	nd: 13	3.12	.17			6.73	3		E:333278.4 N:392411.3		6	of 14
Depth (m)	No	Sample: Type	s & Testino	, TO	CRS	echa SCR (%)	nical RQD (%)	Log If (mm)	Flush Returns	& Details Backfill & Instru- mentation	Water	Description of Strata	Reduced	Depth (Thick ness)	
19.95-20.10		С			П	90	50					from 20.15m to 20.40m 1 No thin bed of weak grey and brown fine to medium grained sandstone. 1 No 60° fracture planar rough clean.	-13.67	20.40	
- 20.70-20.95 - -	212	С		10	00	93	51					Weak locally medium strong reddish brown medium grained SANDSTONE. Discontinuities: 1) closely to medium spaced locally very closely spaced 5-15° planar rough clean locally infilled with reddish brown silty fine sand (<5mm). Rare dark grey siltstone	- - -	- - -	
21.10-21.22 - - - -	213	С						NI 120				inclusions (<10mm) from 21.07m to 21.22m, 1 No thin bed of weak grey and brown fine to medium grained sandstone with extremely closely spaced thin and thick laminations of siltstone.	-	- - - -	
21.70-23.20 - -				1		*	*	400	100% return Air+Mist	(Red)			- - -	- - -	
22.10-22.20	214	С							100 -					_	
22.30-22.50 - -	215	С		10	00	100	44					from 22.52m to 23.10m, very	- -	-	
- - - -												weak to weak and recovered locally as non-intact core (sandy angular fine to medium gravel sized fragments).	-	- - - -	
23.20-24.70 23.20-23.50		С		,		*	X	30					- - -	_ _(5.80) - -	
-				10	00	100	87	150 350				from 23.65m to 23.75m, 1 No thin bed of weak grey and brown fine to medium grained sandstone.	-	-	

	Boring Pro	ogress and	Water Ob	servations	5		Co	noral	Domorko	
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth		<u>Ge</u>	nerai	Remarks	
Method Used:	Insp Dynam	crete core + ection pit + ic sampling + ary Cored	Plan Used	4.	Concrete Core Hand tools + nacchio GEO 3	er +	All dimensions in metre Drilled By: Joseph Taylor	Logged By:	Scale:	1:22 Checked A AG



Contract:								Cli	ent:				Boreho	ole:	
		Pro	ject	Blue							В	uro Happold		Е	H102
Contract Re	f:			Start:	01.1	2.17	Gro	und L	evel (m):		National Grid Co-ordinate:	Sheet:		
7	'64 3	393		End:	13.1	2.17			6.73			E:333278.4 N:392411.3		7	of 14
		Sample	s & Te		ı	Mecha	anical	Log	0 <u>8</u>	∞ ₋ 6	_		ed -	Depth	Material
Depth (m)	No	Туре	Re	sults	TCR (%)	SCR (%)	RQD (%)	lf (mm)	Flush Returns & Details	Backfill Instru mentati	Water	Description of Strata	Reduced Level	(Thick ness)	
- - - 24.45-24.70	217	С			100							from 23.95m to 24.30m, 1 No medium bed of weak grey stained orangish brown fine to medium grained sandstone. Discontinuities locally clay smeared.	-	-	
24.70-26.20					\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	X	X	-	١				- - -	-	
25.30-25.62	218	С						30 150 350	100% return — Air+Mist — (Red)			from 25.05m to 25.25m, 1 No thin bed of weak grey and brown fine to medium grained sandstone.	- - -	- - -	
-					100	100	87						- - -	- - -	
-													- - -	-	
-					↓		↓		↓				-19.47	26.20	
												Borehole terminated at 26.20m depth.		-	

		Boring Pro	gress and	Water Ob	servations	S			Co	noral	Remarks		
	Date	Time	Borehole	Casing	Borehole Diameter	Water			Ge	nerai	Remarks		
			Depth	Depth	(mm)	Depth							
							Д	ll dimen	sions in metre	s	Scale:	1:22	
) [Method Used:	Inspe Dynam	rete core + ection pit + ic sampling + ary Cored	Plan Use	4.	Concrete Core Hand tools + nacchio GEO		Drilled By:	Joseph Taylor	Logged By:	TBeeson	Checked By:	AGS



Contract:				Client:			Borehole	e:		
Project E	Blue				E	Buro Happold			ΒH′	102
Contract Ref:	Start:	01.12.17	Groun	d Level (m):		National Grid Co-ordinate:	Sheet:			
764393	End:	13.12.17		6.73		E:333278.4 N:392411.3		8	of	14

BH102 - Concrete Core





BH102 - Box 1

Used:

Plant Used: Hilti Concrete Corer + Hand tools + Comacchio GEO 305

Drilled

Logged Joseph Taylor By:

TBeeson

Checked





Contract:			Clie	ent:			Borehole	: :		
Project E	Blue				E	Buro Happold		ı	вн	102
Contract Ref:	Start:	01.12.17	Ground Le	evel (m):		National Grid Co-ordinate:	Sheet:			
764393	End:	13.12.17	(6.73		E:333278.4 N:392411.3		9	of	14

BH102 - Box 2





BH102 - Box 3

Method Used:

Plant Used: Hilti Concrete Corer + Hand tools + Comacchio GEO 305

Drilled

Logged Joseph Taylor By:

TBeeson

Checked





Contract:				Client:			Borehol	e:
Project E	Blue				E	Buro Happold		BH102
Contract Ref:	Start:	01.12.17	Groun	d Level (m):		National Grid Co-ordinate:	Sheet:	
764393	End:	13.12.17		6.73		E:333278.4 N:392411.3		10 of 14

BH102 - Box 4





BH102 - Box 5

Method Used:

Plant Used: Hilti Concrete Corer + Hand tools + Comacchio GEO 305

Drilled

Logged By:

TBeeson

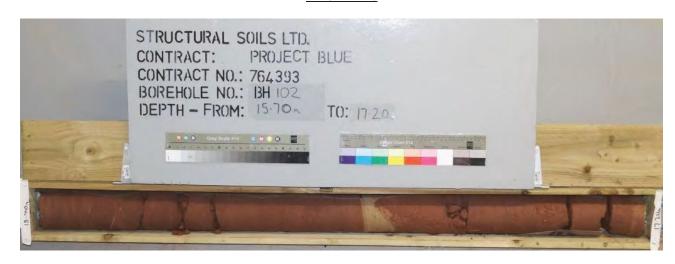
Checked





Contract:			CI	ient:			Borehol	e:
Project E	Blue				E	Buro Happold		BH102
Contract Ref:	Start:	01.12.17	Ground L	evel (m):		National Grid Co-ordinate:	Sheet:	
764393	End:	13.12.17		6.73		E:333278.4 N:392411.3		11 of 14

BH102 - Box 6





BH102 - Box 7

Method

Plant Used: Hilti Concrete Corer + Hand tools + Comacchio GEO 305

Drilled

Logged

Checked



GINT_LIBRARY V8 06.GLB LibVersion: v8 06 018 Pt/Version: v8 06 - Core+Full Castleford SI - 008 | Log COMPOSITE LOG - A4P | 764393 - PROJECT BLUE.GPJ - v8 06.
Structural Soils Lid, Branch Office - Castleford: The Potteries, Pottery Street, Castleford, West Yorkshire, WF10 1NJ. Tel: 01977-552255, Fax: 01977-552299, Web: www.soils.co.uk, Email: ask@soils.co.uk. | 31/05/18 - 16:32 | AJ4 |

Used:

Joseph Taylor

By:

TBeeson



Contract:				Client:		Borehol	e:
Project E	Blue				Buro Happold		BH102
Contract Ref:	Start:	01.12.17	Groun	d Level (m):	National Grid Co-ordinate:	Sheet:	
764393	End:	13.12.17		6.73	E:333278.4 N:392411.3		12 of 14

BH102 - Box 8





BH102 - Box 9

Method

Plant Used: Hilti Concrete Corer + Hand tools + Comacchio GEO 305

Drilled

Joseph Taylor

Logged By:

Checked





Contract:				Client:		Borehol	e:
Project E	Blue				Buro Happold		BH102
Contract Ref:	Start:	01.12.17	Groun	d Level (m):	National Grid Co-ordinate:	Sheet:	
764393	End:	13.12.17		6.73	E:333278.4 N:392411.3		13 of 14

BH102 - Box 10





BH102 - Box 11

Method Used:

Plant Used: Hilti Concrete Corer + Hand tools + Comacchio GEO 305

Drilled

Joseph Taylor By:

Logged **TBeeson** Checked





Contract:			Clien	t:		Borehole	э:
Project E	Blue				Buro Happold		BH102
Contract Ref:	Start:	01.12.17	Ground Leve	el (m):	National Grid Co-ordinate:	Sheet:	
764393	End:	13.12.17	6.	73	E:333278.4 N:392411.3		14 of 14

BH102 - Box 12



Hilti Concrete Corer + Hand tools + Comacchio GEO 305

Drilled Joseph Taylor Logged By:

TBeeson

Checked





GINT_LIBRARY V8 06.GLB LibVersion: v8 06 018 PriVersion: v8 06 - Core+Full Castleford SI - 008 | Log COMPOSITE LOG - A4P | 764393 - PROJECT BLUE.GPJ - v8 06.
Structural Soils Ltd, Branch Office - Castleford: The Potteries, Pottery Street, Castleford, West Yorkshire, WF10 1NJ. Tel: 01977-552255, Fax: 01977-552299, Web: www.soils.co.uk, Email: ask@soils.co.uk. | 31/05/18 - 15:56 | AJ4 |

STRUCTURAL SOILS

POPEHOLE LOG

Contract:								Cli	ent:				Boreho		
		Pro	ject E									uro Happold		BH	1102A
Contract Re	f:			Start:	26.0°	1.18	Grou	und Le	evel (m)	:	1	National Grid Co-ordinate:	Sheet:		
7	7643	393		End:	26.0°				6.72			E:333278.3 N:392411.8		1	of 2
Daniella		Samples	s & Tes	ting	N	/lecha	nical	Log	ails	tion	e		ced	Depth	Materia
Depth (m)	No	Туре	Res	sults	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Backf Instr menta	Water	Description of Strata	Reduced	(Thick ness)	Graphic Legend
										ПП		MADE GROUND: CONCRETE (Driller's Description).		_	
												(Driller's Description).	-	(0.40)	\bowtie
										Ö Ş					\bowtie
												MADE GROUND: Reddish brown	6.32	0.40	
												gravelly SAND (Driller's description).		-	
													-	(0.80)	
										• • •			-	-	
													5.52	1.20	
												MADE GROUND: Sandstone GRAVEL and cobbles (Driller's			
												Description).	-	-	
														-	
														(1.30)	
														_	
													-	-	
														-	
									st (c			MADE ODOUND D. OLAY	4.22	2.50	
									100% return Air+Mist (Brown)			MADE GROUND: Brown CLAY with bands of sand and cobbles (Driller's Description).		-	
													-	-	
													-	-	
													_		
														_	
													-	-	
													-	-	
														<u> </u>	

	Boring Pro	gress and	Water Ob	servations	3	
Date	Time	Borehole	Casing	Borehole Diameter	Water	
Date	Tille	Depth	Depth	(mm)	Depth	lt
26/01/18	12:00	5.50	None	100	-	
						ŀ

General Remarks

- Hand dug inspection pit to 1.20m.
 Openhole borehole for installation of standpipe.
 Drilled using air-mist flush.
- 35mm ID standpipe installed on completion, response zone 1.00m to 5.50m.
 Data logger (diver) installed at 4.50m.

1:22 All dimensions in metres Scale: Checked PMR Drilled Method Inspection pit + Plant Logged Used: Rotary open hole Used: Comacchio GEO 205 Lee Smith Ву: **AJones**



120														DC		-111			.UG
Contract:								Cli	ent:								Boreho	le:	
		Pro	ject E	Blue								В	uro Hap	pold				BH	102A
Contract Re	f:			Start:	26.0	1.18	Grou	ınd Le	evel	(m)	:	- I	National Grid	d Co-ordina	ate:		Sheet:		
7	'64 3	393		End:	26.0	1.18			6.7	2			E:33327	78.3 N:	39241	1.8		2	of 2
Depth			s & Tes			Mecha SCR		Log	sh	etails	Backfill & Instru- mentation	Water	Des	cription of	f Strata		Reduced	Depth (Thick	Material Graphic
(m)	No	Туре	Res	sults	(%)	(%)	(%)	(mm)	Flus	\ &	m = Bac	>		<u>.</u>			Rec	ness)	Legend
(m) 4.20 4.50	No	EW EW		sults	(%)				100% return	(Brown)			Borehole depth.	terminate	d at	5.50m	1.22		Legend
					1														

	Е	Boring Pro	gress and	Water Ob	servations	3			Co	noral	Remarks		
	Date	Time	Borehole	Casing	Borehole Diameter	Water			Ge	nerai	Remarks		
	Julio	11110	Depth	Depth	(mm)	Depth							
<u>'</u>													
							_	II alian a a a			01	1:22	
; <u> </u>							P	ıı aimens	ions in metre	S	Scale:	1.22	
) I	thod		ction pit +	Plan				Drilled		Logged		Checked	
Us	ed:	Rotary	open hole	Use	d: Coma	cchio GEC	205	By:	Lee Smith	Ву:	AJones	By: PMK	AGS

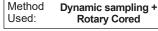


Contract:		_					Cli	ent:						Boreho		
		Pro	ject Blue			1					uro Hap	•			E	3H′
Contract F			Start:			Grou		evel (m)	:	1	National Grid			Sheet:		
	764	393	End:	24.0	1.18			-3.16			E:33329	98.3 N	:392491.8		1	of
Depth (m)	No	Sample Type	s & Testing Results	TCR	SCR	RQD	Log If	Flush Returns & Details	Backfill	Water	Des	scription	of Strata	Reduced Level	Depth (Thick ness)	Gr
0.00-1.00		P	85% recovery	(%)	(%)	(%)	(mm) ⊑ ₾ ∞			Very soft	dark blui	sh grey slightly	ď	11033)	× ×
											sandy clay medium. medium fragments	ey SILT. Occasion gravel	Sand is fine to onal fine to sized shell	-	- - - _(1.00) -	× × × × × × × × × × × × × × × × × × ×
														- - -4.16	1.00	× × × × ×
1.00-2.00 1.00-1.45 1.00-1.45	1	SPT D	N=87			1	NA ¥	-			Gravel is fine to med	angular dium of s	/	-4.36	- 1.20	× × ×
1.66-1.84	201	С		90	31	18	NI 60 180				reddish b grained Discontinu closely to 0-25° plan locally clay fi extremely	orown fir uities: o very o ar and u y/silt sme rom 1.20 weak an	Om to 1.36m, d recovered as	-	-	
2.00-3.50				<u> </u>	*	*	NI	100% return Water keddish brown)			subrounder sized fraging from 80-90° fraging stained blagger firecovered	ed fine to ments). 1.35m to acture ur ack. rom 2.00 as no	subangular to coarse gravel of 1.55m, 1 No. idulating rough on to 2.80m, on-intact core unded fine to	-	_(1.60) - - -	
-				100	41	14	X	, 100% 			fragments induced. at 2.2 of mediun grained sa from). Pos 24m 1 N n strong andstone. 1 2.29m t actures o	o 2.80m, 2 No closely spaced	-5.96 -	2.80	
3.26-3.40	202	С					50 90 430				to medium	n grained uities: 1	dish brown fine SANDSTONE.) closely to very closely planar and	-	-	
3.50-5.00						Å					undulating smeared.	smootl	n locally clay	-	-	
3.70-4.13	203	С		100	88	53					medium b thinly and	oed of r I thickly	to 4.15m 1 No medium strong interlaminated y and yellowish	- -	-	
В	oring F	rogress	s and Water Ob								Gar	neral l	Remarks			
Date	Time	De		Boreh Diame (mm	eter	Wate Depth	⊥∦	1. Deck	to silt	leve			sed as reference	e for GI		
23/01/18 24/01/18 24/01/18	16:00 08:00 12:30	5.0	00 3.50	146 146 146	6	1.10 1.10 4.80		2. Drille	r note	s los	s of flush re T.01 2017 (<i>l</i>	turns fro	m 9.50m.	3L .		
								A	ll dime	nsio	ns in metres	s	Scale:	1:22		
			pling + Plan						Drilled					Checke		\neg

	Boring Pro	gress and	Water Ob	servations	3
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
23/01/18 24/01/18 24/01/18	16:00 08:00 12:30	5.00 5.00 15.50	3.50 3.50 3.50	146 146 146	1.10 1.10 4.80

General Remarks

- 1. Deck to silt level 8.40m. Silt level used as reference for GL.
- 2. Driller notes loss of flush returns from 9.50m. 3. SPT hammer JT.01 2017 (E_r = 72.00%) used.







BOREHOLE LOG

Contract:		Droi	oot Pluo				Cli	ent:		D	Rura Hannald	Boreho		3H103
Contract Re	۰ŧ۰	Proj	ect Blue	23 (11 12	Grou	nd L	evel (m	ı).		Buro Happold National Grid Co-ordinate:	Sheet:		оптиз
	7643	393		24.0				-3.16			E:333298.3 N:392491.8	Onoct.		of 9
	_		& Testing					_				 	Depth	Materia
Depth (m)	No		Results		SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Backfill	Water	Description of Strata	Reduced	(Thick ness)	Graph Legen
4.31-4.56	204	С		100		53	90 110 250				brown fine to medium grained sandstone from 4.13m to 4.31m, 1 No 70-80° fracture undulating rough clean. Locally weak and recovered as non-intact core (angular to subangular fine to coarse gravel sized fragments).	- - - - -	(3.70)	
5.00-6.50					 	X	*	-			from 5.00m to 6.00m, locally stained dark brown (possibly drilling induced).	-	-	
5.42-5.66	205	С		100	100	93	20 90 220	100% retum Water (Reddish brown)			from 5.79m to 5.90m, locally fine grained.	- - - - -	-	
6.50-8.00				<u> </u>		X	*	1 (Re			from 6.23m to 6.36m, 1 No thin bed of medium strong thickly laminated grey fine grained sandstone. Medium strong dark reddish	-9.66	6.50	
6.50-6.86	206	С									brown fine to medium locally coarse grained SANDSTONE. Discontinuities: 1) closely spaced 0-15° planar rough clean.	-	(0.74)	
				100	99	73	NI 120 270				from 6.98m to 7.04m, with localised irregular thin lenses of light grey fine grained sandstone from 7.07m to 7.24m, discontinuity set 1 is extremely	-10.40	- - 7.24 -	
											closely to very closely spaced from 7.16m to 7.18m, very weak and recovered as non-intact core (sandy subangular fine to medium gravel sized fragments). Medium strong locally weak	-	-	
											reddish brown fine to medium grained SANDSTONE with localised very thin to thin beds of	-	- -	

E	Boring Pro	gress and	Water Ob	servations	3			Co	norol	Domorko		
Date	Time	Borehole	Casing	Borehole Diameter	Water			Ge	nerai	Remarks		
Date	Tillic	Depth	Depth	(mm)	Depth							
										I	4.00	
						A	ll dimen	sions in metre	S	Scale:	1:22	
Method Used:		sampling or ry Cored	+ Plan Used		cchio GEO	205	Drilled By:	Joseph Taylor	Logged By:	MGalan + TBeeson	Checked A	SAGS



BOREHOLE LOG

Contract:							Cli	ent:				Boreho		
		Pro	ject Blue								Buro Happold		В	H103
Contract Ref	f:		Start:	23.0	1.18	Gro	und L	evel (r	n):		National Grid Co-ordinate:	Sheet:		
7	643	393	End:	24.0	1.18			-3.16	3		E:333298.3 N:392491.8		3	of 9
Depth			& Testing		Mecha SCR	anica RQD	l Log	Flush Returns	Backfill	Water	Description of Strata	Reduced	Depth (Thick	Materia Graphic
(m)	No	Туре	Results	(%)	(%)	(%)	(mm)	Ref	A W	>		Re	ness)	Legend
8.00-9.50 8.47-8.65	207	С		100	100	77	NI 120 270	100% return Water	eddisii browij		light grey and dark grey fine to medium grained sandstone. Discontinuities: 1) closely to medium spaced locally very closely spaced 0-10° planar rough clean. from 8.00m to 8.25m, locally very weak to weak from 8.15m to 8.24m, 1 No. 80-90° fracture undulating rough clean from 8.67m to 8.72m, 1 No very thin bed of medium strong	-	- - - - -	
									<u>Y</u>		dark grey fine grained sandstone. from 9.22m to 9.40m, 1 No	-	(3.86)	
9.50-11.00				*	X X	X	 	X			thin bed of medium strong light grey fine to medium grained sandstone with localised thin laminations of dark grey siltstone from 9.50m to 9.65m, assumed zone of core loss.	-	-	
							NI 40 110	-				- - -	-	
10.07-10.31	208	С		90	68	49	70					- - -	-	
							170 170 280	0% return Water	(MA)		from 10.57m to 10.78m, 1 No medium bed of light grey fine locally medium grained sandstone with very closely spaced thick laminations of light grey siltstone.	- - -	-	
11.00-12.50				*	X	*	*					- -14.26	11 10	
11 59 11 00	200			100	72	58	NI 50 120				Medium strong locally weak and very weak reddish brown fine to medium grained SANDSTONE. Discontinuities: 1) very closely to medium spaced 5-20° planar rough clean. from 11.12m to 11.22m, 1	-	-	
11.58-11.90	209	С					NI 160 290				No. 70° fracture planar rough clean from 11.45m to 11.49m, 1 No very thin bed of weak light grey fine grained grained sandstone.	-	-	

	Boring Pro	gress and	Water Ob	servations	3			Co	norol	Remarks	
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter	Water Depth			Ge	nerai	Remarks	
		Берип	Берип	(mm)	Берит						
							II alima a mai a m			01	1:22
						P	II dimension	is in metre	S	Scale:	
Method Used:	Dynamic Rota	sampling ry Cored	+ Plan Used		cchio GEC	205	Drilled By: Jose	eph Taylor	Logged By:	MGalan + TBeeson	Checked AGS



BOREHOLE LOG

Contract:							Clie	ent:				Boreho	ole:	
		Projec	t Blue							В	uro Happold		В	H103
Contract Re	f:			23.0	1.18	Grou	ınd Le	evel (m):		National Grid Co-ordinate:	Sheet:		
7	'64 3	393	End:	24.0°	1.18		-	3.16			E:333298.3 N:392491.8		4	of 9
Depth (m)		Samples & Type	Testing Results	TCR	SCR	anical RQD	Log	Flush Returns & Details	Backfill	Water	Description of Strata	Reduced	Depth (Thick	Mater Graph Leger
(***)		,,,,,,		100	72	58	NI 160	<u> </u>			from 11.48m to 11.58m, recovered locally as non-intact core (angular to subangular fine to coarse gravel sized fragments).	- - -	_(2.02)	
12.50-14.00 12.87-13.09		С			X		290				from 12.46m to 12.50m, 1 No. 48° fracture undulating rough clean. from 12.50m to 12.91m, 1 No. 80-90° fracture planar locally undulating rough clean.	-	- - -	
				100	81	70	30 80 320	0% return Water (N/A)			Medium strong locally weak thinly and thickly laminated light grey and dark grey fine grained SANDSTONE with very closely spaced thick laminations to very thin beds of yellowish grey fine grained sandstone. Discontinuities: 1) closely to medium spaced locally very	16.28 - - - - - 16.90	- -(0.62)	
14.00-15.50				<u> </u>	*	X	NI V	1 %0 			closely spaced 0-10° planar smooth clean from 13.21m to 13.27m and 13.44m to 15.50m, 2 No very thin beds of medium strong reddish brown fine grained sandstone. Weak to medium strong reddish brown fine to medium grained SANDSTONE. Discontinuities: 1) extremely closely to closely spaced 0-10° planar rough locally	-	-	
15.26-15.50	1211	С		100	91	55	NI 90 240				smooth clean from 13.74m to 14.00m, locally weak with frequent incipient fractures, Recovered partially as non-intact core (subangular coarse gravel and cobble sized fragments) from 14.26m to 14.40m, 1 No. 85-90° fracture undulating rough clean from 14.44m to 14.50m, weak	-	- (1.76) - - - - -	
					V						and recovered locally as non-intact core (angular medium to coarse gravel sized fragments) from 15.46m to 15.50m, 1 No very thin bed of medium strong brown fine grained sandstone. Borehole terminated at 15.50m depth.	-18.66	15.50	

E	Boring Pro	gress and	Water Ob	servations	3			Col	norol	Remarks		
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth			Gei	nerai	Remarks		
		Бори	Борит	(11111)	Борит							
						Д		sions in metre	es	Scale:	1:22	
Method Used:		sampling ry Cored	+ Plan Used		cchio GEO	205	Drilled By:	Joseph Taylor	Logged By:	MGalan + TBeeson	Checked By:	AGS



Contract:				Client:			Borehole	e:		
Project E	Blue				E	Buro Happold		I	BH	103
Contract Ref:	Start:	23.01.18	Groun	d Level (m):		National Grid Co-ordinate:	Sheet:			
764393	End:	24.01.18		-3.16		E:333298.3 N:392491.8		5	of	9

BH103 - Box 1





BH103 - Box 2

Method

Plant Used:

Comacchio GEO 205

Drilled

Logged Joseph Taylor

MGalan + **TBeeson** Checked





Contract:				Client:			Borehole	э:		
Project E	Blue				E	Buro Happold			вн	103
Contract Ref:	Start:	23.01.18	Groun	d Level (m):		National Grid Co-ordinate:	Sheet:			
764393	End:	24.01.18		-3.16		E:333298.3 N:392491.8		6	of	9

BH103 - Box 3





BH103 - Box 4

Method

Plant Used:

Comacchio GEO 205

Drilled Joseph Taylor Logged

MGalan + **TBeeson** Checked





Contract:				Client:			Borehole	э:			
Project E	Blue				E	Buro Happold			вн	10	3
Contract Ref:	Start:	23.01.18	Groun	d Level (m):		National Grid Co-ordinate:	Sheet:				
764393	End:	24.01.18		-3.16		E:333298.3 N:392491.8		7	of	9	,

BH103 - Box 5





BH103 - Box 6

Rotary Cored

Plant Used:

Comacchio GEO 205

Drilled

Logged Joseph Taylor

MGalan + **TBeeson** Checked





Contract:				Client:			Borehole	e:		
Project E	Blue				E	Buro Happold		ı	вн	103
Contract Ref:	Start:	23.01.18	Groun	d Level (m):		National Grid Co-ordinate:	Sheet:			
764393	End:	24.01.18		-3.16		E:333298.3 N:392491.8		8	of	9

BH103 - Box 7





BH103 - Box 8

Used: **Rotary Cored** Plant Used:

Comacchio GEO 205

Drilled

Joseph Taylor

Logged MGalan + **TBeeson** Checked





Contract:				Client:			Borehole	э:		
Project E	Blue				E	Buro Happold			вн	103
Contract Ref:	Start:	23.01.18	Groun	d Level (m):		National Grid Co-ordinate:	Sheet:			
764393	End:	24.01.18		-3.16		E:333298.3 N:392491.8		9	of	9

BH103 - Box 9





BH103 - Box 10

Method Dynamic sampling + Used: **Rotary Cored**

Plant Used:

Comacchio GEO 205

Drilled Joseph Taylor Logged MGalan + **TBeeson**

Checked





Contract:								Cli	ent:				Boreho		
		Pro	ject Blu									uro Happold		В	H104
Contract Re	f:		Sta	art:	25.0	1.18	Grou		evel (m):	1	National Grid Co-ordinate:	Sheet:		
7	764 3	393	En	d:	25.0	1.18			1.88			E:333338.4 N:392535.5		1	of 10
Depth (m)	No		s & Testing Results		TCR	Mecha SCR	RQD	Log If	Flush Returns & Details	Backfill	Water	Description of Strata	Reduced	Depth (Thick ness)	Material Graphic Legend
0.00-1.00 	2	P	0% recove	ery	(%)	(%)	(%)	<u>(mm)</u>	<u> </u>			Very soft black slightly sandy clayey SILT. Sand is fine. Rare fine to medium gravel sized shell fragments.		-(2.05)	* * * * * * * * * * * * * * * * * * *
	3	SPT	2,4/2,45,					1	1			Very soft to soft dark brown and	-3.93 -	2.05	× × ×
2.00-2.34	4	D	for 40mi	m				NA ↓				black sandy gravelly SILT. Sand is fine to coarse. Gravel is angular to subangular fine to medium of	- - - 4.22	2.34	× · · × · × · × · × · · × · · · × ·
- - 2.54-2.74 - - - - - -	201	С			100	77	30	20 80 200	100% return Water (Reddish Brown)			sandstone. Weak to medium strong reddish brown medium locally coarse grained SANDSTONE. With closely to medium spaced very thin beds of grey fine to medium grained sandstone. Discontinuities: 1) very closely to closely spaced 0-10° planar rough clean locally stained black. from 2.34m to 2.60m, silt smearing on core surface.	-	-(2.01)	V V
3.50-5.00	202	С			100	99	20					Description on next sheet	-	-	

E	Boring Pro	gress and	Water Ob	servations	;			Cal	aaral	Domorko	
Date	Time	Borehole	Casing	Borehole Diameter	Water			Gei	ierai	Remarks	
Date	11110	Depth	Depth	(mm)	Depth	1 Doo	k to cilt love	ol 7.50m 9	Silt lovel i	used as reference	oo for Cl
25/01/18	13:30	17.00	3.50	146	5.40	2. UXC	clearance er notes los		by magn eturn fron	etometer adjace n 9.50m.	
						A	II dimensio	ns in metre	s	Scale:	1:22
Method Used:		sampling ry Cored	+ Plan Use	-	cchio GEC	205	Drilled By: Jo	seph Taylor	Logged By:	MGalan + TBeeson	Checked As By:

GINT_LIBRARY V8 06.GLB LibVersion: V8 06 018 PrjVersion: V8 06 - Core+Full Castleford SI - 008 | Log COMPOSITE LOG - A4P | 764393 - PROJECT BLUE.GPJ - V8 06.
Structural Solis Ltd, Branch Office - Castleford: The Potteries, Pottery Street, Castleford, West Yorkshire, WF10 1NJ. Tel: 01977-552255, Fax: 01977-552299, Web: www.solis.co.uk, Email: ask@solis.co.uk. | 31/05/18 - 16:34 | AJ4 |



Contract:							Cli	ent:				Boreho		
		Proj	ect Blue								Buro Happold		В	H104
Contract Re	ef:		Start:	25.0	1.18	Gro	und L	evel (m):		National Grid Co-ordinate:	Sheet:		
	7643	393	End:	25.0	1.18			-1.8	8		E:333338.4 N:392535.5		2	of 10
Depth (m)	No	· I	& Testing Results	TCR	Mecha	anica RQD		ush	Details Backfill	Water	Description of Strata	Reduced	Depth (Thick	Materia Graphi Legend
(111)	INO	Туре	Results	(%)	(%)	(%)	(mm)	0 = %	∞		from 3.88m to 4.01m, with thick laminations of bluish grey fine grained sandstone.	- 2 -	ness)	Legen
											Medium strong reddish brown fine	-6.23	4.35	
4.40-4.58	203	С		100	99	20	20 80				to medium grained SANDSTONE. Discontinuities: 1) very closely to closely locally medium spaced 0-20° planar rough clean from 4.46m to 4.49m, 1 No 78° fracture planar rough clean from 4.50m to 4.92m, 1 No 72° fracture undulating rough	- - - -	-	
5.00-6.50	00.4				1	X	200				clean. from 5.10m - 5.15m, 1 No 45°	-	-	
5.13-5.35	204	С									fracture planar rough clean from 5.29m to 5.42m, 1 No	-	-	
											thin bed of medium strong light grey fine to medium grained sandstone with very closely spaced thin laminations of dark grey siltstone from 5.54m to 5.72m, 1 No.	-	- - -	
				100	98	56	T T	100% return Water	ddish Brown)		74° fracture undulating rough clean.	-	-	
								1	(Rec			-	(3.70)	
3.50-8.00				+	X	*	_					-	-	
							NI 90 270					-	_	
				100	93	65					from 7.05m to 7.20m, very weak to weak with very closely spaced bedding fractures. Recovered locally as non-intact core (subangular fine to medium	-	-	
7.45-7.72	205	С									gravel sized fragments) from 7.11m to 7.20m, with occasional clasts of weak reddish brown mudstone and occasional black staining.	-	-	
											Description on next sheet		-	

	1	Boring Pro	gress and	Water O	bservations	3			Co	noral	Remarks			
	Date	Time	Borehole	Casing	Borehole Diameter	Water			Ge	nerai	Remarks			
	Baio	1 11110	Depth	Depth	(mm)	Depth								
,														
:														
							P	ll dimen	sions in metre	es	Scale:	1:22		
	Method	Dynamic	sampling -	+ Plai	nt			Drilled		Logged	MGalan +	Checked	1	
;	Used:		ry Cored	Use	d: Coma	cchio GEC	205	By:	Joseph Taylor	By:	TBeeson	By:	(IV	AGS

GINT_LIBRARY_V8_06.GLB LibVersion: v8_06_018 PrjVersion: v8_06 - Core+Full Castleford SI - 008 | Log COMPOSITE LOG - A4P | 764393 - PROJECT BLUE.GPJ - v8_06.
Structural Solis Ltd, Branch Office - Castleford: The Potteries, Pottery Street, Castleford, West Yorkshire, WF10 1NJ. Tel: 01977-552255, Fax: 01977-552299, Web: www.solis.co.uk, Email: ask@solis.co.uk. | 31/05/18 - 16:34 | AJ4 |

Used: **Rotary Cored**

Used: Comacchio GEO 205 By:

By:

By: VΔ





BOREHOLE LOG

00												BOKEHO	JLI		.UG
Contract:								Cli	ent:				Boreho		
		Pro	ject B									Buro Happold		В	H104
Contract Re	f:			Start:	25.0	1.18	Gro	und L	evel (m	1):		National Grid Co-ordinate:	Sheet:		
7	'64 3	393		End:	25.0	1.18			-1.88			E:333338.4 N:392535.5		3	of 10
D "		Samples	s & Test	ing		Mecha	anical	Log	SI		e		ced	Depth	Material
Depth (m)	No	Туре	Res	ults	TCR (%)	SCR (%)	RQD (%)	lf (mm)	Flush Returns & Defails	Backfill	Water		Reduced Level	(Thick ness)	Graphic Legend
8.00-9.50 8.63-8.86 9.50-11.00 9.61-9.90	206	С			100	100	91	30 170 230	100% return Water (Reddish Brown)			from 7.87m to 8.00m, 1 No. 90° fracture undulating rough clean. Medium strong to strong reddish brown fine grained SANDSTONE with closely to medium spaced thick laminations to very thin beds of medium strong light grey and yellowish brown fine grained sandstone. Discontinuities: 1) very closely to closely locally medium spaced 5-20° planar smooth clean. from 8.60m to 8.63m, 2 No. 25-30° fractures planar rough clean. at 9.14m, 1 No thin lamination of reddish brown mudstone.	-9.93 	(1.90)	
- - - - - 11.00-12.50 - 11.05-11.24		С			100	93	78	NI 130 290	0% return Water (NA)			Medium strong locally weak reddish brown fine to medium grained SANDSTONE. Discontinuities: 1) closely to medium spaced 0-15° planar and undulating rough clean. from 9.95m to 10.03m, very weak to weak and recovered as non-intact core (angular fine to coarse gravel sized fragments). at 10.16m, 1 No. thick lamination of light grey fine to medium grained sandstone. at 10.54m, 1 No. 10° fracture (locally incipient) planar smooth clean (possibly drilling induced).	13.16		
					100	96	71	50 130 200				Thinly interbedded medium strong grey and yellowish brown fine to medium grained SANDSTONE and medium strong to strong reddish brown medium grained sandstone. Discontinuities: 1) very closely to closely spaced 0-10° planar smooth clean from 11.62m to 11.72m, with extremely closely spaced thin	- - - -	- - (0.93) -	

	Boring Pro	gress and	Water Ob	servations	3			Co	noral	Remarks	
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter	Water Depth			Ge	nerai	Remarks	
		Берит	Берит	(mm)	Берш						
						A	II dimensio	ons in metre	s	Scale:	1:22
Method Used:	Dynamic Rota	sampling ry Cored	+ Plan Used		cchio GEC	205	Drilled By: Jo	oseph Taylor	Logged By:	MGalan + TBeeson	Checked AG



BOREHOLE LOG

												BOKEH	ULI		.UG
Contract:								Cli	ent:				Boreho	ole:	
		Proj	ect Bl	ue							В	suro Happold		В	H104
Contract Ref	:		(Start:	25.0°	1.18	Gro	und Le	evel (n	n):		National Grid Co-ordinate:	Sheet:		
7	643	393		End:	25.0°	1.18			-1.88	3		E:333338.4 N:392535.5		4	of 10
5 "		Samples	& Testir	ng	N	/lecha	anical	Log	SI SI	≅ ≡	<u>_</u>		ced	Depth	Material
Depth (m)	No	Туре	Resu	ılts	TCR (%)	SCR (%)	RQD (%)	lf (mm)	Flush Returns & Defails	Backfill	Water	Description of Strata	Reduced	(Thick ness)	Graphic Legend
-								50				laminations of dark grey siltstone.	-	-	
- -					100	96 1	71	200	-			thin lenses of light grey fine grained sandstone.	14.09	_ 12.21	
12.50-14.00					*	*	X	-				Medium strong reddish brown fine to medium grained SANDSTONE. Discontinuities: 1) closely to medium locally very closely	- - -	- -	
- - 12.76-13.06 -	209	С						NI 220 300				spaced 0-10° planar rough clean from 12.26m to 12.32m, 1 No. 90° fracture undulating rough clean from 12.44m to 12.50m, 1	- -	- (1.25)	
-					100	83	76					No. 75° fracture undulating rough clean from 12.55m to 12.65m, recovered as non-intact core	-	-	
- - -								X	-			(angular to subangular medium to coarse gravel sized fragments) from 12.61m to 12.94m, 3 No very thin to thin beds of medium	- -15.34 -	13.46	
-												strong light grey and yellowish brown fine to medium grained sandstone. Medium strong locally weak	-	-	
 14.00-15.50 - -					*	*	,	-	0% return Water	(ANI)		reddish brown fine to medium grained SANDSTONE. With medium spaced very thin to medium beds of medium strong grey and yellowish brown fine	-	-	
- _ 14.32-14.50 -	210	С						NI 90				grained sandstone. Discontinuities: 1) very closely to closely locally medium spaced 0-10° planar rough locally smooth clean.	- - -	(2.04)	
- - -					87	87	49	230				from 13.47m to 13.55m, weak and recovered as non-intact core (angular fine to medium gravel sized fragments).	- - -	-	
-												from 14.00m to 14.20m, assumed zone of core loss.	- -	-	
- -													- -	-	
15.50-17.00 - - -					100	93	57	40 120 170				Medium strong locally weak reddish brown medium grained SANDSTONE. Discontinuities: 1) very closely to closely spaced 5-20° planar and undulating rough clean.	-17.38 - - -	- - - -	

2	E	Boring Pro	gress and	Water Ob		3		C	Conc	ral	Remarks		
	Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth			Jene	ziai i	INCIIIAINS		
S Llu, Dialicii Oling - Ca				·		·							
000							А	II dimensions in m	etres		Scale:	1:22	
ollactais	Method Used:		sampling ry Cored	+ Plan Use		cchio GEC	205	Drilled By: Joseph Tay		ogged y:	MGalan + TBeeson	Checked By:	AS AGS



BOREHOLE LOG

Contract:							Cli	ent:				Boreho		
		Pro	ject Blue								uro Happold		В	H104
Contract Ref:			Start:	25.0	1.18	Grou	and Le	evel (m):	1	National Grid Co-ordinate:	Sheet:		
76	643	93	End:	25.0	1.18		-	1.88			E:333338.4 N:392535.5		5	of 10
Depth (m)		Sample: Type	s & Testing Results		Mecha SCR (%)	RQD (%)	Log If (mm)	Flush Returns & Details	Backfill	Water	Description of Strata	Reduced	Depth (Thick ness)	Material Graphic Legend
16.08-16.24 2		C		100	93	57		0% return F Water R (NA) 8			at 15.70m, 1 No. 35° fracture planar rough clean. from 16.60m to 16.75m, 1 No. 75° fracture undulating rough clean.	-18.88	- - - - - - - -	
											Borehole terminated at 17.00m depth.			

	Е	Boring Pro	gress and	Water Ob	servations	3			Co	norol	Remarks		
	Date	Time	Borehole Depth	Casing Depth	Borehole Diameter	Water Depth			Ge	lerai	Remarks		
;			Debili	Бериі	(mm)	Берит							
								II dimono	ions in metre	•	Caalar	1:22	
							A	ii dimens	ions in metre	S	Scale:	1.22	
5	Method Used:		sampling ry Cored	+ Plan Used		cchio GEO	205	Drilled By:	Joseph Taylor	Logged By:	MGalan + TBeeson	Checked By:	AGS



Contract:			Client:			Borehole	:	
Project E	Blue			E	Buro Happold		BH ^r	104
Contract Ref:	Start:	25.01.18	Ground Level (m)	:	National Grid Co-ordinate:	Sheet:		
764393	End:	25.01.18	-1.88		E:333338.4 N:392535.5		6 of	10

BH104 - Box 1





BH104 - Box 2

Method Dynamic sampling + Used: **Rotary Cored**

Plant Used:

Drilled

MGalan + **TBeeson** Checked



GINT_LIBRARY V8 06.GLB LibVersion: v8 06 018 Pt/Version: v8 06 - Core+Full Castleford SI - 008 | Log COMPOSITE LOG - A4P | 764393 - PROJECT BLUE.GPJ - v8 06.
Structural Soils Lid, Branch Office - Castleford: The Potteries, Pottery Street, Castleford, West Yorkshire, WF10 1NJ. Tel: 01977-552255, Fax: 01977-552299, Web: www.soils.co.uk, Email: ask@soils.co.uk. | 31/05/18 - 16:34 | AJ4 |

Comacchio GEO 205

Joseph Taylor

Logged



Contract:				Client:		Borehole	e:		
Project E	Blue						ΒH′	104	
Contract Ref:	ntract Ref: Start: 25.01.18 Gro			d Level (m):	National Grid Co-ordinate:	Sheet:			
764393	End:	25.01.18		-1.88	E:333338.4 N:392535.5		7	of	10

BH104 - Box 3





BH104 - Box 4

Plant Used:

Comacchio GEO 205

Drilled

Logged Joseph Taylor

MGalan + **TBeeson** Checked





Contract:			Client:			Borehole	e:		
Project E	Blue			E	Buro Happold		E	3H1	04
Contract Ref:	Start: 25.01	.18 Grour	nd Level (m):		National Grid Co-ordinate:	Sheet:			
764393	End: 25.0 1	.18	-1.88		E:333338.4 N:392535.5		8	of	10

BH104 - Box 5





BH104 - Box 6

Plant Used:

Comacchio GEO 205

Drilled

Logged Joseph Taylor

MGalan + **TBeeson** Checked





Contract:				Client:		Borehole	э:		
Project E	Blue					I	BH1	104	
Contract Ref:	ntract Ref: Start: 25.01.18 Gro			d Level (m):	Sheet:				
764393	End:	25.01.18		-1.88	E:333338.4 N:392535.5		9	of	10

BH104 - Box 7





BH104 - Box 8

Used: **Rotary Cored** Plant Used: Drilled

Joseph Taylor

Logged MGalan + **TBeeson** Checked





Contract:				Client:			Borehol	e:	
Project E	Blue				Buro Happold		BH104		
Contract Ref:	f: Start: 25.01.18 Grou				nd Level (m): National Grid Co-ordinate:				
764393	End:	25.01.18		-1.88		E:333338.4 N:392535.5		10 of 10	

BH104 - Box 9





BH104 - Box 10

Method Used:

Plant Used:

Comacchio GEO 205

Drilled Joseph Taylor Logged MGalan + **TBeeson** Checked





Contract:								Cli	ient:			Boreho	ole:	
		Pro	ject E	Blue						Е	Buro Happold		Е	3H105
Contract Re	ef:				18.0	1.18	Gro	und L	evel (m):		National Grid Co-ordinate:	Sheet:		
	764	393		End:	22.0	1.18			-2.86		E:333327.2 N:392443.9		1	of 11
		Samples	s & Tes	ting	1	Mecha	anical	Log	<u> </u>	T		8 -	Depth	Materia
Depth (m)	No			sults		SCR (%)	RQD (%)	If (mm	Flush Returns & Details Backfill	Water	Description of Strata	Reduced	(Thick ness)	l
0.00-0.60	1	UT _(UT100)	1 b 0% re	olow covery							Very soft dark bluish grey slightly sandy clayey SILT. Sand is fine Occasional fine to medium grave sized shell fragments.	/ - - - -	(0.60)	× · × · × · × · × · × · × · × · × · × ·
0.60-1.10 0.60-0.60	2	SPT _(NR)		/100 4mm	100	42	20	NI V	<u> </u>		Medium strong locally weak dark reddish brown fine to medium grained SANDSTONE Discontinuities: 1) very closely to closely spaced 0-15° planar rough) - -	0.60	× ×
1.00-1.10 1.10-2.60	201	С			*	\ \ \ \ \ \ \ \ \ \ \ \	X	-			clean from 0.60m to 0.79m, 1 Not thin bed of medium strong grey fine grained sandstone Recovered as non-intact core (subangular medium to coarse gravel sized fragments) at 0.94m, with localised black		-	
1.75-1.89	202	С			93	77	31	20 90 130			staining from 1.10m to 1.20m assumed zone of core loss.		(2.00)	
									100% return Water (Reddish brown)		from 2.10m to 2.15m discontinuity set 1 is 0-20° and locally undulating.	i - - -	- - - -	
2.60-4.10					X	X	X	*	-		Medium strong locally strong	-5.46	2.60	
2.75-2.94	203	С			100	100	83	20 120 230			reddish brown fine to medium locally coarse grained SANDSTONE. With widely spaced thin to medium beds of thickly interlaminated light grey fine sandstone and dark grey siltstone. Discontinuities: 1 closely to medium spaced locally very closely spaced 0-10° planar rough clean. from 3.22m to 3.33m, 1 Not thin bed of medium strong light grey fine to medium grained.		- - - - -	

l l	Boring Pro	gress and	Water Ob	servations	s
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
18/01/18 19/01/18 19/01/18 22/01/18	16:00 08:00 15:00 08:00	0.60 0.60 10.10 10.10	None None 1.10 1.10	140 140 146 146	-8.10 -8.10 1.80 2.80
22/01/18	11:00	16.00	1.10	146	4.70

General Remarks

- 1. Deck to silt level 8.50m. Silt level used as reference for GL. 2. UXO clearance performed by magnetometer adjacent to position. 3. No recovery of UT sample due to very soft nature of silt. 4. SPT hammer JT.01 2017 ($E_{\rm r}$ = 72.00%) used.

1:22 All dimensions in metres Scale: Plant

Method Dynamic sampling + Used: **Rotary Cored**

GINT_LIBRARY V8 06.GLB LibVersion: v8 06 018 PriVersion: v8 06 - Core+Full Castleford SI - 008 | Log COMPOSITE LOG - A4P | 764393 - PROJECT BLUE.GPJ - v8 06.
Structural Soils Ltd, Branch Office - Castleford: The Pottery Street, Castleford, West Yorkshire, WF10 1NJ. Tel: 01977-552255, Fax: 01977-552299, Web: www.soils.co.uk, Email: ask@soils.co.uk. | 31/05/18 - 16:36 | AJ4 |

Used: Comacchio GEO 205 Drilled Joseph Taylor Logged MGalan + By: **TBeeson** Checked





Contract:							CI	ient:				Boreho	ole:	
Ooritraot.		Proi	ect Blue							В	Buro Happold	Borone		3H105
Contract Re	ef:		Start:	18.0	1.18	Grou	und L	.evel	(m):		National Grid Co-ordinate:	Sheet:		
	7643	393	End:	22.0				-2.8	36		E:333327.2 N:392443.9		2	of 11
	;	Samples	& Testing	N	/lecha	anical	Log		o ≅ ≡			bed -	Depth	Materia
Depth (m)	No	Туре	Results	TCR (%)	SCR (%)	RQD (%)	Log If (mm	Flush	& Details Backfill	Water	Description of Strata	Reduced	(Thick ness)	Graphic Legend
4.10-5.60 5.60-7.10 5.60-5.78	204	С		100	100	83	20 120 230		(Reddish brown)		from 4.90m to 5.15m, 1 No medium bed of medium strong light grey fine to medium grained sandstone with very closely spaced thick laminations of dark grey siltstone from 5.20m to 5.40m, discontinuity set 1 is 10-20°.	- - - - - - - - - - - - - - - - - - -	(3.40)	
7.10-8.60	205	C		100	87	37	NI 80 120 NI 80 130 130 130 130 130 130 130 130 130 13		(Reddisk		Weak to medium strong reddish brown fine to medium grained SANDSTONE. Discontinuities: 1) very closely to closely spaced 0-20° planar smooth locally rough clean. 2) medium spaced 65-75° planar rough clean from 6.00m to 6.10m, 3 No. 90° fractures planar rough clean (drilling induced) from 6.37m to 6.48m, and 6.76m to 6.98m, very weak to weak and recovered partially as non-intact core (angular fine to coarse gravel sized fragments) from 6.50m to 6.70m, 1 No very thin bed of medium strong light grey fine to medium grained sandstone with very closely spaced thick laminations of dark grey siltstone from 7.13m to 7.27m and 7.43m to 7.50m and 8.08m to 8.20m, recovered as non-intact core (sandy angular to subangular	-		

	E	Boring Pro	gress and	Water Ob	servations	3			Co	noral	Remarks		
5	Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth			Ge	liciai	Remarks		
2				•									
ŝ													
)							А	II dimen	sions in metre	s	Scale:	1:22	
	Method Used:	Dynamic Rota	sampling ry Cored	+ Plan Used		cchio GEC	205	Drilled By:	Joseph Taylor	Logged By:	MGalan + TBeeson	Checked By:	AS AGS

GINT_LIBRARY_V8_06.GLB LibVersion: v8_06_018 PrjVersion: v8_06 - Core+Full Castleford SI - 008 | Log COMPOSITE LOG - A4P | 764393 - PROJECT BLUE.GPJ - v8_06.
Structural Solis Ltd, Branch Office - Castleford: The Potteries, Pottery Street, Castleford, West Yorkshire, WF10 1NJ. Tel: 01977-552255, Fax: 01977-552299, Web: www.solis.co.uk, Email: ask@solis.co.uk. | 31/05/18 - 16:36 | AJ4 |



Contract:							Cli	ent:				Boreho	ole:	
Contract.		Projec	ct Blue					CIII.		R	uro Happold	Doreit		H105
Contract Re	f:	TTOJCC	Start:	18 N	1 18	Grou	ınd I	evel (ı	n):		National Grid Co-ordinate:	Sheet:		11100
	'643	193		22.0				-2.8			E:333327.2 N:392443.9	0		of 11
		Samples &						_			L:333327:2 N:332443:3	 0		
Depth (m)	No		Results		SCR (%)	RQD (%)	If (mm)	Flush	& Details Backfill	Water	Description of Strata	Reduced	Depth (Thick ness)	Materia Graphic Legend
8.60-10.10				100	43	22	NI 80 130				from 8.23m to 8.30m, 1 No thin bed of medium strong light grey fine to medium grained sandstone. Medium strong reddish brown fine to medium grained SANDSTONE. With very closely to closely spaced very thin beds of light grey fine to medium grained sandstone. Discontinuities: 1) very closely to medium spaced planar smooth locally rough clean from 8.60m to 8.90m, 1 No medium bed of weak light grey fine locally medium grained sandstone. 3 No 80-90° parallel	- - -11.46 - - - -	- - - (0.90) - -	
9.42-9.70	206	С						100% return Water	(Keddish brown)		fractures undulating rough clean. Recovered partially as non-intact core (subangular medium to coarse gravel sized fragments) from 9.00m to 9.09m, recovered as non-intact core (angular medium to coarse gravel sized fragments). Medium strong reddish brown fine to medium grained SANDSTONE.	-12.36	9.50	
10.57-10.90		С		100	97	71	80 150 370		(Ke		With widely spaced thin beds of medium strong thickly laminated light grey fine grained sandstone. Discontinuities: 1) closely to medium spaced locally very closely spaced 0-15° planar rough clean.		-	
11.60-13.10				100	100	69	30 120 320	_			from 11.03m to 11.42m, 1 No. 70° fracture undulating rough clean. from 11.60m to 11.80m, 1 No. 75° fracture undulating rough clean.	-	-	

	Boring Pro	gress and	Water Ob	servations	3			Co	norol	Remarks		
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter	Water Depth			Ge	Herai	Remarks		
		Deptin	Берип	(mm)	Бериі							
										ı		
						A	III dimens	sions in metre	es	Scale:	1:22	
Method Used:	Dynamic Rota	sampling ry Cored	+ Plan Used		cchio GEC	205	Drilled By:	Joseph Taylor	Logged By:	MGalan + TBeeson	Checked By:	AGS



Op												BOKEH	ULI		.UG
Contract:								Cli	ent:				Boreho	ole:	
		Pro	ject Bl	ue							В	uro Happold		Е	H105
Contract Re	f:		8	Start:	18.0	1.18	Grou	und Le	evel (n	n):	ı	National Grid Co-ordinate:	Sheet:		
7	'64 3	393	E	End:	22.0	1.18			-2.86	5		E:333327.2 N:392443.9		4	of 11
Depth (m)	No		s & Testir Resu			Mecha SCR (%)	RQD	Log	Flush Returns & Details	Backfill	Water	Description of Strata	Reduced	Depth (Thick ness)	Material Graphic Legend
12.19-12.51	208	С			(70)	(70)	(70)		L & &	8		from 11.97m to 12.07m, 1 No thin bed of medium strong thinly and thickly laminated light grey and light greenish grey fine to medium grained sandstone.	- - -	-	
13.10-14.50					100	100	69	30				from 12.68m to 12.76m, 1 No thin bed of medium strong grey fine to medium grained sandstone from 12.88m to 13.05m, with localised thick laminations of light grey fine to medium grained sandstone.	-	- (6.50) - - -	
-					100	93	57	120 320	100% return Water (Deddish brown)			from 13.26m to 13.38m, 1 No thin bed of medium strong light grey fine to medium grained sandstone from 13.43m to 13.80m, 1 No. 75-90° fracture undulating rough clean.	-	-	
_ _ 14.14-14.35 _ _	209	С							100% W W			from 14.38m to 14.60m, 1 No	-	- - -	
14.50-16.00								N				medium bed of medium strong light grey fine to medium grained sandstone from 14.63m to 14.64m, 1 No thick lamination of light grey fine to medium grained sandstone.	-	- - - -	
	210	С			100	92	49	95 250				recovered as non-intact core (subrounded fine to medium gravel sized fragments) from 15.42m to 15.65m, 1 No medium bed of weak light grey fine to medium grained sandstone. 1 No 80-90° fracture	-18.86	16.00	

	E	Boring Pro	gress and	Water Ol	oservations	3			Co	noral	Remarks			
	Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth			Ge	ilerai	Remarks			
			23941	23041	()	25611								
							Δ	ll dimen	sions in metre	ne .	Scale:	1:22		
)	ethod sed:		sampling ry Cored	+ Plar Use		cchio GEC		Drilled By:	Joseph Taylor	Logged By:	MGalan + TBeeson	Checked By:	As	AGS

GINT_LIBRARY_V8_06.GLB LibVersion: v8_06_018 PrjVersion: v8_06 - Core+Full Castleford SI - 008 | Log COMPOSITE LOG - A4P | 764393 - PROJECT BLUE.GPJ - v8_06.
Structural Solis Ltd, Branch Office - Castleford: The Potteries, Pottery Street, Castleford, West Yorkshire, WF10 1NJ. Tel: 01977-552255, Fax: 01977-552299, Web: www.solis.co.uk, Email: ask@solis.co.uk. | 31/05/18 - 16:36 | AJ4 |



Contract: Client: Buro Happold Contract Ref: Start: 18.01.18 Ground Level (m): National Grid Co-ordinate: Sheet:	BH105
	BH105
Contract Ref: Start: 18.01.18 Ground Level (m): National Grid Co-ordinate: Sheet:	
Total 10.01.10 Ground Edver (III).	
764393 End: 22.01.18 -2.86 E:333327.2 N:392443.9 5	of 11
Depth (m) No Type Results TCR SCR RQD If (%) (%) (%) (mm) II ≥ 2 ≥ 2 Scription of Strata Scription of Scription of Strata Scription of	k Graphic
undulating rough clean, Recovered partially as non-intact core (angular to subangular fine lo tocarse grave) sized fragments). Borehole terminated at 16.00m depth.	

	F	Boring Pro	ogress and	Water O	bservations	3			201	noral	Domorko	
	Date	Time	Borehole	Casing	Borehole Diameter	Water		Ċ	JUI	nerari	Remarks	
2	Bate	1 11110	Depth	Depth	(mm)	Depth						
;												
3												
5												
5												
ĵ												
i												
							P	II dimensions in m	etre	s	Scale:	1:22
,	Method	Dynamic	sampling -	+ Plai	nt			Drilled		Logged	MGalan +	Checked A

GINT_LIBRARY_V8_06.GLB LibVersion: v8_06_018 PrjVersion: v8_06 - Core+Full Castleford SI - 008 | Log COMPOSITE LOG - A4P | 764393 - PROJECT BLUE.GPJ - v8_06.
Structural Solis Ltd, Branch Office - Castleford: The Potteries, Pottery Street, Castleford, West Yorkshire, WF10 1NJ. Tel: 01977-552255, Fax: 01977-552299, Web: www.solis.co.uk, Email: ask@solis.co.uk. | 31/05/18 - 16:36 | AJ4 |

Used: **Rotary Cored**

Used: Comacchio GEO 205 Ву: Joseph Taylor

TBeeson By:

By:

AGS



Contract:			Client:		Borehole:	
Project E	Blue			Buro Happold		BH105
Contract Ref:	Start:	18.01.18	Ground Level (m):	National Grid Co-ordinate:	Sheet:	
764393	End:	22.01.18	-2.86	E:333327.2 N:392443.9	(6 of 11

BH105 - Box 1





BH105 - Box 2

Method Dynamic sampling + **Rotary Cored**

Plant Used:

Comacchio GEO 205

Drilled

Logged

Checked



GINT_LIBRARY V8 06.GLB LibVersion: v8 06 018 Pt/Version: v8 06 - Core+Full Castleford SI - 008 | Log COMPOSITE LOG - A4P | 764393 - PROJECT BLUE.GPJ - v8 06.
Structural Soils Lid, Branch Office - Castleford: The Potteries, Pottery Street, Castleford, West Yorkshire, WF10 1NJ. Tel: 01977-552255, Fax: 01977-552299, Web: www.soils.co.uk, Email: ask@soils.co.uk. | 31/05/18 - 16:36 | AJ4 |

Used:

Joseph Taylor

MGalan + **TBeeson**



Contract: Client: Borehole: **Project Blue Buro Happold BH105** Contract Ref: Start: 18.01.18 Ground Level (m): National Grid Co-ordinate: Sheet: E:333327.2 N:392443.9 7 764393 End: 22.01.18 -2.86 of 11

BH105 - Box 3





BH105 - Box 4

Method Dynamic sampling + **Rotary Cored**

Plant Used:

Comacchio GEO 205

Drilled Joseph Taylor Logged MGalan + **TBeeson**

Checked





Contract:				Client:			Borehole	e:	
Project E	Blue				E	Buro Happold		I	BH105
Contract Ref:	Start:	18.01.18	Groun	d Level (m):		National Grid Co-ordinate:	Sheet:		
764393	End:	22.01.18		-2.86		E:333327.2 N:392443.9		8	of 11

BH105 - Box 5





BH105 - Box 6

Plant Used:

Comacchio GEO 205

Drilled Joseph Taylor Logged MGalan + **TBeeson** Checked





Contract:				Client:			Borehole	э:	
Project E	Blue				E	Buro Happold		ı	BH10
Contract Ref:	Start:	18.01.18	Groun	d Level (m):		National Grid Co-ordinate:	Sheet:		
764393	End:	22.01.18		-2.86		E:333327.2 N:392443.9		9	of 11

BH105 - Box 7





BH105 - Box 8

Dynamic sampling +

Plant Used:

Comacchio GEO 205

Drilled Joseph Taylor Logged

MGalan + **TBeeson** Checked





Contract:				Client:			Borehol	e:
Project E	Blue				E	Buro Happold		BH105
Contract Ref:	Start:	18.01.18	Groun	d Level (m):		National Grid Co-ordinate:	Sheet:	
764393	End:	22.01.18		-2.86		E:333327.2 N:392443.9		10 of 11

BH105 - Box 9





BH105 - Box 10

Method Used:

Plant Used:

Comacchio GEO 205

Drilled Joseph Taylor Logged MGalan + **TBeeson** Checked





Contract:			Client:			Borehole	e:
Project E	Blue			Buro l	Happold		BH105
Contract Ref:	Start:	18.01.18	Ground Level (m):	Nationa	al Grid Co-ordinate:	Sheet:	
764393	End:	22.01.18	-2.86	E:3	33327.2 N:392443.9		11 of 11

BH105 - Box 11





Method Dynamic sampling + Used: **Rotary Cored**

Plant Used:

Comacchio GEO 205

Drilled

Joseph Taylor

By:

Logged MGalan + **TBeeson** Checked





Contract:								Cli	ent:				Boreho	ole:		
Project Blue											В	uro Happold	BH106			
Contract Ref: Start: 09.01.18 Groun							Grou	und Le	evel (m):	Sheet:					
764393 End:			End:	11.01.18				2.62			E:333375.7 N:392522.9		of 20			
Depth		· ·	s & Test				RQD If (%)		sh urns etails	Backfill	Water	Description of Strata	Reduced	Depth (Thick	Materia Graphi	
(m)	No	Туре		Results		(%)	(%)	(mm)	Ret & D	B	>	·	Red	ness)	Legen	
0.00-1.00	1	Р	0% red	covery								Very soft dark bluish grey sandy clayey SILT. Sand is fine. Occasional fine to medium gravel sized shell fragments.	-		* * * * * * * * * * * * * * * * * * *	
1.00-1.80	2	Р	0% re	covery									-	- - - -	× × × × × × × × × × × × × × × × × × ×	
													-4.42	1.80	× ·× ·	
1.80-2.70 1.80-2.13	3	SPT	6 19/26	6,47,27	A		1	NI	1			Extremely weak reddish brown SANDSTONE. Recovered	_	-		
1.80-2.13	4	D		80mm	94	27	0	20 40				predominantly as non-intact core (very sandy subangular to subrounded fine to coarse gravel sized fragments). Very thinly interbedded medium strong light grey fine to medium grained SANDSTONE and weak to medium strong yellow medium	-4.62	2.00		
2.59-2.70	201	С						60				grained sandstone. Localised thin and thick laminations of dark grey	-	_		
2.70-4.20					T T	X	ı X		90-100% return Water (Reddish brown)			and black siltstone. Discontinuities: 1) very closely spaced 0-10° planar rough clean locally stained black.	- - -5.58	- - - 2.96		
3.08-3.25	202	С			93	80	55	20 100 200	90-1 <u>0</u>			Medium strong locally weak reddish brown fine to coarse medium SANDSTONE. Discontinuities 1) closely locally very closely and medium spaced 0-10° planar rough clean. from 3.39m to 3.42m, with extremely spaced thin laminations of black siltstone. from 3.40m to 3.55m, dark brown.	-	(1.24)		

Boring Progress and Water Observations											
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth						
09/01/18 10/01/18 10/01/18 11/01/18 11/01/18	16:00 08:00 16:00 08:00 14:00	2.70 2.70 19.20 19.20 32.70	2.70 2.70 3.40 3.40 3.40	150 150 146 146 146	-7.40 -6.60 8.10 5.80 15.80						

General Remarks

- 1. Deck to silt level 7.60m. Silt level used as reference for GL. 2. UXO clearance performed by magnetometer adjacent to position. 3. No recovery of piston samples due to very soft nature of silt.
- 4. SPT hammer JT.01 2017 (E_r = 72.00%) used.

1:22 All dimensions in metres Scale:

Dynamic sampling + Method Used: **Rotary Cored**

Plant Used: Comacchio GEO 205 Drilled Ashley Everill Logged MGalan + By: **TBeeson** Checked







Cambus str								0'	: _ · · · ·				BOREH			
Contract:		Dro	io of D	lua				CI	ient:			Boreho		LIANG		
Contract Re	.f.	Pro	ject B		00.0	4.40	Cro	undl	Buro Happold nd Level (m): National Grid Co-ordinate:							3H106
					` '						_	. 00				
	_			End:					_			\perp	E:333375.7 N:392522.9	1 70	2	of 20
Depth		Samples	s & Test	ing		Mecha SCR	anica	Log	Many Backfill			Water	Description of Strata	ncec	Depth (Thick	Material Graphic
(m)	No	Туре	Res	ults	(%)	(%)	(%)	ול mm)		& De la	Вас	×	Description of Strata	Reduced	ness)	Legend
. 4 00 5 70					93	80	55 Y	20 100					Madisus dans and disk business	-6.82	4.20	
4.20-5.70					[1		200					Medium strong reddish brown medium to coarse grained	-	-	
								X	-				SANDSTONE. Discontinuities: 1) closely to medium spaced locally	-	-	
													very closely spaced 0-15° planar	-	-	
													rough clean. Occasional lenses of reddish brown fine grained	-	-	
													sandstone.	-	-	
								20					from 4.20m to 4.41m, with extremely closely spaced thin	-	-	
					100	100	75	200 360					laminations of dark grey siltstone.			
5.01-5.37	203	С			lт	lι										
															_	
														-	-	
														-	-	
								1						-	-	
														-	-	
5.70-7.20					X	X	X	+						-	-	
0.70 7.20									딜	wn)				-	-	
5.89-6.06	204	С							retu	bro bro				-	(3.56)	
-									%00 %00	war					– ` ′	
									90-100% return	water (Reddish brown)					-	
														_	-	
					100	100	46							-	-	
								20						-	-	
								130						-	-	
								170						-	-	
														-	-	
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					↓	↓								-	-	
7.20-8.70					A	A	1	1							<u> </u>	
7.36-7.56	205	С														
1.00-1.00	200														_	
					100	100	75							-	-	
					100	100	'3							-10.38	7 76	
													Medium strong to strong reddish	- 10.00		
									1				brown fine to medium grained SANDSTONE with rare to	-	}	:::::::

	E	Boring Pro	ogress and	Water C	bservations	6	General Remarks							
	Date	Time	Borehole	Casing	Borehole Diameter	Water			Ge	nerai	Remarks			
	Date	111110	Depth	Depth	(mm)	Depth								
۱.														
1														
							F	All dimens	sions in metre	es	Scale:	1:22		
	Method		sampling	+ Pla		ecchio GEC		Drilled By: Ashley Everill		Logged By:	MGalan +	Checked	4	VG6



Op												BUKER	ULI		.UG
Contract:								Cli	ient:				Boreho	ole:	
		Pro	ject Blu	ıe							В	Buro Happold		В	H106
Contract Ref: Start: 09.01.18 Groun								und L	evel (r	Sheet:					
7	764393 End:					11.01.18			-2.62			E:333375.7 N:392522.9		of 20	
Depth			s & Testino			Mecha	anical RQD	Log	Flush Returns	Backfill	Water	Description of Strata	Reduced	Depth (Thick	Graphic
(m)	No	Туре	Result	ts	(%)	(%)	(%)	(mm	Ref 2	8 <u>8</u>	>	-	Rec	ness)	Legend
8.70-10.20	206	С			100	100	75	20 250 280	90-100% return Water			occasional lenses of grey fine to medium grained sandstone. Discontinuities: 1) closely to medium spaced locally very closely spaced 0-10° planar rough clean. from 7.76m to 7.92m, weak to medium strong light grey and darkish green SILTSTONE with localised very closely spaced thin laminations of grey mudstone. Discontinuities: 1) very closely to closely spaced 0-10° planar smooth clean. from 8.36m to 8.50m, 3 No. lenses of grey fine to medium grained sandstone. from 8.74m to 8.78m, 1 No very thin bed of medium strong grey medium grained sandstone.		(2.44)	
40.00.44.70					<u> </u>		L X	L X	90-10C W	sippau)		Madisus shows and disk house fire	-12.82	10.20	
10.20-11.70								20 80 150				Medium strong reddish brown fine to medium grained SANDSTONE with closely to medium spaced very thin beds of medium strong light grey fine to coarse grained sandstone. Discontinuities: 1) very closely to closely spaced 0-10° planar smooth clean.	- - - - -13.44	(0.62)	
10.93-11.27	207	С			100	99	63	20 320 330				Medium strong to strong reddish brown medium grained SANDSTONE. Discontinuities: 1) medium spaced locally very closely to closely spaced 0-10° planar rough clean from 10.99m to 11.01m, 2 No thick laminations of grey fine to coarse grained sandstone.	-	-	
11.70-13.20					100	91	62	40 100 200	1				-	(1.87)	

2	E	Boring Pro	gress and	Water Ob	servations	3	General Remarks							
2	Date	Time	Borehole	- 5	Borehole Diameter	Water			Gei	nerai	Remarks			
i do			Depth	Depth	(mm)	Depth								
j														
2														
5														
2														
5														
į														
2														
5							Δ.	II dimen	sions in metre	es	Scale:	1:22		
Outotai	Method Used:	_ j						Drilled By:	Ashley Everill	Logged By:	MGalan + TBeeson	Checked Assets	AGS	