

Report No 1306

**Crane Cross Civic Amenity Site,
Pembrokeshire**

FACTUAL REPORT

**Carried out for:
Pembrokeshire County Council**

**Engineer:
Capita**

May 2014

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**CRANE CROSS CIVIC AMENITY SITE, PEMBROKESHIRE****FACTUAL REPORT****Report No: 1306****Date: May 2014****Employer:**

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1 INTRODUCTION

In March 2014 Apex Drilling Services (APEX) was commissioned by Capita Property & Infrastructure (Capita) on behalf of Pembrokeshire County Council to carry out a ground investigation at Crane Cross, near Saundersfoot, Pembrokeshire. The investigation was required to obtain geotechnical and geo-environmental information for a proposed new civic amenity site.

The scope of the investigation, which was specified by Capita, comprised trail pitting, continuous dynamic probing, in situ testing in the form of dynamic cone penetrometer testing and laboratory testing. The investigation was carried out in accordance with the contract specification, Eurocode 7 and relevant related standards identified below (see also References). The fieldwork was carried out on 20th March and 4th April 2014.

This report presents the factual records of the fieldwork and laboratory testing. The data is also presented separately in digital format.

2 THE SITE AND GEOLOGY

2.1 The Site

The site is located at the Crane Cross area, approximately 1.5km south west of Saundersfoot town centre, Pembrokeshire, as shown in Figure 1, Site Location Plan, Enclosure F.

The area of investigation currently comprises of agricultural fields. The site is bounded to the north by Devonshire Drive, to the east and south by farm land, and to the west by an overgrown parcel of land with a railway line beyond.

The topography of the site is generally flat with little difference in levels (see Ground Level on the exploratory logs, Enclosure A).

The centre of the site is at National Grid reference SN 116 038.

2.2 Published Geology

The published geological map of the area, BGS Sheet 228, shows the solid geology comprises mudstones, siltstones and sandstones of the Carboniferous aged Lower Coal Measure Formation. An east – west trending anticline is shown approximately 0.2km to the north and dips between 50 and 65°. An east – west trending fault is located approximately 0.5km to the east of the site.

No superficial deposits are recorded.

3 FIELDWORK

3.1 General

The fieldwork which was specified by Capita was carried out in general accordance with BS 5930+A2 (2010), BS EN 1997-2 (2007), BS EN ISO 22475-1 (2006) and BS 10175 (2011).

Whilst undertaking geo-environmental sampling a best practice policy was observed which included using new disposable nitrile gloves for each sample interval, ensuring appropriate sample containers were used, cleaning tools to prevent cross contamination, keeping samples in cool boxes containing ice packs and dispatching samples at the earliest opportunity, complete with chain of custody, to the testing laboratory.

No visual or olfactory evidence of contamination was observed in any of the trial pits.

The exploratory hole locations were selected by Capita. The locations and elevations of the exploratory holes were surveyed by John Vincent Surveys Ltd. on completion of the fieldwork.

The positions of the exploratory holes are shown on the Exploratory Hole Location Plan in Enclosure F.

3.2 Exploratory Holes

The exploratory holes are listed in the following table.

SUMMARY OF EXPLORATORY HOLES

TYPE	QUANTITY	MAXIMUM DEPTH (m)	REMARKS
Trial Pits	6	4.30	Designated TP1 to TP6
Dynamic Probe	7	5.00	Designated DP1 to DP7

The exploratory hole records are presented in Enclosure A and should be read in conjunction with the Key which is included in that enclosure. The records provide descriptions of the materials encountered in accordance with BS EN ISO 14688-1 (2002) and 14689-1 (2003), for soils and rocks respectively, as amplified by BS 5930+A2 (2010).

The records also give details of the samples taken together with observations made during operations. Photographs of the trial pits are presented in Enclosure E.

3.3 In Situ Testing

In situ testing was carried out in accordance with the relevant standards as tabulated below. The testing is summarised in the following table and the results are presented in Enclosure B unless noted otherwise.

SUMMARY OF IN SITU TESTING

TYPE	QUANTITY	REMARKS
Dynamic Cone Penetrometer	3	Designated DCP1 to DCP3

4 LABORATORY TESTING

4.1 Geotechnical Testing

The testing was scheduled by Capita and was carried out in accordance with BS 1377-2 (1990) unless otherwise stated. The testing was undertaken by Apex Testing Solutions at their Bridgend laboratory. The testing is summarised below and the results are presented in Enclosure C.

SUMMARY OF GEOTECHNICAL LABORATORY TESTING

TYPE	REMARKS
Moisture Content	11 no.
Liquid Limit, Plastic Limit & Plasticity Index	11 no.

TYPE	REMARKS
Particle Size Distribution Analysis	11 no.
California Bearing Ratio on re-compacted disturbed sample	3 no.
Particle Size Distribution – Aggregate Analysis	3 no.
Bituminous Analysis	3 no.

4.2 Geoenvironmental Testing

The testing was scheduled by Capita and was carried out using MCERTS accredited testing methods unless otherwise stated. The testing was undertaken by ALcontrol Laboratories at their Deeside laboratory. The testing is summarised below and the results are presented in Enclosure D.

SUMMARY OF GEOENVIRONMENTAL LABORATORY TESTING

TYPE - SOIL	REMARKS
Report No. 265510	
As, B, Cd, Cr (hexavalent), Cu, Pb, Hg, Ni, Zn, Soil Organic Matter, TPH CWG with Ali / Aro Split & Carbon Banding, Cyanide (inorganic).	6 no.
Report No. 265933	
BRE SD1 (Greenfield Site), pH, Acid Soluble SO ₄ , Loss on Ignition.	5 no.

Prepared By	Aled Henry BSc. (Hons) FGS
Reviewed By	Robert Brewer BSc.
Approved for Issue By	

REFERENCES

- AGS : 2005 : Electronic transfer of geotechnical and geoenvironmental data (Edition 3.1 including addendum May 2005). Association of Geotechnical and Geoenvironmental Specialists.
- BGS England and Wales Sheet 228 : Haverfordwest 1976. 1:50000 geological map (solid & drift). British Geological Survey
- BRE Special Digest 1 : 2005 : Concrete in aggressive ground. Building Research Establishment.
- BS 1377-2: 1990: Methods of test for soils for civil engineering purposes. Classification tests. British Standards Institution.
- BS 5930+A2 : 2010 : Code of practice for site investigations (Amendment 2). British Standards Institution.
- BS 10175 : 2011 : Code of practice for investigation of potentially contaminated sites. British Standards Institution.
- BS 22475-3 : 2011: Geotechnical investigation and testing. Sampling methods and groundwater measurements. British Standards Institution.
- BS EN 1997-2 : 2007 : Eurocode 7 - Geotechnical design - Part 2 Ground investigation and testing. British Standards Institution.
- BS EN ISO 14688-1 : 2002 : Geotechnical investigation and testing - Identification and classification of soil - Part 1 Identification and description. British Standards Institution.
- BS EN ISO 14689-1 : 2003 : Geotechnical investigation and testing - Identification and classification of rock - Part 1 Identification and description. British Standards Institution.
- UK Specification for Ground investigation 2nd Edition 2012

ENCLOSURE A
EXPLORATORY HOLE RECORDS

Exploratory Hole Log Key

Trial Pits

Dynamic Probe

TP1 to TP6

DP1 to DP7

Key to Exploratory Hole Records

SAMPLES

Undisturbed

U	Driven tube sample	} nominally 100 mm diameter and full recovery unless otherwise stated
UT	Driven thin wall tube sample	
TW	Pushed thin wall tube sample	
P	Pushed piston sample	
WLS	Liner sample (from Windowless or similar sampler), full recovery unless otherwise stated	
CBR	CBR mould sample	
BLK	Block sample	
C	Core sample (from rotary core) taken for laboratory testing	
AMAL	Amalgamated sample	

Disturbed

D	Small sample
B	Bulk sample

Other

W	Water sample
G	Gas sample

	Environmental chemistry samples (in more than one container where appropriate)
ES	Soil sample
EW	Water sample

Comments

Sample reference numbers are assigned to every sample taken. A sample reference of 'NR' indicates that attempt was made to take a tube sample, however, there was no recovery.

Monitoring samples taken after completion of hole construction are not shown on the exploratory hole logs.

TESTS

SPT S or SPT C	Standard Penetration Test, open shoe (S) or solid cone (C)
----------------	--

The Standard Penetration Test is defined in BS EN ISO 22476-3 (2005). The incremental blow counts are given in the Field Records column; each increment is 75 mm unless stated otherwise and any penetration under self weight in mm (SW) is noted. Where the full 300 mm test drive is achieved the total number of blows for the test drive is presented as N = ** in the Test column. Where the test drive blows reach 50 the total blow count beyond the seating drive is given (without the N = prefix).

IV	<i>in situ</i> Vane shear strength, peak (p) and remoulded (r)
HV	Hand vane shear strength, peak (p) and remoulded (r)
PP	Pocket penetrometer test, converted to shear strength
KFH, KRH, KPI	Permeability tests (KFH = falling head, KRH = rising head; KPI = packer inflow); results provided in Field Records column (one value per stage for packer tests)

DRILLING RECORDS

The mechanical indices (TCR/SCR/RQD & If) are defined in BS 5930+A2 (2010)

TCR	Total Core Recovery, %
SCR	Solid Core Recovery, %
RQD	Rock Quality Designation, %
If	Fracture spacing, mm. Minimum, typical and maximum spacings are presented. The term non-intact (NI) is used where the core is fragmented.

Flush returns, estimated percentage with colour where relevant, are given in the Records column

CRF	Core recovered (length in m) in the following run
AZCL	Assessed zone of core loss
NR	Not recovered

GROUNDWATER

▼	Groundwater strike
▽	Groundwater level after standing period

Key to Exploratory Hole Records

INSTALLATION

Standpipe/ piezometer

Details of standpipe/piezometer installations are given on the Record. Legend column shows installed instrument depths including slotted pipe section or tip depth, response zone filter material type and layers of backfill.

SP
SPIE
PPIE
EPIE



The type of instrument installed is indicated by a code in the Legend column at the depth of the response zone:
Standpipe
Standpipe piezometer
Pneumatic piezometer
Electronic piezometer

Inclinometer or Slip Indicator

The installation of vertical profiling instruments is indicated on the Record. The base of tubing is shown in the Legend column.

ICE
ICM
SLIP



The type of instrument installed is indicated by a code in the Legend column at the base of the tubing:
Biaxial inclinometer
Inclinometer tubing for use with probe
Slip indicator

Settlement Points or Pressure Cells

The installation of single point instruments is indicated on the Record. The location of the measuring device is shown in the Legend column.

ESET
ETM
EPCE
PPCE



The type of instrument installed is indicated by a code in the Legend column:
Electronic settlement cell/gauge
Magnetic extensometer settlement point
Electronic embedment pressure cell
Electronic push in pressure cell

INSTALLATION LEGENDS

A legend describing the installation is shown in the rightmost column. Legends additional to BS5930 are used to describe the backfill materials as indicated below.

Arising



Concrete



Grout



Bentonite



Sand



Gravel



Macadam



NOTES

- 1 Soils and rocks are described in accordance with BS EN ISO 14688-1 (2002) and 14689-1 (2003) respectively as amplified by BS 5930+A2 (2010).
- 2 For fine soils consistency determined in the field by the logger is reported for those strata where undisturbed samples are available. The consistency is qualified and given (in brackets) when, in the opinion of the logger, the sample is disturbed but the assessed consistency is reasonably representative of the in situ conditions; in these circumstances it will normally underestimate consistency in situ. No consistency is given where the samples available are too disturbed to allow a reasonable assessment.
- 3 Evidence of the occurrence of very coarse particles (cobbles and boulders) is presented on the logs, however, because of their size in relation to the exploratory hole these records may not be fully representative of their size and frequency in the ground mass.
- 4 The declination of bedding and joints is given with respect to the normal to the core axis. Thus in a vertical borehole this will be the dip.
- 5 The assessment of SCR, RQD and Fracture Spacing excludes artificial fractures
- 6 Strata legends are in accordance with BS 5930+A2 (2010).
- 7 Water level observations of discernible entries during the advancing of the exploratory hole are given at the foot of the log and in the Legend column. The term "none observed" is used where no discrete entries are identified although this does not necessarily indicate that the hole has not been advanced below groundwater level. Under certain conditions groundwater cannot be observed, for instance, drilling with water flush or overwater, or boring at a rate much faster than water can make its way into the borehole (ref BS5930+A2:2010, Clause 47.2.7). In addition, where appropriate, water levels in the hole at the time of recovering individual samples or carrying out in situ tests and at shift changes are given in the Records column.
- 8 The borehole logs present the results of Standard Penetration Tests recorded in the field without correction or interpretation. However, in certain ground conditions (eg high hydraulic head or where very coarse particles are present) some judgement may be necessary in considering whether the results are representative of in situ mass conditions.

Notes:
See report text for full references of standards

Project Crane Cross Civic Amenity Site, Pembrokeshire
Project No. 1306
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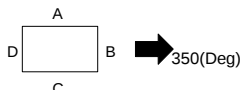
Key

Sheet 2 of 2

Trial Pit Log

Logged AH Checked		Start 20/03/2014 End 20/03/2014	Equipment, Methods and Remarks Komatsu pc138us Tracked Excavator Machine excavated pit G.L. - 3.00m. Terminated on Engineer's instruction.	Dimensions and Orientation Width 0.90m Length 4.70m 	Ground Level 71.860 Coordinates 211703E 203900N National Grid 211703E - 203900N Chainage
Samples and Tests			Strata		
Depth	Type & No	Date Records	Description	Depth, Level (Thickness)	Legend Backfill/ Instruments
0.30	ES 1	20/03/2014 1400	Soft to firm dark brown slightly sandy slightly gravelly CLAY with many rootlets. Gravel is angular to sub-angular fine to coarse of sandstone and siltstone.	(0.20) 0.20 71.66	
0.70-0.80	B 2		Stiff to very stiff medium strength brown and orange brown slightly sandy slightly gravelly CLAY with low cobble content. Gravel is angular to sub-angular fine to coarse of sandstone and siltstone. Cobbles are angular to sub-angular of sandstone. Hand vane @ 0.40m 45/18, 41/19, 44/18 KPa.		
0.80	ES 3				
1.60	D 4			(1.80)	
2.30-2.40	B 5		Brown locally grey slightly clayey sandy angular to sub-angular fine to coarse GRAVEL of sandstone with low to medium cobble content. Cobbles are angular of sandstone.	2.00 69.86 ▽ (0.60)	
2.70-2.80	B 6		Very weak brown fine grained SANDSTONE recovered as slightly clayey angular fine to coarse gravel and angular cobbles.	2.60 69.26 (0.40)	
		20/03/2014 1500	Exploratory Hole Ends at 3.00 m	3.00 68.86	
Groundwater Entries No. Struck Post Strike Behaviour 1 2.10 Fast Inflow			Depth Related Marks * From To (m)		Stability Localised collapsing Shoring None Weather Rain
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. Scale: 1:25 www.apexdrilling.co.uk			Project Crane Cross Civic Amenity Site, Pembrokeshire Project No. 1306 Carried out for Pembrokeshire County Council		Trial Pit TP1 Sheet 1 of 1

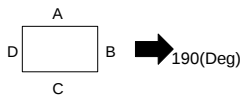
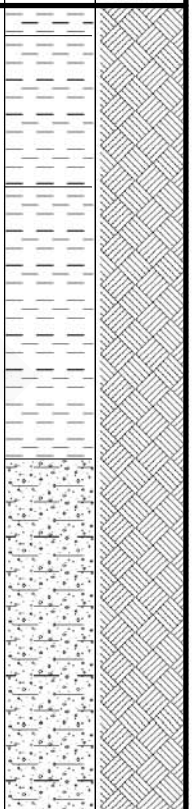
Trial Pit Log

Logged AH Checked		Start 20/03/2014 End 20/03/2014	Equipment, Methods and Remarks Komatsu pc138us Tracked Excavator Machine excavated pit G.L. - 3.70m. Terminated due to difficult excavation.	Dimensions and Orientation Width 0.80m Length 4.80m 	Ground Level 72.880 Coordinates 211747E 203876N National Grid 211747E - 203876N Chainage
Samples and Tests			Strata		
Depth	Type & No	Date Records	Description	Depth, Level (Thickness)	Legend
0.10	ES 1	20/03/2014 0800	Firm dark brown slightly sandy slightly gravelly CLAY with many rootlets. Gravel is angular to sub-angular fine to coarse of sandstone and siltstone.	(0.15)	
0.20-0.30	B 3		Stiff medium strength grey locally brownish grey slightly sandy slightly gravelly CLAY. Gravel is angular to sub-angular fine to coarse of siltstone and sandstone.	0.15 72.73 (0.25)	
0.25	D 2		Hand vane @ 0.30m 46/16, 40/20, 46/18 KPa.	0.40 72.48	
0.50-0.60	B 4		Firm low to medium strength orange brown locally greyish brown and dark grey slightly sandy locally sandy CLAY.	(0.80)	
0.70	ES 5		Hand vane @ 0.70m 38/10, 42/16, 36/14 KPa.	1.20 71.68	
			Stiff grey to dark grey slightly sandy slightly gravelly CLAY. Gravel is angular to sub-angular fine to coarse of siltstone.	(0.60)	
1.50-1.60	B 6			1.80 71.08	
1.90-2.00	B 7		Clayey sandy angular to sub-angular fine to coarse GRAVEL of siltstone with low cobble content. Cobbles are angular of siltstone. Becoming less clayey with more cobbles with increasing depth.	(0.70)	
			Very weak brown and grey SILTSTONE recovered as sandy angular to sub-angular gravel and angular cobbles.	2.50 70.38	
3.00-3.10	B 8			(1.20)	
		20/03/2014 0800	Exploratory Hole Ends at 3.70 m	3.70 69.18	
Groundwater Entries No. Struck Post Strike Behaviour 1 1.90 Fast Inflow			Depth Related Marks * From To (m)		Stability Localised collapsing Shoring None Weather Dry
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. Scale: 1:25			Project Crane Cross Civic Amenity Site, Pembrokeshire Project No. 1306 Carried out for Pembrokeshire County Council		Trial Pit TP2 Sheet 1 of 1

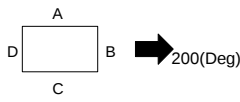
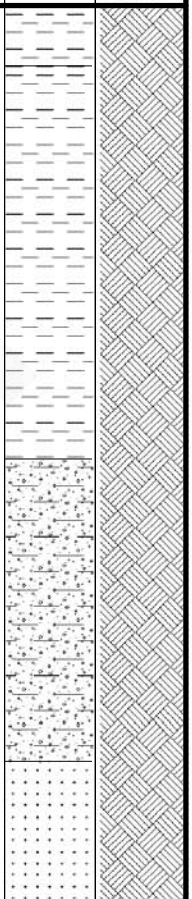
Trial Pit Log

Logged AH Checked		Start 20/03/2014 End 20/03/2014	Equipment, Methods and Remarks Komatsu pc138us Tracked Excavator Machine excavated pit G.L. - 3.00m. Terminated on Engineer's instruction.	Dimensions and Orientation Width 0.90m Length 4.80m 	Ground Level 73.290 Coordinates 211743E 203838N National Grid 211743E - 203838N Chainage
Samples and Tests			Strata		
Depth	Type & No	Date Records	Description	Depth, Level (Thickness)	Legend Backfill/ Instruments
0.20	D 1	20/03/2014 1500	Firm brown slightly sandy slightly gravelly CLAY with many rootlets. Gravel is angular to sub-angular fine to coarse of sandstone and siltstone.	(0.30)	
0.50	ES 2		Stiff to very stiff orange brown and light grey slightly sandy slightly gravelly CLAY with low cobble content. Gravel is angular to sub-angular fine to coarse of siltstone and sandstone. Cobbles are angular of sandstone.	0.30 72.99	
0.70-0.80	B 3				
0.90	ES 4			(1.40)	
1.80-1.90	B 5		Brown very silty very sandy angular to sub-angular fine to coarse GRAVEL of sandstone with low cobble content. Cobbles are angular of sandstone.	1.70 71.59 ▽ (0.70)	
2.80-2.90	B 6		Very weak brown fine grained SANDSTONE recovered as angular gravel and angular cobbles.	2.40 70.89 (0.60)	
		20/03/2014 1600	Exploratory Hole Ends at 3.00 m	3.00 70.29	
Groundwater Entries No. Struck Post Strike Behaviour 1 1.90 Fast Inflow			Depth Related Marks * From To (m)		Stability Localised collapsing Shoring None Weather Rain
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. Scale: 1:25 www.apexdrilling.co.uk			Project Crane Cross Civic Amenity Site, Pembrokeshire Project No. 1306 Carried out for Pembrokeshire County Council		Trial Pit TP3 Sheet 1 of 1

Trial Pit Log

Logged AH Checked		Start 20/03/2014 End 20/03/2014	Equipment, Methods and Remarks Komatsu pc138us Tracked Excavator Machine excavated pit G.L. - 2.70m. Terminated on Engineer's instruction.	Dimensions and Orientation Width 0.90m Length 4.60m 	Ground Level 73.200 Coordinates 211727E 203829N National Grid 211727E - 203829N Chainage
Samples and Tests			Strata		
Depth	Type & No	Date Records	Description	Depth, Level (Thickness)	Legend Backfill/ Instruments
0.30 0.40-0.50 0.40	ES 1 B 2 D 3	20/03/2014 0900	Firm dark brown slightly sandy slightly gravelly CLAY with many rootlets. Gravel is angular to sub-angular fine to coarse of sandstone and siltstone. Stiff medium strength greyish brown slightly sandy slightly gravelly CLAY. Gravel is angular to sub-angular fine to coarse of siltstone and sandstone. Hand vane @ 0.30m 40/18, 44/18, 42/16 KPa.	(0.10) 0.10 73.10 (0.50)	
0.70 0.80-0.90	ES 4 B 5		Firm to stiff orange brown and light grey slightly sandy slightly gravelly CLAY. Gravel is angular to sub-angular fine to coarse of siltstone.	0.60 72.60 (0.90)	
1.80-1.90	B 6		Light grey and brown clayey sandy angular to sub-angular fine to coarse GRAVEL of siltstone with low to medium cobble content. Cobbles are angular of siltstone.	1.50 71.70 (1.20)	
20/03/2014 1000			2.60m: Water rose from 2.60 - 1.80m in 90 min Exploratory Hole Ends at 2.70 m	2.70 70.50	
Groundwater Entries No. Struck Post Strike Behaviour 1 1.80 Fast Inflow			Depth Related Marks * From To (m)		Stability Localised collapsing Shoring None Weather Dry
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. Scale: 1:25 www.apexdrilling.co.uk			Project Crane Cross Civic Amenity Site, Pembrokeshire Project No. 1306 Carried out for Pembrokeshire County Council		Trial Pit TP4 Sheet 1 of 1

Trial Pit Log

Logged AH Checked		Start 20/03/2014 End 20/03/2014	Equipment, Methods and Remarks Komatsu pc138us Tracked Excavator Machine excavated pit G.L. - 3.00m. Terminated on Engineer's instruction.	Dimensions and Orientation Width 0.85m Length 4.60m 	Ground Level Coordinates 72.480 211651E 203866N National Grid 211651E - 203866N Chainage
Samples and Tests			Strata		
Depth	Type & No	Date Records	Description	Depth, Level (Thickness)	Legend Backfill/ Instruments
0.10	D 1	20/03/2014 1130	Firm brown slightly sandy slightly gravelly CLAY with many rootlets. Gravel is angular to sub-angular fine to coarse of sandstone and siltstone.	(0.20)	
0.40	ES 2		Stiff to very stiff medium strength brownish grey slightly sandy slightly gravelly CLAY with low cobble content. Gravel is angular to sub-angular fine to coarse of sandstone and siltstone. Cobbles are angular to sub-angular of sandstone.	0.20 72.28	
0.50-0.60	B 3		Hand vane @ 0.50m 46/18, 50/17, 42/16 KPa.		
0.90	ES 4			(1.30)	
1.10	D 5				
1.80-1.90	B 6		Orange brown and grey sandy very clayey angular to sub-angular fine to coarse GRAVEL of sandstone and siltstone with low to medium cobble content. Cobbles are angular to sub-angular of sandstone. Becoming less clayey with increasing depth.	1.50 70.98	
2.60-2.70	B 7		Very weak brown fine grained SANDSTONE recovered as angular to sub-angular fine to coarse gravel and angular cobbles.	2.50 69.98	
		20/03/2014 1300	Exploratory Hole Ends at 3.00 m	(0.50) 3.00 69.48	
Groundwater Entries No. Struck Post Strike Behaviour 1 2.10 Fast Inflow			Depth Related Marks * From To (m)		Stability Localised collapsing Shoring None Weather Dry
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. Scale: 1:25 www.apexdrilling.co.uk			Project Crane Cross Civic Amenity Site, Pembrokeshire Project No. 1306 Carried out for Pembrokeshire County Council		Trial Pit TP5 Sheet 1 of 1

Trial Pit Log

Logged AH Checked		Start 20/03/2014 End 20/03/2014	Equipment, Methods and Remarks Komatsu pc138us Tracked Excavator Machine excavated pit G.L. - 4.30m. Terminated due to difficult excavation.	Dimensions and Orientation Width 0.90m Length 4.80m 	Ground Level 72.900 Coordinates 211659E 203836N National Grid 211659E - 203836N Chainage
Samples and Tests			Strata		
Depth	Type & No	Date Records	Description	Depth, Level (Thickness)	Legend Backfill/ Instruments
0.20 0.30	D 1 ES 2	20/03/2014 1000	Firm dark brown to brown slightly sandy slightly gravelly CLAY with many rootlets. Gravel is angular to sub-angular fine to coarse of sandstone and siltstone.	(0.40) 0.40 72.50	
0.80 0.90-1.00	ES 3 B 4		Stiff locally very stiff medium strength slightly sandy slightly gravelly silty CLAY with low cobble content. Gravel is angular to sub-angular fine to coarse of sandstone. Cobbles are angular to sub-angular of sandstone. Hand vane @ 1.20m 40/18, 46/19, 42/16 KPa.	(1.40)	
1.50	D 5				
1.90-2.00	B 6		Firm orange brown slightly gravelly sandy CLAY with low to medium cobble content. Gravel is angular to sub-angular fine to coarse of sandstone Cobbles are angular of sandstone.	1.80 71.10 (0.60)	
2.80-2.90	B 7		Very weak brown fine grained SANDSTONE recovered as angular fine to coarse gravel and angular cobbles.	2.40 70.50 (1.90)	
3.50-3.60	B 8				
		20/03/2014 1100	Exploratory Hole Ends at 4.30 m	4.30 68.60	
Groundwater Entries No. Struck Post Strike Behaviour 1 1.80 Fast inflow			Depth Related Marks * From To (m)		Stability Localised collapsing Shoring None Weather Dry
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. Scale: 1:25 www.apexdrilling.co.uk			Project Crane Cross Civic Amenity Site, Pembrokeshire Project No. 1306 Carried out for Pembrokeshire County Council		Trial Pit TP6 Sheet 1 of 1

APEX
DRILLING
SERVICES

Operator AR		Probe Type DPH	Cone Diameter (mm) 50		Cone tip abandoned - at (mBGL)		Ground Level 71.460				
Logged by AH		Rod Diameter (mm) 35	Hammer Mass (kg) 63.50				Coordinates 211720E 203912N				
Checked by		Rod Mass (kg/m) 8	Fall Height (mm) 760		Date of Test 20/03/2014		National Grid 211720E - 203912N				
Chainage											
Level	Depth (m)	Blows per 100mm	Blow Count					Torque (Nm)	Description	Legend	Backfill/Instrument
			5	10	15	20	25				
		0									
		1									
		1									
		1									
		2									
		3									
		2									
		5									
		2									
	1.00	2									
		3									
		3									
		3									
		3									
		4									
		6									
		5									
		4									
		3									
	2.00	5									
		7									
		7									
		9									
		11									
		13									
		17									
		20									
		27									
		28									
	3.00	26									
		52									
		56									
	4.00										
Remarks								Equipment, Methods and Comments			
								Dando Terrier Rig			
								Dynamic sample (super heavy weight) G.L. - 3.20m. Terminated on obstruction.			
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.								Project Crane Cross Civic Amenity Site, Pembrokeshire			
Scale: 1:24								Project No. 1306			
www.apexdrilling.co.uk								Carried out for Pembrokeshire County Council			
								Exploratory Hole DP1			
								Sheet 1 of 1			

APEX
DRILLING
SERVICES

Operator AR		Probe Type DPSH		Cone Diameter (mm) 50		Cone tip abandoned - at (mBGL)		Ground Level 72.870			
Logged by AH		Rod Diameter (mm) 35		Hammer Mass (kg) 63.50				Coordinates 211744E 203876N			
Checked by		Rod Mass (kg/m) 8		Fall Height (mm) 760		Date of Test 20/03/2014		National Grid 211744E - 203876N			
Chainage											
Level	Depth (m)	Blows per 100mm	Blow Count					Torque (Nm)	Description	Legend	Backfill/Instrument
			5	10	15	20	25				
		0									
		0									
		0									
		0									
		0									
		2									
		2									
		2									
		3									
	1.00	5									
		8									
		6									
		4									
		3									
		3									
		3									
		4									
		4									
	2.00	4									
		7									
		6									
		7									
		8									
		7									
		9									
		12									
		12									
		13									
	3.00	16									
		14									
		14									
		14									
		15									
		18									
		23									
		33									
		35									
		43									
	4.00	47									
		53									
		54									
								End of Probehole at 4.30 m			
Remarks								Equipment, Methods and Comments			
								Dando Terrier Rig			
								Dynamic sample (super heavy weight) G.L. - 4.30m. Terminated on obstruction.			
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.			Project Crane Cross Civic Amenity Site, Pembrokeshire			Exploratory Hole					
Scale: 1:24			Project No. 1306			DP2					
www.apexdrilling.co.uk			Carried out for Pembrokeshire County Council			Sheet 1 of 1					

APEX
DRILLING
SERVICES

[illegible]

Exploratory Hole DP3

Sheet 1 of 1

APEX
DRILLING
SERVICES

Operator AR		Probe Type DPSH		Cone Diameter (mm) 50		Cone tip abandoned - at (mBGL)		Ground Level 73.190			
Logged by AH		Rod Diameter (mm) 35		Hammer Mass (kg) 63.50				Coordinates 211722E 203828N			
Checked by		Rod Mass (kg/m) 8		Fall Height (mm) 760		Date of Test 20/03/2014		National Grid 211722E - 203828N			
								Chainage			
Level	Depth (m)	Blows per 100mm	Blow Count					Torque (Nm)	Description	Legend	Backfill/Instrument
			5	10	15	20	25				
		0									
		0									
		0									
		0									
		0									
		0									
		1									
		2									
		3									
		2									
	1.00	2									
		1									
		2									
		4									
		6									
		6									
		6									
		11									
		10									
	2.00	10									
		9									
		6									
		5									
		3									
		3									
		4									
		5									
		6									
		8									
	3.00	12									
		17									
		15									
		14									
		20									
		30									
		47									
		63									
	4.00										
Remarks								Equipment, Methods and Comments			
								Dando Terrier Rig			
								Dynamic sample (super heavy weight) G.L. - 3.70m. Terminated on obstruction.			
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.								Project Crane Cross Civic Amenity Site, Pembrokeshire			
Scale: 1:24								Project No. 1306			
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								Exploratory Hole DP4			
								Sheet 1 of 1			

Dynamic Probe Log

Operator	AR	Probe Type	DPSH	Cone Diameter (mm)	50	Cone tip abandoned - at (mBGL)		Ground Level	72.550
Logged by	AH	Rod Diameter (mm)	35	Hammer Mass (kg)	63.50			Coordinates	211671E 203866N
Checked by		Rod Mass (kg/m)	8	Fall Height (mm)	760	Date of Test	20/03/2014	National Grid	211671E - 203866N
								Chainage	

Level	Depth (m)	Blows per 100mm	Blow Count					Torque (Nm)	Description	Legend	Backfill/Instrument
			5	10	15	20	25				
		0									
		1									
		1									
		0									
		1									
		0									
		0									
		1									
		1									
	1.00	2									
		2									
		2									
		3									
		2									
		2									
		4									
		5									
		5									
	2.00	3									
		3									
		4									
		6									
		5									
		7									
		9									
		11									
		15									
		16									
	3.00	16									
		15									
		17									
		18									
		25									
		24									
		29									
		26									
		24									
		28									
	4.00	52									
									End of Probehole at 4.00 m		

Remarks	Equipment, Methods and Comments Dando Terrier Rig Dynamic sample (super heavy weight) G.L. - 4.00m. Terminated on obstruction.
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Dynamic Probe Log



Operator	AR	Probe Type	DPSH	Cone Diameter (mm)	50	Cone tip abandoned - at (mBGL)		Ground Level	72.760
Logged by	AH	Rod Diameter (mm)	35	Hammer Mass (kg)	63.50			Coordinates	211666E 203848N
Checked by		Rod Mass (kg/m)	8	Fall Height (mm)	760	Date of Test	20/03/2014	National Grid	211666E - 203848N
								Chainage	

Level	Depth (m)	Blows per 100mm	Blow Count					Torque (Nm)	Description	Legend	Backfill/Instrument
			5	10	15	20	25				
		0									
		0									
		1									
		0									
		1									
		0									
		0									
		1									
		2									
	1.00	3									
		3									
		2									
		4									
		8									
		9									
		9									
		10									
		12									
	2.00	9									
		4									
		4									
		5									
		4									
		4									
		5									
		5									
		6									
		7									
	3.00	7									
		7									
		8									
		7									
		8									
		8									
		6									
		11									
		12									
		10									
	4.00	10									
		6									
		5									
		5									
		16									
		26									
		31									
		36									
		42									
		49									
		53									

Remarks	Equipment, Methods and Comments Dando Terrier Rig Dynamic sample (super heavy weight) G.L. - 5.00m. Terminated on obstruction.
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Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.	Project Project No. Carried out for	Crane Cross Civic Amenity Site, Pembrokeshire 1306 Pembrokeshire County Council	Exploratory Hole DP6 Sheet 1 of 1
Scale: 1:24	www.apexdrilling.co.uk		

APEX
DRILLING
SERVICES

Operator AR		Probe Type DPSH		Cone Diameter (mm) 50		Cone tip abandoned - at (mBGL)		Ground Level 72.750			
Logged by AH		Rod Diameter (mm) 35		Hammer Mass (kg) 63.50				Coordinates 211698E 203867N			
Checked by		Rod Mass (kg/m) 8		Fall Height (mm) 760		Date of Test 20/03/2014		National Grid 211698E - 203867N			
								Chainage			
Level	Depth (m)	Blows per 100mm	Blow Count					Torque (Nm)	Description	Legend	Backfill/Instrument
			5	10	15	20	25				
		0									
		0									
		1									
		0									
		0									
		1									
		0									
		0									
	1.00	1									
		2									
		2									
		2									
		2									
		4									
		3									
		4									
		5									
	2.00	7									
		5									
		7									
		11									
		10									
		10									
		11									
		10									
		12									
		16									
	3.00	17									
		17									
		18									
		22									
		22									
		45									
		51									
		54									
	4.00										
Remarks								Equipment, Methods and Comments			
								Dando Terrier Rig Dynamic sample (super heavy weight) G.L. - 3.70m. Terminated on obstruction.			
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.								Project Crane Cross Civic Amenity Site, Pembrokeshire			
Scale: 1:24								Project No. 1306			
www.apexdrilling.co.uk								Carried out for Pembrokeshire County Council			
								Exploratory Hole DP7			
								Sheet 1 of 1			

**ENCLOSURE B
IN SITU TESTING**

Dynamic Cone Penetrometer

DCP1 to DCP3

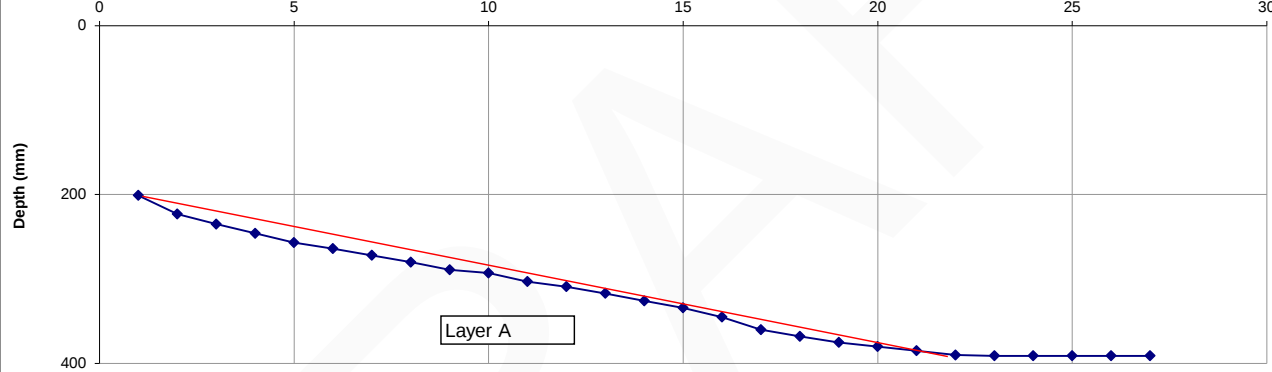
Trial Pit Log



Logged AH		Start 04/04/2014		Equipment, Methods and Remarks Hand excavated inspection pit G.L. - 0.40m. Dynamic cone penetrometer undertaken at base.		Dimensions and Orientation Width 0.50m Length 0.60m A D B C ➔		Ground Level 73.110 Coordinates 211887E 204106N National Grid 211887E - 204106N Chainage	
Samples and Tests				Strata					
Depth	Type & No	Date Records	Description			Depth, Level (Thickness)	Legend	Backfill/ Instruments	
0.00-0.20	B 1	04/04/2014 1300	Bituminous bound aggregate surface layer wearing course.			0.01(0.01)			
			Bituminous bound aggregate base layer.			73.40(0.17)			
0.30-0.40	B 2	04/04/2014 1500	MADE GROUND: Brown and grey slightly silty sandy angular medium to coarse GRAVEL of limestone (sub-base).			0.19			
		04/04/2014 1500 0.20	Firm brown slightly sandy slightly gravelly CLAY. Gravel is angular to subangular fine to coarse of sandstone.			72.92(0.21)			
			Exploratory Hole Ends at 0.40 m			0.40(0.00)			
						72.71			
						72.71			
Groundwater Entries No. Struck (m) Post Strike Behaviour			Depth Related Marks * From To (m)			Stability N/A			
- 0.20 Fast Inflow						Shoring N/A			
						Weather Dry			
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. Scale: 1:25 www.apexdrilling.co.uk				Project Crane Cross Civic Amenity Site, Pembrokeshire Project No. 1306 Carried out for Pembrokeshire County Council		Trial Pit DCP1 Sheet 1 of 1			

DYNAMIC CONE PENETROMETER TEST RESULTS					Date Job No.		04/04/2014 1306			
Client Name Job Name					Zero Reading Test Location		176 DCP1			
Pembrokeshire County Council Crane Cross, Pembrokeshire										
No. of Blows	Reading (mm)	Mean penetration per blow (mm)	Layer	Top of layer (mm)	Base of layer (mm)	Blows at top of layer (no)	Blows at base of layer (no)	Mean penetration per blow (mm)	CBR of layer (%)	
0	176									
1	201	25	Layer A	176	391	0	27	8.0	33.7	
2	223	22								
3	235	12								
4	246	11								
5	257	11								
6	264	7								
7	272	8								
8	280	8								
9	289	9								
10	293	4								
11	303	10								
12	309	6								
13	317	8								
14	326	9								
15	334	8								
16	345	11								
17	360	15								
18	368	8								
19	375	7								
20	380	5								
21	385	5								
22	390	5								
23	391	1								
24	391	0								
25	391	0								
26	391	0								
27	391	0								

Total number of blows



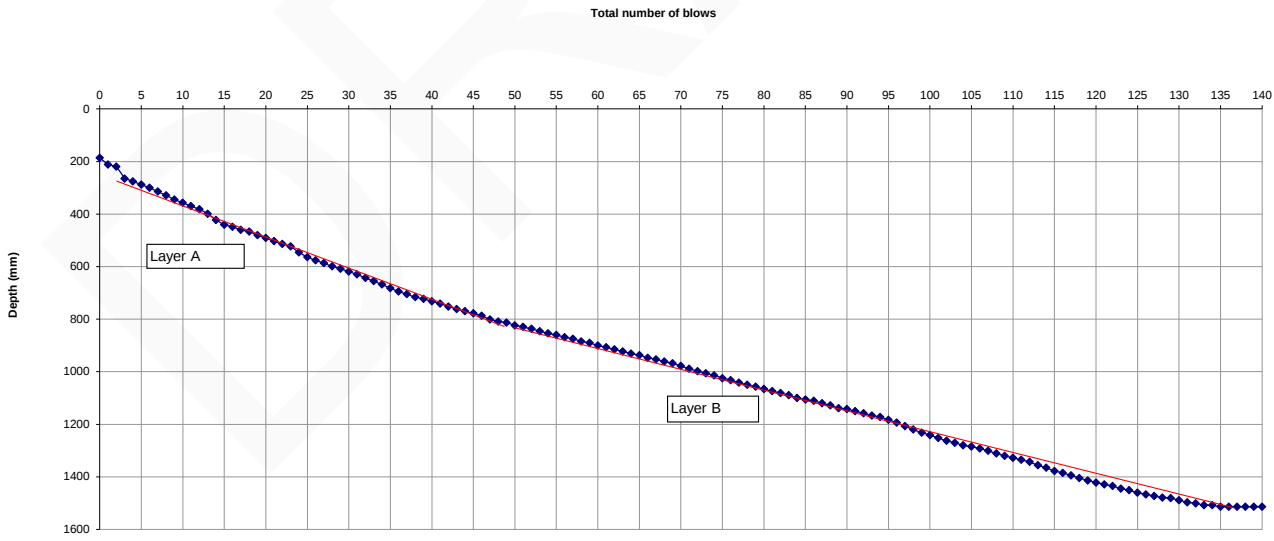
Remarks:	Test started at 0.40m BGL, just below road construction				
Note	Test location saturated with water, test abandoned on refusal				
Particles >20mm	Unknown	Weather	Dry		Operators AH / AR

Trial Pit Log

Logged AH Checked		Start 04/04/2014 End 04/04/2014	Equipment, Methods and Remarks Hand excavated inspection pit G.L. - 0.40m. Dynamic cone penetrometer undertaken at base.	Dimensions and Orientation Width 0.50m Length 0.60m	Ground Level 70.960 Coordinates 211808E 204027N National Grid 211721E - 203931N Chainage
Samples and Tests			Strata		
Depth	Type & No	Date Records	Description	Depth, Level (Thickness)	Legend Backfill/ Instruments
0.00-0.10	B 1	04/04/2014 1030	Bituminous bound aggregate surface layer wearing course.	0.01 (0.01)	
0.20-0.30	B 2		Bituminous bound aggregate base layer.	70.96 (0.07)	
			MADE GROUND: Dark brown and dark grey silty sandy angular medium to coarse GRAVEL of limestone (sub-base).	0.08 (0.30)	
		04/04/2014 1200	Firm brown slightly sandy slightly gravelly CLAY. Gravel is angular to subangular fine to coarse of sandstone.	0.38 (0.02)	
			Exploratory Hole Ends at 0.40 m	70.58 0.40 70.56	
Groundwater Entries No. Struck Post Strike Behaviour No Groundwater Encountered			Depth Related Marks * From To (m)		Stability N/A Shoring N/A Weather Dry
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. Scale: 1:25			Project Crane Cross Civic Amenity Site, Pembrokeshire Project No. 1306 Carried out for Pembrokeshire County Council		Trial Pit DCP2 Sheet 1 of 1

DYNAMIC CONE PENETROMETER TEST RESULTS								Date	04/04/2014			
Client Name								Job No.	1306			
Job Name								Zero Reading	186			
Crane Cross, Pembrokehire								Test Location	DCP2			
No. of Blows	Reading (mm)	Mean penetration per blow (mm)	No. of Blows	Reading (mm)	Mean penetration per blow (mm)	Layer	Top of layer (mm)	Base of layer (mm)	Blows at top of layer (no)	Blows at base of layer (no)	Mean penetration per blow (mm)	CBR of layer (%)
0	186		71	989	14	Layer A	186	809	0	48	13.0	20.1
1	212	26	72	998	9							
2	220	8	73	1006	8							
3	265	45	74	1014	8							
4	276	11	75	1025	11							
5	288	12	76	1032	7							
6	300	12	77	1042	10							
7	314	14	78	1050	8							
8	329	15	79	1057	7							
9	345	16	80	1066	9							
10	357	12	81	1074	8	Layer B	809	1504	48	135	8.0	33.6
11	370	13	82	1081	7							
12	382	12	83	1089	8							
13	399	17	84	1100	11							
14	423	24	85	1106	6							
15	441	18	86	1111	5							
16	449	8	87	1120	9							
17	460	11	88	1128	8							
18	467	7	89	1139	11							
19	480	13	90	1142	3							
20	491	11	91	1150	8							
21	503	12	92	1158	8							
22	514	11	93	1167	9							
23	523	9	94	1172	5							
24	546	23	95	1183	11							
25	564	18	96	1194	11							
26	576	12	97	1207	13							
27	587	11	98	1220	13							
28	599	12	99	1232	12							
29	608	9	100	1241	9							
30	619	11	101	1252	11							
31	630	11	102	1263	11							
32	643	13	103	1271	8							
33	655	12	104	1280	9							
34	668	13	105	1285	5							
35	682	14	106	1292	7							
36	695	13	107	1301	9							
37	705	10	108	1311	10							
38	716	11	109	1320	9							
39	723	7	110	1328	8							
40	732	9	111	1335	7							
41	741	9	112	1343	8							
42	752	11	113	1356	13							
43	762	10	114	1365	9							
44	770	8	115	1378	13							
45	778	8	116	1385	7							
46	787	9	117	1395	10							
47	801	14	118	1405	10							
48	809	8	119	1414	9							
49	813	4	120	1422	8							
50	824	11	121	1429	7							
51	829	5	122	1435	6							
52	837	8	123	1445	10							
53	846	9	124	1451	6							
54	854	8	125	1460	9							
55	860	6	126	1467	7							
56	869	9	127	1473	6							
57	875	6	128	1479	6							
58	885	10	129	1481	2							
59	890	5	130	1489	8							
60	900	10	131	1497	8							
61	907	7	132	1501	4							
62	915	8	133	1508	7							
63	923	8	134	1508	0							
64	931	8	135	1514	6							
65	937	6	136	1514	0							
66	947	10	137	1514	0							
67	953	6	138	1514	0							
68	961	8	139	1514	0							
69	968	7	140	1514	0							
70	978	10										

Total number of blows



Remarks:	Test started at 0.40m BGL, just below road construction			
Note	Test abandoned on refusal			
Particles >20mm	Unknown	Weather	Dry	Operators
				AH / AR

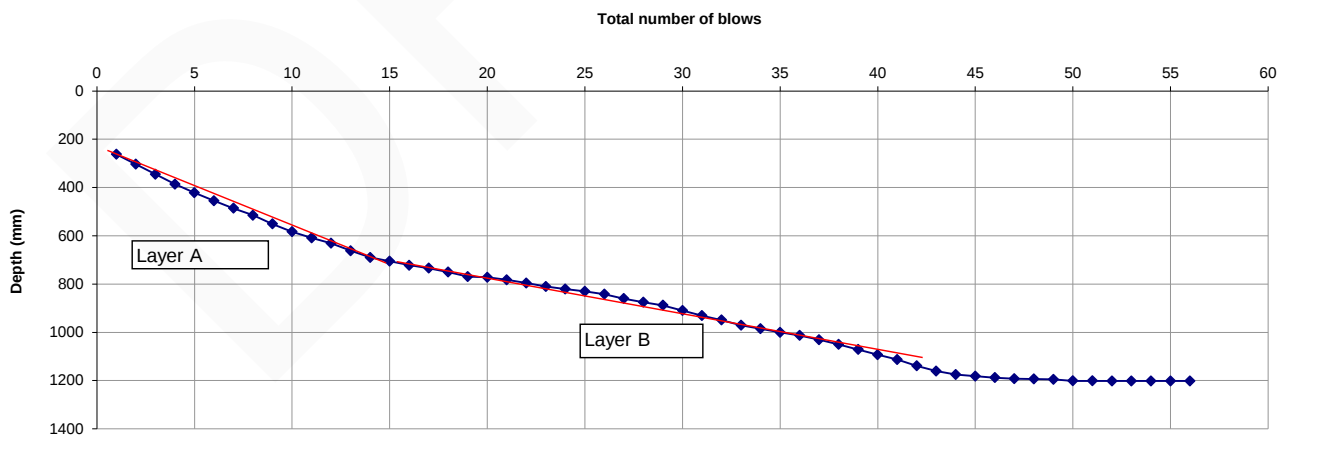
Trial Pit Log



Logged AH		Start 04/04/2014		Equipment, Methods and Remarks Hand excavated inspection pit G.L. - 0.40m. Dynamic cone penetrometer undertaken at base.		Dimensions and Orientation Width 0.60m Length 0.50m A D B C ➔		Ground Level 70.940 Coordinates 211721E 203931N National Grid 211721E - 203931N Chainage	
Samples and Tests				Strata					
Depth	Type & No	Date Records	Description				Depth, Level (Thickness)	Legend	Backfill/ Instruments
0.00	B 1	04/04/2014 0830	Bituminous bound aggregate surface layer wearing course.				0.01(0.01)		
			Bituminous bound aggregate base layer.				70.98(0.07)		
			MADE GROUND: Dark grey and black slightly silty sandy angular medium to coarse GRAVEL of limestone (sub-base).				0.09(0.12)		
							70.86		
0.30-0.40	B 2	04/04/2014 1000	MADE GROUND: Light grey slightly slightly clayey sandy angular medium to coarse GRAVEL of limestone (sub-base).				0.20(0.20)		
			Firm dark brown slightly sandy slightly gravelly CLAY. Gravel is angular to subangular fine to coarse of sandstone.				70.74(0.00)		
			Exploratory Hole Ends at 0.40 m				0.40		
							70.54		
Groundwater Entries No. Struck Post Strike Behaviour No Groundwater Encountered			Depth Related Marks * From To (m)				Stability N/A Shoring N/A Weather Dry		
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. Scale: 1:25 www.apexdrilling.co.uk				Project Crane Cross Civic Amenity Site, Pembrokeshire Project No. 1306 Carried out for Pembrokeshire County Council				Trial Pit DCP3 Sheet 1 of 1	

DYNAMIC CONE PENETROMETER TEST RESULTS					Date Job No.		04/04/2014 1306			
Client Name Job Name					Zero Reading Test Location		201 DCP3			
Pembrokeshire County Council Crane Cross, Pembrokeshire <td colspan="2"></td> <td colspan="2"></td> <td colspan="2"></td>										
No. of Blows	Reading (mm)	Mean penetration per blow (mm)	Layer	Top of layer (mm)	Base of layer (mm)	Blows at top of layer (no)	Blows at base of layer (no)	Mean penetration per blow (mm)	CBR of layer (%)	
0	201									
1	262	61	Layer A	201	722	0	15	34.7	7.1	
2	303	41								
3	345	42								
4	386	41								
5	422	36								
6	455	33								
7	486	31								
8	515	29								
9	551	36								
10	583	32								
11	609	26								
12	631	22								
13	662	31								
14	690	28								
15	705	15								
16	722	17	Layer B	722	1202	15	52	13.0	20.1	
17	734	12								
18	750	16								
19	769	19								
20	772	3								
21	783	11								
22	796	13								
23	810	14								
24	821	11								
25	830	9								
26	842	12								
27	860	18								
28	875	15								
29	888	13								
30	910	22								
31	931	21								
32	949	18								
33	971	22								
34	985	14								
35	1000	15								
36	1013	13								
37	1031	18								
38	1050	19								
39	1071	21								
40	1093	22								
41	1113	20								
42	1139	26								
43	1161	22								
44	1175	14								
45	1182	7								
46	1188	6								
47	1192	4								
48	1193	1								
49	1195	2								
50	1201	6								
51	1201	0								
52	1202	1								
53	1202	0								
54	1202	0								
55	1202	0								
56	1202	0								

Total number of blows



Remarks:	Test started at 0.40m BGL, just below road construction				
Note	Test abandoned on refusal				
Particles >20mm	Unknown	Weather	Dry		Operators AH / AR

ENCLOSURE C
GEOTECHNICAL LABORATORY TEST RESULTS

Moisture Content	MC 1 – MC 11
Liquid Limit, Plastic Limit & Plasticity Index	ATT 1 – ATT 11
Particle Size Distribution Analysis	PSD 1 – PSD 11
California Bearing Ratio Re-compacted	CBR1 – CBR3
Particle Size Distribution Analysis – Aggregate	AGG 1 – AGG 3
Bituminous Analysis	SAMPLE 28687- 28689

TEST REPORT
MOISTURE CONTENT
BS1377: Part 2: 1990 : Clause 3.2

Project No:	D4056-14	Client:	Apex Drilling
Project Name:	Crane Cross	Address:	Sturmi Way, Village Farm Industrial Estate, Bridgend CF33 6BZ
ATS Sample No:	2585		

Site Ref / Hole ID:	TP1	Depth (m):	0.70 - 0.80
Sample No:	2	Sample Type:	Bulk
Sampling Certificate Received:	No	Material Description:	Brown grey slightly gravelly slightly sandy CLAY
Location in Works:	Unknown	Material Source:	N/A
Date Sampled:	Unknown	Material Supplier:	N/A
Sampled By:	Unknown	Specification:	BS1377
Date Received:	26 March 2014	Date Tested:	28 March 2014

Test Results

Moisture Content (%)	19
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Remarks:

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BS1377-2 Rev. 2.0					10/04/2014	

TEST REPORT
MOISTURE CONTENT
BS1377: Part 2: 1990 : Clause 3.2

Project No:	D4056-14	Client:	Apex Drilling
Project Name:	Crane Cross	Address:	Sturmi Way, Village Farm Industrial Estate, Bridgend CF33 6BZ
ATS Sample No:	2586		

Site Ref / Hole ID:	TP2	Depth (m):	0.20 - 0.30
Sample No:	3	Sample Type:	Bulk
Sampling Certificate Received:	No	Material Description:	Brown grey slightly gravelly slightly sandy CLAY
Location in Works:	Unknown	Material Source:	N/A
Date Sampled:	Unknown	Material Supplier:	N/A
Sampled By:	Unknown	Specification:	BS1377
Date Received:	26 March 2014	Date Tested:	28 March 2014

Test Results

Moisture Content (%)	29
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Remarks:

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Approver

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L Maiden, Laboratory Supervisor

Date

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Fig

MC 2

TEST REPORT
MOISTURE CONTENT
BS1377: Part 2: 1990 : Clause 3.2

Project No:	D4056-14	Client:	Apex Drilling
Project Name:	Crane Cross	Address:	Sturmi Way, Village Farm Industrial Estate, Bridgend CF33 6BZ
ATS Sample No:	2587		

Site Ref / Hole ID:	TP2	Depth (m):	0.50 - 0.60
Sample No:	4	Sample Type:	Bulk
Sampling Certificate Received:	No	Material Description:	Brown grey slightly sandy CLAY
Location in Works:	Unknown	Material Source:	N/A
Date Sampled:	Unknown	Material Supplier:	N/A
Sampled By:	Unknown	Specification:	BS1377
Date Received:	26 March 2014	Date Tested:	28 March 2014

Test Results

Moisture Content (%)	50
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Remarks:

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Date

10/04/2014

Fig

MC 3

TEST REPORT
MOISTURE CONTENT
BS1377: Part 2: 1990 : Clause 3.2

Project No:	D4056-14	Client:	Apex Drilling
Project Name:	Crane Cross	Address:	Sturmi Way, Village Farm Industrial Estate, Bridgend CF33 6BZ
ATS Sample No:	2588		

Site Ref / Hole ID:	TP3	Depth (m):	0.70 - 0.80
Sample No:	3	Sample Type:	Bulk
Sampling Certificate Received:	No	Material Description:	Brown grey slightly gravelly slightly sandy CLAY
Location in Works:	Unknown	Material Source:	N/A
Date Sampled:	Unknown	Material Supplier:	N/A
Sampled By:	Unknown	Specification:	BS1377
Date Received:	26 March 2014	Date Tested:	28 March 2014

Test Results

Moisture Content (%)	25
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Remarks:

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Date

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Fig

MC 4

TEST REPORT
MOISTURE CONTENT
BS1377: Part 2: 1990 : Clause 3.2

Project No:	D4056-14	Client:	Apex Drilling
Project Name:	Crane Cross	Address:	Sturmi Way, Village Farm Industrial Estate, Bridgend CF33 6BZ
ATS Sample No:	2589		

Site Ref / Hole ID:	TP3	Depth (m):	1.80 - 1.90
Sample No:	5	Sample Type:	Bulk
Sampling Certificate Received:	No	Material Description:	Brown grey very silty very sandy GRAVEL
Location in Works:	Unknown	Material Source:	N/A
Date Sampled:	Unknown	Material Supplier:	N/A
Sampled By:	Unknown	Specification:	BS1377
Date Received:	26 March 2014	Date Tested:	

Test Results

Moisture Content (%)	21
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Remarks:

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BS1377-2 Rev. 2.0				 L Maiden, Laboratory Supervisor	10/04/2014	

TEST REPORT
MOISTURE CONTENT
BS1377: Part 2: 1990 : Clause 3.2

Project No:	D4056-14	Client:	Apex Drilling
Project Name:	Crane Cross	Address:	Sturmi Way, Village Farm Industrial Estate, Bridgend CF33 6BZ
ATS Sample No:	2590		

Site Ref / Hole ID:	TP4	Depth (m):	0.40 - 0.50
Sample No:	2	Sample Type:	Bulk
Sampling Certificate Received:	No	Material Description:	Brown grey slightly gravelly slightly sandy CLAY
Location in Works:	Unknown	Material Source:	N/A
Date Sampled:	Unknown	Material Supplier:	N/A
Sampled By:	Unknown	Specification:	BS1377
Date Received:	26 March 2014	Date Tested:	28 March 2014

Test Results

Moisture Content (%)	31
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Remarks:

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BS1377-2 Rev. 2.0				L Maiden, Laboratory Supervisor		

TEST REPORT
MOISTURE CONTENT
BS1377: Part 2: 1990 : Clause 3.2

Project No:	D4056-14	Client:	Apex Drilling
Project Name:	Crane Cross	Address:	Sturmi Way, Village Farm Industrial Estate, Bridgend CF33 6BZ
ATS Sample No:	2591		

Site Ref / Hole ID:	TP4	Depth (m):	0.80 - 0.90
Sample No:	5	Sample Type:	Bulk
Sampling Certificate Received:	No	Material Description:	Brown grey slightly gravelly slightly sandy CLAY
Location in Works:	Unknown	Material Source:	N/A
Date Sampled:	Unknown	Material Supplier:	N/A
Sampled By:	Unknown	Specification:	BS1377
Date Received:	26 March 2014	Date Tested:	28 March 2014

Test Results

Moisture Content (%)	37
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Remarks:

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Approver

R. Maiden

L Maiden, Laboratory Supervisor

Date

10/04/2014

Fig

MC 7

TEST REPORT
MOISTURE CONTENT
BS1377: Part 2: 1990 : Clause 3.2

Project No:	D4056-14	Client:	Apex Drilling
Project Name:	Crane Cross	Address:	Sturmi Way, Village Farm Industrial Estate, Bridgend CF33 6BZ
ATS Sample No:	2592		

Site Ref / Hole ID:	TP5	Depth (m):	0.50 - 0.60
Sample No:	3	Sample Type:	Bulk
Sampling Certificate Received:	No	Material Description:	Brown grey slightly gravelly slightly sandy CLAY
Location in Works:	Unknown	Material Source:	N/A
Date Sampled:	Unknown	Material Supplier:	N/A
Sampled By:	Unknown	Specification:	BS1377
Date Received:	26 March 2014	Date Tested:	28 March 2014

Test Results

Moisture Content (%)	18
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Remarks:

QA Ref.		Apex Testing Solutions Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	 7771	Approver <i>L Maiden</i>	Date 10/04/2014	Fig MC 8
BS1377-2 Rev. 2.0				L Maiden, Laboratory Supervisor		

TEST REPORT
MOISTURE CONTENT
BS1377: Part 2: 1990 : Clause 3.2

Project No: D4056-14 Project Name: Crane Cross ATS Sample No: 2593	Client: Apex Drilling Address: Sturmi Way, Village Farm Industrial Estate, Bridgend CF33 6BZ
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Site Ref / Hole ID: TP5 Sample No: 6 Sampling Certificate Received: No Location in Works: Unknown Date Sampled: Unknown Sampled By: Unknown Date Received: 26 March 2014	Depth (m): 1.80 - 1.90 Sample Type: Bulk Material Description: Brown grey very clayey sandy GRAVEL with low cobble content Material Source: N/A Material Supplier: N/A Specification: BS1377 Date Tested: 28 March 2014
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Test Results

Moisture Content (%)	14
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Remarks:

TEST REPORT
MOISTURE CONTENT
BS1377: Part 2: 1990 : Clause 3.2

Project No:	D4056-14	Client:	Apex Drilling
Project Name:	Crane Cross	Address:	Sturmi Way, Village Farm Industrial Estate, Bridgend CF33 6BZ
ATS Sample No:	2594		

Site Ref / Hole ID:	TP6	Depth (m):	0.90 - 1.00
Sample No:	4	Sample Type:	Bulk
Sampling Certificate Received:	No	Material Description:	Brown grey slightly gravelly slightly sandy CLAY
Location in Works:	Unknown	Material Source:	N/A
Date Sampled:	Unknown	Material Supplier:	N/A
Sampled By:	Unknown	Specification:	BS1377
Date Received:	26 March 2014	Date Tested:	28 March 2014

Test Results

Moisture Content (%)	22
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Remarks:

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BS1377-2 Rev. 2.0					10/04/2014	

TEST REPORT
MOISTURE CONTENT
BS1377: Part 2: 1990 : Clause 3.2

Project No:	D4056-14	Client:	Apex Drilling
Project Name:	Crane Cross	Address:	Sturmi Way, Village Farm Industrial Estate, Bridgend CF33 6BZ
ATS Sample No:	2595		

Site Ref / Hole ID:	TP6	Depth (m):	1.90 - 2.00
Sample No:	6	Sample Type:	Bulk
Sampling Certificate Received:	No	Material Description:	Brown slightly gravelly sandy CLAY
Location in Works:	Unknown	Material Source:	N/A
Date Sampled:	Unknown	Material Supplier:	N/A
Sampled By:	Unknown	Specification:	BS1377
Date Received:	26 March 2014	Date Tested:	28 March 2014

Test Results

Moisture Content (%)	19
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Remarks:

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L Maiden, Laboratory Supervisor

Date

10/04/2014

Fig

MC 11

TEST REPORT
LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX
BS 1377:Part 2:1990: Clause 4.3/5.3/5.4

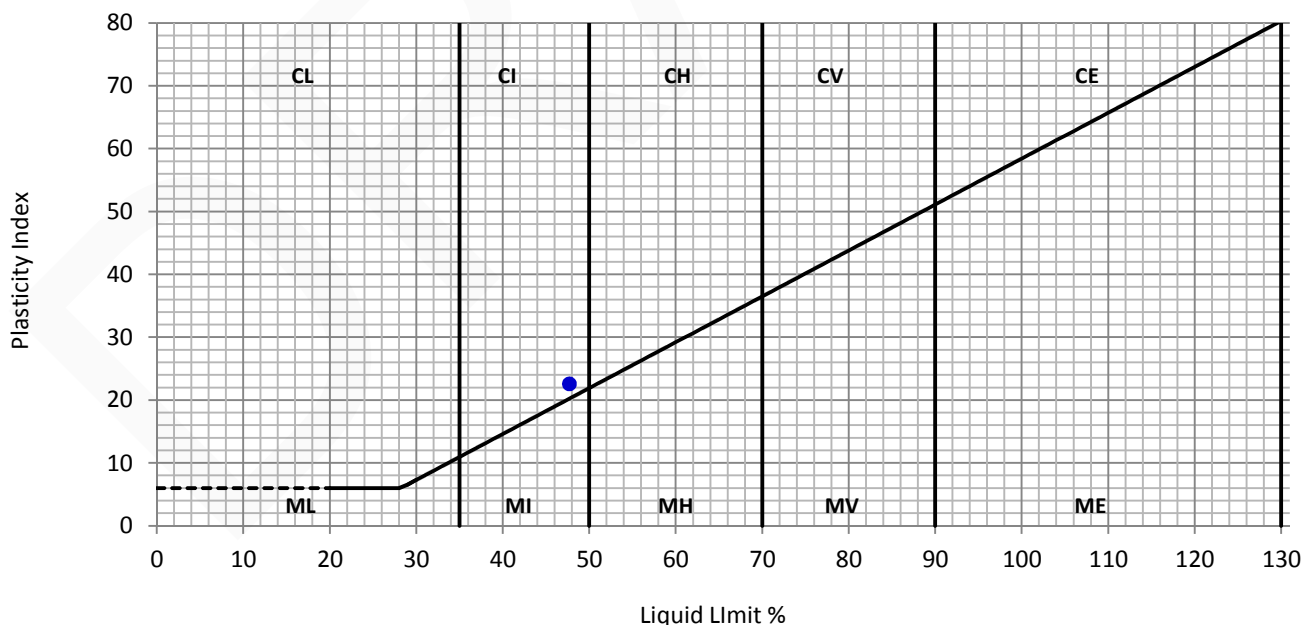
Project No:	D4056-14	Client:	Apex Drilling
Project Name:	Crane Cross	Address:	Sturmi Way, Village Farm Industrial Estate, Bridgend CF33 6BZ
ATS Sample No:	2585		

Site Ref / Hole ID:	TP1	Depth (m):	0.70 - 0.80
Sample No:	2	Sample Type:	Bulk
Sampling Certificate Received:	No	Material Description:	Brown grey slightly gravelly slightly sandy CLAY
Location in Works:	Unknown	Material Source:	N/A
Date Sampled:	Unknown	Material Supplier:	N/A
Sampled By:	Unknown	Specification:	BS1377
Date Received:	26 March 2014	Date Tested:	31 March 2014

Test Results

Liquid Limit	48	%
Plastic Limit	25	%
Plasticity Index	23	%

Preparation:	4.2.4 Sieved Specimen
Proportion retained on 425µm sieve:	18 %



Remarks:

QA Ref.

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Date

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Fig.

ATT 1

TEST REPORT
LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX
BS 1377:Part 2:1990: Clause 4.3/5.3/5.4

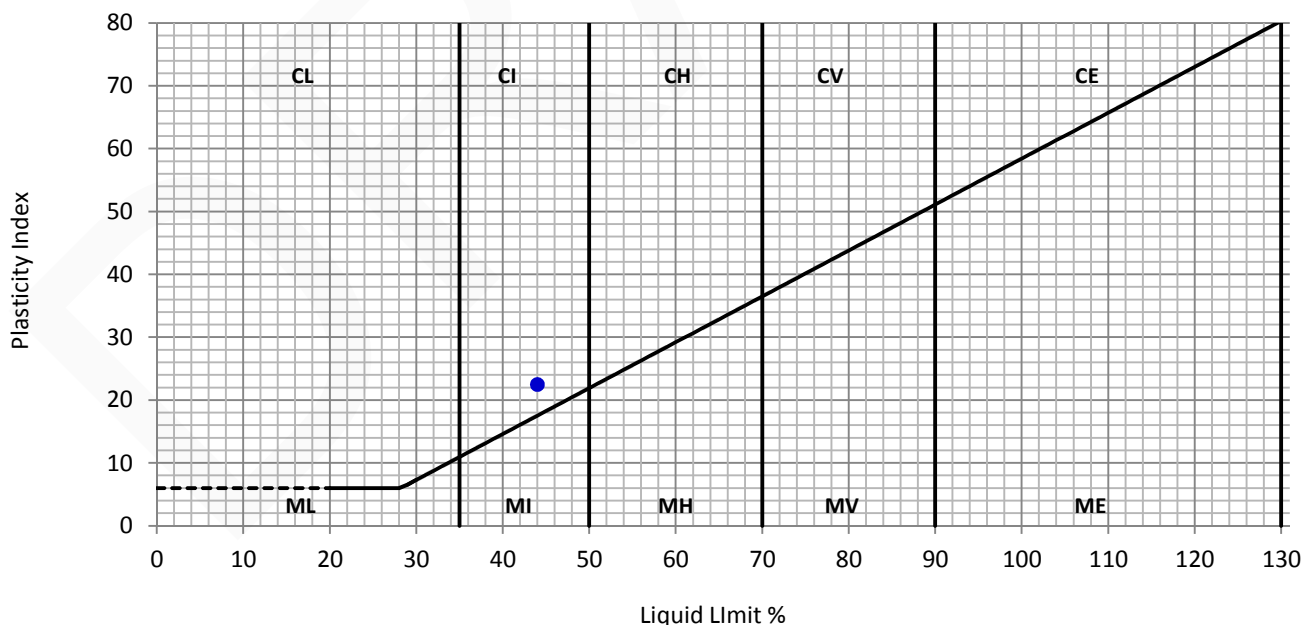
Project No:	D4056-14	Client:	Apex Drilling
Project Name:	Crane Cross	Address:	Sturmi Way, Village Farm Industrial Estate, Bridgend CF33 6BZ
ATS Sample No:	2586		

Site Ref / Hole ID:	TP2	Depth (m):	0.20 - 0.30
Sample No:	3	Sample Type:	Bulk
Sampling Certificate Received:	No	Material Description:	Brown grey slightly gravelly slightly sandy CLAY
Location in Works:	Unknown	Material Source:	N/A
Date Sampled:	Unknown	Material Supplier:	N/A
Sampled By:	Unknown	Specification:	BS1377
Date Received:	26 March 2014	Date Tested:	31 March 2014

Test Results

Liquid Limit	44	%
Plastic Limit	22	%
Plasticity Index	22	%

Preparation:	4.2.3 Natural Specimen
Proportion retained on 425µm sieve:	3 %



Remarks:

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Date

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Fig.

ATT 2

TEST REPORT
LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX
BS 1377:Part 2:1990: Clause 4.3/5.3/5.4

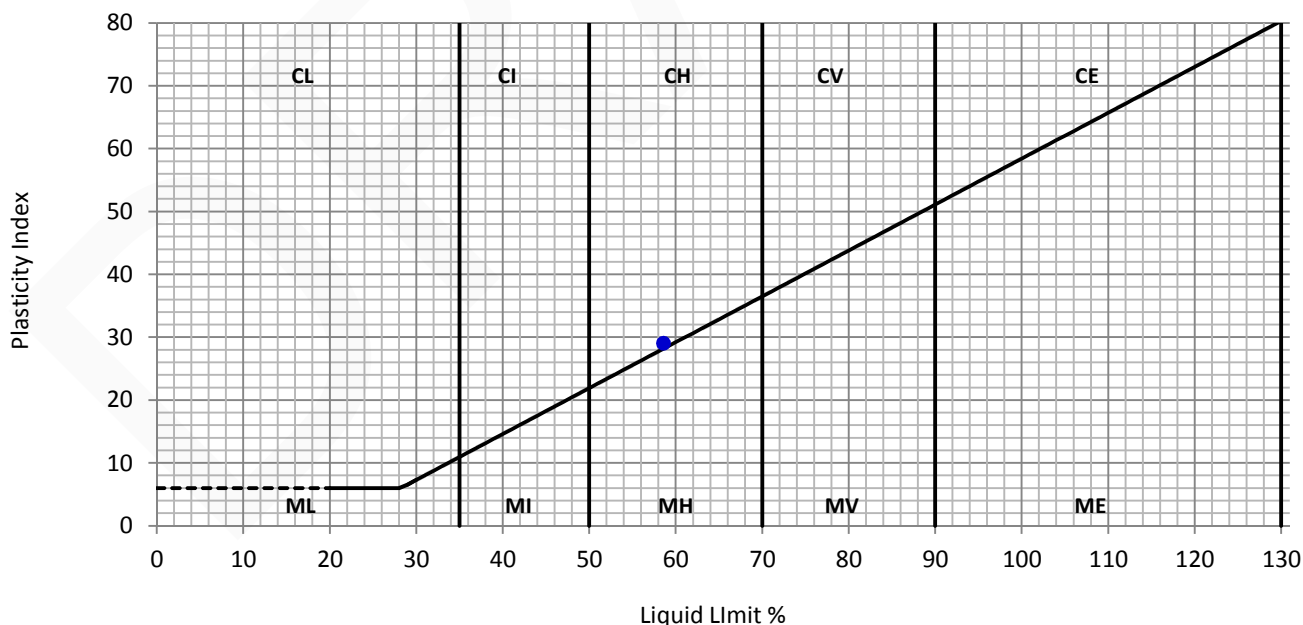
Project No:	D4056-14	Client:	Apex Drilling
Project Name:	Crane Cross	Address:	Sturmi Way, Village Farm Industrial Estate, Bridgend CF33 6BZ
ATS Sample No:	2587		

Site Ref / Hole ID:	TP2	Depth (m):	0.50 - 0.60
Sample No:	4	Sample Type:	Bulk
Sampling Certificate Received:	No	Material Description:	Brown grey slightly sandy CLAY
Location in Works:	Unknown	Material Source:	N/A
Date Sampled:	Unknown	Material Supplier:	N/A
Sampled By:	Unknown	Specification:	BS1377
Date Received:	26 March 2014	Date Tested:	31 March 2014

Test Results

Liquid Limit	59	%	
Plastic Limit	30	%	
Plasticity Index	29	%	

Preparation:	4.2.3 Natural Specimen
Proportion retained on 425µm sieve:	1 %



Remarks:

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Date

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Fig.

ATT 3

TEST REPORT
LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX
BS 1377:Part 2:1990: Clause 4.3/5.3/5.4

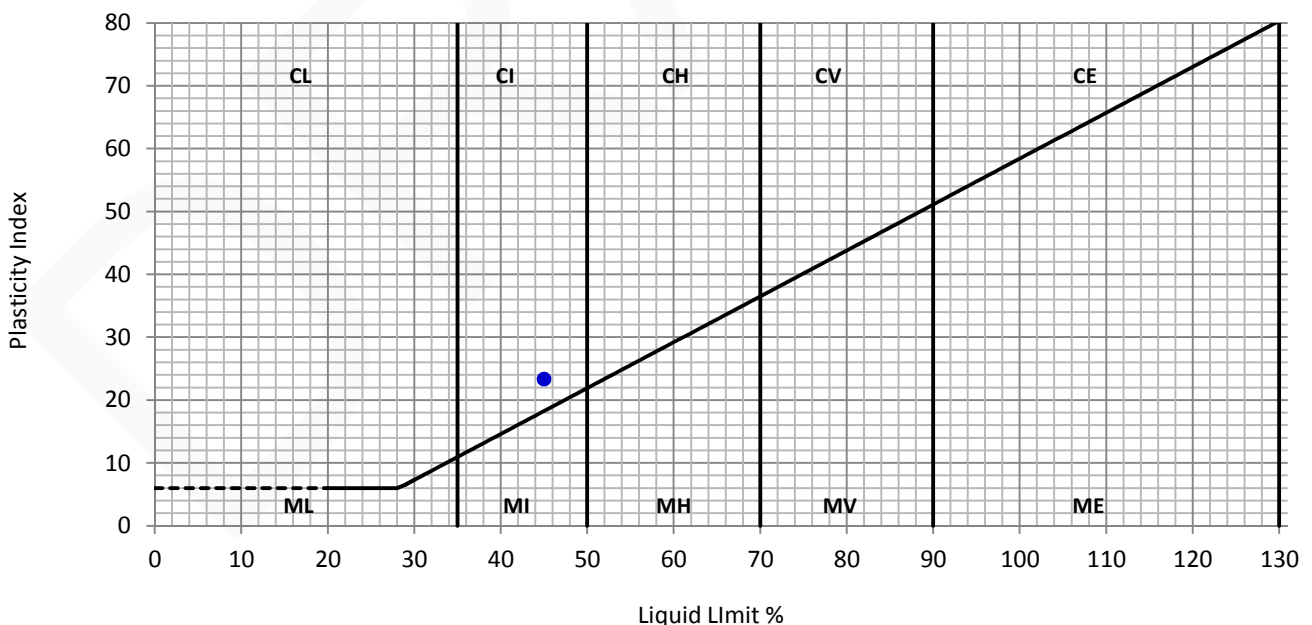
Project No:	D4056-14	Client:	Apex Drilling
Project Name:	Crane Cross	Address:	Sturmi Way, Village Farm Industrial Estate, Bridgend CF33 6BZ
ATS Sample No:	2588		

Site Ref / Hole ID:	TP3	Depth (m):	0.70 - 0.80
Sample No:	3	Sample Type:	Bulk
Sampling Certificate Received:	No	Material Description:	Brown grey slightly gravelly slightly sandy CLAY
Location in Works:	Unknown	Material Source:	N/A
Date Sampled:	Unknown	Material Supplier:	N/A
Sampled By:	Unknown	Specification:	BS1377
Date Received:	26 March 2014	Date Tested:	31 March 2014

Test Results

Liquid Limit	45	%
Plastic Limit	22	%
Plasticity Index	23	%

Preparation:	4.2.3 Natural Specimen
Proportion retained on 425µm sieve:	5 %



Remarks:

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Date

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Fig.

ATT 4

TEST REPORT
LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX
BS 1377:Part 2:1990: Clause 4.3/5.3/5.4

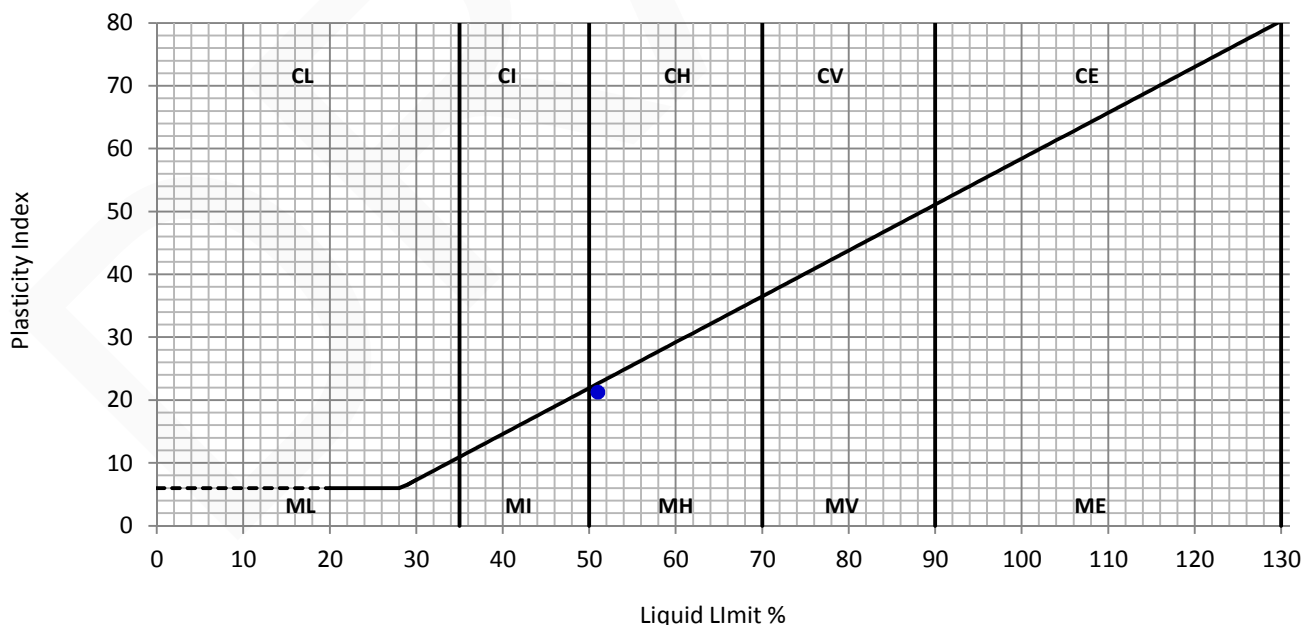
Project No:	D4056-14	Client:	Apex Drilling
Project Name:	Crane Cross	Address:	Sturmi Way, Village Farm Industrial Estate, Bridgend CF33 6BZ
ATS Sample No:	2589		

Site Ref / Hole ID:	TP3	Depth (m):	1.80 - 1.90
Sample No:	5	Sample Type:	Bulk
Sampling Certificate Received:	No	Material Description:	Brown grey very silty very sandy GRAVEL
Location in Works:	Unknown	Material Source:	N/A
Date Sampled:	Unknown	Material Supplier:	N/A
Sampled By:	Unknown	Specification:	BS1377
Date Received:	26 March 2014	Date Tested:	02 April 2014

Test Results

Liquid Limit	51	%
Plastic Limit	30	%
Plasticity Index	21	%

Preparation:	4.2.4 Sieved Specimen
Proportion retained on 425µm sieve:	61 %



Remarks:

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Date

10/04/2014

Fig.

ATT 5

TEST REPORT
LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX
BS 1377:Part 2:1990: Clause 4.3/5.3/5.4

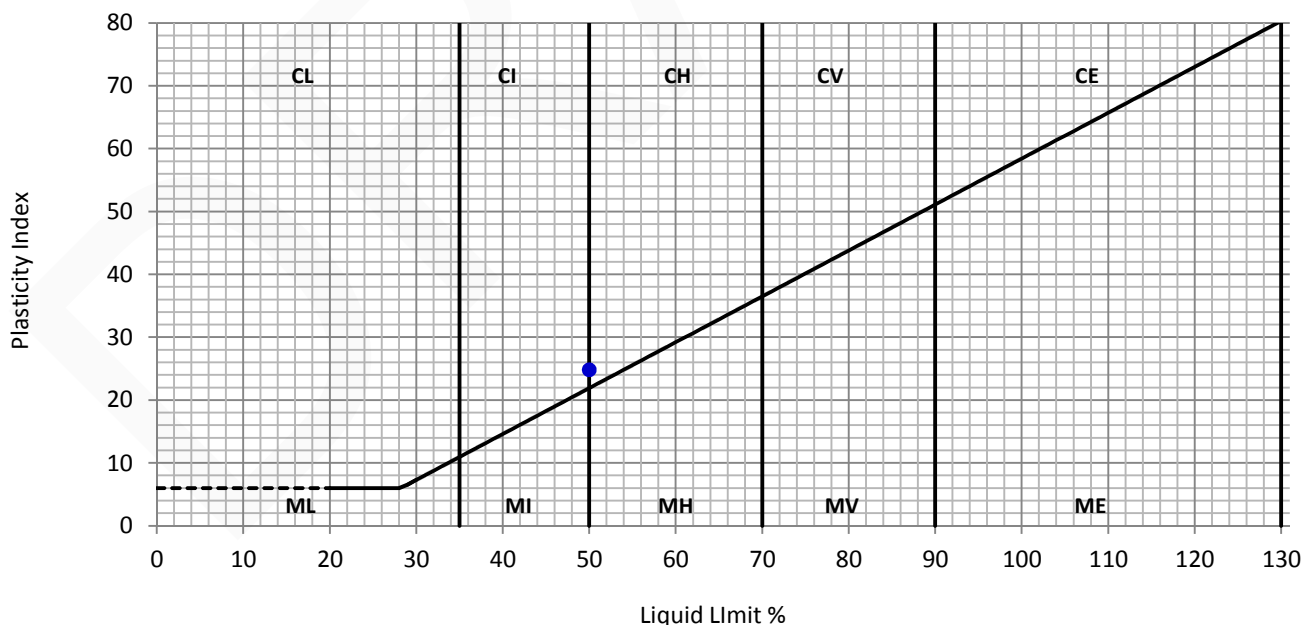
Project No:	D4056-14	Client:	Apex Drilling
Project Name:	Crane Cross	Address:	Sturmi Way, Village Farm Industrial Estate, Bridgend CF33 6BZ
ATS Sample No:	2590		

Site Ref / Hole ID:	TP4	Depth (m):	0.40 - 0.50
Sample No:	2	Sample Type:	Bulk
Sampling Certificate Received:	No	Material Description:	Brown grey slightly gravelly slightly sandy CLAY
Location in Works:	Unknown	Material Source:	N/A
Date Sampled:	Unknown	Material Supplier:	N/A
Sampled By:	Unknown	Specification:	BS1377
Date Received:	26 March 2014	Date Tested:	31 March 2014

Test Results

Liquid Limit	50	%
Plastic Limit	25	%
Plasticity Index	25	%

Preparation:	4.2.3 Natural Specimen
Proportion retained on 425µm sieve:	4 %



Remarks:

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Approver

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L Maiden, Laboratory Supervisor

Date

10/04/2014

Fig.

ATT 6

TEST REPORT
LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX
BS 1377:Part 2:1990: Clause 4.3/5.3/5.4

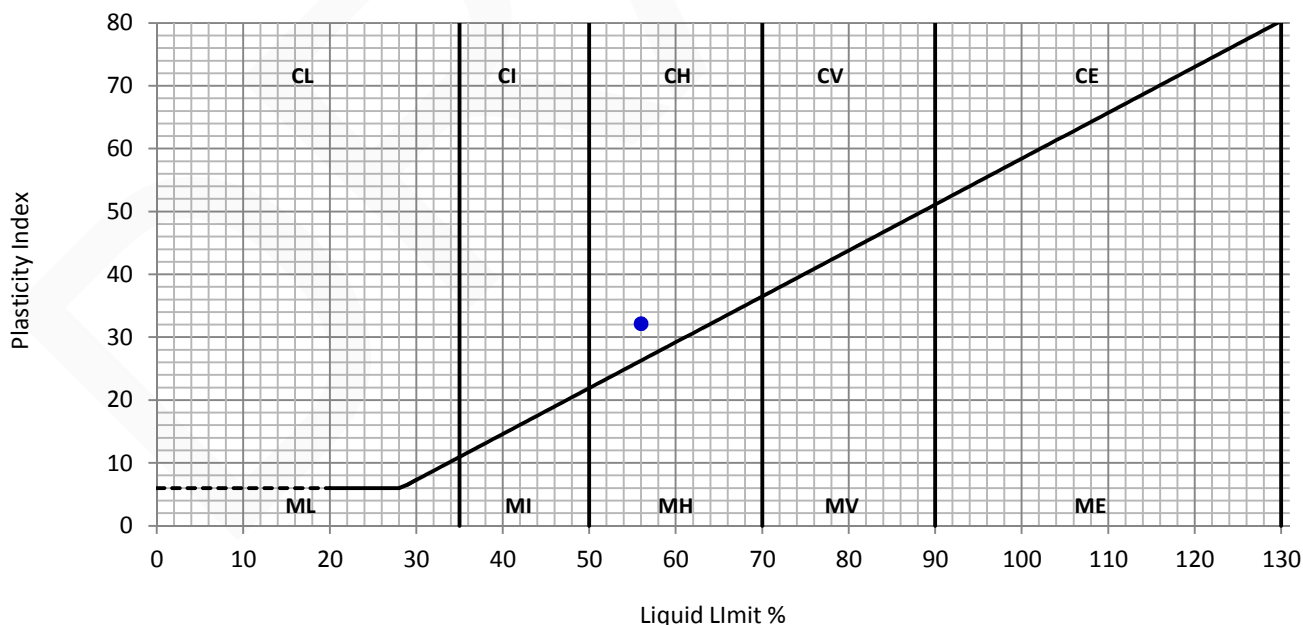
Project No:	D4056-14	Client:	Apex Drilling
Project Name:	Crane Cross	Address:	Sturmi Way, Village Farm Industrial Estate, Bridgend CF33 6BZ
ATS Sample No:	2591		

Site Ref / Hole ID:	TP4	Depth (m):	0.80 - 0.90
Sample No:	5	Sample Type:	Bulk
Sampling Certificate Received:	No	Material Description:	Brown grey slightly gravelly slightly sandy CLAY
Location in Works:	Unknown	Material Source:	N/A
Date Sampled:	Unknown	Material Supplier:	N/A
Sampled By:	Unknown	Specification:	BS1377
Date Received:	26 March 2014	Date Tested:	02 April 2014

Test Results

Liquid Limit	56	%
Plastic Limit	24	%
Plasticity Index	32	%

Preparation:	4.2.3 Natural Specimen
Proportion retained on 425µm sieve:	4 %



Remarks:

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Date

10/04/2014

Fig.

ATT 7

TEST REPORT
LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX
BS 1377:Part 2:1990: Clause 4.3/5.3/5.4

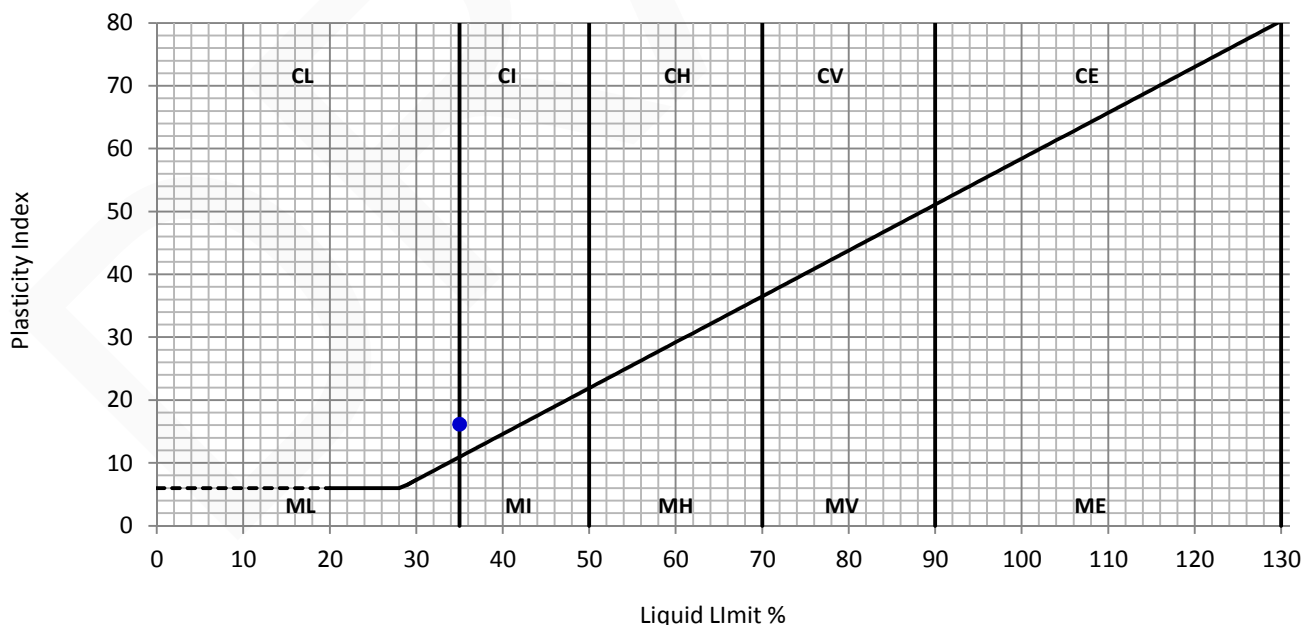
Project No:	D4056-14	Client:	Apex Drilling
Project Name:	Crane Cross	Address:	Sturmi Way, Village Farm Industrial Estate, Bridgend CF33 6BZ
ATS Sample No:	2592		

Site Ref / Hole ID:	TP5	Depth (m):	0.50 - 0.60
Sample No:	3	Sample Type:	Bulk
Sampling Certificate Received:	No	Material Description:	Brown grey slightly gravelly slightly sandy CLAY
Location in Works:	Unknown	Material Source:	N/A
Date Sampled:	Unknown	Material Supplier:	N/A
Sampled By:	Unknown	Specification:	BS1377
Date Received:	26 March 2014	Date Tested:	31 March 2014

Test Results

Liquid Limit	35	%
Plastic Limit	19	%
Plasticity Index	16	%

Preparation:	4.2.3 Natural Specimen
Proportion retained on 425µm sieve:	4 %



Remarks:

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L Maiden, Laboratory Supervisor

Date

10/04/2014

Fig.

ATT 8

TEST REPORT
LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX
BS 1377:Part 2:1990: Clause 4.3/5.3/5.4

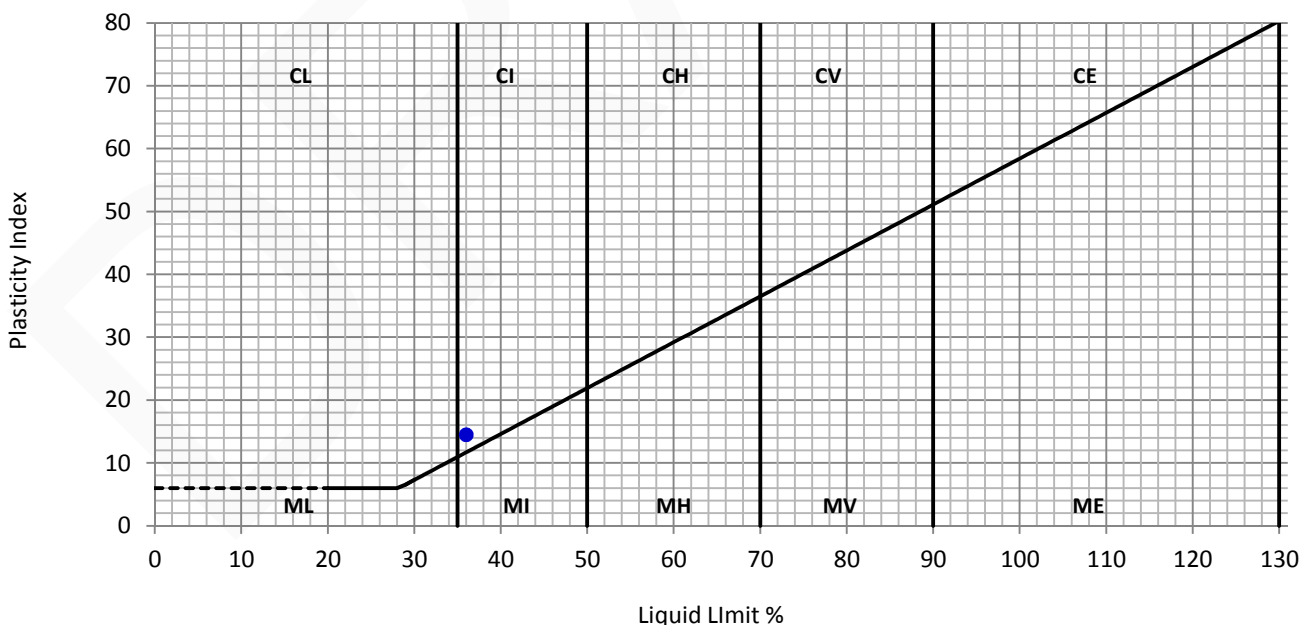
Project No:	D4056-14	Client:	Apex Drilling
Project Name:	Crane Cross	Address:	Sturmi Way, Village Farm Industrial Estate, Bridgend CF33 6BZ
ATS Sample No:	2593		

Site Ref / Hole ID:	TP5	Depth (m):	1.80 - 1.90
Sample No:	6	Sample Type:	Bulk
Sampling Certificate Received:	No	Material Description:	Brown grey very clayey sandy GRAVEL with low cobble content
Location in Works:	Unknown	Material Source:	N/A
Date Sampled:	Unknown	Material Supplier:	N/A
Sampled By:	Unknown	Specification:	BS1377
Date Received:	26 March 2014	Date Tested:	02 April 2014

Test Results

Liquid Limit	36	%
Plastic Limit	22	%
Plasticity Index	14	%

Preparation:	4.2.4 Sieved Specimen
Proportion retained on 425µm sieve:	64 %



Remarks:

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Approver

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L Maiden, Laboratory Supervisor

Date

10/04/2014

Fig.

ATT 9

TEST REPORT
LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX
BS 1377:Part 2:1990: Clause 4.3/5.3/5.4

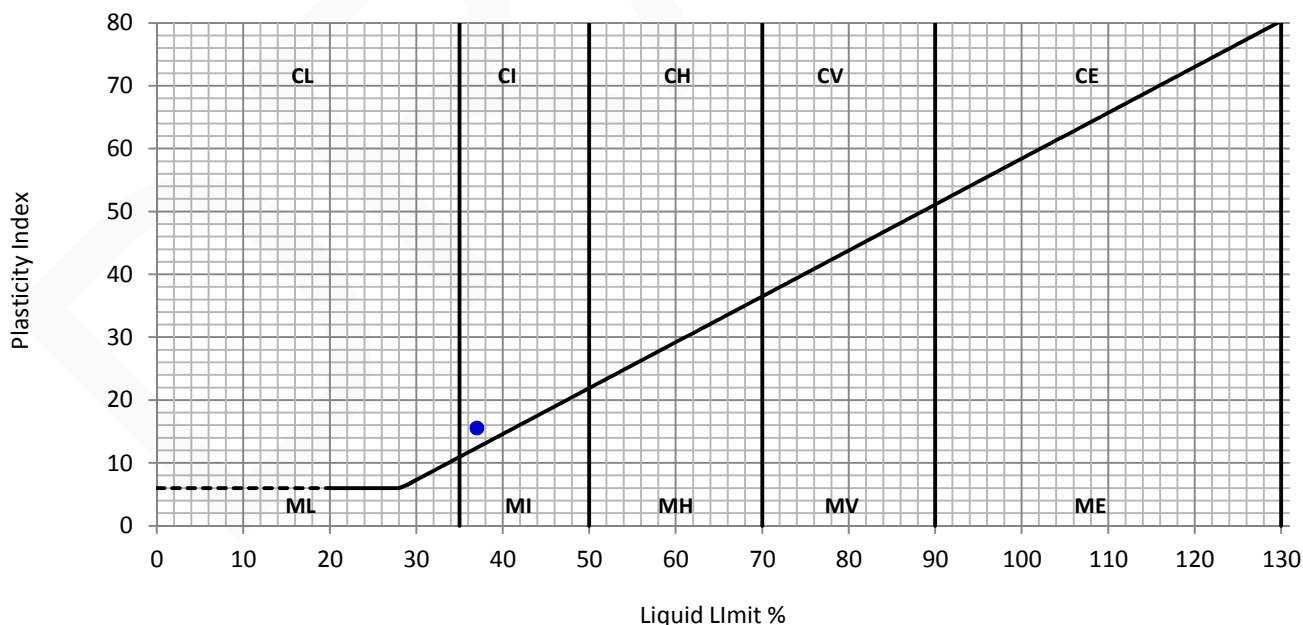
Project No:	D4056-14	Client:	Apex Drilling
Project Name:	Crane Cross	Address:	Sturmi Way, Village Farm Industrial Estate, Bridgend CF33 6BZ
ATS Sample No:	2594		

Site Ref / Hole ID:	TP6	Depth (m):	0.90 - 1.00
Sample No:	4	Sample Type:	Bulk
Sampling Certificate Received:	No	Material Description:	Brown grey slightly gravelly slightly sandy CLAY
Location in Works:	Unknown	Material Source:	N/A
Date Sampled:	Unknown	Material Supplier:	N/A
Sampled By:	Unknown	Specification:	BS1377
Date Received:	26 March 2014	Date Tested:	31 March 2014

Test Results

Liquid Limit	37	%
Plastic Limit	21	%
Plasticity Index	16	%

Preparation:	4.2.3 Natural Specimen
Proportion retained on 425µm sieve:	1 %



Remarks:

QA Ref.

BS1377-2
Rev 3.0



Apex Testing Solutions

Sturmi Way, Village Farm Industrial Est, Pyle,
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Approver

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Date

10/04/2014

Fig.

ATT 10

TEST REPORT
LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX
BS 1377:Part 2:1990: Clause 4.3/5.3/5.4

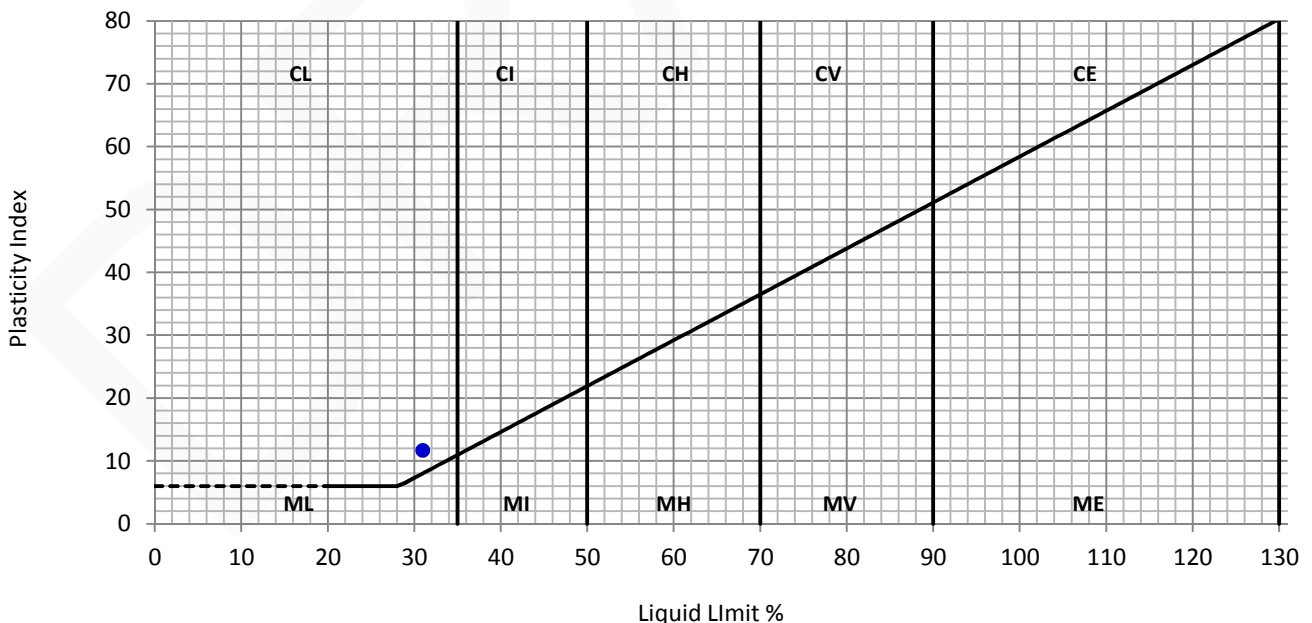
Project No:	D4056-14	Client:	Apex Drilling
Project Name:	Crane Cross	Address:	Sturmi Way, Village Farm Industrial Estate, Bridgend CF33 6BZ
ATS Sample No:	2595		

Site Ref / Hole ID:	TP6	Depth (m):	1.90 - 2.00
Sample No:	6	Sample Type:	Bulk
Sampling Certificate Received:	No	Material Description:	Brown slightly gravelly sandy CLAY
Location in Works:	Unknown	Material Source:	N/A
Date Sampled:	Unknown	Material Supplier:	N/A
Sampled By:	Unknown	Specification:	BS1377
Date Received:	26 March 2014	Date Tested:	02 April 2014

Test Results

Liquid Limit	31	%
Plastic Limit	19	%
Plasticity Index	12	%

Preparation:	4.2.4 Sieved Specimen
Proportion retained on 425µm sieve:	16 %



Remarks:

QA Ref.

BS1377-2
Rev 3.0



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Approver

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L Maiden, Laboratory Supervisor

Date

10/04/2014

Fig.

ATT 11

TEST REPORT
PARTICLE SIZE DISTRIBUTION ANALYSIS
BS 1377:Part 2:1990: Clause 9.2 / 9.4

Project No:	D4056-14	Client:	Apex Drilling
Project Name:	Crane Cross	Address:	Sturmi Way, Village Farm Industrial Estate, Bridgend CF33 6BZ
ATS Sample No:	2585		

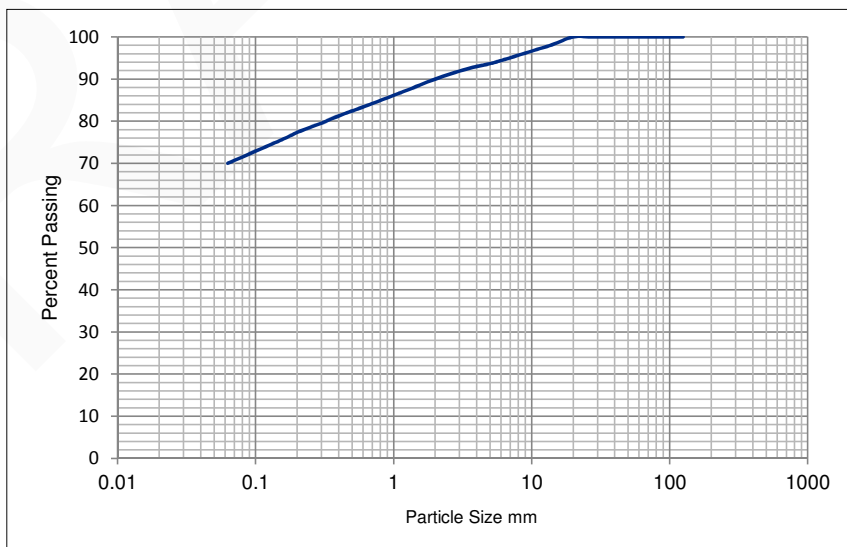
Site Ref / Hole ID:	TP1	Depth (m):	0.70 - 0.80
Sample No:	2	Sample Type:	Bulk
Sampling Certificate Received:	No	Material Description:	Brown grey slightly gravelly slightly sandy CLAY
Location in Works:	Unknown	Material Source:	N/A
Date Sampled:	Unknown	Material Supplier:	N/A
Sampled By:	Unknown	Specification:	BS1377
Date Received:	26 March 2014	Date Tested:	04 April 2014

Test Results

Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
50	100
37.5	100
28	100
20	100
14	98
10	97
6.3	95
5.0	94
3.35	92
2.00	90
1.18	87
0.600	83
0.425	82
0.300	80
0.212	78
0.150	75
0.063	70

Sedimentation	
Particle Size mm	% Passing
0.0201	
0.0060	
0.0020	

Preparation / Pretreatment	
Sieve:	Pre dried
Pipette:	



Sample Portions		Particle Density Mg/m3	Uniformity Coefficient D_{60} / D_{10}
Cobbles / Boulders	0	N/A	
Gravel	10	Dry mas of sample, kg	N/A
Sand	20		
Silt / Clay	70	1.4	N/A

Remarks:

QA Ref.

BS1377 - 2

Rev 3.0



Apex Testing Solutions

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Date

10/04/2014

Fig

PSD 1

TEST REPORT
PARTICLE SIZE DISTRIBUTION ANALYSIS
BS 1377:Part 2:1990: Clause 9.2 / 9.4

Project No:	D4056-14	Client:	Apex Drilling
Project Name:	Crane Cross	Address:	Sturmi Way, Village Farm Industrial Estate, Bridgend CF33 6BZ
ATS Sample No:	2586		

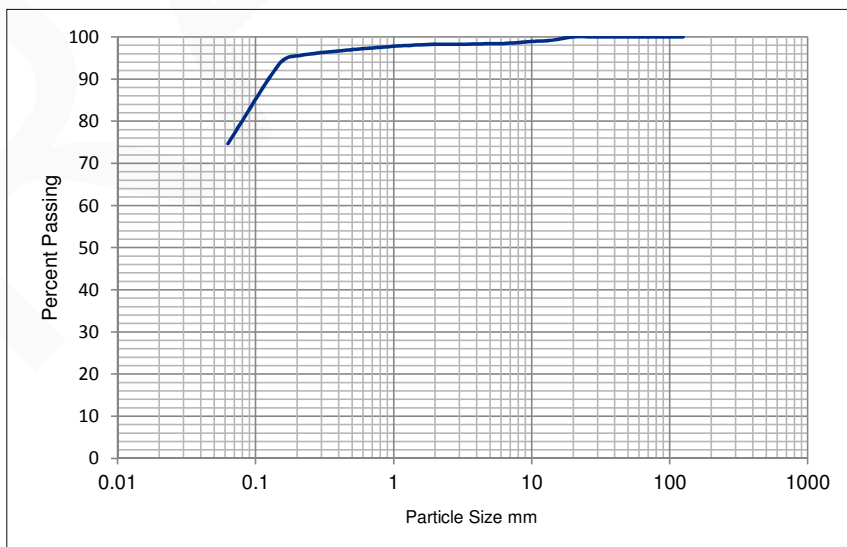
Site Ref / Hole ID:	TP2	Depth (m):	0.20 - 0.30
Sample No:	3	Sample Type:	Bulk
Sampling Certificate Received:	No	Material Description:	Brown grey slightly gravelly slightly sandy CLAY
Location in Works:	Unknown	Material Source:	N/A
Date Sampled:	Unknown	Material Supplier:	N/A
Sampled By:	Unknown	Specification:	BS1377
Date Received:	26 March 2014	Date Tested:	04 April 2014

Test Results

Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
50	100
37.5	100
28	100
20	100
14	99
10	99
6.3	98
5.0	98
3.35	98
2.00	98
1.18	98
0.600	97
0.425	97
0.300	96
0.212	96
0.150	94
0.063	75

Sedimentation	
Particle Size mm	% Passing
0.0201	
0.0060	
0.0020	

Preparation / Pretreatment	
Sieve:	Pre dried
Pipette:	



Sample Portions		Particle Density Mg/m3	Uniformity Coefficient D_{60} / D_{10}
Cobbles / Boulders	0	N/A	
Gravel	2	Dry mas of sample, kg	N/A
Sand	23		
Silt / Clay	75	1.2	N/A

Remarks:

QA Ref.		Apex Testing Solutions Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096		Approver <i>K Maiden</i>	Date 10/04/2014	Fig
BS1377 - 2 Rev 3.0			7771	L Maiden, Laboratory Supervisor		PSD 2

TEST REPORT
PARTICLE SIZE DISTRIBUTION ANALYSIS
BS 1377:Part 2:1990: Clause 9.2 / 9.4

Project No:	D4056-14	Client:	Apex Drilling
Project Name:	Crane Cross	Address:	Sturmi Way, Village Farm Industrial Estate, Bridgend CF33 6BZ
ATS Sample No:	2587		

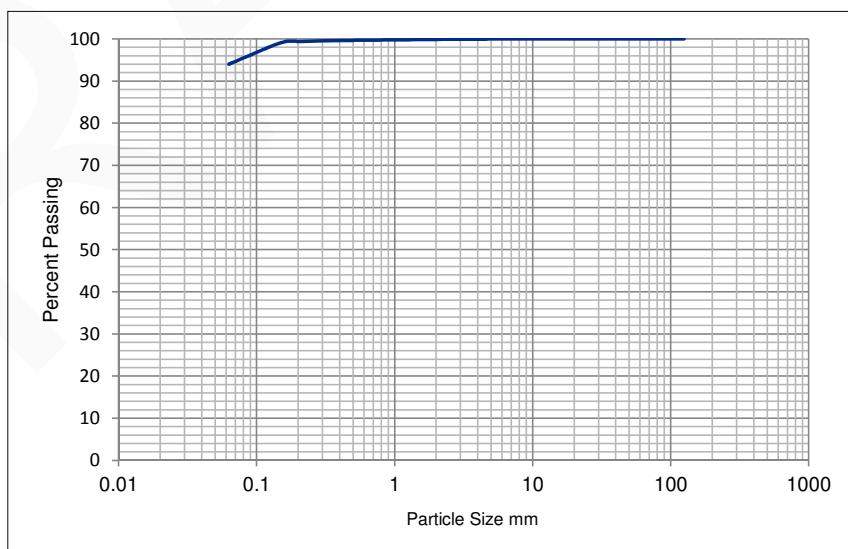
Site Ref / Hole ID:	TP2	Depth (m):	0.50 - 0.60
Sample No:	4	Sample Type:	Bulk
Sampling Certificate Received:	No	Material Description:	Brown grey slightly sandy CLAY
Location in Works:	Unknown	Material Source:	N/A
Date Sampled:	Unknown	Material Supplier:	N/A
Sampled By:	Unknown	Specification:	BS1377
Date Received:	26 March 2014	Date Tested:	04 April 2014

Test Results

Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
50	100
37.5	100
28	100
20	100
14	100
10	100
6.3	100
5.0	100
3.35	100
2.00	100
1.18	100
0.600	100
0.425	100
0.300	100
0.212	99
0.150	99
0.063	94

Sedimentation	
Particle Size mm	% Passing
0.0201	
0.0060	
0.0020	

Preparation / Pretreatment	
Sieve:	Pre dried
Pipette:	



Sample Portions		Particle Density Mg/m3	Uniformity Coefficient D₆₀ / D₁₀
Cobbles / Boulders	0	N/A	
Gravel	0		
Sand	6	Dry mas of sample, kg	
Silt / Clay	94	0.9	N/A

Remarks:

TEST REPORT
PARTICLE SIZE DISTRIBUTION ANALYSIS
BS 1377:Part 2:1990: Clause 9.2 / 9.4

Project No:	D4056-14	Client:	Apex Drilling
Project Name:	Crane Cross	Address:	Sturmi Way, Village Farm Industrial Estate, Bridgend CF33 6BZ
ATS Sample No:	2588		

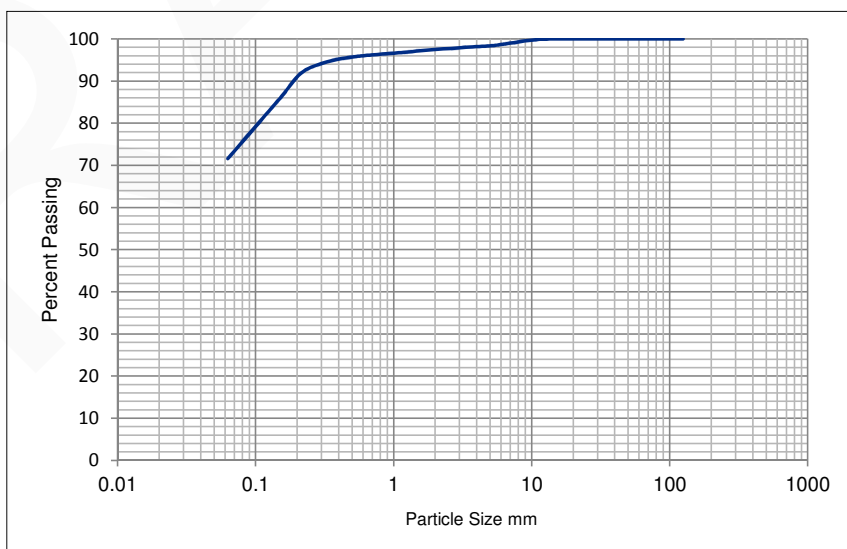
Site Ref / Hole ID:	TP3	Depth (m):	0.70 - 0.80
Sample No:	3	Sample Type:	Bulk
Sampling Certificate Received:	No	Material Description:	Brown grey slightly gravelly slightly sandy CLAY
Location in Works:	Unknown	Material Source:	N/A
Date Sampled:	Unknown	Material Supplier:	N/A
Sampled By:	Unknown	Specification:	BS1377
Date Received:	26 March 2014	Date Tested:	04 April 2014

Test Results

Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
50	100
37.5	100
28	100
20	100
14	100
10	100
6.3	99
5.0	98
3.35	98
2.00	97
1.18	97
0.600	96
0.425	95
0.300	94
0.212	92
0.150	86
0.063	72

Sedimentation	
Particle Size mm	% Passing
0.0201	
0.0060	
0.0020	

Preparation / Pretreatment	
Sieve:	Pre dried
Pipette:	



Sample Portions		Particle Density Mg/m3	Uniformity Coefficient D_{60} / D_{10}
Cobbles / Boulders	0	N/A	
Gravel	3		
Sand	25	Dry mas of sample, kg	
Silt / Clay	72	2.4	N/A

Remarks:

QA Ref.

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Apex Testing Solutions

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7771

Approver

K. Maiden

L Maiden, Laboratory Supervisor

Date

10/04/2014

Fig

PSD 4

TEST REPORT
PARTICLE SIZE DISTRIBUTION ANALYSIS
BS 1377:Part 2:1990: Clause 9.2 / 9.4

Project No:	D4056-14	Client:	Apex Drilling
Project Name:	Crane Cross	Address:	Sturmi Way, Village Farm Industrial Estate, Bridgend CF33 6BZ
ATS Sample No:	2589		

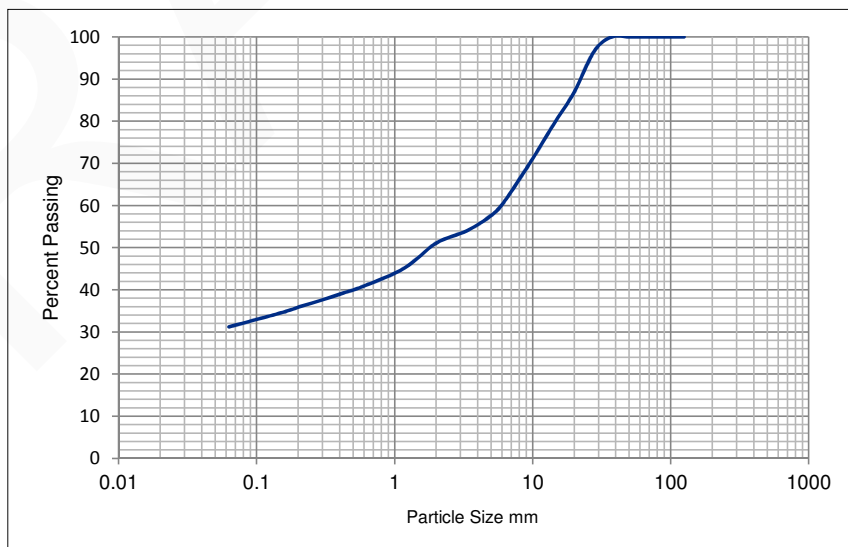
Site Ref / Hole ID:	TP3	Depth (m):	1.80 - 1.90
Sample No:	5	Sample Type:	Bulk
Sampling Certificate Received:	No	Material Description:	Brown grey very silty very sandy GRAVEL
Location in Works:	Unknown	Material Source:	N/A
Date Sampled:	Unknown	Material Supplier:	N/A
Sampled By:	Unknown	Specification:	BS1377
Date Received:	26 March 2014	Date Tested:	04 April 2014

Test Results

Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
50	100
37.5	100
28	97
20	87
14	79
10	71
6.3	61
5.0	58
3.35	54
2.00	51
1.18	45
0.600	41
0.425	39
0.300	38
0.212	36
0.150	35
0.063	31

Sedimentation	
Particle Size mm	% Passing
0.0201	
0.0060	
0.0020	

Preparation / Pretreatment	
Sieve:	Pre dried
Pipette:	



Sample Portions		Particle Density Mg/m3	Uniformity Coefficient D_{60} / D_{10}
Cobbles / Boulders	0	N/A	
Gravel	49	Dry mas of sample, kg	N/A
Sand	20		
Silt / Clay	31	9.8	N/A

Remarks:

TEST REPORT
PARTICLE SIZE DISTRIBUTION ANALYSIS
BS 1377:Part 2:1990: Clause 9.2 / 9.4

Project No:	D4056-14	Client:	Apex Drilling
Project Name:	Crane Cross	Address:	Sturmi Way, Village Farm Industrial Estate, Bridgend CF33 6BZ
ATS Sample No:	2590		

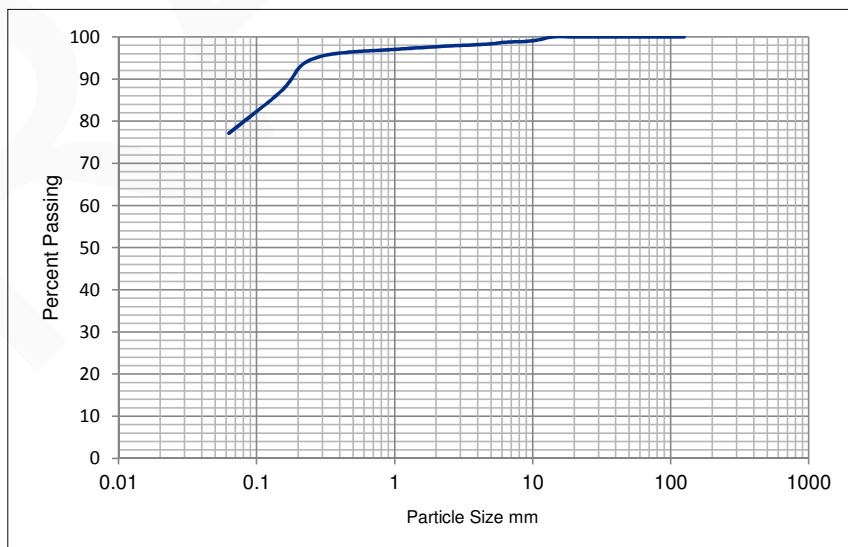
Site Ref / Hole ID:	TP4	Depth (m):	0.40 - 0.50
Sample No:	2	Sample Type:	Bulk
Sampling Certificate Received:	No	Material Description:	Brown grey slightly gravelly slightly sandy CLAY
Location in Works:	Unknown	Material Source:	N/A
Date Sampled:	Unknown	Material Supplier:	N/A
Sampled By:	Unknown	Specification:	BS1377
Date Received:	26 March 2014	Date Tested:	07 April 2014

Test Results

Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
50	100
37.5	100
28	100
20	100
14	100
10	99
6.3	99
5.0	98
3.35	98
2.00	98
1.18	97
0.600	97
0.425	96
0.300	95
0.212	93
0.150	87
0.063	77

Sedimentation	
Particle Size mm	% Passing
0.0201	
0.0060	
0.0020	

Preparation / Pretreatment	
Sieve:	Pre dried
Pipette:	



Sample Portions		Particle Density Mg/m3	Uniformity Coefficient D_{60} / D_{10}
Cobbles / Boulders	0	N/A	
Gravel	2	Dry mas of sample, kg	N/A
Sand	21		
Silt / Clay	77	1.1	N/A

Remarks:

QA Ref.

BS1377 - 2

Rev 3.0



Apex Testing Solutions

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Approver

K Maid

L Maiden, Laboratory Supervisor

Date

10/04/2014

Fig

PSD 6

TEST REPORT
PARTICLE SIZE DISTRIBUTION ANALYSIS
BS 1377:Part 2:1990: Clause 9.2 / 9.4

Project No:	D4056-14	Client:	Apex Drilling
Project Name:	Crane Cross	Address:	Sturmi Way, Village Farm Industrial Estate, Bridgend CF33 6BZ
ATS Sample No:	2591		

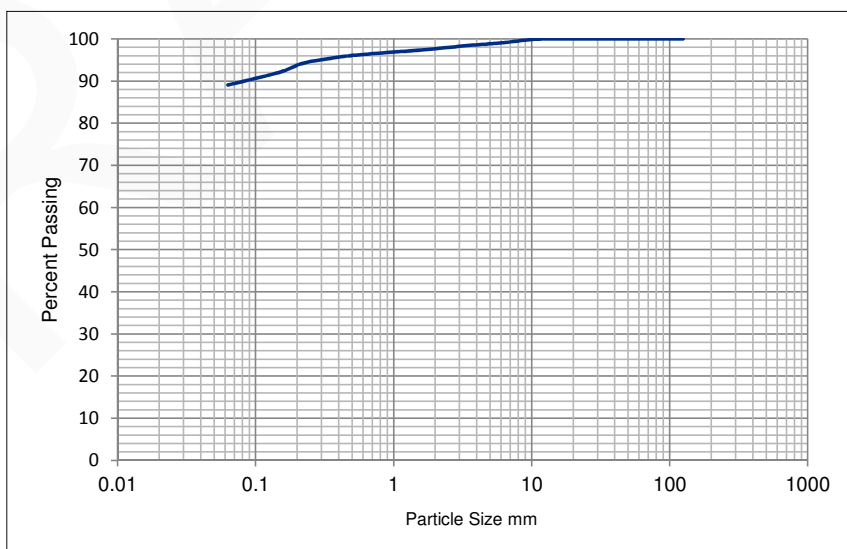
Site Ref / Hole ID:	TP4	Depth (m):	0.80 - 0.90
Sample No:	5	Sample Type:	Bulk
Sampling Certificate Received:	No	Material Description:	Brown grey slightly gravelly slightly sandy CLAY
Location in Works:	Unknown	Material Source:	N/A
Date Sampled:	Unknown	Material Supplier:	N/A
Sampled By:	Unknown	Specification:	BS1377
Date Received:	26 March 2014	Date Tested:	04 April 2014

Test Results

Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
50	100
37.5	100
28	100
20	100
14	100
10	100
6.3	99
5.0	99
3.35	98
2.00	98
1.18	97
0.600	96
0.425	96
0.300	95
0.212	94
0.150	92
0.063	89

Sedimentation	
Particle Size mm	% Passing
0.0201	
0.0060	
0.0020	

Preparation / Pretreatment	
Sieve:	Pre dried
Pipette:	



Sample Portions		Particle Density Mg/m3	Uniformity Coefficient D_{60} / D_{10}
Cobbles / Boulders	0	N/A	
Gravel	2		
Sand	9	Dry mas of sample, kg	
Silt / Clay	89	1.2	N/A

Remarks:

QA Ref.

BS1377 - 2

Rev 3.0



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Approver

K. Maiden

L Maiden, Laboratory Supervisor

Date

10/04/2014

Fig

PSD 7

TEST REPORT
PARTICLE SIZE DISTRIBUTION ANALYSIS
BS 1377:Part 2:1990: Clause 9.2 / 9.4

Project No:	D4056-14	Client:	Apex Drilling
Project Name:	Crane Cross	Address:	Sturmi Way, Village Farm Industrial Estate, Bridgend CF33 6BZ
ATS Sample No:	2592		

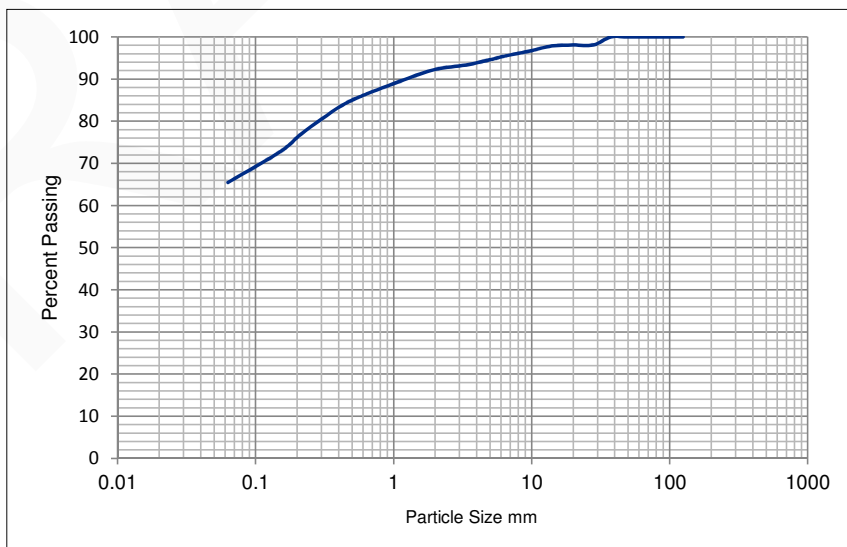
Site Ref / Hole ID:	TP5	Depth (m):	0.50 - 0.60
Sample No:	3	Sample Type:	Bulk
Sampling Certificate Received:	No	Material Description:	Brown grey slightly gravelly slightly sandy CLAY
Location in Works:	Unknown	Material Source:	N/A
Date Sampled:	Unknown	Material Supplier:	N/A
Sampled By:	Unknown	Specification:	BS1377
Date Received:	26 March 2014	Date Tested:	07 April 2014

Test Results

Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
50	100
37.5	100
28	98
20	98
14	98
10	97
6.3	95
5.0	95
3.35	93
2.00	92
1.18	90
0.600	86
0.425	84
0.300	80
0.212	77
0.150	73
0.063	65

Sedimentation	
Particle Size mm	% Passing
0.0201	
0.0060	
0.0020	

Preparation / Pretreatment	
Sieve:	Pre dried
Pipette:	



Sample Portions		Particle Density Mg/m3	Uniformity Coefficient D_{60} / D_{10}
Cobbles / Boulders	0	N/A	
Gravel	8	Dry mas of sample, kg	N/A
Sand	27		
Silt / Clay	65	1.3	

Remarks:

QA Ref.

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Approver

K Maiden

L Maiden, Laboratory Supervisor

Date

10/04/2014

Fig

PSD 8

TEST REPORT
PARTICLE SIZE DISTRIBUTION ANALYSIS
BS 1377:Part 2:1990: Clause 9.2 / 9.4

Project No:	D4056-14	Client:	Apex Drilling
Project Name:	Crane Cross	Address:	Sturmi Way, Village Farm Industrial Estate, Bridgend CF33 6BZ
ATS Sample No:	2593		

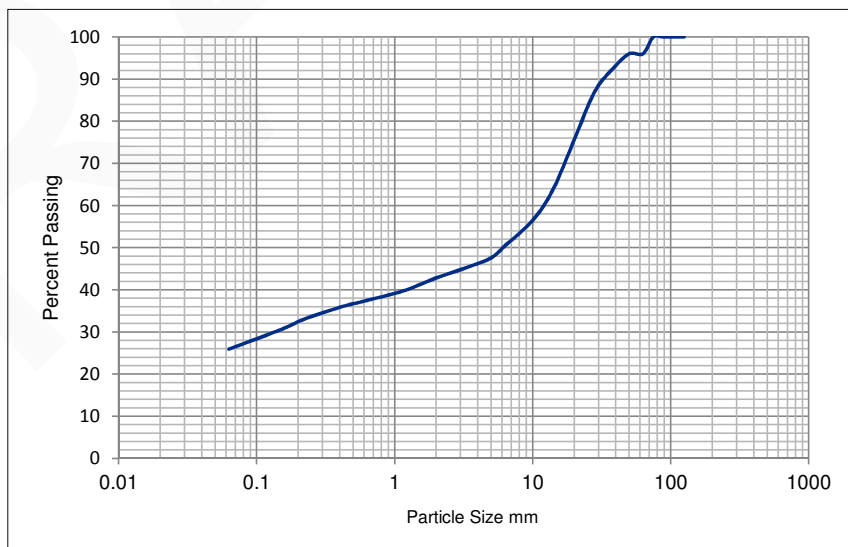
Site Ref / Hole ID:	TP5	Depth (m):	1.80 - 1.90
Sample No:	6	Sample Type:	Bulk
Sampling Certificate Received:	No	Material Description:	Brown grey very clayey sandy GRAVEL with low cobble content
Location in Works:	Unknown	Material Source:	N/A
Date Sampled:	Unknown	Material Supplier:	N/A
Sampled By:	Unknown	Specification:	BS1377
Date Received:	26 March 2014	Date Tested:	07 April 2014

Test Results

Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	96
50	96
37.5	92
28	87
20	76
14	64
10	56
6.3	50
5.0	48
3.35	45
2.00	43
1.18	40
0.600	37
0.425	36
0.300	35
0.212	33
0.150	31
0.063	26

Sedimentation	
Particle Size mm	% Passing
0.0201	
0.0060	
0.0020	

Preparation / Pretreatment	
Sieve:	Pre dried
Pipette:	



Sample Portions		Particle Density Mg/m3	Uniformity Coefficient D_{60} / D_{10}
Cobbles / Boulders	4	N/A	
Gravel	53	Dry mas of sample, kg	N/A
Sand	17		
Silt / Clay	26	12.9	N/A

Remarks:

TEST REPORT
PARTICLE SIZE DISTRIBUTION ANALYSIS
BS 1377:Part 2:1990: Clause 9.2 / 9.4

Project No:	D4056-14	Client:	Apex Drilling
Project Name:	Crane Cross	Address:	Sturmi Way, Village Farm Industrial Estate, Bridgend CF33 6BZ
ATS Sample No:	2594		

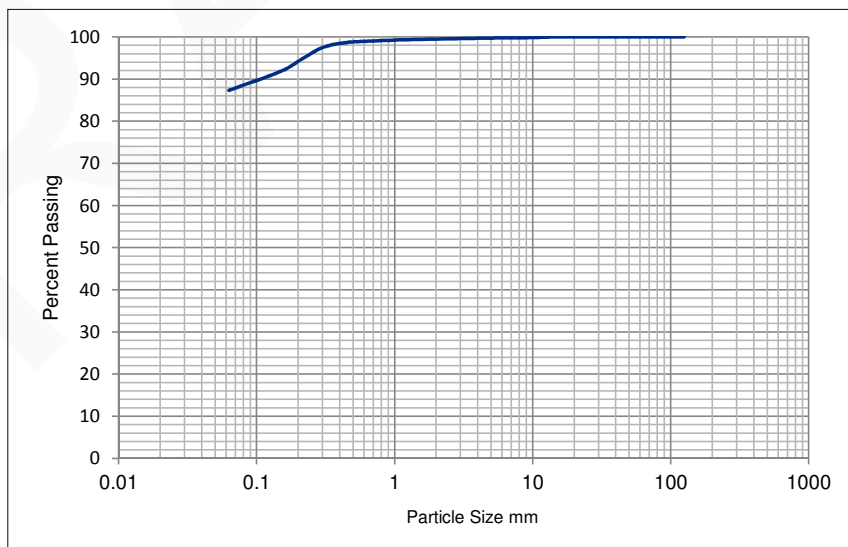
Site Ref / Hole ID:	TP6	Depth (m):	0.90 - 1.00
Sample No:	4	Sample Type:	Bulk
Sampling Certificate Received:	No	Material Description:	Brown grey slightly gravelly slightly sandy CLAY
Location in Works:	Unknown	Material Source:	N/A
Date Sampled:	Unknown	Material Supplier:	N/A
Sampled By:	Unknown	Specification:	BS1377
Date Received:	26 March 2014	Date Tested:	07 April 2014

Test Results

Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
50	100
37.5	100
28	100
20	100
14	100
10	100
6.3	100
5.0	100
3.35	100
2.00	99
1.18	99
0.600	99
0.425	99
0.300	97
0.212	95
0.150	92
0.063	87

Sedimentation	
Particle Size mm	% Passing
0.0201	
0.0060	
0.0020	

Preparation / Pretreatment	
Sieve:	Pre dried
Pipette:	



Sample Portions		Particle Density Mg/m3	Uniformity Coefficient D_{60} / D_{10}
Cobbles / Boulders	0	N/A	
Gravel	1	Dry mas of sample, kg	N/A
Sand	12		
Silt / Clay	87	2.5	

Remarks:

QA Ref.

BS1377 - 2
Rev 3.0



Apex Testing Solutions

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Approver

K. Maiden

L Maiden, Laboratory Supervisor

Date

10/04/2014

Fig

PSD 10

TEST REPORT
PARTICLE SIZE DISTRIBUTION ANALYSIS
BS 1377:Part 2:1990: Clause 9.2 / 9.4

Project No: D4056-14	Client: Apex Drilling	
Project Name: Crane Cross	Address: Sturmi Way, Village Farm Industrial Estate, Bridgend	
ATS Sample No: 2595	CF33 6BZ	

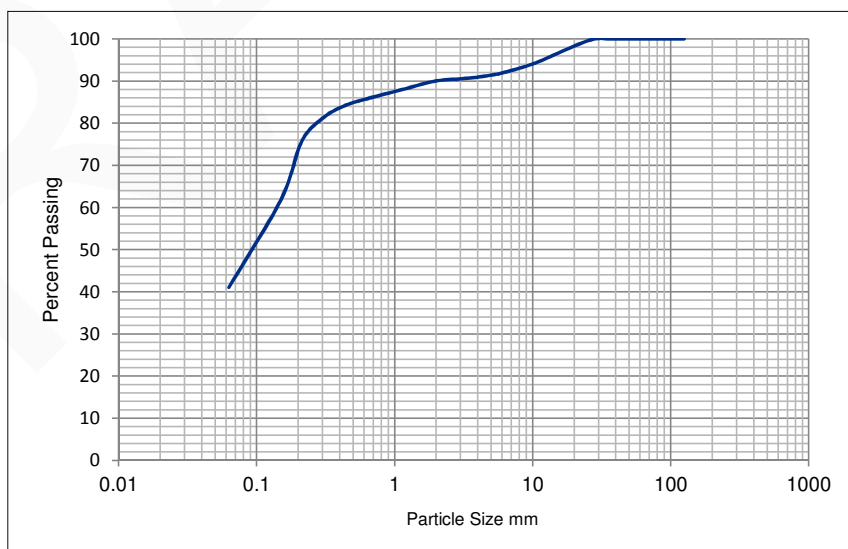
Site Ref / Hole ID: TP6	Depth (m): 1.90 - 2.00	
Sample No: 6	Sample Type: Bulk	
Sampling Certificate Received: No	Material Description: Brown slightly gravelly sandy CLAY	
Location in Works: Unknown	Material Source: N/A	
Date Sampled: Unknown	Material Supplier: N/A	
Sampled By: Unknown	Specification: BS1377	
Date Received: 26 March 2014	Date Tested: 07 April 2014	

Test Results

Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
50	100
37.5	100
28	100
20	98
14	96
10	94
6.3	92
5.0	91
3.35	91
2.00	90
1.18	88
0.600	86
0.425	84
0.300	81
0.212	76
0.150	62
0.063	41

Sedimentation	
Particle Size mm	% Passing
0.0201	
0.0060	
0.0020	

Preparation / Pretreatment	
Sieve:	Pre dried
Pipette:	



Sample Portions		Particle Density Mg/m3	Uniformity Coefficient D_{60} / D_{10}
Cobbles / Boulders	0	N/A	
Gravel	10	Dry mas of sample, kg	N/A
Sand	49		
Silt / Clay	41	6.6	

Remarks:

Laboratory Test Certificate

Site Crane Cross
Client Apex Testing Solutions



F.A.O. Lisa Maiden
Address Sturmi Way
Village Farm Industrial Estate
Pyle
Bridgend
CF33 6BZ

Job Number AC0428
Lab Number L10420
Order Number AT144

Number of samples submitted for testing: 3 sample (s)

CBR / Moisture Content Relationship 3 test (s)

Date (s) sample (s) received at laboratory: 8 Apr-14
Date of receipt of testing instructions 9 Apr-14
Date testing started: 9 Apr-14
Date of issue: 25 Apr-14

Please note that we will keep the sample (s) for one month after submission of our report and will then dispose of them without notice unless you ask us to store them. We will then make a separate charge for this.

Approved by :
Lorna Logan

CBR / Dry Density / Moisture Content Relationship

BS1377:Part 4:1990

Method **3.4** 2.5Kg rammer - Soils with some coarse-gravel size particles

Site Crane Cross

Client Apex Testing Solutions

Job Number AC0428

Lab Number L10420

cjassociates

Hole	Sample	Depth [m]
TP2	B4	0.50

Particle density	[Mg/m ³]	2.65
Passing 37.5mm	[%]	100
Passing 20mm	[%]	100
Weight of rammer	[Kg]	2.5
No Blows		62
Drop Height	[mm]	300
Number of Layers		3
Crushable Material	[Y/N]	n
Single Sample or Separate Samples		single
Initial Moisture Content	[%]	44

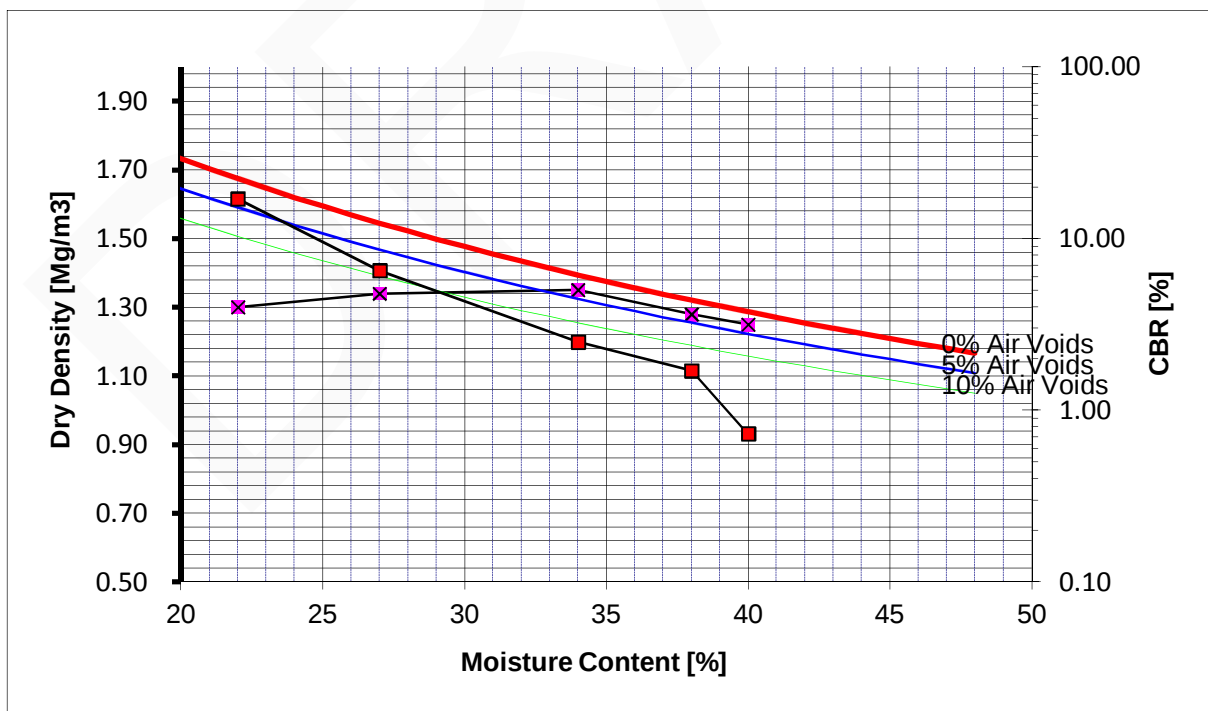
Comments

Particle Density assumed.

Material Description

Firm orange mottled grey and dark brown slightly gravelly slightly silty CLAY

Point Number		1	2	3	4	5
Moisture content	[%]	40	38	34	27	22
Bulk Density	[Mg/m ³]	1.75	1.76	1.81	1.71	1.59
Dry Density	[Mg/m ³]	1.25	1.28	1.35	1.34	1.30
CBR Correction Applied	Y/N	N	N	N	N	N
CBR Sample	Top/Bottom	Top	Top	Top	Top	Top
CBR 2.5mm	[%]	0.58	1.7	2.5	6.5	17
CBR 5.0mm	[%]	0.73	1.7	2.5	6.0	14
Design CBR	[%]	0.73	1.7	2.5	6.5	17



Checked

Approved

[Signature]

CBR / Dry Density / Moisture Content Relationship

BS1377:Part 4:1990

Method **3.4** 2.5Kg rammer - Soils with some coarse-gravel size particles

Site Crane Cross

Client Apex Testing Solutions

Job Number AC0428

Lab Number L10420

cjassociates

Hole	Sample	Depth [m]
TP4	B2	0.40

Particle density	[Mg/m ³]	2.65
Passing 37.5mm	[%]	100
Passing 20mm	[%]	99
Weight of rammer	[Kg]	2.5
No Blows		62
Drop Height	[mm]	300
Number of Layers		3
Crushable Material	[Y/N]	n
Single Sample or Separate Samples		single
Initial Moisture Content	[%]	31

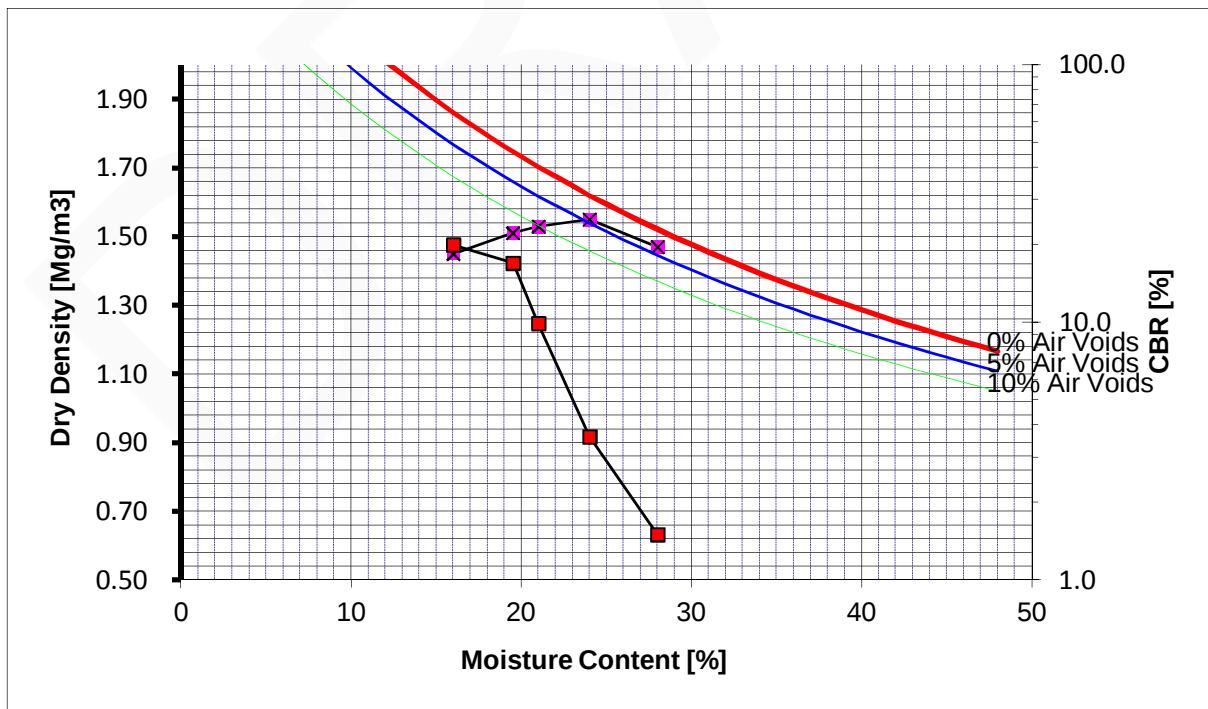
Comments

Particle Density assumed.

Material Description

Firm purplish brown mottled brown and orange clayey slightly gravelly SILT.

Point Number		1	2	3	4	5
Moisture content	[%]	28	24	21	20	16
Bulk Density	[Mg/m ³]	1.89	1.91	1.85	1.81	1.67
Dry Density	[Mg/m ³]	1.47	1.55	1.53	1.51	1.45
CBR Correction Applied	Y/N	N	N	N	N	N
CBR Sample	Top/Bottom	Top	Top	Top	Top	Top
CBR 2.5mm	[%]	1.3	3.2	9.2	17	14
CBR 5.0mm	[%]	1.5	3.6	9.9	16	20
Design CBR	[%]	1.5	3.6	9.9	17	20



Checked

Approved

Signature

CBR / Dry Density / Moisture Content Relationship

BS1377:Part 4:1990

Method **3.4** 2.5Kg rammer - Soils with some coarse-gravel size particles

Site Crane Cross

Client Apex Testing Solutions

Job Number AC0428

Lab Number L10420

cjassociates

Hole	Sample	Depth [m]
TP5	B3	0.50

Particle density	[Mg/m ³]	2.65
Passing 37.5mm	[%]	100
Passing 20mm	[%]	96
Weight of rammer	[Kg]	2.5
No Blows		62
Drop Height	[mm]	300
Number of Layers		3
Crushable Material	[Y/N]	n
Single Sample or Separate Samples		single
Initial Moisture Content	[%]	19

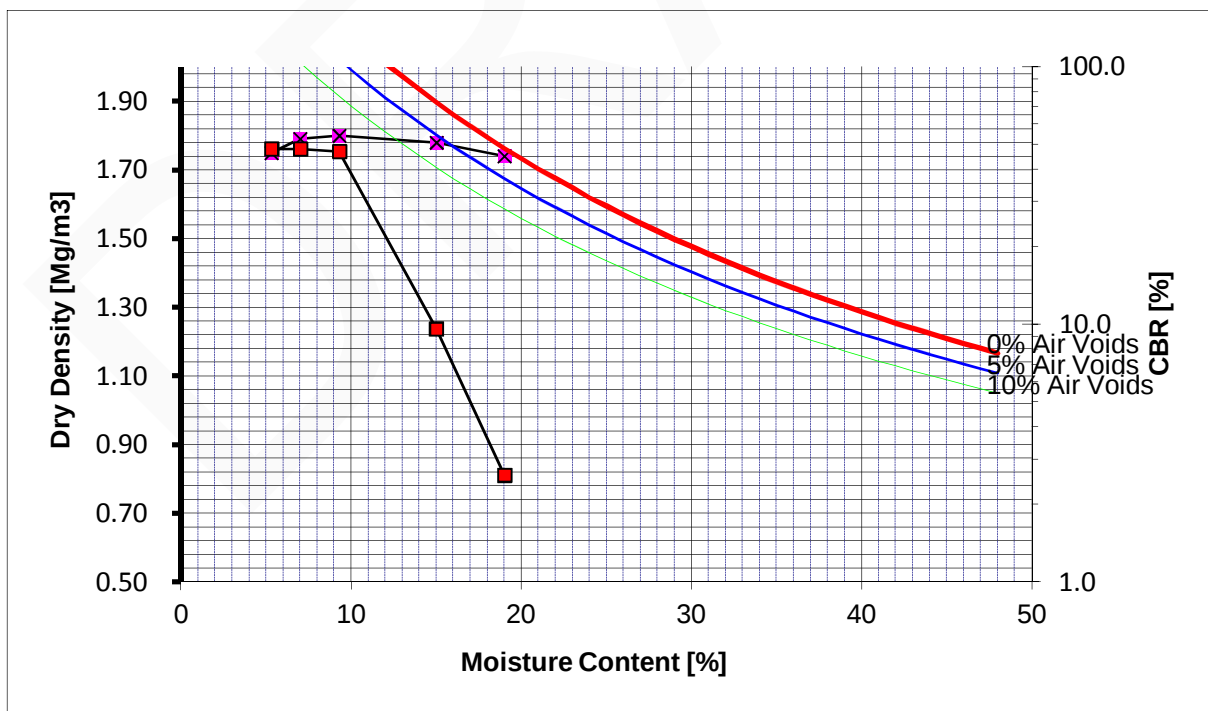
Comments

Particle Density assumed.

Material Description

MADE GROUND (soft to firm dark grey slightly gravelly slightly sandy clay).

Point Number		1	2	3	4	5
Moisture content	[%]	19	15	9.3	7.0	5.3
Bulk Density	[Mg/m ³]	2.08	2.05	1.96	1.92	1.84
Dry Density	[Mg/m ³]	1.74	1.78	1.80	1.79	1.75
CBR Correction Applied	Y/N	N	N	N	N	N
CBR Sample	Top/Bottom	Top	Top	Top	Top	Top
CBR 2.5mm	[%]	2.4	7.5	47	41	40
CBR 5.0mm	[%]	2.6	9.6	45	48	48
Design CBR	[%]	2.6	9.6	47	48	48



Checked

Approved

[Signature]

TEST REPORT

PARTICLE SIZE DISTRIBUTION

BS EN 933-1

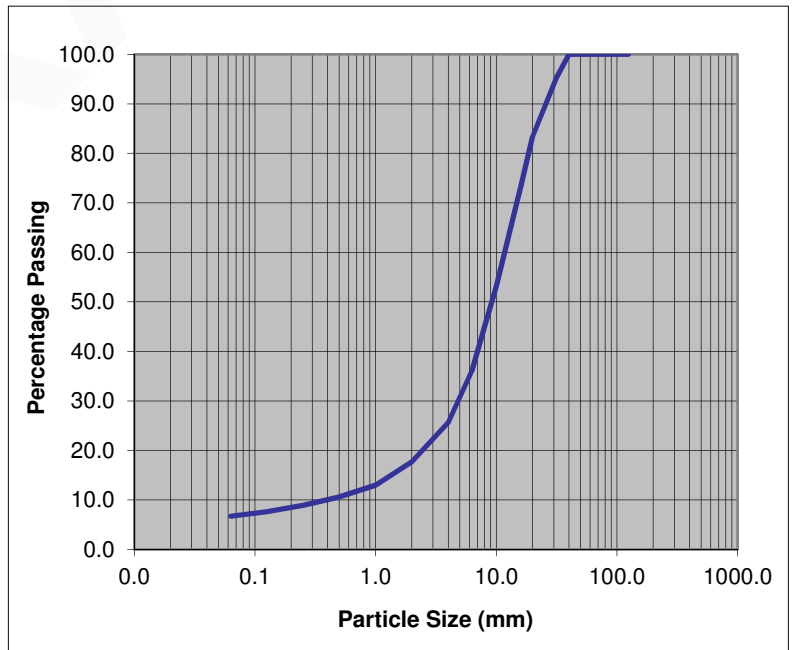
Project No.: D4056-14	Client: Apex Drilling
Project Name: Crane Cross	Address: Sturmi Way
Sample No.: 2723	Village Farm Industrial Estate
	Pyle
	Bridgend

Site Reference: DCP1	Sample Type: Bulk
Location in works: Unknown	Material Description: Brown grey slightly silty sandy GRAVEL
Date Sampled: Unknown	Material Source: Unknown
Sampled By: Client	Material Supplier: Unknown
Sampling Certificate Received: No	Specification: SHW Series 800
Date Received: 11 April 2014	Date Tested: 17 April 2014

TEST RESULTS

Particle Size (mm)	Percentage Passing	Specification
125.0	100	
80.0	100	
63.0	100	100
40.0	100	
31.5	95	75 - 99
20.0	83	
16.0	73	43 - 81
10.0	53	
8.0	45	23 - 66
6.3	36	
4.0	26	12 - 53
2.0	18	6 - 42
1.0	13	3 - 32
0.5	11	
0.250	9	
0.125	8	
0.063	7	0 - 9

Moisture Content (%)	6.6
----------------------	-----



Remarks: Material complies with Type 1 grading requirements

QA Ref.

EN 933-1
Rev. 1.0



Apex Testing Solutions

Sturmi Way, Village Farm Industrial Est,
Pyle, Bridgend, CF33 6BZ

Tel: 01656 746762 Fax: 01656 749096



Approver

R. Anstee

Date

24/04/2014

Fig.

AGG 1

R Anstee, Laboratory Manager

TEST REPORT

PARTICLE SIZE DISTRIBUTION

BS EN 933-1

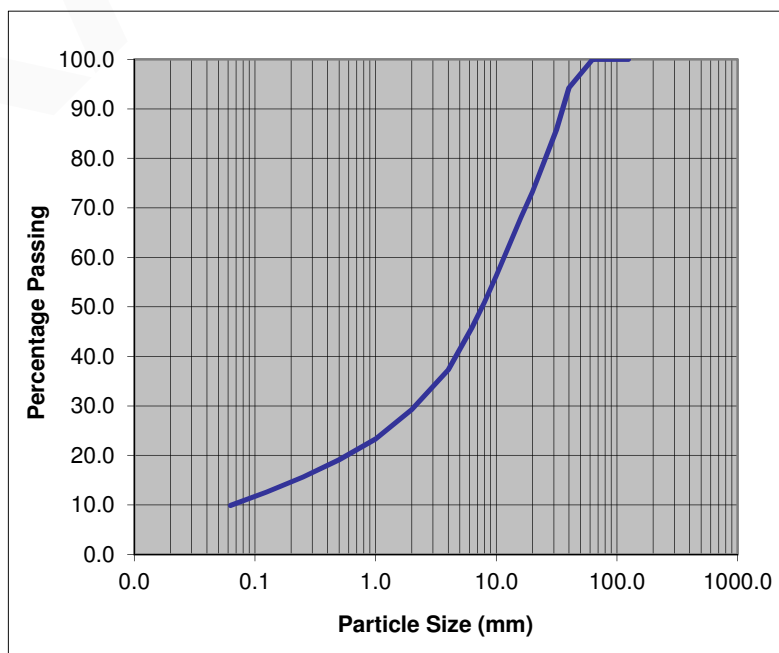
Project No.:	D4056-14	Client:	Apex Drilling
Project Name:	Crane Cross	Address:	Sturmi Way Village Farm Industrial Estate Pyle Bridgend
Sample No.:	2724		

Site Reference:	DCP2	Sample Type:	Bulk
Location in works:	Unknown	Material Description:	Brown grey silty sandy GRAVEL
Date Sampled:	Unknown	Material Source:	Unknown
Sampled By:	Client	Material Supplier:	Unknown
Sampling Certificate Received:	No	Specification:	SHW Series 800
Date Received:	11 April 2014	Date Tested:	17 April 2014

TEST RESULTS

Particle Size (mm)	Percentage Passing	Specification
125.0	100	
80.0	100	
63.0	100	100
40.0	94	
31.5	86	75 - 99
20.0	73	
16.0	68	43 - 81
10.0	56	
8.0	51	23 - 66
6.3	46	
4.0	37	12 - 53
2.0	29	6 - 42
1.0	23	3 - 32
0.5	19	
0.250	16	
0.125	13	
0.063	10	0 - 9*

Moisture Content (%)	5.0
----------------------	-----



Remarks: Material does not comply with Type 1 grading requirements

QA Ref.

EN 933-1
Rev. 1.0



Apex Testing Solutions

Sturmi Way, Village Farm Industrial Est,
Pyle, Bridgend, CF33 6BZ

Tel: 01656 746762 Fax: 01656 749096



Approver

R. Anstee

R Anstee, Laboratory Manager

Date

24/04/2014

Fig.

AGG 2

TEST REPORT

PARTICLE SIZE DISTRIBUTION

BS EN 933-1

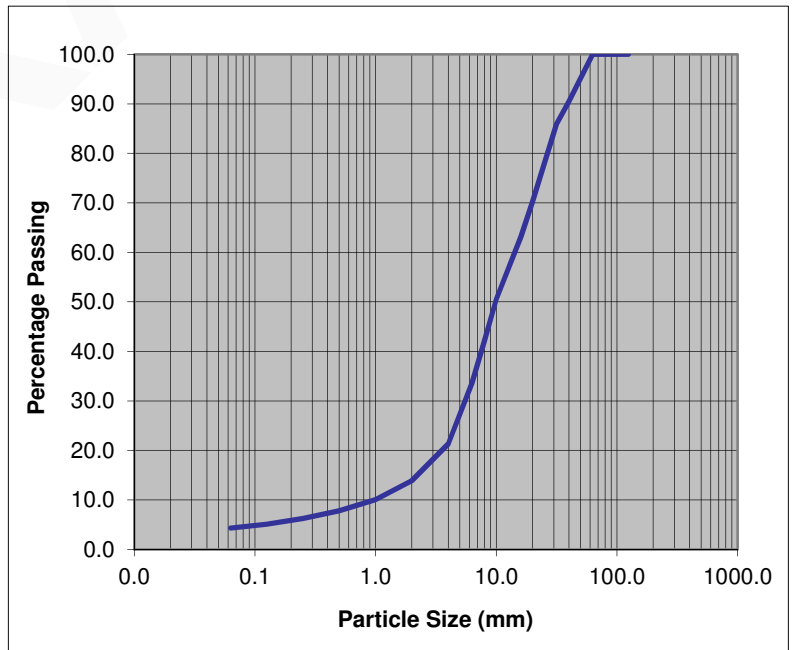
Project No.: D4056-14	Client: Apex Drilling
Project Name: Crane Cross	Address: Sturmi Way
Sample No.: 2725	Village Farm Industrial Estate
	Pyle
	Bridgend

Site Reference: DCP3	Sample Type: Bulk
Location in works: Unknown	Material Description: Brown grey slightly silty sandy GRAVEL
Date Sampled: Unknown	Material Source: Unknown
Sampled By: Client	Material Supplier: Unknown
Sampling Certificate Received: No	Specification: SHW Series 800
Date Received: 11 April 2014	Date Tested: 17 April 2014

TEST RESULTS

Particle Size (mm)	Percentage Passing	Specification
125.0	100	
80.0	100	
63.0	100	100
40.0	90	
31.5	86	75 - 99
20.0	70	
16.0	63	43 - 81
10.0	51	
8.0	42	23 - 66
6.3	34	
4.0	21	12 - 53
2.0	14	6 - 42
1.0	10	3 - 32
0.5	8	
0.250	6	
0.125	5	
0.063	4	0 - 9

Moisture Content (%)	7.5
----------------------	-----



Remarks: Material complies with Type 1 grading requirements

QA Ref.

EN 933-1
Rev. 1.0



Apex Testing Solutions

Sturmi Way, Village Farm Industrial Est,
Pyle, Bridgend, CF33 6BZ

Tel: 01656 746762 Fax: 01656 749096



Approver

R. Anstee

R Anstee, Laboratory Manager

Date

29/04/2014

Fig.

AGG 3

LAB TEST CERTIFICATE

Certificate No: K14/3072/28687/1/1

To: Robert Brewer

Client: Apex Drilling
Sturmi Way
Village Farm Ind Est
Pyle
Bridgend, CF33 6BZ



Unit 2 Glover Court
Burymead Road
Hitchin
Herts, SG5 1RT

Tel: 01462 423 040
email: info@mattestsouth.co.uk
Website: www.mattestsouth.co.uk

Summary of Bituminous Laboratory Testing Crane Cross GI

Location: Crane Cross GI

Date Received: 01.05.14

Testing Completed

MSL Sample Number	28687	28688	28689						
Analysis	X	X	X						
Maximum Density									
Refusal Air Voids									
Bulk Density									
Wheel Tracking									
ITSM									
Core Log									
Binder Recovery									
Surface Layer Depth	12	11	12						
Base Layer Depth	174	69	73						
Total Depth	186	80	85						

Comments:

Approved For Issue

S Wilson (Laboratory Manager - Herts)

Page 1 of 1

Date: 12/05/2014



MATtest Southern Ltd
 Unit 1 Glover Court
 Burymead Road
 Hitchin
 Hertfordshire
 SG5 1RT
 Tel: 01462 423040
 Email: info@mattestsouth.co.uk



BITUMINOUS ANALYSIS TEST REPORT
for Product: 03019/ Unknown Specification_ Bitumen
Supplier/ source: Not Known

Material type: Unknown Supplier Test method: Binder by difference to BS EN 12697-1

SAMPLE INFORMATION**Sample number 28687**

Sampled/ tested
 Thu 01 May 2014/ 07-05-14
 at 0000 hrs

Location Crane Cross GI
 Ticket/truck number Client Sample Ref. DCP1gl-0.2m
 Sampling notes Client Sampled
 Sampling Method Cut Out

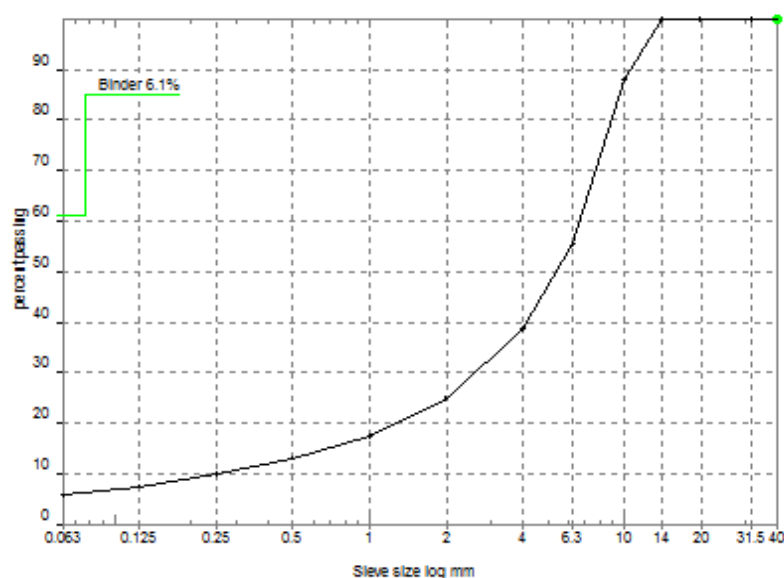
Chainage/layer Depth gl - 0.2m
 Weather conditions -
 Aggregate type -
 Sampling Certificate -

SAMPLE ANALYSIS

Sieve size	Percent passing	Specification limits	Complies ?
40mm	100	100 - 100	yes
31.5mm	100	-	-
20mm	100	-	-
14mm	100	-	-
10mm	88	-	-
6.3mm	55	-	-
4mm	39	-	-
2mm	25	-	-
1mm	18	-	-
500µm	13	-	-
250µm	10	-	-
125µm	8	-	-
63µm	6	-	-
Binder content %	6.1	not specified	na

Parameters are evaluated to the accuracy of spec. limits

REMARKS**Compliance status ok**



Signed _____

MATtest Southern Ltd
 Unit 1 Glover Court
 Burymead Road
 Hitchin
 Hertfordshire
 SG5 1RT
 Tel: 01462 423040
 Email: info@mattestsouth.co.uk



BITUMINOUS ANALYSIS TEST REPORT
for Product: 03019/ Unknown Specification_ Bitumen
Supplier/ source: Not Known

Material type: Unknown Supplier Test method: Binder by difference to BS EN 12697-1

SAMPLE INFORMATION**Sample number 28688**

Sampled/ tested
 Thu 01 May 2014/ 07-05-14
 at 0000 hrs

Location Crane Cross GI

Ticket/truck number Client Sample Ref. DCP2gl-0.1m

Sampling notes Client Sampled

Sampling Method Cut Out

Chainage/layer Depth gl - 0.1m

Weather conditions -

Aggregate type -

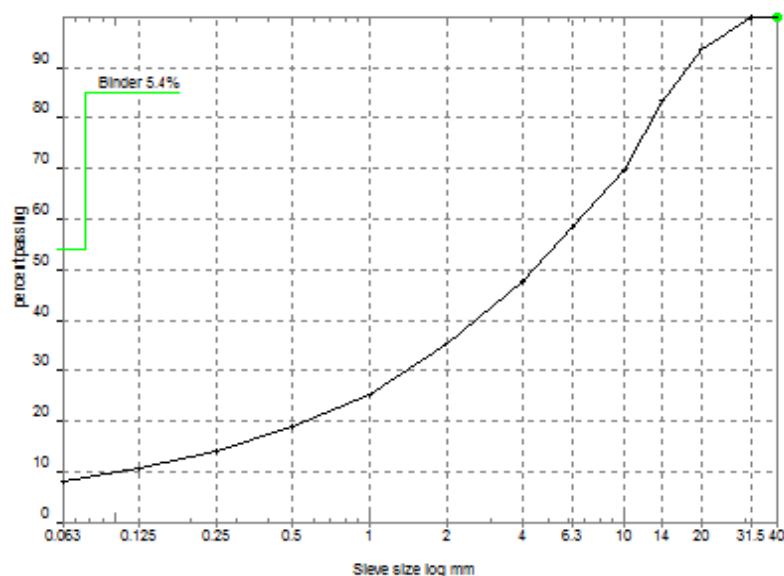
Sampling Certificate -

SAMPLE ANALYSIS

Sieve size	Percent passing	Specification limits	Complies ?
40mm	100	100 - 100	yes
31.5mm	100	-	-
20mm	94	-	-
14mm	83	-	-
10mm	70	-	-
6.3mm	59	-	-
4mm	48	-	-
2mm	35	-	-
1mm	25	-	-
500µm	19	-	-
250µm	14	-	-
125µm	11	-	-
63µm	8	-	-
Binder content %	5.4	not specified	na

Parameters are evaluated to the accuracy of spec. limits

REMARKS**Compliance status ok**



Signed _____

MATtest Southern Ltd
 Unit 1 Glover Court
 Burymead Road
 Hitchin
 Hertfordshire
 SG5 1RT
 Tel: 01462 423040
 Email: info@mattestsouth.co.uk



BITUMINOUS ANALYSIS TEST REPORT
for Product: 03019/ Unknown Specification_ Bitumen
Supplier/ source: Not Known

Material type: Unknown Supplier Test method: Binder by difference to BS EN 12697-1

SAMPLE INFORMATION**Sample number** 28689

Sampled/ tested
 Thu 01 May 2014/ 07-05-14
 at 0000 hrs

Location Crane Cross GI

Ticket/truck number Client Sample Ref. DCP3gl-0.1m

Sampling notes Client Sampled

Sampling Method Cut Out

Chainage/layer Depth gl - 0.1m

Weather conditions -

Aggregate type -

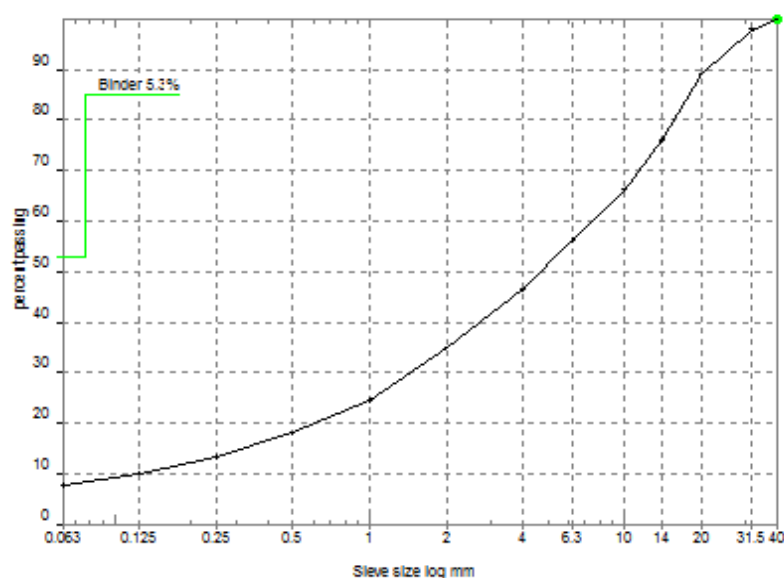
Sampling Certificate -

SAMPLE ANALYSIS

Sieve size	Percent passing	Specification limits	Complies ?
40mm	100	100 - 100	yes
31.5mm	98	-	-
20mm	89	-	-
14mm	76	-	-
10mm	66	-	-
6.3mm	56	-	-
4mm	46	-	-
2mm	35	-	-
1mm	25	-	-
500µm	18	-	-
250µm	13	-	-
125µm	10	-	-
63µm	8	-	-
Binder content %	5.3	not specified	na

Parameters are evaluated to the accuracy of spec. limits

REMARKS**Compliance status ok**



Signed _____

ENCLOSURE D
GEOENVIRONMENTAL LABORATORY TEST RESULTS

Soil - Report Number

265510

265933



Apex Drilling Services Limited
Sturmi Way
Village Farm Industrial Estate
Pyle
Bridgend
CF33 6BZ

Attention: Aled Henry

CERTIFICATE OF ANALYSIS

Date: 03 April 2014
Customer: H_APEXDRL_BGD
Sample Delivery Group (SDG): 140322-72
Your Reference: 1306
Location: Crane Cross
Report No: 265510

We received 12 samples on Saturday March 22, 2014 and 6 of these samples were scheduled for analysis which was completed on Thursday April 03, 2014. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

All chemical testing (unless subcontracted) is performed at ALcontrol Hawarden Laboratories.

Approved By:

Sonia McWhan

Operations Manager





SDG:	140322-72	Location:	Crane Cross	Order Number:	
Job:	H_APEXDRL_BGD-15	Customer:	Apex Drilling Services Limited	Report Number:	265510
Client Reference:	1306	Attention:	Aled Henry	Superseded Report:	

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
9026391	TP1		0.30	20/03/2014
9026392	TP1		0.80	20/03/2014
9026393	TP2		0.10	20/03/2014
9026394	TP2		0.70	20/03/2014
9026396	TP3		0.50	20/03/2014
9026397	TP3		0.90	20/03/2014
9026398	TP4		0.30	20/03/2014
9026399	TP4		0.70	20/03/2014
9026400	TP5		0.40	20/03/2014
9026401	TP5		0.90	20/03/2014
9026402	TP6		0.30	20/03/2014
9026403	TP6		0.80	20/03/2014

Only received samples which have had analysis scheduled will be shown on the following pages.



SDG: 140322-72
Job: H_APEXDRL_BGD-15
Client Reference: 1306

Location: Crane Cross
Customer: Apex Drilling Services Limited
Attention: Aled Henry

Order Number:
Report Number: 265510
Superseded Report:

SOLID Results Legend X Test N No Determination Possible	Lab Sample No(s)		9026391	9026393	9026396	9026398	9026400	9026402
	Customer Sample Reference		TP1	TP2	TP3	TP4	TP5	TP6
	AGS Reference							
	Depth (m)		0.30	0.10	0.50	0.30	0.40	0.30
	Container		60g VOC (ALE215) 400g Tub (ALE214) 250g Amber Jar (AL)	60g VOC (ALE215) 400g Tub (ALE214) 250g Amber Jar (AL)	60g VOC (ALE215) 400g Tub (ALE214) 250g Amber Jar (AL)	60g VOC (ALE215) 400g Tub (ALE214) 250g Amber Jar (AL)	60g VOC (ALE215) 400g Tub (ALE214) 250g Amber Jar (AL)	60g VOC (ALE215) 400g Tub (ALE214) 250g Amber Jar (AL)
Cyanide Comp/Free/Total/Thiocyanate	All	NDPs: 0 Tests: 6	X	X	X	X	X	X
EPH CWG (Aliphatic) GC (S)	All	NDPs: 0 Tests: 6	X	X	X	X	X	X
EPH CWG (Aromatic) GC (S)	All	NDPs: 0 Tests: 6	X	X	X	X	X	X
GRO by GC-FID (S)	All	NDPs: 0 Tests: 6		X	X	X	X	X
Hexavalent Chromium (s)	All	NDPs: 0 Tests: 6	X	X	X	X	X	X
Metals in solid samples by OES	All	NDPs: 0 Tests: 6	X	X	X	X	X	X
Sample description	All	NDPs: 0 Tests: 6	X	X	X	X	X	X
Total Organic Carbon	All	NDPs: 0 Tests: 6	X	X	X	X	X	X
TPH CWG GC (S)	All	NDPs: 0 Tests: 6	X	X	X	X	X	X



SDG:	140322-72	Location:	Crane Cross	Order Number:	
Job:	H_APEXDRL_BGD-15	Customer:	Apex Drilling Services Limited	Report Number:	265510
Client Reference:	1306	Attention:	Aled Henry	Superseded Report:	

Sample Descriptions

Grain Sizes

very fine	<0.063mm	fine	0.063mm - 0.1mm	medium	0.1mm - 2mm	coarse	2mm - 10mm	very coarse	>10mm
-----------	----------	------	-----------------	--------	-------------	--------	------------	-------------	-------

Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Description	Grain size	Inclusions	Inclusions 2
9026391	TP1	0.30	Light Brown	Silty Clay	0.063 - 0.1 mm	Stones	None
9026393	TP2	0.10	Dark Brown	Silty Clay Loam	0.1 - 2 mm	Vegetation	None
9026396	TP3	0.50	Light Brown	Clay Loam	0.1 - 2 mm	Vegetation	N/A
9026398	TP4	0.30	Dark Brown	Silty Clay Loam	0.1 - 2 mm	Vegetation	N/A
9026400	TP5	0.40	Light Brown	Clay Loam	0.063 - 0.1 mm	Stones	N/A
9026402	TP6	0.30	Dark Brown	Silty Clay Loam	0.1 - 2 mm	Vegetation	N/A

These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

Location: Crane Cross
Customer: Apex Drilling Services Limited
Attention: Aled Henry

SDG: 140322-72
Job: H_APEXDRL_BGD-15
Client Reference: 1306

Order Number:
Report Number: 265510
Superseded Report:

13:43:14 03/04/2014



CERTIFICATE OF ANALYSIS

SDG: 140322-72
Job: H_APEXDRL_BGD-15
Client Reference: 1306

Location: Crane Cross
Customer: Apex Drilling Services Limited
Attention: Aled Henry

Order Number:
Report Number: 265510
Superseded Report:

TPH CWG (S)

Results Legend			Customer Sample R		TP1	TP2	TP3	TP4	TP5	TP6
#	ISO17025 accredited.		Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference		0.30	0.10	0.50	0.30	0.40	0.30
M	mCERTS accredited.				Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid
aq	Aqueous / settled sample.				20/03/2014	20/03/2014	20/03/2014	20/03/2014	20/03/2014	20/03/2014
diss.filt	Dissolved / filtered sample.									
tot.unfilt	Total / unfiltered sample.									
*	Subcontracted test.									
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery				22/03/2014	22/03/2014	22/03/2014	22/03/2014	22/03/2014	22/03/2014
(F)	Trigger breach confirmed				140322-72	140322-72	140322-72	140322-72	140322-72	140322-72
1-5&*\$@	Sample deviation (see appendix)				9026391	9026393	9026396	9026398	9026400	9026402
Component	LOD/Units	Method								
GRO Surrogate % recovery**	%	TM089			104	93	93	94	116	103
GRO TOT (Moisture Corrected)	<44 µg/kg	TM089			<44	<44	<44	<44	<44	<44
					M	M	M	M	M	M
Methyl tertiary butyl ether (MTBE)	<5 µg/kg	TM089			<5	<5	<5	<5	<5	<5
					M	M	M	M	M	M
Benzene	<10 µg/kg	TM089			<10	<10	<10	<10	<10	<10
					M	M	M	M	M	M
Toluene	<2 µg/kg	TM089			<2	<2	<2	<2	<2	<2
					M	M	M	M	M	M
Ethylbenzene	<3 µg/kg	TM089			<3	<3	<3	<3	<3	<3
					M	M	M	M	M	M
m,p-Xylene	<6 µg/kg	TM089			<6	<6	<6	<6	<6	<6
					M	M	M	M	M	M
o-Xylene	<3 µg/kg	TM089			<3	<3	<3	<3	<3	<3
					M	M	M	M	M	M
sum of detected mpo xylene by GC	<9 µg/kg	TM089			<9	<9	<9	<9	<9	<9
sum of detected BTEX by GC	<24 µg/kg	TM089			<24	<24	<24	<24	<24	<24
Aliphatics >C5-C6	<10 µg/kg	TM089			<10	<10	<10	<10	<10	<10
Aliphatics >C6-C8	<10 µg/kg	TM089			<10	<10	<10	<10	<10	<10
Aliphatics >C8-C10	<10 µg/kg	TM089			<10	<10	<10	<10	<10	<10
Aliphatics >C10-C12	<10 µg/kg	TM089			<10	<10	<10	<10	<10	<10
Aliphatics >C12-C16	<100 µg/kg	TM173			<100	<100	<100	<100	<100	<100
Aliphatics >C16-C21	<100 µg/kg	TM173			<100	<100	<100	<100	<100	<100
Aliphatics >C21-C35	<100 µg/kg	TM173			<100	2310	<100	<100	<100	<100
Aliphatics >C35-C44	<100 µg/kg	TM173			<100	<100	3510	<100	<100	<100
Total Aliphatics >C12-C44	<100 µg/kg	TM173			<100	2310	3510	<100	<100	<100
Aromatics >EC5-EC7	<10 µg/kg	TM089			<10	<10	<10	<10	<10	<10
Aromatics >EC7-EC8	<10 µg/kg	TM089			<10	<10	<10	<10	<10	<10
Aromatics >EC8-EC10	<10 µg/kg	TM089			<10	<10	<10	<10	<10	<10
Aromatics >EC10-EC12	<10 µg/kg	TM089			<10	<10	<10	<10	<10	<10
Aromatics >EC12-EC16	<100 µg/kg	TM173			808	<100	<100	<100	<100	117
Aromatics >EC16-EC21	<100 µg/kg	TM173			<100	<100	<100	<100	<100	<100
Aromatics >EC21-EC35	<100 µg/kg	TM173			1270	11200	<100	7140	<100	8070
Aromatics >EC35-EC44	<100 µg/kg	TM173			4770	5170	956	3300	334	2640
Aromatics >EC40-EC44	<100 µg/kg	TM173			2040	1360	754	1100	258	993
Total Aromatics >EC12-EC44	<100 µg/kg	TM173			3990	12600	<100	9580	<100	9730
Total Aliphatics & Aromatics >C5-C44	<100 µg/kg	TM173			3990	14900	3510	9580	<100	9740



SDG:	140322-72	Location:	Crane Cross	Order Number:	
Job:	H_APEXDRL_BGD-15	Customer:	Apex Drilling Services Limited	Report Number:	265510
Client Reference:	1306	Attention:	Aled Henry	Superseded Report:	

Table of Results - Appendix

Method No	Reference	Description	Wet/Dry Sample ¹	Surrogate Corrected
PM001		Preparation of Samples for Metals Analysis		
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material		
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) and BTEX (MTBE) compounds by Headspace GC-FID (C4-C12)		
TM132	In - house Method	ELTRA CS800 Operators Guide		
TM151	Method 3500D, AWWA/APHA, 20th Ed., 1999	Determination of Hexavalent Chromium using Kone analyser		
TM153	Method 4500A,B,C, I, M AWWA/APHA, 20th Ed., 1999	Determination of Total Cyanide, Free (Easily Liberatable) Cyanide and Thiocyanate using the Skalar SANS+ System Segmented Flow Analyser		
TM173	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	Determination of Speciated Extractable Petroleum Hydrocarbons in Soils by GC-FID		
TM181	US EPA Method 6010B	Determination of Routine Metals in Soil by iCap 6500 Duo ICP-OES		

¹ Applies to Solid samples only. DRY indicates samples have been dried at 35°C. NA = not applicable.



SDG:	140322-72	Location:	Crane Cross	Order Number:	
Job:	H_APEXDRL_BGD-15	Customer:	Apex Drilling Services Limited	Report Number:	265510
Client Reference:	1306	Attention:	Aled Henry	Superseded Report:	

Test Completion Dates

Lab Sample No(s)	9026391	9026393	9026396	9026398	9026400	9026402
Customer Sample Ref.	TP1	TP2	TP3	TP4	TP5	TP6
AGS Ref.						
Depth	0.30	0.10	0.50	0.30	0.40	0.30
Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID

Cyanide Comp/Free/Total/Thiocyanate	02-Apr-2014	02-Apr-2014	02-Apr-2014	02-Apr-2014	02-Apr-2014	02-Apr-2014
EPH CWG (Aliphatic) GC (S)	02-Apr-2014	02-Apr-2014	03-Apr-2014	03-Apr-2014	03-Apr-2014	03-Apr-2014
EPH CWG (Aromatic) GC (S)	02-Apr-2014	02-Apr-2014	03-Apr-2014	03-Apr-2014	03-Apr-2014	03-Apr-2014
GRO by GC-FID (S)	01-Apr-2014	02-Apr-2014	01-Apr-2014	01-Apr-2014	02-Apr-2014	02-Apr-2014
Hexavalent Chromium (s)	02-Apr-2014	03-Apr-2014	02-Apr-2014	02-Apr-2014	02-Apr-2014	03-Apr-2014
Metals in solid samples by OES	02-Apr-2014	02-Apr-2014	02-Apr-2014	02-Apr-2014	02-Apr-2014	02-Apr-2014
Sample description	31-Mar-2014	31-Mar-2014	31-Mar-2014	31-Mar-2014	31-Mar-2014	31-Mar-2014
Total Organic Carbon	02-Apr-2014	02-Apr-2014	02-Apr-2014	02-Apr-2014	02-Apr-2014	02-Apr-2014
TPH CWG GC (S)	02-Apr-2014	02-Apr-2014	03-Apr-2014	03-Apr-2014	03-Apr-2014	03-Apr-2014



SDG: 140322-72
Job: H_APEXDRL_BGD-15
Client Reference: 1306

Location: Crane Cross
Customer: Apex Drilling Services Limited
Attention: Aled Henry

Order Number:
Report Number: 265510
Superseded Report:

Appendix General

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICS and SVOC TICS.

2. Samples will be run in duplicate upon request, but an additional charge may be incurred.

3. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALcontrol Laboratories reserve the right to charge for samples received and stored but not analysed.

4. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

5. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

6. When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible. The quantity of asbestos present is not determined unless specifically requested.

7. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

8. If appropriate preserved bottles are not received preservation will take place on receipt. However, the integrity of the data may be compromised.

9. NDP -No determination possible due to insufficient/unsuitable sample.

10. Metals in water are performed on a filtered sample, and therefore represent dissolved metals -total metals must be requested separately.

11. Results relate only to the items tested.

12. LODs for wet tests reported on a dry weight basis are not corrected for moisture content.

13. **Surrogate recoveries** -Most of our organic methods include surrogates, the recovery of which is monitored and reported. For EPH, MO, PAH, GRO and VOCs on soils the result is not surrogate corrected, but a percentage recovery is quoted. Acceptable limits for most organic methods are 70 -130 %.

14. **Product analyses** -Organic analyses on products can only be semi-quantitative due to the matrix effects and high dilution factors employed.

15. Phenols monohydric by HPLC include phenol, cresols (2-Methylphenol, 3-Methylphenol and 4-Methylphenol) and Xylenols (2,3 Dimethylphenol, 2,4 Dimethylphenol, 2,5 Dimethylphenol, 2,6 Dimethylphenol, 3,4 Dimethylphenol, 3,5 Dimethylphenol).

16. Total of 5 speciated phenols by HPLC includes Phenol, 2,3,5-Trimethyl Phenol, 2-Isopropylphenol, Cresols and Xylenols (as detailed in 15).

17. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

18. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

19. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

20. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

21. For all leachate preparations (NRA, DIN, TCLP, BSEN 12457-1, 2, 3) volatile loss may occur, as we do not employ zero headspace extraction.

22. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill /made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

23. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

Sample Deviations

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Holding time exceeded before sample received
5	Samples exceeded holding time before preservation was performed
\$	Sampled on date not provided
♦	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to sampled on date
&	Sample Holding Time exceeded - Late arrival of instructions.

Asbestos

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using Alcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using Alcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthrophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than :
 -

Trace -Where only one or two asbestos fibres were identified.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.



Apex Testing Solutions Limited
Sturmi Way
Village Farm Industrial Estate
Pyle
Bridgend
CF33 6BZ

Attention: Lisa Maiden

CERTIFICATE OF ANALYSIS

Date: 08 April 2014
Customer: H_APEXTEST_BRG
Sample Delivery Group (SDG): 140331-12
Your Reference: D4056-14
Location: Crane Cross
Report No: 265933

We received 5 samples on Saturday March 29, 2014 and 5 of these samples were scheduled for analysis which was completed on Tuesday April 08, 2014. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

All chemical testing (unless subcontracted) is performed at ALcontrol Hawarden Laboratories.

Approved By:

Sonia McWhan

Operations Manager





SDG:	140331-12	Location:	Crane Cross	Order Number:	AT139
Job:	H_APEXTEST_BRG-40	Customer:	Apex Testing Solutions Limited	Report Number:	265933
Client Reference:	D4056-14	Attention:	Lisa Maiden	Superseded Report:	

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
9067870	TP1	D2	0.70 - 0.80	
9067873	TP4	D3	0.40	
9067877	TP5	D5	1.10	
9067879	TP6	D5	1.50	
9067880	TP6	D7	2.80 - 2.90	

Only received samples which have had analysis scheduled will be shown on the following pages.

DRAFT



SDG:	140331-12	Location:	Crane Cross	Order Number:	AT139
Job:	H_APEXTEST_BRG-40	Customer:	Apex Testing Solutions Limited	Report Number:	265933
Client Reference:	D4056-14	Attention:	Lisa Maiden	Superseded Report:	

SOLID
Results Legend

- X

Test
- N

No Determination Possible

Lab Sample No(s)	Customer Sample Reference	AGS Reference	Depth (m)	Container					
9067880	TP6	D7	2.80 - 2.90	1kg TUB					
9067879	TP6	D5	1.50	400g Tub (ALE214)					
9067877	TP5	D5	1.10	400g Tub (ALE214)					
9067873	TP4	D3	0.40	400g Tub (ALE214)					
9067870	TP1	D2	0.70 - 0.80	1kg TUB					
All		NDPs: 0 Tests: 5				X	X	X	X
All		NDPs: 0 Tests: 5				X	X	X	X
All		NDPs: 0 Tests: 5				X	X	X	X
All		NDPs: 0 Tests: 5				X	X	X	X



SDG:	140331-12	Location:	Crane Cross	Order Number:	AT139
Job:	H_APEXTEST_BRG-40	Customer:	Apex Testing Solutions Limited	Report Number:	265933
Client Reference:	D4056-14	Attention:	Lisa Maiden	Superseded Report:	

Sample Descriptions

Grain Sizes

very fine	<0.063mm	fine	0.063mm - 0.1mm	medium	0.1mm - 2mm	coarse	2mm - 10mm	very coarse	>10mm
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Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Description	Grain size	Inclusions	Inclusions 2
9067870	TP1	0.70 - 0.80	Dark Brown	Sandy Silt Loam	0.1 - 2 mm	N/A	N/A
9067873	TP4	0.40	Yellow	Sandy Silt Loam	0.1 - 2 mm	Vegetation	None
9067877	TP5	1.10	Light Brown	Clay Loam	0.1 - 2 mm	Stones	N/A
9067879	TP6	1.50	Light Brown	Loamy Sand	0.1 - 2 mm	Stones	None
9067880	TP6	2.80 - 2.90	Light Brown	Sandy Loam	0.1 - 2 mm	Stones	None

These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

Order Number: AT139
Report Number: 265933
Superseded Report:

Page 5 of 8



SDG:	140331-12	Location:	Crane Cross	Order Number:	AT139
Job:	H_APEXTEST_BRG-40	Customer:	Apex Testing Solutions Limited	Report Number:	265933
Client Reference:	D4056-14	Attention:	Lisa Maiden	Superseded Report:	

Table of Results - Appendix

Method No	Reference	Description	Wet/Dry Sample ¹	Surrogate Corrected
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material		
TM018	BS 1377: Part 3 1990	Determination of Loss on Ignition		
TM133	BS 1377: Part 3 1990;BS 6068-2.5	Determination of pH in Soil and Water using the GLpH pH Meter		
TM221	Inductively Coupled Plasma - Atomic Emission Spectroscopy. An Atlas of Spectral Information: Winge, Fassel, Peterson and Floyd	Determination of Acid extractable Sulphate in Soils by IRIS Emission Spectrometer		

¹ Applies to Solid samples only. DRY indicates samples have been dried at 35°C. NA = not applicable.



SDG:	140331-12	Location:	Crane Cross	Order Number:	AT139
Job:	H_APEXTEST_BRG-40	Customer:	Apex Testing Solutions Limited	Report Number:	265933
Client Reference:	D4056-14	Attention:	Lisa Maiden	Superseded Report:	

Test Completion Dates

Lab Sample No(s)	9067870	9067873	9067877	9067879	9067880
Customer Sample Ref.	TP1	TP4	TP5	TP6	TP6
AGS Ref.	D2	D3	D5	D5	D7
Depth	0.70 - 0.80	0.40	1.10	1.50	2.80 - 2.90
Type	SOLID	SOLID	SOLID	SOLID	SOLID
Loss on Ignition in soils	04-Apr-2014	04-Apr-2014	04-Apr-2014	04-Apr-2014	04-Apr-2014
pH	02-Apr-2014	02-Apr-2014	02-Apr-2014	02-Apr-2014	02-Apr-2014
Sample description	01-Apr-2014	01-Apr-2014	01-Apr-2014	01-Apr-2014	01-Apr-2014
Total Sulphate	07-Apr-2014	07-Apr-2014	08-Apr-2014	08-Apr-2014	08-Apr-2014



SDG: 140331-12
Job: H_APEXTEST_BRG-40
Client Reference: D4056-14

Location: Crane Cross
Customer: Apex Testing Solutions Limited
Attention: Lisa Maiden

Order Number: AT139
Report Number: 265933
Superseded Report:

Appendix General

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICS and SVOC TICS.

2. Samples will be run in duplicate upon request, but an additional charge may be incurred.

3. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALcontrol Laboratories reserve the right to charge for samples received and stored but not analysed.

4. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

5. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

6. When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible. The quantity of asbestos present is not determined unless specifically requested.

7. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

8. If appropriate preserved bottles are not received preservation will take place on receipt. However, the integrity of the data may be compromised.

9. NDP -No determination possible due to insufficient/unsuitable sample.

10. Metals in water are performed on a filtered sample, and therefore represent dissolved metals -total metals must be requested separately.

11. Results relate only to the items tested.

12. LODs for wet tests reported on a dry weight basis are not corrected for moisture content.

13. **Surrogate recoveries** -Most of our organic methods include surrogates, the recovery of which is monitored and reported. For EPH, MO, PAH, GRO and VOCs on soils the result is not surrogate corrected, but a percentage recovery is quoted. Acceptable limits for most organic methods are 70 -130 %.

14. **Product analyses** -Organic analyses on products can only be semi-quantitative due to the matrix effects and high dilution factors employed.

15. Phenols monohydric by HPLC include phenol, cresols (2-Methylphenol, 3-Methylphenol and 4-Methylphenol) and Xylenols (2,3 Dimethylphenol, 2,4 Dimethylphenol, 2,5 Dimethylphenol, 2,6 Dimethylphenol, 3,4 Dimethylphenol, 3,5 Dimethylphenol).

16. Total of 5 speciated phenols by HPLC includes Phenol, 2,3,5-Trimethyl Phenol, 2-Isopropylphenol, Cresols and Xylenols (as detailed in 15).

17. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

18. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

19. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

20. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

21. For all leachate preparations (NRA, DIN, TCLP, BSEN 12457-1, 2, 3) volatile loss may occur, as we do not employ zero headspace extraction.

22. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill /made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

23. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

Sample Deviations

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Holding time exceeded before sample received
5	Samples exceeded holding time before preservation was performed
\$	Sampled on date not provided
♦	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to sampled on date
&	Sample Holding Time exceeded - Late arrival of instructions.

Asbestos

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using Alcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using Alcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthrophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than :
 -

Trace -Where only one or two asbestos fibres were identified.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

**ENCLOSURE E
PHOTOGRAPHS**

Trial Pits

E1 to E12

Trial Pit Photographs



TP1

Notes:	Project	Crane Cross Civic Amenity Site, Pembrokeshire	Figure E1
	Project No.	1306	
	Carried out for	Pembrokeshire County Council	

Trial Pit Photographs



TP1

Notes:	Project Crane Cross Civic Amenity Site, Pembrokeshire Project No. 1306 Carried out for Pembrokeshire County Council	Figure E2
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Trial Pit Photographs



TP2

Notes:	Project	Crane Cross Civic Amenity Site, Pembrokeshire	Figure E3
	Project No.	1306	
	Carried out for	Pembrokeshire County Council	

Trial Pit Photographs



TP2

Notes:	Project	Crane Cross Civic Amenity Site, Pembrokeshire	Figure E4
	Project No.	1306	
	Carried out for	Pembrokeshire County Council	



TP3

Notes:	<table><tr><td>Project</td><td>Crane Cross Civic Amenity Site, Pembrokeshire</td></tr><tr><td>Project No.</td><td>1306</td></tr><tr><td>Carried out for</td><td>Pembrokeshire County Council</td></tr></table>	Project	Crane Cross Civic Amenity Site, Pembrokeshire	Project No.	1306	Carried out for	Pembrokeshire County Council	<table><tr><td>Figure</td><td>E5</td></tr></table>	Figure	E5
Project	Crane Cross Civic Amenity Site, Pembrokeshire									
Project No.	1306									
Carried out for	Pembrokeshire County Council									
Figure	E5									

Trial Pit Photographs



TP3

Notes:	Project	Crane Cross Civic Amenity Site, Pembrokeshire	Figure E6
	Project No.	1306	
	Carried out for	Pembrokeshire County Council	



TP4

Notes:	Project	Crane Cross Civic Amenity Site, Pembrokeshire	Figure E7
	Project No.	1306	
	Carried out for	Pembrokeshire County Council	

Trial Pit Photographs



TP4

Notes:	Project	Crane Cross Civic Amenity Site, Pembrokeshire	Figure E8
	Project No.	1306	
	Carried out for	Pembrokeshire County Council	

Trial Pit Photographs



TP5

Notes:	<table><tr><td>Project</td><td>Crane Cross Civic Amenity Site, Pembrokeshire</td></tr><tr><td>Project No.</td><td>1306</td></tr><tr><td>Carried out for</td><td>Pembrokeshire County Council</td></tr></table>	Project	Crane Cross Civic Amenity Site, Pembrokeshire	Project No.	1306	Carried out for	Pembrokeshire County Council	<table><tr><td>Figure</td></tr><tr><td>E9</td></tr></table>	Figure	E9
Project	Crane Cross Civic Amenity Site, Pembrokeshire									
Project No.	1306									
Carried out for	Pembrokeshire County Council									
Figure										
E9										

Trial Pit Photographs



TP5

Notes:	<table><tr><td>Project</td><td>Crane Cross Civic Amenity Site, Pembrokeshire</td></tr><tr><td>Project No.</td><td>1306</td></tr><tr><td>Carried out for</td><td>Pembrokeshire County Council</td></tr></table>	Project	Crane Cross Civic Amenity Site, Pembrokeshire	Project No.	1306	Carried out for	Pembrokeshire County Council	<table><tr><td>Figure</td></tr><tr><td>E10</td></tr></table>	Figure	E10
Project	Crane Cross Civic Amenity Site, Pembrokeshire									
Project No.	1306									
Carried out for	Pembrokeshire County Council									
Figure										
E10										



TP6

Notes:

Project Crane Cross Civic Amenity Site, Pembrokeshire
Project No. 1306
Carried out for Pembrokeshire County Council

Figure

E11



TP6

Notes:	Project Crane Cross Civic Amenity Site, Pembrokeshire Project No. 1306 Carried out for Pembrokeshire County Council	Figure E12
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ENCLOSURE F
DRAWINGS

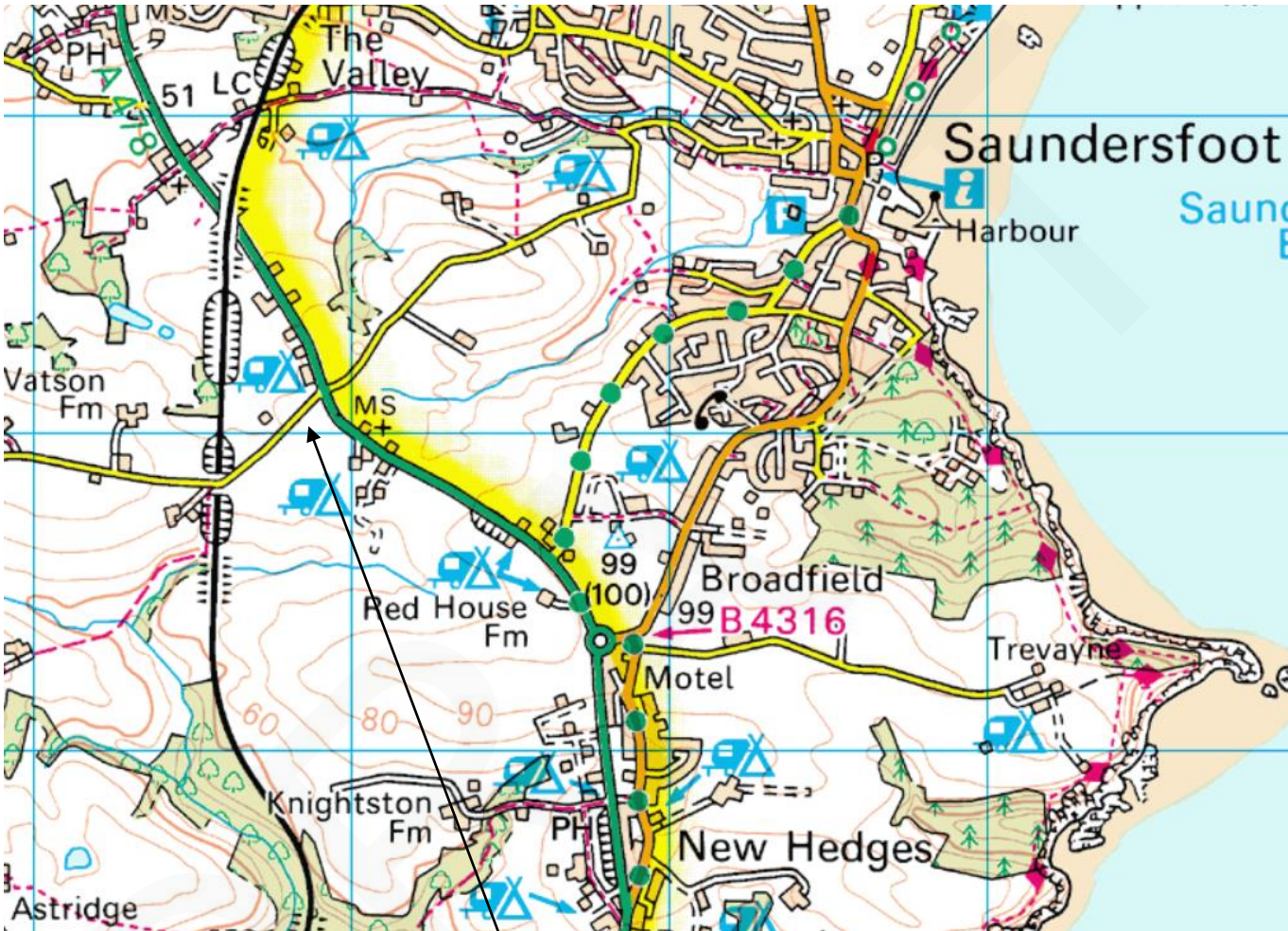
Site Location Plan

F1

Exploratory Hole Location Plan

F2 to F3

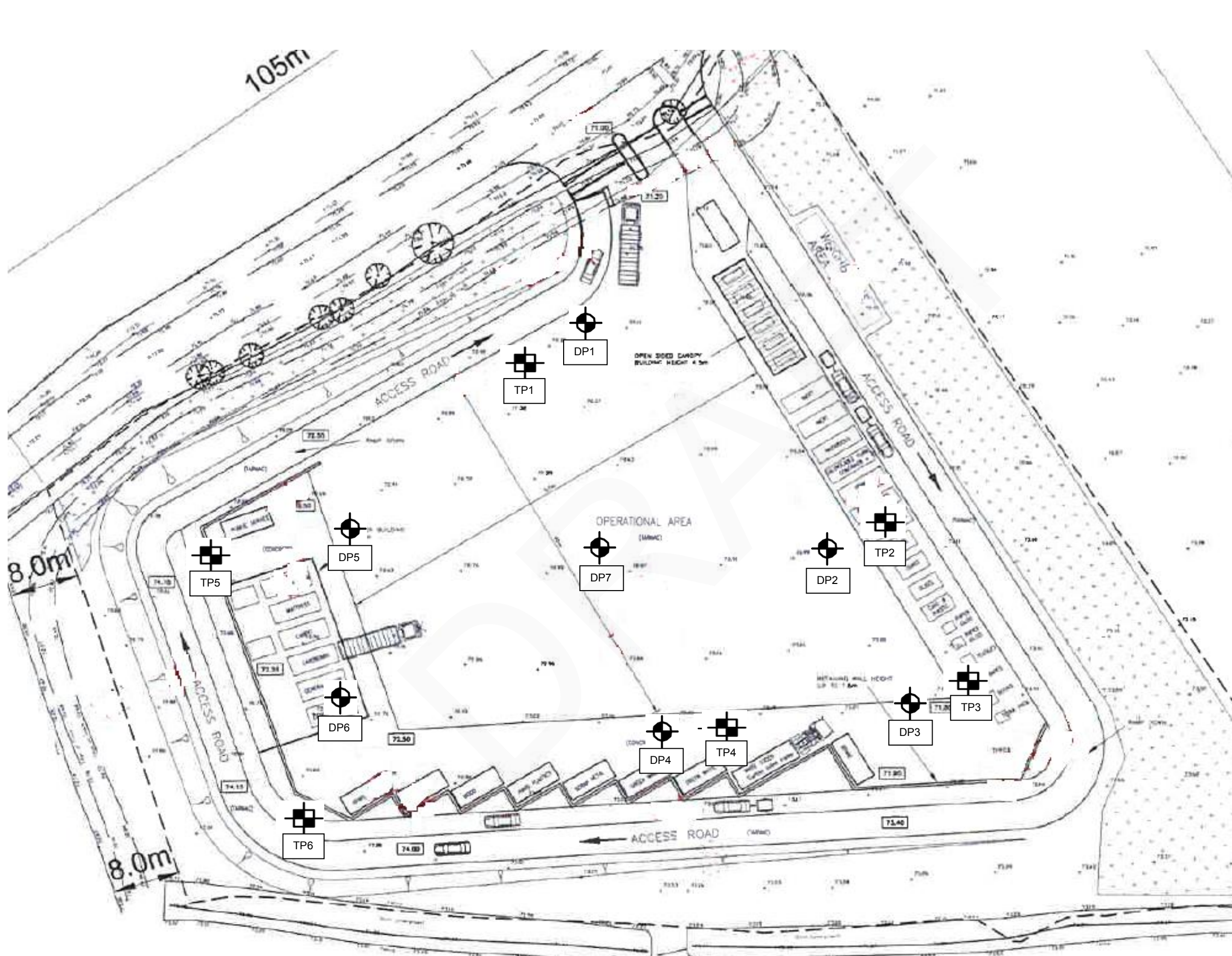
Site Location Plan



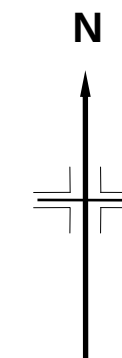
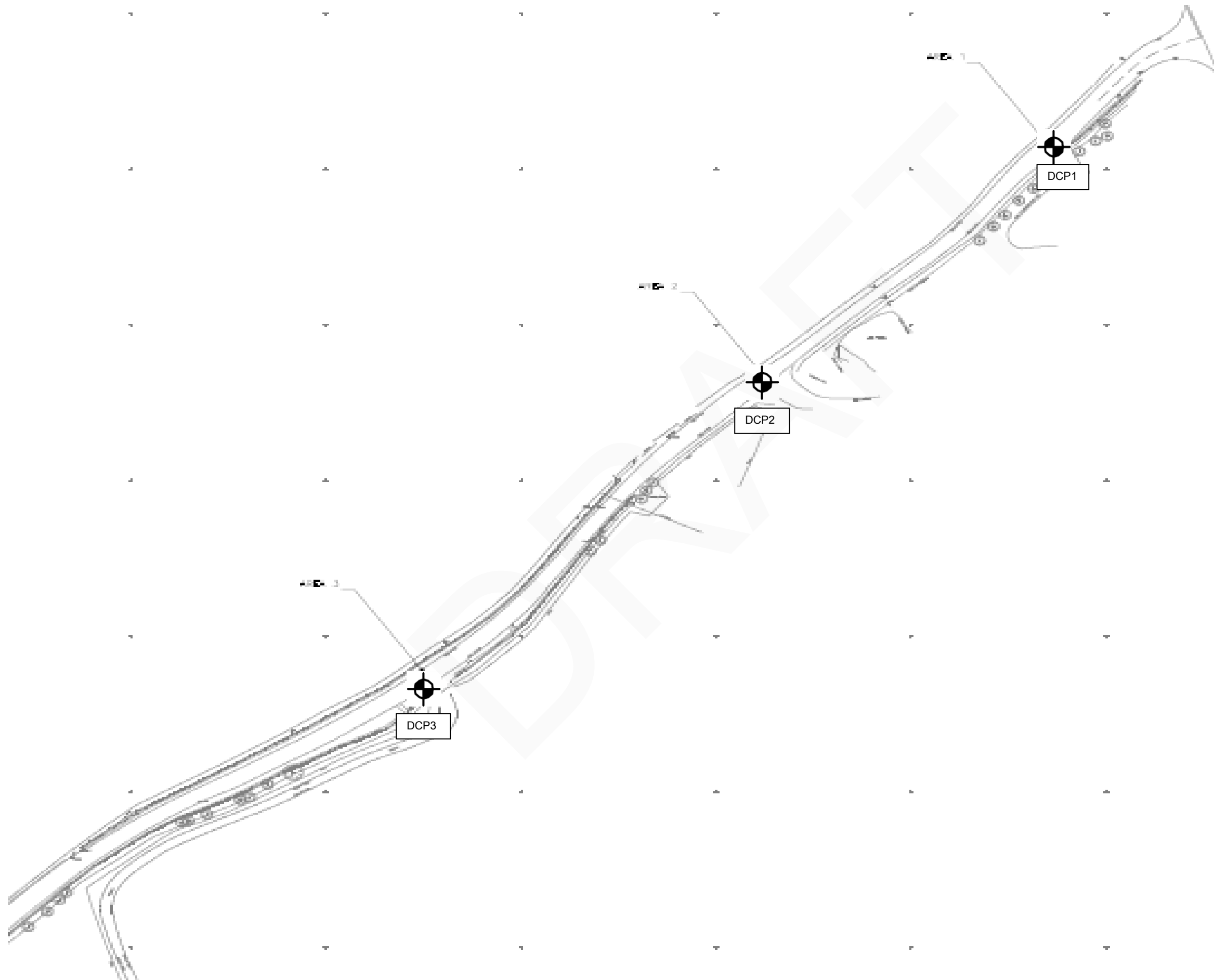
**THE
SITE**

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Notes: NTS	Project	Crane Cross Civic Amenity Site, Pembrokeshire	Figure F1
	Project No.	1306	
	Carried out for	Pembrokeshire County Council	



Title Exploratory Hole Location Plan	
Project Crane Cross Civic Amenity Site, Pembrokeshire	
Client Pembrokeshire County Council	
Key  Dynamic Probe  Trial Pit	
Scale Not To Scale (Approximate Locations)	
	
Project No 1306	Figure No F2



Title	Exploratory Hole Location Plan		
Project	Crane Cross Civic Amenity Site, Pembrokeshire		
Client	Pembrokeshire County Council		
Key	 Dynamic Cone Penetrometer		
Scale	Not To Scale (Approximate Locations)		
			
Project No	1306		Figure No
			F3