



Ground and Environmental Services Limited

Unit 2 Montpelier Business Park

Dencora Way

Ashford

Kent

TN23 4FG

01233 646237

**Stonwald,
Hillside Street,
Hythe,
Kent CT21 5DJ**

Report on Ground Investigation

On behalf of Parking Options Chartered Surveyors



Document Reference: 13259

May 2024

air quality assessment contaminated land ecology environmental audits noise assessment
environmental impact assessments flood risk assessments geotechnical engineering ground investigation
hydrogeology noxious weeds remediation design risk assessments waste management

Site: Stonwald, Hillside Street, Hythe, Kent CT21 5DJ

Document Reference No: 13259

Quality Management

Prepared by:	JM
Reviewed by:	PAD
Authorised by:	CSS
Date	May 2024
Revision	Draft – awaiting final laboratory test results

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1 INTRODUCTION

Ground and Environmental Services Ltd (GES) was commissioned by Parking Options Chartered Surveyors (The Client) to undertake a Ground Investigation on a proposed development site at Stonwald, Hillside Street, Hythe CT21 5DJ.

It was understood that the current development proposal comprises the reduction of ground levels to the drive and garage by demolition and excavation and the construction of a new retaining wall along the front elevation of the property.

The purpose of the ground investigation was to provide geotechnical recommendations to aid retaining wall design.

This report specifically excludes comment or advice with regards to contaminated land or pollution related issues.

2 SITE LOCATION AND LAYOUT

The site was located in Hythe to the North-east of Hillside Street and was centred upon an approximate ordnance survey grid reference centre: TR16289 34874.

The investigation area was located to the South of the Stonwald Property, this area comprised of a flat upper terraced area with hardstanding in the East and soft landscaping in the West. To the South of this a sharp downward slope led to an area of hardstanding with a garage built into the hillside. The site is situated on an escarpment which steeply slopes downward to the South from Church Road to the North of the Stonwald property to Hillside Street to the South/Southwest. This is part of a much larger escarpment which comprises much of the Hythe area.

The site was surrounded on all sides by residential properties with Church Road to the immediate North, Tynwald Residential Home to the South with Hillside Street to the South/Southwest.

3 GEOLOGICAL SETTING

Reference to the online British Geological Survey maps indicated the site to be underlain by the solid geology of the Weald Clay Formation with the overlying Atherfield Clay Formation shown in outcrop to the immediate North of the site. The geological memoir for the area described these strata as follows:

Atherfield Clay Formation

Comprising of generally massive yellow brown to pale grey sandy mudstones with an impersistent phosphatic pebble bed with vertebrate bones, gritty sandstone or very shelly sandy mudstone with glauconite, at the base.

Weald Clay Formation

Comprising of thinly bedded mudstones and mudstones with subordinate siltstones and fine to medium grained sandstones.

4 INTRUSIVE INVESTIGATION

4.1 FIELDWORK

The site works were carried out between the 25th April and 15th May 2024 and comprised the following:

- Window Sampling
- Groundwater Level Monitoring

The positions of the above works on the site are indicated on Figure 1, Exploratory Hole Location Plan.

Window Sampling

Three window sample holes were excavated to depths ranging between 3.0mbegl and 4.0mbegl. WS1 and WS2 were excavated using handheld drilling techniques and WS3 using a track mounted Premier 110 window sampling rig.

The soils and materials encountered in the holes were logged and representative samples recovered for laboratory analysis. Standard penetration tests were also carried out in WS3 using the split spoon attachment. Upon completion WS2 and WS3 were completed with 35mm standpipes. WS1 was backfilled with arisings.

Window sample logs and installation details are presented in Appendix 1.

Groundwater Level Monitoring

The results from the groundwater level monitoring visit undertaken on the 15th May 2024 are presented in Appendix 2.

4.2 GROUNDWATER

Groundwater was encountered during the intrusive investigation in WS3 at a depth of 0.6mbegl. Post fieldwork monitoring recorded WS2 to be dry and WS3 to have ground water at 0.69mbegl.

It should be noted that groundwater levels may vary due to seasonal fluctuations in rainfall, but in the shorter term, can be affected by antecedent weather conditions or other causes.

5 LABORATORY TESTING

The following range of laboratory tests were scheduled and the results are presented in Appendix 3.

- i.* Determination of Moisture Content (4 no.).
- ii.* Determination of Atterberg Limits (4 no.).
- iii.* Determination of pH (3 no.).
- iv.* Determination of water-soluble sulphate (3 no.).

At the time of reporting the results from some of the Atterberg limit tests were awaited.

6 GROUND CONDITIONS

6.1 GROUND PROFILE

The soils encountered during this investigation are described in the window sample logs presented in Appendix 1. The ground profile encountered at the site comprised a significant thickness of Made Ground over a discontinuous horizon of soils typical of the Atherfield Clay Formation over soils typical of the Weald Clay Formation.

Made Ground

Made Ground materials were found at all WS locations to depths ranging between 1.3mbegl and 2.4mbegl and comprised of dark brown silty sandy clay with red brick flint, concrete, burnt carbon and occasional fine roots up to 2mm in diameter. At the location of WS1 a paving slab over sand and concrete was encountered from surface level to 0.45mbegl.

Atherfield Clay Formation

The Atherfield Clay Formation was found to a depth of 3.9mbegl in WS1 and to the base of WS2 at 3.0mbegl. The Atherfield Clay Formation comprised of light tan with some pale green silty clay in WS1 and light tan with some pale green very sandy clay in WS2.

Weald Clay Formation

The Weald Clay Formation was found in WS1 between 3.9mbegl and 4.0mbegl and in WS3 from 1.3mbegl to a minimum depth of 5.0mbegl. The Weald Clay Formation comprised of three distinctive horizons:

Upper Horizon:

The upper horizon was found from 3.9mbegl to 4.0mbegl (WS1) and 1.3mbegl to 2.3mbegl (WS3). The upper horizon comprised of dark grey brown with some light tan slightly silty clay.

Middle Horizon:

The middle horizon was found only in WS3 from 2.3mbegl to 3.0mbegl and comprised of firm light brown clay.

Lower Horizon:

The lower horizon was found only in WS3 from 3.0mbegl to 5.0mbegl and comprised of dark grey clay with occasional fossil beds throughout.

The base of the Weald Clay Formation was not found during this investigation.

6.2 ENGINEERING PROPERTIES

The engineering properties of the principal strata, as described above, can be assessed based upon a combination of the in situ and laboratory test results. A summary of the engineering properties is given below:

Atherfield Clay Formation

Classification tests indicated intermediate to very high plasticity clay soils (CI/CV) with plasticity indices in the range 16% to 47% recorded. With reference to the NHBC standards these soils are classified as having a low to high shrink/swell potential.

It is worth noting the lower plasticity soils were found in WS2 which had a significantly greater sand constituent and a low shrink swell potential.

Weald Clay Formation

Standard penetration tests (SPTs) within the Weald Formation recorded N values in the range 7 to 26 (soft to stiff). The SPT test results are presented in Figure 2. Figure 3 provides a plot of corrected N_{60} values against depth. The N_{60} value taking into account an energy ratio (Er) of 86% for the test equipment used.

Classification tests indicated high plasticity clay soils (CH) with plasticity indices of 37% recorded. With reference to the NHBC standards these soils are classified as having a medium shrink/swell potential.

Foundation Design Parameters

For preliminary design of foundations, the following values may be used:

- Undrained Shear strength (lower bound) 40 kN/m² Firm
- Coefficient of Compressibility $mv = 0.25\text{m}^2/\text{MN}$ (Estimated).
- Shrink/swell potential High

7 ENGINEERING DESIGN

7.1 GENERAL CONSIDERATIONS

It should be noted that in the Hythe area, 'Latchgate' conditions typically apply to new developments. These are put in place to ensure that new building does not adversely affect the ground water regime, current stability of the slopes and stability of adjacent properties and structures.

Given that the site lies within a known landslip zone the following general rules should be followed which apply to all buildings constructed on sloping ground.

1. Avoid unloading at the toe of the slope.
2. Avoid loading at the crest of the slope.
3. Incorporate drainage.
4. Prevent slope drainage feeding into back scarp or old slip feature.
5. For sites with a marginal factor of safety on slope stability, slope stabilisation features may need to be considered, which should as far as possible be installed without disturbing the slope.

If these general rules cannot practically be followed measures would need to be incorporated into the building design so as to counter the adverse effects of such changes to the site. A discussion on slope stability issues is presented in section 7.2 below.

7.2 SLOPE STABILITY ASSESSMENT

At the time of the ground investigation no visual observations of slope instability were made either on site or in the immediate surrounding area. However, it should be noted that the site appears to have previously been landscaped and the natural geomorphology of the ground surface has been changed.

From the results of numerous studies on the Lower Greensand escarpment the main slope failure mechanisms that may have an impact on the site would be creep movement along pre-existing shear surfaces located within superficial Landslip Deposits and deep seated translational and rotational failure within the Atherfield Clay stratum.

Based on the composition of the Made ground found during this ground investigation which comprised silty sandy clay with subordinate quantities of brick, flint and carbon fragments the risk of movement from creep movement along pre-existing shear surfaces in this material is considered to be very low for this site.

Soils of both the Atherfield Clay and Weald Clay Formations were found during this investigation although no evidence of shear surfaces, indicative of previous movement, were observed within the soil profile with a maximum depth of 5m investigated. It is considered given the nature of the development and the lack of evidence of any pre-existing shear surface the risk of mobilising a translational and rotational slip in the

Atherfield or Weald Clay is very low. The requirement for a full slope stability analysis should be confirmed with Folkestone and Hythe District Council Building Control. However based on the information gained from this investigation it is our opinion that a full slope stability analysis would not be required.

For information purposes the following data set is considered appropriate, without the benefit of additional ground investigation work, should a full slope stability analysis be required.

Material	Bulk Unit Weight	Angle of Shearing Resistance	Cohesion
Made Ground Materials	18 kg/cm ³	15° (Peak) 10° (Residual)	0
Atherfield Clay	20	23 (peak) 12 (residual)	0
Weald Clay	20	23 (peak) 12 (residual)	0

7.3 ALLOWABLE BEARING PRESSURES

It was understood that the proposed redevelopment of the site would comprise the reduction of ground levels to the drive and garage by demolition and excavation and the construction of a new retaining wall along the front elevation of the property.

At the time of reporting, applied structural loads from the proposed development were unknown. However, for preliminary foundation design purposes a maximum line load of 30kN/m run has been adopted.

Allowable Bearing Pressure

Based on field observations, in situ testing and laboratory test results, a maximum allowable bearing of 100 kN/m² is recommended for foundations placed within either of the Atherfield or Weald Clay Formations.

7.4 RETAINING WALLS

The following parameters may be used in the design of new retaining walls:

Material	Bulk Unit Weight (kN/m ³)	Angle of Shearing Resistance, ϕ °	Cohesion, c' (kN/m ²)
Landslip Deposits	18.5	20	0
Atherfield Clay	20	23	0
Weald Clay	20	23	0

Groundwater was not found in WS2 but was found at a depth of 0.69m below ground level which would likely be below the level of the proposed new retaining wall. Nevertheless drainage measures would need to be introduced in any new retaining wall to prevent the build up of groundwater pressure.

7.5 TEMPORARY WORKS

Excavations in excess of 1.2m depth will be required in connection with the proposed development on this site. If there is a requirement for personnel to enter into excavations, then the need for trench side support should be considered for any depth of excavation and, therefore, appropriate equipment should be available on site prior to excavation proceeding. A site specific risk assessment should be carried out where man entry into excavations is required.

With reference to CIRIA Report 97 'Trenching Practice' the following angles from horizontal are given for safe temporary slopes:

Strata	Material Type	Dry site	Wet site
Made Ground	Soft to firm silty sandy clays	30-45	10-20
Atherfield and Weald Clay Formation	Firm slightly sandy silty clays	35-45	20-25

As there may be insufficient space to accommodate these temporary slope angles a form of temporary slope support such as temporary sheet piles toeing into the Weald Clay maybe required.

It should be noted all exposed foundation bases should be blinded to prevent softening and deterioration of the formation, particularly when working in wet weather and whenever there is a delay between forming the excavation and placing the foundation concrete. All soft, loose, organic or otherwise deleterious material at foundation depth should be removed and replaced with lean mix/concrete.

7.6 CHEMICAL ATTACK ON BURIED CONCRETE

The results of the chemical testing indicated a concentration of water-soluble sulphate in the range 15 mg/l to 62 mg/l as SO₄. pH values were slightly alkaline with a range between 7.9 and 8.3 pH units.

In accordance with BRE Special Digest 1 (SD1:2005) entitled 'Concrete in Aggressive Ground' a design sulphate class for the site of DS-1 is recommended. Using SD1 an ACEC (Aggressive Chemical Environment for Concrete) class of AC-1 is recommended.

8 CONCLUSIONS AND RECOMMENDATIONS

Based on the site investigation, intrusive works and subsequent data assessment, the following conclusions and recommendations have been drawn in respect of the site at Stonwald, Hillside Street, Hythe, Kent CT21 5DJ.

- The ground investigation found Made Ground over soils typical of the Atherfield Clay Formation with soils typical of the Weald Clay Formation found at depth.
- At the time of reporting, applied structural loads from the proposed development of the site were unknown. However, for preliminary foundation design purposes a line load of 30kN/m run was assumed for the new retaining wall.
- The Atherfield Clay and Weald Clay Formations were identified as suitable founding strata for the proposed retaining wall.
- Based on field observations, in situ testing and laboratory test results, a maximum allowable bearing of 100kN/m² was recommended.
- Parameters have been provided for use in the design of retaining structures and temporary works.
- The Atherfield Clay and Weald Clay Formation was found during this investigation although no evidence of shear surfaces, indicative of previous slope movement, were observed within the soil profile. It is considered given the nature of the development and the lack of evidence of any pre-existing shear surface the risk of mobilising a translational and rotational slip in either the Atherfield Clay and Weald Clay is low.
- The requirement for a full slope stability analysis should be confirmed with Folkestone and Hythe District Council Building Control. However, based on the information gained from this investigation it is our opinion that a full slope stability analysis would not be required.
- A design sulphate class of DS-1 and an ACEC class of AC-1 was recommended for buried concrete.



- KEY:**
- WS - WINDOW SAMPLE
 - BH - BOREHOLE
 - (I) - INSTALLATION
 - TP - TRIAL PIT
 - HDTP - HAND DUG TRIAL PIT
 - SP - SOAKAGE PIT
 - ▲ DCP - DYNAMIC CONE PENETRATION
 - DP - DYNAMIC PROBE
 - HA - HAND AUGER
 - PT - PERCOLATION TEST
 - GM - GAS MONITORING STANDPIPE
 - S - SAMPLE LOCATION
 - HHWS - HAND-HELD WINDOW SAMPLE

CLIENT:
Mr K Hammond

SITE ADDRESS:
Stonewald
Hillside Street
Hythe
CT21 5DJ

DRAWING NO.:
Figure 1

DRAWING TITLE:
Exploratory Hole Location Plan

PROJECT NO.:
13259

DATE:
05/2024

DRAWN:
PJ

REVISION:
00

GROUND AND ENVIRONMENTAL
SERVICES (GES) LIMITED
UNIT 2
MONTPELIER BUSINESS PARK
DENCORA WAY
ASHFORD
KENT TN23 4FG
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Figure 2: Stonwald, Hillside Street, Hythe
SPT N-Depth Profile

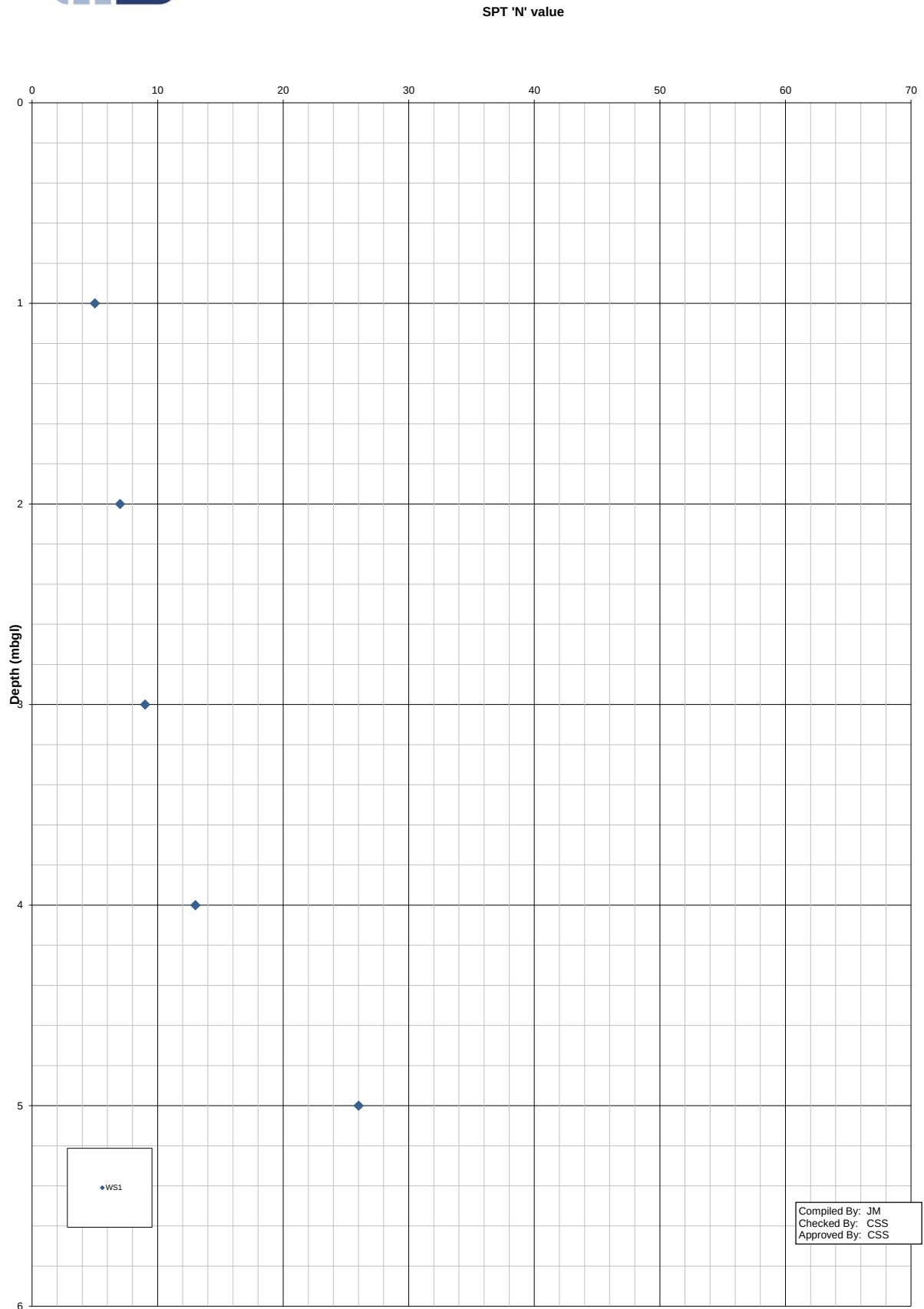
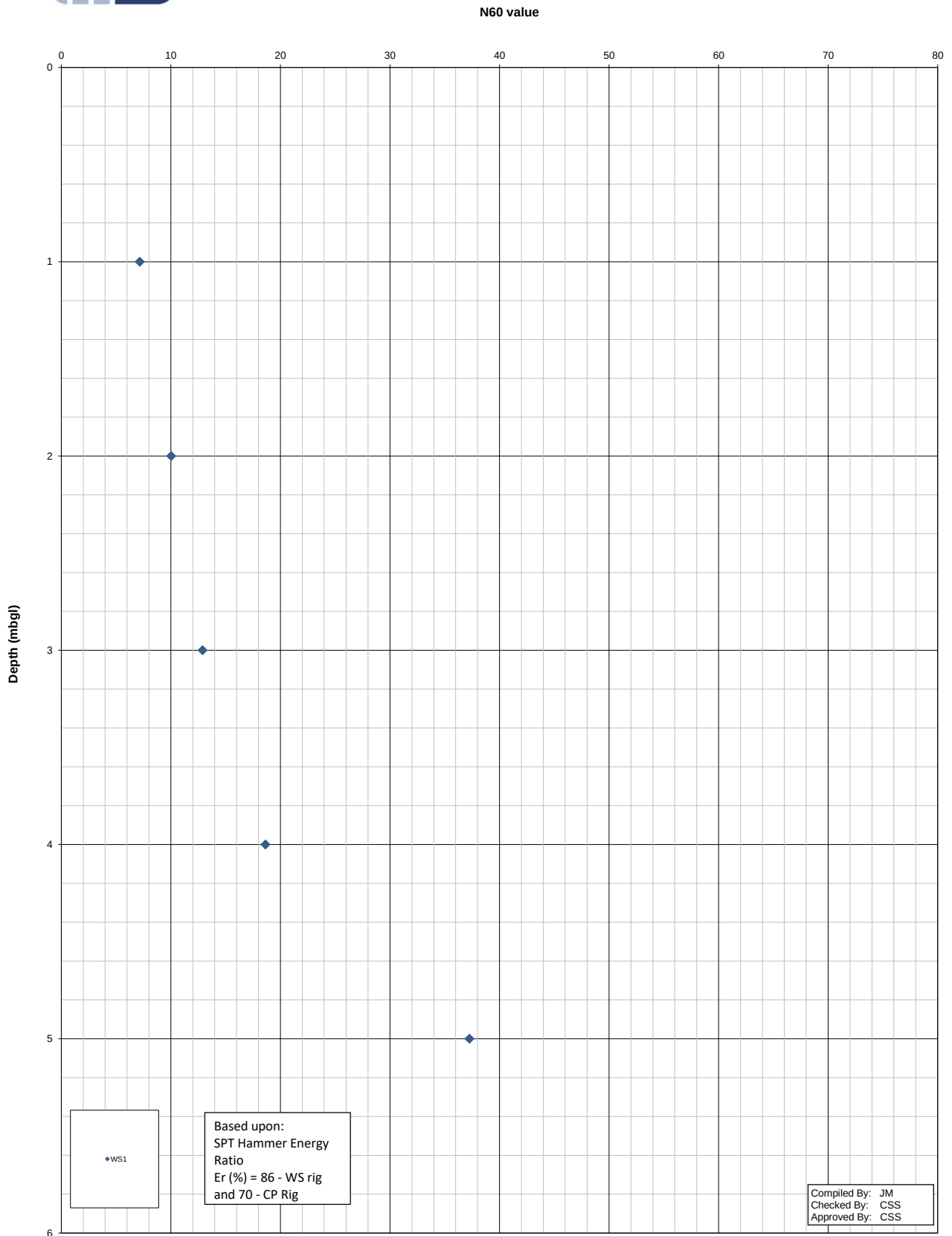




Figure 3: Stonwald, Hillside Street, Hythe
N60-Depth Profile

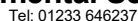




APPENDIX 1

**WINDOW SAMPLE LOGS AND
INSTALLATION DETAILS**

 Ground and Environmental Services Limited Unit 2 Montpelier Business Park Dencora Way, Ashford Kent TN23 4FG Window Sampler Log No. WS1 Sheet: 1 of 1																																																																																																												
Equipment & Methods. Hand Held Equipment Support Used:None Backfill: Arisings Project Name: Stonwald, Hillside Street Project Location: Hythe Client: Parking Options Chartered Surveyors Job No: 13259																																																																																																												
Co-ordinates: E: N: Ground Level (m): Date Started:25/04/2024 Date Completed:25/04/2024																																																																																																												
Samples and In situ Testing Depth (m) No. Type Result Field Records DESCRIPTION Reduced Level (m) Legend Depth (Thick) (m) <table><tr><td rowspan="4">0.30</td><td rowspan="4"></td><td rowspan="4">D</td><td rowspan="4"></td><td rowspan="4"></td><td>MADEGROUND: Concrete Slab.</td><td>-0.10</td><td rowspan="4"></td><td>(0.10)</td></tr><tr><td>MADEGROUND: Brick, sand and concrete.</td><td></td><td>(0.35)</td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr><tr><td rowspan="2">0.70</td><td rowspan="2"></td><td rowspan="2">D</td><td rowspan="2"></td><td rowspan="2"></td><td>MADEGROUND: Dark brown silty clay with red brick and burnt carbon.</td><td>-0.45</td><td rowspan="2"></td><td>0.45</td></tr><tr><td></td><td></td><td></td></tr><tr><td rowspan="2">1.20</td><td rowspan="2"></td><td rowspan="2">D</td><td rowspan="2"></td><td rowspan="2"></td><td></td><td></td><td rowspan="2"></td><td rowspan="2">(1.95)</td></tr><tr><td></td><td></td><td></td></tr><tr><td rowspan="2">1.80</td><td rowspan="2"></td><td rowspan="2">D</td><td rowspan="2"></td><td rowspan="2"></td><td></td><td></td><td rowspan="2"></td><td rowspan="2"></td></tr><tr><td></td><td></td><td></td></tr><tr><td rowspan="2">2.50</td><td rowspan="2"></td><td rowspan="2">D</td><td rowspan="2"></td><td rowspan="2"></td><td>Dry firm light tan with some pale green slight silty CLAY.</td><td>-2.40</td><td rowspan="2"></td><td>2.40</td></tr><tr><td></td><td></td><td>(1.50)</td></tr><tr><td rowspan="2">3.50</td><td rowspan="2"></td><td rowspan="2">D</td><td rowspan="2"></td><td rowspan="2"></td><td></td><td></td><td rowspan="2"></td><td rowspan="2"></td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td>Dry firm dark grey brown slightly silty CLAY.</td><td>-3.90</td><td rowspan="2"></td><td>3.90 (0.10)</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>-4.00</td><td>4.00</td></tr><tr><td colspan="6"></td><td colspan="3">End of W/S 4.00 m (Thickness of basal layer not proven)</td></tr></table>					0.30		D			MADEGROUND: Concrete Slab.	-0.10		(0.10)	MADEGROUND: Brick, sand and concrete.		(0.35)							0.70		D			MADEGROUND: Dark brown silty clay with red brick and burnt carbon.	-0.45		0.45				1.20		D						(1.95)				1.80		D										2.50		D			Dry firm light tan with some pale green slight silty CLAY.	-2.40		2.40			(1.50)	3.50		D															Dry firm dark grey brown slightly silty CLAY.	-3.90		3.90 (0.10)							-4.00	4.00							End of W/S 4.00 m (Thickness of basal layer not proven)		
0.30		D								MADEGROUND: Concrete Slab.	-0.10			(0.10)																																																																																														
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Remarks: Logged By: JM Checked By: CSS Scale: 1:25 Approved By: FIG No. Notes: For explanation of symbols and abbreviations, see Key Sheet.																																																																																																												



Sheet: 1 of 1

Job No:
13259

Date Started:25/04/2024
Date Completed:25/04/2024

0.30		D		MADEGROUND: Grass over dark brown silty sandy clay with red brick flint and frequent fine roots up to 2mm in diameter.			
0.70		D					(1.50)
1.20		D					
1.80		D		MADEGROUND: Dry light brown with light grey silty clay with red brick and burnt carbon.	-1.50		1.50
				Dry firm to stiff light tan with light slightly pale greenish grey slightly silty very sandy CLAY.	-1.90		1.90
2.50		D					(1.10)
					-3.00		3.00

FIG No.

Notes: For explanation of symbols and abbreviations, see Key Sheet.



Ground and Environmental Services Limited

Unit 2 Montpelier Business Park
Dencora Way, Ashford
Kent TN23 4FG

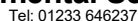
T: 01233 646237

Hole ID. WS2

Installation Details & Readings

Sheet: 1 of 1

Equipment & Methods. Hand Held Equipment _Support Used:None _Backfill: 35mm standpipe		Project Name: Stonwald, Hillside Street Project Location: Hythe Client: Parking Options Chartered Surveyors		Job No: 13259	
Co-ordinates: E: N:		Ground Level (m):		Date Started:25/04/2024 Date Completed:25/04/2024	
Installation Date : 25/04/2024 Depth to TOP Response Zone : 1 (m) Installation Type : SP Depth to BASE Response Zone : 3 (m)				Installation Diagram	Depth Related Remarks (Elevation)
Notes: For explanation of symbols and abbreviations, see Key Sheet.				Compiled By:	Checked By:
				JM	CSS
				Scale:	Approved By:
				FIG No.	



Sheet: 1 of 1

Project Name: Stonwald, Hillside Street
Project Location: Hythe
Client: Parking Options Chartered Surveyors

Job No:
13259

Ground Level (m):

Date Started:10/05/2024
Date Completed:10/05/2024

Samples and In situ Testing				Field Records	DESCRIPTION	Reduced Level (m)	Legend	Depth (Thick) (m)
Depth (m)	No.	Type	Result					
0.30		D		1,1/1,1,1,2	MADEGROUND: Tarmca over concrete.	-0.20		(0.20) 0.20
					MADEGROUND: Dark brown with black sand, brick and concrete.			(0.60)
0.70		D			...from 0.60 Wet	-0.80		0.80
			SN=5		MADEGROUND: Wet dark brown clay with concrete and red brick.			(0.50)
1.20		D				-1.30		1.30
					Wet firm dark grey brown with pockets of light tan highly plastic slightly silty CLAY, occasional preserved roots.			(1.00)
1.80		D		1,1/1,2,2,2				
			SN=7			-2.30		2.30
2.50		D			Wet firm light brown highly plastic CLAY.			(0.70)
			SN=9	1,1/2,2,2,3		-3.00		3.00
3.50		D			Wet dark grey CLAY with occasional fossil beds throughout.			
			SN=13	1,1/2,3,4,4				(2.00)
4.50		D						
			SN=26	2,4/6,6,7,7		-5.00		5.00
					End of W/S 5.00 m (Thickness of basal layer not proven)			

Remarks:

Logged By: JM	Checked By: CSS
Scale: 1:30	Approved By:
FIG No.	

Notes: For explanation of symbols and abbreviations, see Key Sheet.



Ground and Environmental Services Limited

Unit 2 Montpelier Business Park
Dencora Way, Ashford
Kent TN23 4FG

T: 01233 646237

Hole ID. WS3

Installation Details & Readings

Sheet: 1 of 1

Equipment & Methods. Premier 110 _Support Used:None _Backfill: 35mm standpipe		Project Name: Stonwald, Hillside Street Project Location: Hythe Client: Parking Options Chartered Surveyors		Job No: 13259	
Co-ordinates: E: N:		Ground Level (m):		Date Started:10/05/2024 Date Completed:10/05/2024	
Installation Date : 10/05/2024 Depth to TOP Response Zone : 1 (m) Installation Type : SP Depth to BASE Response Zone : 5 (m)				Installation Diagram	Depth Related Remarks (Elevation)
					1 (-1.00)
Notes: For explanation of symbols and abbreviations, see Key Sheet.				Compiled By:	Checked By:
				JM	CSS
				Scale:	Approved By:
				FIG No.	



APPENDIX 2
GROUNDWATER LEVEL MONITORING RESULTS



Accuracy and range of Gas Analyser 5000 (GA5000)					Notes: CH4: methane in percent volume per volume (% v/v) CO2: carbon dioxide in %v/v O2: oxygen in % v/v H2S: hydrogen sulphide in part per million (ppm) CO: carbon monoxide in ppm B.P.: Barometric pressure in mBar Flow: Gas flow in litre per hour (l/h)
Accuracy			Range		
Gas	Gas Concentrations				
	0-5%	5-15%	0-FS		
CH ₄	+/-0.5%	+/-3%		0-70% to specification, 0-100% reading	
CO ₂	+/-0.5%	+/-3%		0-40% to specification, 0-100% reading	
O ₂	+/-1%	+/-1%		0-25%	
CO			+/-10%FS	0-500ppm	
H ₂ S			+/-10%FS	0-200ppm	
B.P.	+/- 5 mBar			700-1200 mBar	
Flow:					



APPENDIX 3
LABORATORY TEST RESULTS



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Site: Stonwald

Project No: 13259

Client: KR Hammond Ltd

Date: 20/05/2024

Date Received: 30/04/2024

Date Tested: 30/04/2024

Test Results

Location ID	Depth (m)	MC (%)	LL (%)	PL (%)	PI (%)	Est. % passing 425 µm sieve	Classification	Sample Type
WS 1	2.5	32	73	31	42	98	CV	D
WS 1	3.5	39	78	31	47	98	CV	D
WS 2	2.5	22	37	21	16	98	CI	D
WS 3	1.8	27	59	22	37	98	CH	D
WS 3	2.5	29	61	24	37	98	CH	D

Visual Descriptions

Location ID	Depth	Description
WS 1	2.5	Light tan with some pale green silty CLAY
WS 1	3.5	Light tan with some pale green silty CLAY
WS 2	2.5	Light tan and pale green very sandy CLAY
WS 3	1.8	Dark grey brown silty CLAY
WS 3	2.5	Dark brown silty CLAY

Tested by: STP

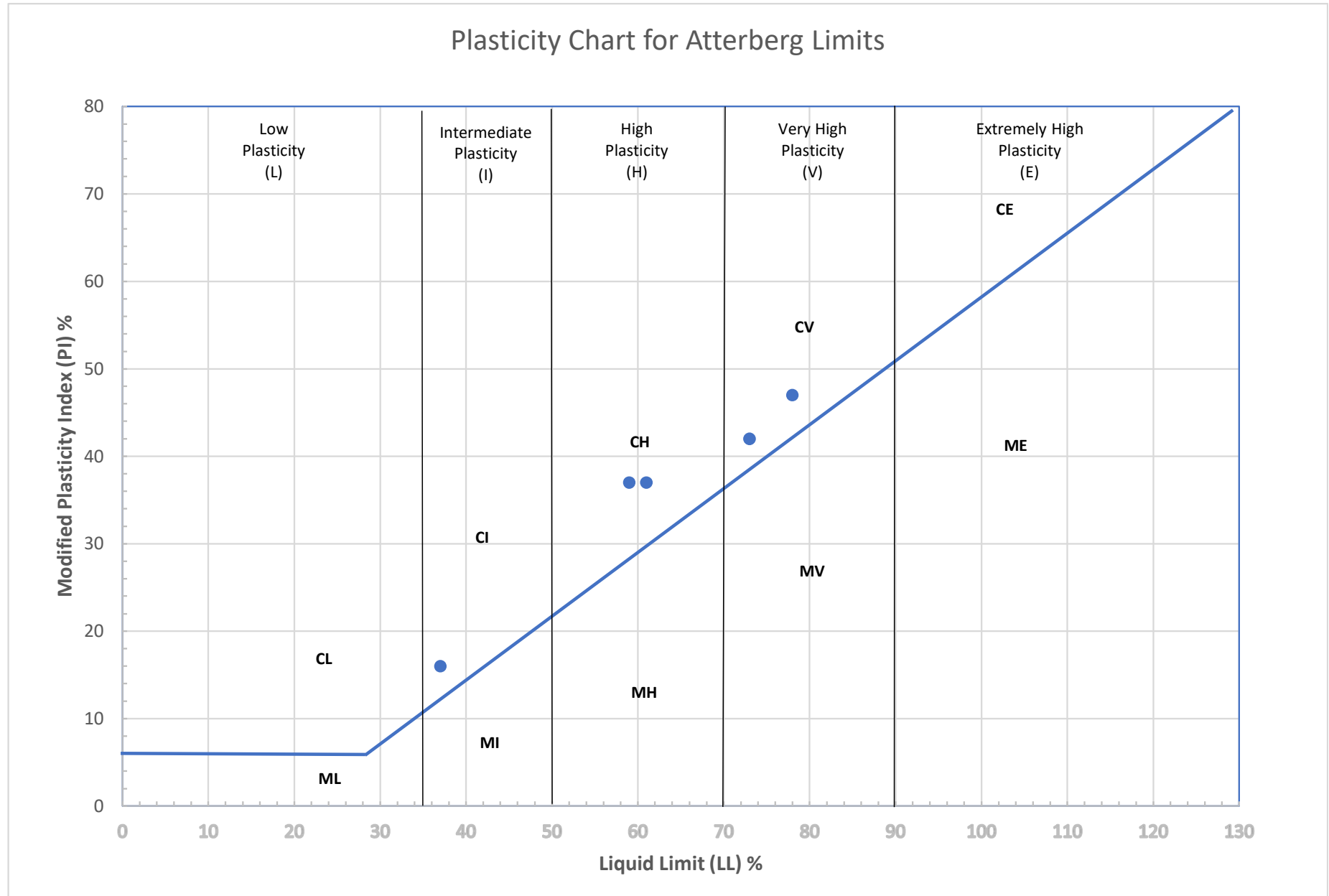
Checked by: CSS

Approved by: CSS

Ground and Environmental Services Limited

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Co Registration No: 7567478





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t: 01622 850410

DETS Report No: 24-04738

Site Reference: Stonwald, Hythe

Project / Job Ref: 13259

Order No: GES/5571.13259

Sample Receipt Date: 01/05/2024

Sample Scheduled Date: 02/05/2024

Report Issue Number: 1

Reporting Date: 09/05/2024

Authorised by:

Steve Knight
Customer Support Manager

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

Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.



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Soil Analysis Certificate						
DETS Report No: 24-04738	~Date Sampled	30/04/24	30/04/24	30/04/24		
Ground & Environmental Services Ltd	~Time Sampled	None Supplied	None Supplied	None Supplied		
~Site Reference: Stonwald, Hythe	~TP / BH No	WS1	WS1	WS2		
~Project / Job Ref: 13259	~Additional Refs	None Supplied	None Supplied	None Supplied		
~Order No: GES/5571.13259	~Depth (m)	1.80	2.50	1.80		
Reporting Date: 09/05/2024	DETS Sample No	712729	712730	712731		

Determinand	Unit	RL	Accreditation				
pH	pH Units	N/a	MCERTS	8.2	8.3	7.9	
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS	61	62	15	
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS	0.06	0.06	0.01	

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

~ Sample details provided by the customer



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Soil Analysis Certificate - Sample Descriptions

DETS Report No: 24-04738	
Ground & Environmental Services Ltd	
~Site Reference: Stonwald, Hythe	
~Project / Job Ref: 13259	
~Order No: GES/5571.13259	
Reporting Date: 09/05/2024	

DETS Sample No	~TP / BH No	~Additional Refs	~Depth (m)	Moisture Content (%)	Sample Matrix Description
712729	WS1	None Supplied	1.80	15.9	Brown sandy loam
712730	WS1	None Supplied	2.50	20.5	Grey clay
712731	WS2	None Supplied	1.80	13.1	Brown sandy loam with stones

Moisture content is part of procedure E003 & is not an accredited test

Insufficient Sample ^{1/5}

Unsuitable Sample ^{U/S}

~ Sample details provided by the customer



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Soil Analysis Certificate - Methodology & Miscellaneous Information

DETS Report No: 24-04738

Ground & Environmental Services Ltd

~Site Reference: Stonwald, Hythe

~Project / Job Ref: 13259

~Order No: GES/5571.13259

Reporting Date: 09/05/2024

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphénylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 - C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	Fraction Organic Carbon (FOC)	Determination of TOC by combustion analyser.	E027
Soil	D	Organic Matter (SOM)	Determination of TOC by combustion analyser.	E027
Soil	D	TOC (Total Organic Carbon)	Determination of TOC by combustion analyser.	E027
Soil	AR	Exchangeable Ammonium	Determination of ammonium by discrete analyser.	E029
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450°C	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (all: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (all: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried

AR As Received

~ Sample details provided by the customer