

# GEOTECHNICAL

## for Subsidence Management Services

**96 Haverstock Hill, Lower Belsize Park, London, NW3 2BD**

Client: Subsidence Management Services  
 Client Contact: Raymond Borrow  
 Client Ref: IFS-AVI-SUB-14-0052426  
 Policy Holder: Haverstock Hill Limited  
 Report Date: 30 September 2016  
 Our Ref: C18151G12112

### Site Plan

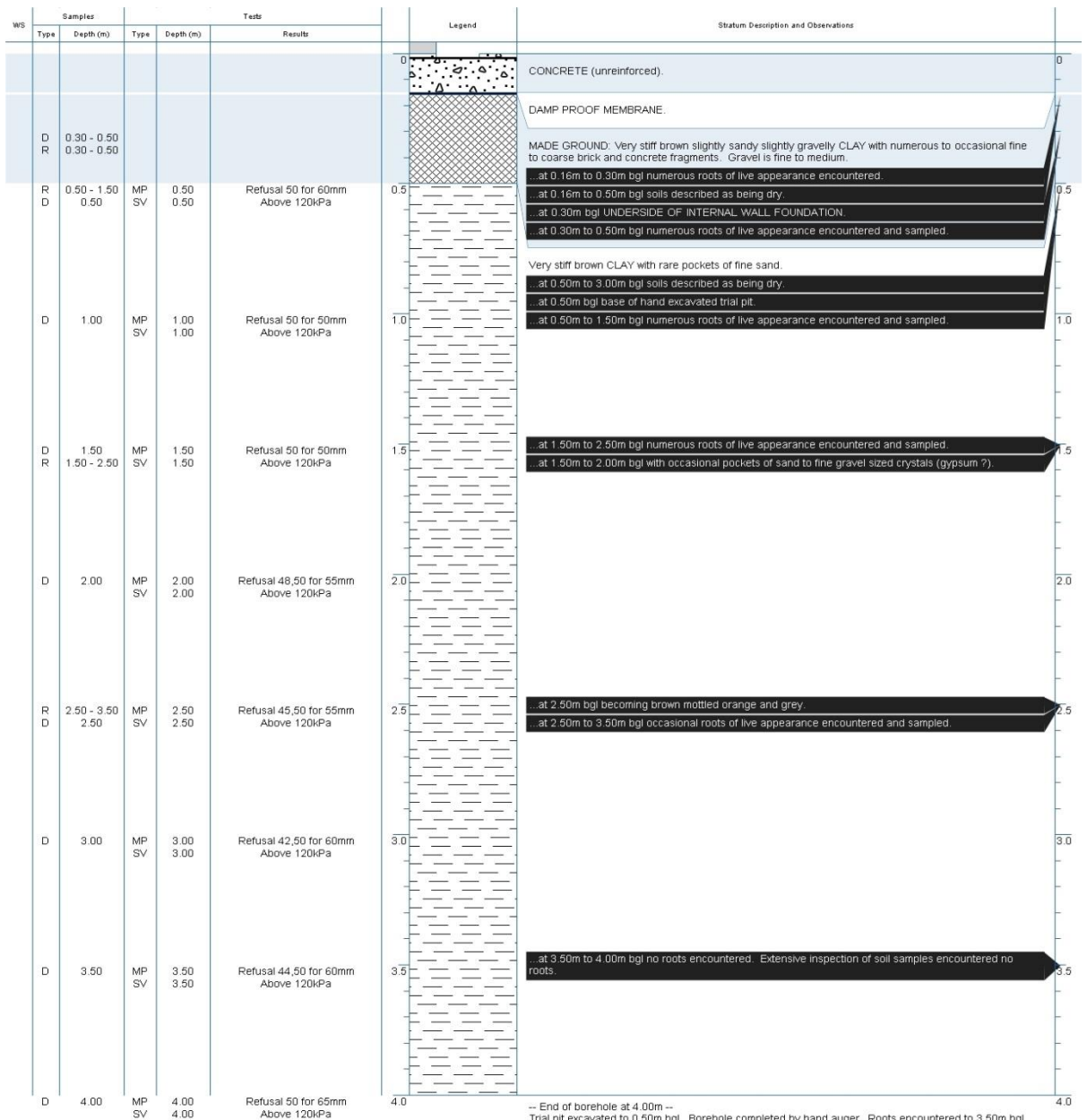
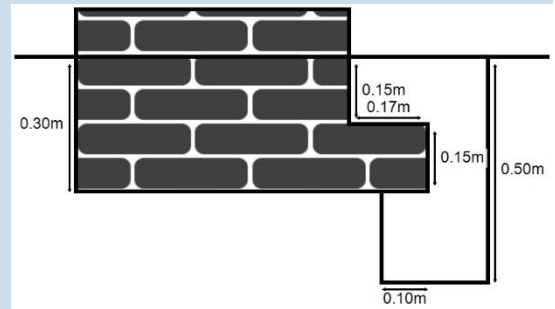


	Borehole		Foul Water Drain		Foul Manhole		Foul Rodding Point		Foul Vent Pipe
	Trial Pit / Borehole		Surface Water Drain		Rain Water Manhole		Surface Rodding Point		Rain Water Gully
	Trial Pit		Combined Drain		Combined Manhole				

## ITP/BH4 Foundation Detail and Borehole Log

### Foundation Detail

Internal wall foundation comprised of brick wall to 150mm bgl, bearing on brickwork to 300mm bgl with a total projection of 170mm from the elevation. Underside of foundation (USF) was exposed to 100mm back from the face of the foundation and probed 300mm back from the face of the foundation.



## Site Observations

### GENERAL:

Site Investigation works undertaken on 16 September 2016 during dry weather (i.e. no rain).

ITP/BH 4 undertaken within the bedroom (1) Rear right corner. Therefore, all depths (i.e. ground level) for ITP/BH 4 taken from floor level at the exploratory hole position.

BH 3 undertaken during a previous site investigation on 25 March 2015 with the results presented within the report dated 27 March 2015.

TP/BH 1 and TP/BH 2 were undertaken during a previous site investigation on 22 October 2014 with the results presented within the report dated 3 November 2014.

### HEALTH AND SAFETY:

Negative signal obtained in Power, Radio and Genny mode on the Cable Avoidance Tool (CAT) at ITP/BH 4.

### FOUNDATIONS:

Internal wall foundation was exposed and the underside of foundation (USF) recorded to be 0.30m bgl in ITP/BH 4.

### SOILS:

Made Ground deposits were encountered extending to a depth of 0.50m bgl in ITP/BH 4.

### ROOTS:

Roots encountered to 3.50m bgl in ITP/BH 4.

### INSITU TESTING:

Mackintosh Probe (MP) and Hand Shear Vane (SV) were undertaken at 0.50m bgl within the hand excavated trial pit and thereafter in the hand auger borehole at maximum 0.50m intervals in ITP/BH 4.

### WATER STRIKES:

No water strike/s (NWS) encountered in ITP/BH 4.

The groundwater observations do not necessarily indicate equilibrium conditions. It should be appreciated that groundwater levels are subject to both seasonal and weather induced variations. Other effects such as construction activities may also change groundwater levels.

# ROOT IDENTIFICATION

## for Subsidence Management Services

96 Haverstock Hill, Lower Belsize Park, London, NW3 2BD

Client: Subsidence Management Services  
Client Contact: Raymond Borrow  
Claim Number: 14C600459  
Client Reference: IFS-AVI-SUB-14-0052426  
Policy Holder: Haverstock Hill Limited  
Report Date: 20 September 2016  
Our Ref: R14296



Intec  
Parc Menai, Bangor,  
Gwynedd, North Wales  
LL57 4FG  
Tel: 01248 672652

Sub Sample	Species Identified		Root Diameter	Starch
<b>TP/BH4:</b>				
0.3-0.5m	<i>Acer</i> spp.	1	1 mm	Moderate
0.5-1.5m	<i>Acer</i> spp.	2	1 mm	Moderate
1.5-2.5m	<i>Ulmus</i> spp.	3	<1 mm	Moderate
1.5-2.5m	<i>Acer</i> spp.		1 mm	Abundant
2.5-3.5m	<i>Ulmus</i> spp.	4	<1 mm	Low
2.5-3.5m	broadleaved species, too juvenile for positive identification	5	<1 mm	Absent

### Comments:

- 1 - Plus 3 others also identified as *Acer* spp.
- 2 - Plus 3 others also identified as *Acer* spp.
- 3 - Plus 3 others also identified as *Ulmus* spp.
- 4 - Plus 1 other also identified as *Ulmus* spp.
- 5 - Plus 2 others the same.

*Acer* spp. are maples, including sycamore, Norway maple, and Japanese maples.

*Ulmus* spp. are elms.

**Signed:** M D Mitchell

Unless we are otherwise instructed in writing, the above sample material will normally be disposed of 6 years after the date of this report.

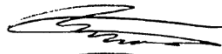
# SOIL ANALYSIS

## for Subsidence Management Services

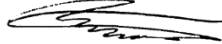
### 96 Haverstock Hill, Lower Belsize Park, London, NW3 2BD

Client: Subsidence Management Services  
Client Contact: Raymond Borrow  
Claim Number: 14C600459  
Policy Holder: Haverstock Hill Limited  
Report Date: 30 September 2016  
Our Ref: C8790S18151  
Laboratory Ref: S8790

Compiled By:



Checked By:



Date samples received: 19 September 2016  
Moisture Content Test Date: 19 September 2016  
Atterberg Limits Test Date: 29 September 2016  
Suction Test Commenced: 20 September 2016  
Suction Test Completed: 27 September 2016  
Days in Contact: 7

### Notes relating to soils testing

Unless otherwise stated, all soils testing was undertaken at Environmental Services' soils laboratory at unit 10H Maybrook Business Park, B76 1AL.

Soil samples have been prepared in accordance with BS1377:Part 1: 1990 Section 7

Descriptions of soil samples within the laboratory have been undertaken generally in accordance with BS5930:1999

Following the issue of this soil analysis report, samples will be retained for 1 month should additional testing, or referencing, be required. It should be noted that any tests undertaken on soils retained subsequent to the issue of this report may not give an accurate indication of the in-situ conditions of the sample.

Natural Moisture Content Tests are undertaken in accordance with ISO 17892:Part 1:2014

The Liquid Limit test is undertaken in accordance with BS1377:Part 2:1990 Section 4.4

The Plastic Limit test and the determination of the Plasticity Index is undertaken in accordance with BS1377:Part 2:1990 Section 5

The Filter Paper Suction Test is undertaken in accordance with the BRE paper IP4/93 (corrected) 'A Method of Determining the State of Desiccation in Clay Soils' and unless otherwise stated within this report the moisture content of the filter paper was determined after 7 days contact with the sample and the test was prepared from a remoulded disturbed sample.

The Filter Paper Suction Tests are conducted in a controlled environment within a temperature range of 18°C and 22°C

The uncertainty of measurement for the displacement transducers is within 0.002mm, typically 0.1% of the range of consolidation and swell of a sample, and the deformation of the consolidation apparatus typically at around 0.15% of the consolidation of a sample and adding these to other human factors the accuracy of the quoted strain measurement in an individual test is deemed to be within +/- 2.5%.

This Soil Analysis Report may not be reproduced, in part or in full, without written approval of the laboratory.

**Note**

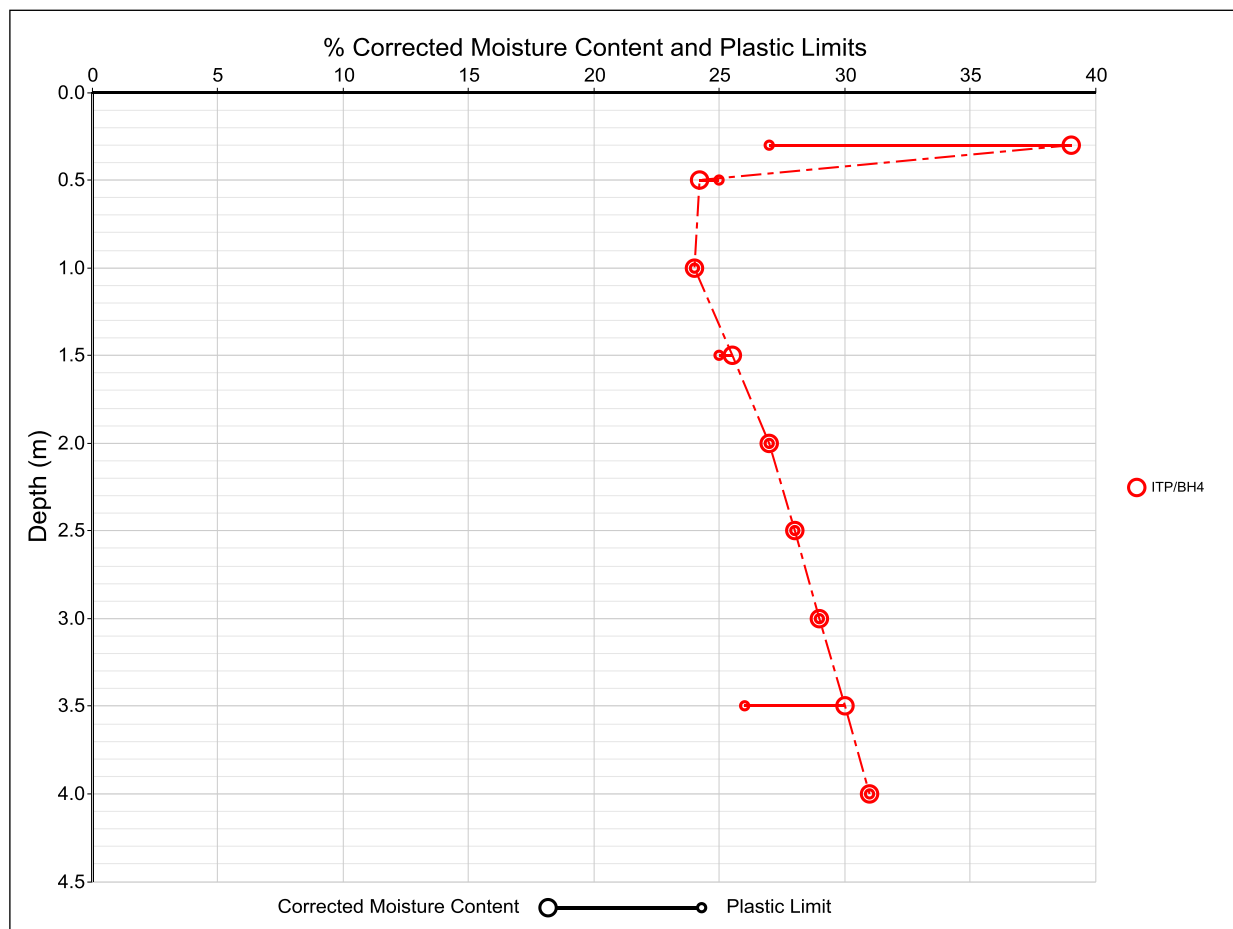
Where appropriate moisture contents have been corrected to demonstrate the equivalent moisture content following the sample being passed through a .425 mm sieve for comparison with the Liquid & Plastic Limit. Where this is not available, uncorrected moisture contents have been used in the graph on the following page.

**Deviations to testing schedule:**

All testing has been undertaken in line with the soils testing schedule provided

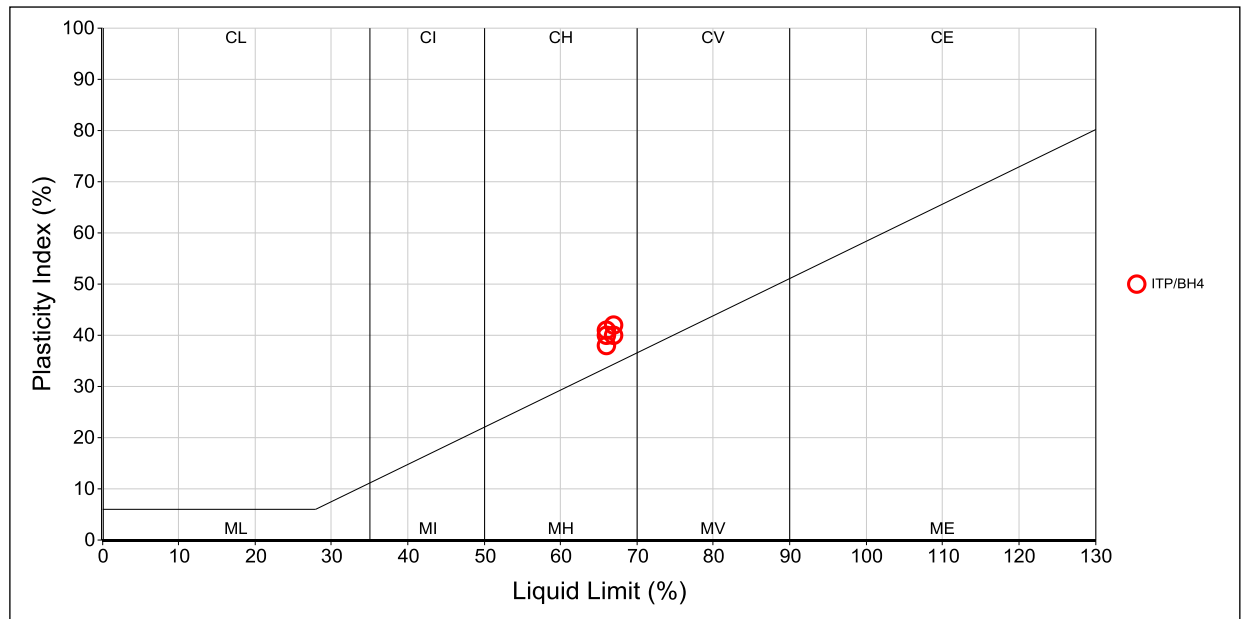
Lab Ref	Depth (m)	MC (%)	Corr MC (%)	LL (%)	PL (%)	PI (%)	% Passing .425mm
Samples from ITP/BH4							
001	0.30	16	39	67	27	40	41
002	0.50	24	24	67	25	42	99
003	1.00	24					
004	1.50	25	26	66	25	41	98
005	2.00	27					
006	2.50	28	28	66	28	38	100
007	3.00	29					
008	3.50	30	30	66	26	40	100
009	4.00	31					

**Corrected Moisture Content and Plastic Limits Graph**



Lab Ref	Depth (m)	Description	BS:5930	NHBC Chapter 4.2
Samples from ITP/BH4				
001	0.30	Stiff brown sandy CLAY with some fine to coarse gravel including brick fragments and flint	CH	High
002	0.50	Stiff brown slightly sandy CLAY with rare fine gravel	CH	High
003	1.00	Firm brown slightly sandy CLAY with rare fine gravel		
004	1.50	Firm brown slightly sandy CLAY with rare fine gravel	CH	High
005	2.00	Firm brown/grey slightly sandy CLAY		
006	2.50	Firm brown/grey slightly sandy CLAY	CH	Medium
007	3.00	Stiff brown/grey slightly sandy CLAY		
008	3.50	Firm to stiff brown/grey CLAY with rare sand	CH	High
009	4.00	Firm to stiff brown/grey CLAY		

## Plasticity Chart for Casagrande Classification



### References and Interpretation

The following provides a brief interpretation of the test results by comparison of the results to published classifications. The Atterberg Limit test may be used to classify the plasticity of soils; the plasticity classes defined in BS5930:1999 "Code of Practice for Site Investigations" are as follows.

CL (ML)	CLAY and CLAY/SILT of Low plasticity
CI (MI)	CLAY and CLAY/SILT of Intermediate plasticity
CH (MH)	CLAY and CLAY/SILT of High plasticity
CV (MV)	CLAY and CLAY/SILT of Very High plasticity
CE (ME)	CLAY and CLAY/SILT of Extremely High plasticity
O	The letter O is added to prefixes to symbolise a significant proportion of organic matter.
NP	Non-plastic

The Plasticity Index (PI) Result obtained from the Atterberg Limit tests may also be used to classify the potential for volume change of fine soils, in accordance with the National House Building Council's standards - Chapter 4.2 (2003) "Building Near Trees", as summarised below.

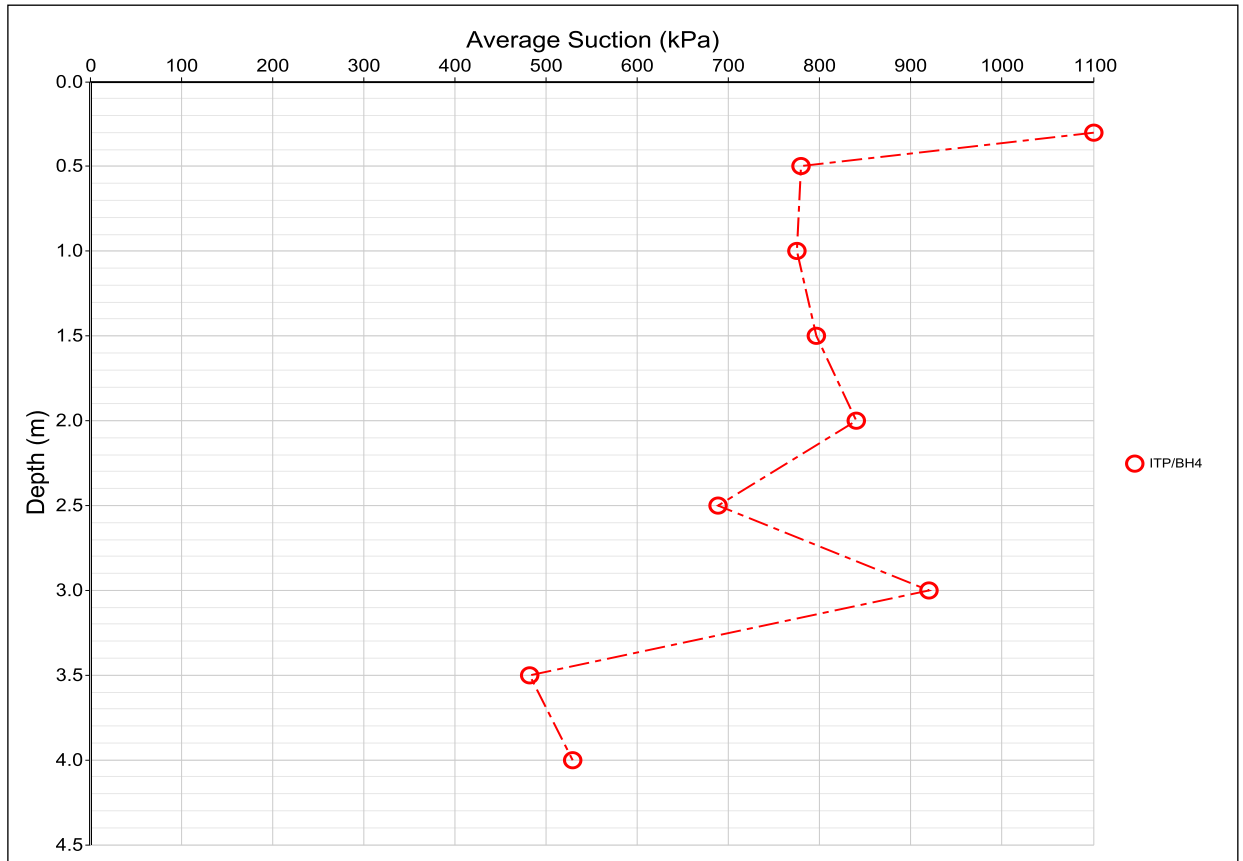
Modified PI < 10	Non Classified.
Modified PI = 10 to <20	Low volume change potential.
Modified PI = 20 to <40	Medium volume change potential.
Modified PI = 40 or greater	High volume change potential.

The 2003 edition of Chapter 4.2 also permits use of the Plasticity Index without modification. The classifications for this are grouped by soil type (soils with similar visual soils description and using unmodified Plasticity Indices.



Lab Ref	Depth (m)	Filter Paper	Bag Weight (g)	Bag + Wet Filter (g)	Bag + Dry Filter (g)	Oven Dry Filter (g)	Water Content (%)	Suction (kPa)	Average (kPa)
<span style="color: red;">■</span> Samples from ITP/BH4									
001	0.30	Top	0.934	1.156	1.108	0.175	27.622	1324.114	1172.739
		Middle	0.942	1.057	1.031	0.089	29.763	974.375	
		Bottom	0.939	1.070	1.041	0.103	28.195	1219.729	
002	0.50	Top	0.944	1.162	1.113	0.169	29.258	1047.472	830.554
		Middle	0.952	1.067	1.039	0.087	31.761	731.961	
		Bottom	0.957	1.088	1.056	0.099	31.951	712.228	
003	1.00	Top	0.940	1.159	1.109	0.169	29.478	1014.998	825.866
		Middle	0.951	1.067	1.039	0.088	32.534	655.194	
		Bottom	0.961	1.093	1.062	0.100	31.076	807.405	
004	1.50	Top	0.960	1.194	1.140	0.180	29.839	963.839	849.125
		Middle	0.946	1.051	1.026	0.080	31.039	811.684	
		Bottom	0.960	1.077	1.049	0.089	31.390	771.851	
005	2.00	Top	0.963	1.204	1.150	0.187	28.984	1089.426	895.145
		Middle	0.961	1.070	1.045	0.084	30.513	875.229	
		Bottom	0.937	1.057	1.028	0.091	31.868	720.779	
006	2.50	Top	0.924	1.157	1.102	0.179	30.683	854.106	734.270
		Middle	0.918	1.027	1.001	0.083	31.604	748.531	
		Bottom	0.927	1.046	1.016	0.089	33.147	600.172	
007	3.00	Top	0.956	1.188	1.135	0.178	30.174	918.725	980.927
		Middle	0.948	1.061	1.036	0.088	28.214	1216.457	
		Bottom	0.916	1.042	1.012	0.096	31.074	807.598	
008	3.50	Top	0.937	1.170	1.109	0.172	35.137	451.333	514.368
		Middle	0.943	1.057	1.028	0.085	34.115	522.461	
		Bottom	0.926	1.048	1.017	0.092	33.515	569.311	
009	4.00	Top	0.922	1.158	1.099	0.177	33.183	597.073	563.784
		Middle	0.926	1.046	1.014	0.088	35.633	420.337	
		Bottom	0.924	1.048	1.018	0.094	32.337	673.943	

### Average Suction



### Average Water Content

