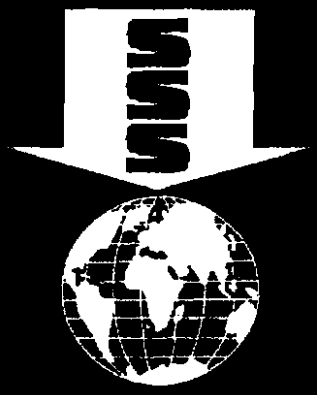
REPORT ON GROUND INVESTIGATION



SUB SOIL SURVEYS LIMITED

Chaddock Lane, Astley, Manchester
M29 7LD
Tel: 01942 883565

Report No 2005/161

Clancy Consulting
Dunham Court
2 Dunham Road
Altrincham
Cheshire
WA14 4NX

Report on Contamination Aspects of Ground Investigation

at Site of

Proposed Development

at

Adelphi Square, 64-68 Dale Street, Manchester

November 2005

Sub Soil Surveys Ltd.
Manchester

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PLANNING
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1 INTRODUCTION AND OBJECT

1.1 This investigation has been carried out to the instructions of Clancy Consulting at the site of a proposed development at Adelphi Square, 64 - 68 Dale Street, Manchester.

1.2 This report has been prepared to give comments on the results of the chemical contamination analysis. Ground gas monitoring is being undertaken in standpipes installed in the boreholes sunk on the site and the findings will be reported and appraised in due course in a further report.

2 CONTAMINATION ASSESSMENT AND CHEMICAL TESTS

2.1 The study of old maps of the area lies outside the scope of this investigation although we understand that in the past the site was developed by commercial premises.

2.2 The consideration of asbestos being present on the site lies outside the scope of this investigation.

2.3 Our conceptual model of the site with regard to contamination issues is built around the 'source, pathway, receptor' concept thus:

Contamination Source	Pathways	Receptors
Made Ground	soil ingestion	Construction workers
	dust inhalation	Site end users
	dermal contact	General public
		Environment

2.4 The site is an area with no specifically identifiable contamination sources which is to be developed by the construction of housing with garden areas.

The results of chemical testing for contamination in the ground will be assessed using the methodology presented in the recent DEFRA guidance, in particular CLR10 of the guidance documents relating to the CLEA modelling system. This guidance presents Soil Guideline Values (SGVs) derived from statistical models which relate accepted Tolerable Daily Intake values for certain contaminants by humans to soils which they may come into contact with or ingest. The modelling system presents generic SGVs for reasonable 'average' site uses and also allows for risk assessments to be made to derive Site Specific Assessment Criteria (SSAC) for acceptable contamination levels. The generic SGV's relate to Residential end use with plant uptake (e.g. housing with gardens that may be used for growing crops for human consumption), Residential end

use without plant uptake (e.g. housing without gardens but with controlled areas in which crop growing is not allowed), allotments (that may be used for growing crops for human consumption) and Commercial/Industrial use. In our assessment of the results for this site we will use the Commercial/Industrial SGVs as the site is to be fully hard surfaced or occupied by buildings hence human contact with soils below the site by the site end users can sensibly considered to be minimal.

Where an SGV has not yet been derived, we refer to the Dutch Ministry of Housing, Spatial Planning and the Environment's 'intervention' or 'indicative level of serious contamination' values to assess the risks to the site users from exposure to the contamination present below the site. As these assume a 'multifunctional' (i.e. any) end use they are necessarily more stringent than the CLEA SGV's for Commercial/Industrial end use.

2.5 We have initially undertaken chemical testing on six samples of Made Ground from shallow depths obtained from the boreholes. From the appended results it may be seen that the following concentrations were measured:

Summary of Chemical Test Results

Contaminant/ Parameter	Concentration (mg/kg except pH)		DEFRA/ EA Generic SGV for Commercial or Industrial after use	Dutch 'Intervention' Value or 'indicative level of serious contamination'	Comments
	Min.	Max.			
Arsenic	11	31	500	-	Low concentrations
Boron	1	4	-	-	Low concentrations
Cadmium	<0.5	0.6	1,400	-	Low concentrations
Chromium (total)	20	57	5,000	-	Low concentrations
Hexavalent Chromium	<10	<10	-	-	
Copper	30	69	-	190	Low concentrations
Lead	128	635	750	-	Low concentrations
Mercury	0.5	1.0	480	-	Low concentrations
Nickel	12	28	5,000	-	Low concentrations
Selenium	<5	<5	8,000	-	Low concentrations
Zinc	62	120	-	720	Low concentrations
pH	7.9	8.5		-	
Polyaromatic Hydrocarbons (PAH)	<1	120	-	40	*Exceeds Dutch

Total Petroleum Hydrocarbons (TPH)	141	2,290		5000 (for mineral oils)	Low concentrations
PCB (Total of 11 Congenors µg/kg	30	600	-	1	Low concentrations relative to Dutch

In the comments column 'Low Concentration' etc. refers to the measured concentration relative to the assessment criteria noted in the text.

2.6 Of the contaminants tested for only PAH had a measured concentration in one sample that lay above the Dutch Intervention value. Two tests were carried out on this sample, however, to provide the data for the above appraisal and for the Waste Disposal criteria. The test for the Waste Disposal criteria indicated a measured PAH concentration of only 3 mg/kg compared to the above determination of 120 mg/kg. This indicates a relatively high degree of non-homogeneity in the sample which may be due to an inclusion of (say) bitumen. The results of the Waste Disposal Criteria test also indicate PCB's to be present in the samples tested, although these are present at relatively low levels.

2.7 The tests have been carried out on 'spot' samples hence higher (or lower) concentrations of contaminants may well be present below the site between and away from the borehole positions. As part of the development work to be undertaken on the site a careful inspection of all excavations should be undertaken and any materials which may be suspected to contain higher levels of or different contaminants than those reported in this investigation should be subject to further relevant testing and appraisal.

2.8 We are of the opinion that if the measured levels of contamination remain in place below a structure or hardstanding where future human contact with the soil can be sensibly considered unlikely, there should be little hazard to the future end users of the site (i.e. adopting the Commercial/Industrial development SGV's) in particular as there is no pathway linking the contaminants and the end users.

2.9 Construction personnel should be adequately protected from contact with the soils by the use of normal construction hygiene precautions (e.g. suitable protective clothing, gloves, no smoking or eating, etc.) and dust minimisation measures should be adopted to minimise risks to construction personnel and the general public.

2.10 Disposal of soil should be assessed by reference to the Waste Disposal criteria testing undertaken (reported on the enclosed Casella Certificate Numbers 05/5087/50/C1 and 05/5088 +89/50/C1). These results indicate that the material lies in the category of 'Stable, non-reactive hazardous waste' although this, together with any cost implications, should be confirmed by reference to the operator and tip to be utilised for the waste disposal route for material from the site.

The results of the leachate testing indicate that the leachate would not be a source of significant contamination to the ground environment with respect to the contaminants tested for. As noted above, however, PCB's have been proved in the samples tested from the site and these could be a source of contamination which could migrate offsite. PCB's are 'oily' liquids which can be more dense than water and were used in transformer and capacitors due to their high insulating capabilities. A careful inspection should therefore be made of the materials exposed during the site works for signs of 'oily' compounds with appropriate sampling and testing to check for PCB's being undertaken on any discovered. It would be advisable to remove any PCB contaminated ground discovered during the works together with any adjacent similarly contaminated ground to avoid any future difficulties.

The proposed development will include the removal of contaminated ground from the site as part of the construction work and the hard surfacing/structures will be constructed over all of the site which will hence effectively prevent the percolation of rainwater into the site. Following the removal of any PCB contaminated ground we are of the opinion that the site is therefore unlikely to be a source of significant contamination to the environment.

Eur Ing R H Shires

H A Baines, Environmental Scientist

APPENDIX A

SUB SOIL *Surveys Ltd* MANCHESTER M29 7LD 0942 883565

Ground Level	Site Reference	Borehole No	
	2005/161	1	1 of 2

Boring Method	CASING	Site	Client
Light Cable Percussion	150mm to depth of 9.1m	Manchester	Clancy Consulting

Date	Depth of Casing Below G.L.	Water Level Morning & Evening	Depth of Strata Below G.L.	Description of Strata (all depths given in metres)	Inst. Details	No. & Type of Sample	Penetration of Sampler From	Penetration of Sampler To	Number of Blows	Symbolic Log
30.09.05			0.04	Tarmac Stone, brick, clay, sand, stone (MADE GROUND)		1D	0.20			
						2D	0.50			
			0.80	Clay, brick, stone, sand (MADE GROUND)		3D	1.00			
			1.30	Very stiff brown fissured CLAY with a little gravel and numerous grey root filled fissures		4X	1.35	1.65	12	
30.09.05 03.10.05	1.6	Dry	1.65			5U 6D	1.80 2.00			NR
						7U	2.50	2.95		
						8D	3.00	-		
						9U	3.50	3.95		
						10D	4.00			
			4.30	Brown silty SAND and sandy SILT		11U	4.50	4.95		
			4.70	Very stiff brown slightly sandy CLAY with a little gravel and bands of sandy silt and silty sand		12D	4.90			
						13U	5.50	5.95		
						14D	6.00			
			6.20	Stiff brown slightly sandy CLAY with a little gravel and occasional cobbles		15U	6.50	6.95		
						16D	7.00			
						17U	7.50	7.95		
			8.00			18D	8.00			

Sample Key: B.Bulk D.Disturbed U.Open Tube V.Vane W.Water X.Standard Penetration Test

Water Level Observations during boring depths below ground level

depth observed	after 5 mins.	after 10 mins.	after 15 mins.	after 20 mins.	Estimated Seepage	Depth of Casing when sealed N.S. - Not Sealed
None						

Water Added to Assist Boring at:

Water level in Cased/Uncased Borehole on Completion depth below ground level

Date	Water Level	Depth of Casing

REMARKS

Standpipe inserted to 6.0m, gravel response zone 1.0-6.0m
Time spent excavating by hand - 45 minutes

SUB SOIL *Surveys Ltd* MANCHESTER M29 7LD 0942 883565

Ground Level	Site Reference	Borehole No.	
	2005/161	1	2 of 2

Boring Method	CASING	Site	Client
Light Cable Percussion	150mm to depth of 9.1m	Manchester	Clancy Consulting

Date	Depth of Casing Below G.L.	Water Level Morning & Evening	Depth of Strata Below G.L.	Description of Strata (all depths given in metres)	Inst. Details	No. & Type of Sample	Penetration of Sampler From	Penetration of Sampler To	Number of Blows	Symbolic Log
				Very stiff brown slightly sandy CLAY with a little gravel and sand lenses		19U	8.50	8.95		
						20D	9.00			
						21U	9.50	9.95		
						22D	10.00			
						23U	11.00	11.45		
03.10.05	9.1		11.5			24D	11.50			

Sample Key: B.Bulk D.Disturbed U.Open Tube V.Vane W.Water X.Standard Penetration Test

Water Level Observations during boring depths below ground level

depth observed	after 5 mins.	after 10 mins.	after 15 mins.	after 20 mins.	Estimated Seepage	Depth of Casing when sealed N.S. - Not Sealed

Water Added to Assist Boring at:

Water level in Cased/Uncased Borehole on Completion depth below ground level

Date	Water Level	Depth of Casing

REMARKS

SUB SOIL *Surveys Ltd* MANCHESTER M29 7LD 0942 883565

Ground Level	Site Reference	Borehole No	
	2005/161	2	1 of 3

Boring Method	CASING	Site	Client
Light Cable Percussion	150mm to depth of 16.3m	Manchester	Clancy Consulting

Date	Depth of Casing Below G.L.	Water Level Morning & Evening	Depth of Strata Below G.L.	Description of Strata (all depths given in metres)	Inst. Details	No. & Type of Sample	Penetration of Sampler From	Penetration of Sampler To	Number of Blows	Symbolic Log
29.09.05			0.04	Tarmac						
				Greyish brown sand, stone, concrete, brick, ash (MADE GROUND)		1D	0.20			
						2D	0.50			
						3D	1.00			
						4X	1.35	1.65	6	
						5X	1.95	2.25	5	
						6X	2.65	2.95	9	
			3.10	Stiff brown sandy CLAY with a little gravle and grey fissures		7U	3.40	3.85		
						8D	3.90			
			4.40	Brown silty SAND and sandy SILT with occasional clay lenses		9U	4.40	4.85		
			5.10	Firm to stiff brown sandy CLAY with a little gravel and laminated zones		10D	4.90			
						11X	5.05	5.35	16	
						12U	5.80	6.25		
						13D	6.30			
						14U	6.80	7.25		
						15D	7.30			
			8.00			16U	7.80	8.25		

Sample Key: B.Bulk D.Disturbed U.Open Tube V.Vane W.Water X.Standard Penetration Test

Water Level Observations during boring depths below ground level

depth observed	after 5 mins.	after 10 mins	after 15 mins.	after 20 mins.	Estimated Seepage	Depth of Casing when sealed N.S. - Not Sealed
None						

Water Added to Assist Boring at:

Water level in Cased/Uncased Borehole on Completion depth below ground level

Date	Water Level	Depth of Casing

REMARKS

Standpipe inserted to 6.0m, gravel response zone 1.0-6.0m
Time spent excavating by hand - " hrs.
Time Spent Chiselling/Boring when N>30: (6 hrs)

SUB SOIL *Surveys Ltd* MANCHESTER M29 7LD 0942 883565

Ground Level	Site Reference	Borehole No.	
	2005/161	2	2 of 3

Boring Method	CASING	Site	Client
Light Cable Percussion	150mm to depth of 16.3m	Manchester	Clancy Consulting

Date	Depth of Casing Below G.L.	Water Level Morning & Evening	Depth of Strata Below G.L.	Description of Strata (all depths given in metres)	Inst. Details	No. & Type of Sample	Penetration of Sampler From	Penetration of Sampler To	Number of Blows	Symbolic Log
				Stiff brown sandy CLAY with a little gravel and occasional cobbles		17D	8.30			
						18U	8.80	9.25		
			9.00	Very stiff dark brown sandy CLAY with a little gravel and sand lenses		19D	9.30			
						20U	9.80	10.25		
			10.20	Greyish brown silty SAND		21D	10.30			
			10.40	Stiff brown slightly laminated sandy CLAY with a little gravel		22X	10.45	10.75	57	
			11.50	Very stiff brown sandy CLAY with a little gravel and numerous sand lenses		23X	11.65	11.95	74	
						24U	13.00	13.45		
						25D	13.50			
						26X	14.65	14.95	117	
29.09.05 30.09.05	13.8	Dry	14.95			27B	15.00	15.20		
			16.00			28X	15.15	16.30	88	

Sample Key: B.Bulk D.Disturbed U.Open Tube V.Vane W.Water X.Standard Penetration Test

Water Level Observations during boring depths below ground level

depth observed	after 5 mins.	after 10 mins.	after 15 mins.	after 20 mins.	Estimated Seepage	Depth of Casing when sealed N.S. - Not Sealed

Water Added to Assist Boring at:

Water level in Cased/Uncased Borehole on Completion depth below ground level

Date	Water Level	Depth of Casing

REMARKS

SUB SOIL *Surveys Ltd* MANCHESTER M29 7LD 0942 883565

Ground Level

Site Reference 2005/161

Borehole No 2 3 of 3

Boring Method: Light Cable Percussion

CASING: 150mm to depth of 16.3m

Site: Manchester

Client: Clancy Consulting

Date	Depth of Casing Below G.L.	Water Level Morning & Evening	Depth of Strata Below G.L.	Description of Strata (all depths given in metres)	Inst. Details	No. & Type of Sample	Penetration of Sampler From	Penetration of Sampler To	Number of Blows	Symbolic Log
				Stiff brown sandy CLAY with a little gravel and numerous sand lenses						
30.09.05	16.3		17.48			29X	17.40	17.48	50	SP

Sample Key: B.Bulk D.Disturbed U.Open Tube V.Vane W.Water X.Standard Penetration Test

Water Leval Observations during boring depths below ground level

depth observed	after 5 mins.	after 10 mins.	after 15 mins.	after 20 mins.	Estimated Seepage	Depth of Casing when sealed N.S. - Not Sealed

Water Added to Assist Boring at:

Water level in Cased/Uncased Borehole on Completion depth below ground level

Date	Water Level	Depth of Casing

REMARKS

APPENDIX B

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CASELLA SEAL

Chemistry Laboratory Certificate

Client: Sub Soil Consultancy Services Limited
Kennedy Road, off Chaddock Lane, Astley, Manchester, M29 7LD
Site: Manchester 2005/161
Date Tested: 20/10/05, 24/10/05, 25/10/05, 26/10/05, 27/10/05
Methodology: CTP01, CTP08, CTP09d, CTP09e, CTP09g, CTP10a, CTP10c, CTP10d, CTP20a, CTP26a, CTP27, ICPMS 0.1ppb, ICPMS 0.5ppb, ICPMS 1ppb
Date Reported: 27 October, 2005
Date Received: 14 October, 2005
Sample Type: Solid

Certificate No: 05/5088 + 89/50/C1
File No: 05/5088/50
Client Ref: 2005/161

Lab sample ref	N297475	N297476
Client sample ref	BH1 - D3 1.00m	BH2 - D1 0.20m
Date sampled	07/10/05	07/10/05
Sample matrix (see notes page)	S	S

Analyte	Units	ISO17025	LOD		
pH (BS 12457-3 2:1 leach)				8.2	8.0
pH (BS 12457-3 8:1 leach)				8.4	7.8
Conductivity (BS 12457-3 2:1 leach)	µS/cm	N	10	674	2450
Conductivity (BS 12457-3 8:1 leach)	µS/cm	N	10	119	1490
Dissolved Solids (leachable)	mg/kg	N	4000	<4000	18579
Fluoride leachable	mg/kg	N	10	<10	<10
Chloride leachable	mg/kg	N	800	<800	<800
Sulphate leachable	mg/kg	N	1000	<1000	9330
Phenols (screen) leachable	mg/kg	N	1	<1	<1
DOC (leachable) *	mg/kg	N	500	<500	<500
Antimony leachable MS	mg/kg	N	0.06	<0.06	0.12
Arsenic leachable	mg/kg	N	0.5	<0.5	<0.5
Barium leachable	mg/kg	N	20	<20	<20
Cadmium leachable MS	mg/kg	N	0.04	<0.04	<0.04
Chromium leachable	mg/kg	N	0.5	<0.5	<0.5
Copper leachable	mg/kg	N	2.0	<2.0	<2.0
Lead leachable	mg/kg	N	0.5	<0.5	<0.5
Mercury leachable MS	mg/kg	N	0.01	<0.01	<0.01
Molybdenum leachable	mg/kg	N	0.5	<0.5	<0.5
Nickel leachable	mg/kg	N	0.4	<0.4	<0.4
Selenium leachable MS	mg/kg	N	0.1	<0.1	<0.1
Zinc leachable	mg/kg	N	4.0	<4.0	<4.0

Notes
1. # indicates separate report appended.
2. Tests marked * indicate subcontracted analyses.

Prepared by:

L Carolan
Account Manager

Approved by:

P Chadwick
Operations Director

Casella Seal is a trading name of Casella Analytic Ltd
Company Registration No: 09823669 Registered Office: Regent House, Wolseley Road, Kempston, Bedford MK42 7JY
Think environment. Think Casella

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CASELLA SEAL

Client	Subsoil Consultancy Services Ltd. : Kennedy Road, Astley, Manchester M29 7LD
Contract/Site	Manchester 2005/161
Sample Matrix	Solids
File No.	05/5087/50/C1
Date Received	14/10/05
Date Tested	25/10/05
Methodology	Laboratory Developed In-House Method - 'Speciated PCB congeners' by GC-MS

Analysis : **PCB Congeners**

All Values in µg/kg

Sample Reference		N297473	N297474
Client Reference		BH 1 D3 1.00m	BH 2 D1 0.20m
Name			
PCB 18		8	134
PCB 31/28		11	190
PCB 52		7	79
PCB 44		4	117
PCB 101		<5	25
PCB 149		<5	11
PCB 118		<5	15
PCB 153		<5	12
PCB 138		<5	15
PCB 180		<5	12
PCB 194		<5	<5
PCB Aroclor I.D.		1242	1242

Analysed by:

DWalton.

Dean Walton
Chemist

Authorised by:

Martin Clarke
Analyst

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CASELLA SEAL

Chemistry Laboratory Certificate

Client: Sub Soil Consultancy Services Limited
Kennedy Road, off Chaddock Lane, Astley, Manchester, M29 7LD
Site: Manchester 2005/161
Date Tested: 11/10/05, 13/10/05, 14/10/05, 18/10/05, 20/10/05
Methodology: CTP01, CTP07, CTP09c, CTP11a, CTP11b, CTP11h, CTP11i, CTP12, CTP15a, CTP21a, SOP02 GC-MS, Stones
Date Reported: 21 October, 2005
Date Received: 10 October, 2005
Sample Type: Solid

Certificate No: 05/4925/50/C1
File No: 05/4925/50
Client Ref: 2005/161

Lab sample ref	N296219	N296220	N296221	N296222
Client sample ref	BH1 - D1 - 0.20	BH1 - D3 - 1.00	BH2 - D1 - 0.20	BH2 - X4 - 1.20-1.65
Date sampled	07/10/05	07/10/05	07/10/05	07/10/05
Sample matrix (see notes page)	S	S	S	S

Analyte	Units	ISO17025	MCERTS	LOD				
pH		Y	Y		8.0	7.9	8.5	8.1
Sulphate (water soluble) $_S$	g/l	Y	Y	0.1	0.4	0.4	<0.1	1.5
PAH (total) $_S$	mg/kg	N	N	1	6	<1	120	6
TPH (FT-IR) $_{SM}$	mg/kg	N	N/A	10	1300	174	520	2290
Arsenic $_S$	mg/kg	Y	N	5	11	31	14	14
Boron (water soluble) $_S$	mg/kg	Y	N	1	1	4	2	3
Cadmium $_S$	mg/kg	Y	N	0.5	<0.5	0.6	<0.5	<0.5
Chromium (total) $_S$	mg/kg	Y	N	5	25	28	20	57
Chromium (VI) $_S$	mg/kg	Y	N/A	10	<10	<10	-	<10
Copper $_S$	mg/kg	Y	N	5	30	69	54	42
Lead $_S$	mg/kg	Y	N	5	128	229	318	635
Mercury $_S$	mg/kg	Y	N	0.5	0.5	0.6	1.0	1.0
Nickel $_S$	mg/kg	Y	N	5	12	28	17	18
Selenium $_S$	mg/kg	Y	N	5	<5	<5	<5	<5
Zinc $_S$	mg/kg	Y	N	5	62	85	116	120

Notes
1. Analyses suffixed 'S' were performed on the sample dried at 35°C.
2. Analyses suffixed 'SM' were performed on the sample as received.
3. All results are expressed as dry weight.
4. MCERTS accreditation applicable to Sample Matrix 'S' only.
5. Natural stones (pebbles, gravels etc.) which do not pass a 10mm sieve are excluded from air dried analyses and results corrected accordingly.
6. # indicates separate report appended.
7. Tests marked * indicate subcontracted analyses.

Prepared by:

L Carolan
Account Manager

Approved by:

P Chadwick
Operations Director

Casella Seal is a trading name of Casella Analytic Ltd
Company Registration No: 01893668 Registered Office: Regent House, Wheeler Road, Kempston, Bedford MK42 7JY

MCERTS

UKAS TESTING 0871

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LABORATORY RESULTS-Classification, Strength, U100 Descriptions

Project: Manchester

Project No: 2005/161

Sample				Classification					Strength						
Hole	Depth	Type	Description	% pass. .425 mm	I_P	W_L	W_P	W%	Test	γ_b Mg/m^3	σ_3 kN/m^2	σ_1-σ_3 kN/m^2	c kN/m^2	ϕ deg
1	2.50 2.95	7U	Very stiff brown sandy CLAY with a little gravel, numerous grey fissures and sand lenses					17	U2	2.13	138 414	362 370	183	0
	3.50 3.95	9U	Very stiff brown fissured CLAY with numerous root filled grey fissures and a little gravel					NO TEST						
	4.50 4.95	11U	4.5-4.75 No Recovery 4.75-4.95 Very stiff light and dark brown very sandy CLAY with a little gravel, numsrous sand lenses and coal fragments					19	U2	2.09	138 414	365 376	185	0
	5.50 5.95	13U	"Very stiff" friable brown mottled sandy CLAY/SILT with occasional sand lenses					NO TEST						
	6.50 6.95	15U	Stiff brown slightly sandy CLAY with a little gravel					NO TEST						
	7.50 7.95	17U	Stiff brown slightly sandy CLAY with a little gravel and a cobble					NO TEST						
	8.50 8.95	19U	Very stiff brown sandy CLAY with a little gravel, occasional sand lenses and coal fragments					13	U2	2.25	138 414	431 452	221	0
	9.50 9.95	21U	Very stiff brown slightly sandy CLAY with a little gravel					NO TEST						
	11.00 11.45	23U						NO TEST						
2	3.40 3.85	7U	Stiff brown sandy CLAY with a little gravel, grey fissures and coal fragments	97.5	26.6	46.7	20.1	22	U2	2.05	138 414	273 305	145	0
	4.40 4.85	9U	Brown silty SAND and sandy SILT with occasional clay lenses					NO TEST						
	5.80 6.25	12U	Stiff brown sandy CLAY with a little gravel, grey fissures and sand lenses					18	U3	2.13	138 276 414	161 263 293	120	0
	6.80 7.25	14U	Stiff brown slightly sandy CLAY with a little gravel					NO TEST						
	7.80 8.25	16U	Stiff dark brown sandy CLAY with a little gravel					NO TEST						
	8.80 9.25	18U	Stiff brown sandy CLAY with a little gravel, coal fragments and a cobble					14	U2	2.22	138 414	289 277	141	0
	9.80 10.25	20U	Very stiff dark brown slightly sandy CLAY with a little gravel and sand lenses					NO TEST						
	13.00 13.45	24U	Very stiff brown sandy CLAY with a little gravel and numerous sand lenses					14	U2	2.14	138 414	352 387	185	0

Remarks

SUB SOIL

M29 7LD 01942 883565

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CASELLA SEAL

Chemistry Laboratory Certificate

Client: Sub Soil Consultancy Services Limited
Kennedy Road, off Chaddock Lane, Astley, Manchester, M29 7LD
Site: Manchester 2005/161
Date Tested: 20/10/05, 21/10/05, 24/10/05, 25/10/05, 26/10/05
Methodology: ANC/BNC, CTP01, CTP02, CTP07, CTP22, SOP01 VOC, SOP02 GC-MS, SOP03 TPH, SOP05 PCB, Stones
Date Reported: 26 October, 2005
Date Received: 14 October, 2005
Sample Type: Solid

Certificate No: 05/5087/50/C1
File No: 05/5087/50
Client Ref: 2005/161

Lab sample ref	N297473	N297474
Client sample ref	BH1 - D3 1.00m	BH2 - D1 0.20m
Date sampled	07/10/05	07/10/05
Sample matrix (see notes page)	S	S

Analyte	Units	ISO17025	MCERTS	LOD		
pH		Y	Y		7.9	9.6
PAH (total) $_S$	mg/kg	N	N	1	3	3
TOC $_S$	% w/w	N	N/A	0.1	1.9	2.7
TPH (GC) $_{SM}$	mg/kg	Y	Y	10	246	141
LOI @ 500 $_S$	% w/w	N	N/A	0.1	3.4	4.0
Acid Neutralisation Capacity	mol/kg	N	N/A	0.1	3.0	3.7
BTEX $_{SM}$		Y	Y		#	#
PCB Congeners $_{SM}$		N	N		#	#

Notes
1. Analyses suffixed 'S' were performed on the sample dried at 35°C.
2. Analyses suffixed 'SM' were performed on the sample as received.
3. All results are expressed as dry weight.
4. MCERTS accreditation applicable to Sample Matrix 'S' only.
5. Natural stones (pebbles, gravels etc.) which do not pass a 10mm sieve are excluded from air dried analyses and results corrected accordingly.
6. # indicates separate report appended.
7. Tests marked * indicate subcontracted analyses.

Prepared by:

L Carolan
Account Manager

Approved by:

A Young
Section Leader

mCERTS

UKAS TESTING 0871

Casella Seal is a trading name of Casella Analytic Ltd
Company Registration No: 02829669 Registered Office: Regent House, Wolseley Road, Kempston, Bedford MK42 7JY

Casella Analytic A division of CASELLA Group
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CASELLA SEAL

Client	Sub Soil Consultancy Ltd, Kennedy Road, Astley, Manchester, M29 7LD
Contract/Site	Manchester 2005/161
Sample Matrix	solids
File No.	05/5087/50/C1
Date Received	14-Oct-05
Date Tested	24-Oct-05
Methodology	Laboratory Developed In-House Method - 'SOP01-Determination of VOC' by GC-MS Headspace

All Values in ug/kg **VOLATILE ORGANIC COMPOUNDS**

Compound		MCERTS	N297473	N297474
			BH1 - D3 1.00m	BH2 - D1 0.20m
	CAS No.			
Benzene	71-43-2	N	<10	<10
Toluene	108-88-3	N	<10	<10
Ethylbenzene	100-41-4	Y	<10	<10
m&p-Xylene	108-38-3/106-42-3	Y	<10	<10
o-Xylene	95-47-6	Y	<10	<10

Analysed by:

Martin Clarke
Analyst

Authorised by:

Dean Walton
Chemist

UKAS TESTING 0871

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Company Registration No: 02923689 Registered Office: Regent House, Wolseley Road, Kempston, Bedford MK42 7JY

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Disturbed Sample Descriptions

Project: Manchester

Project No: 2005/161

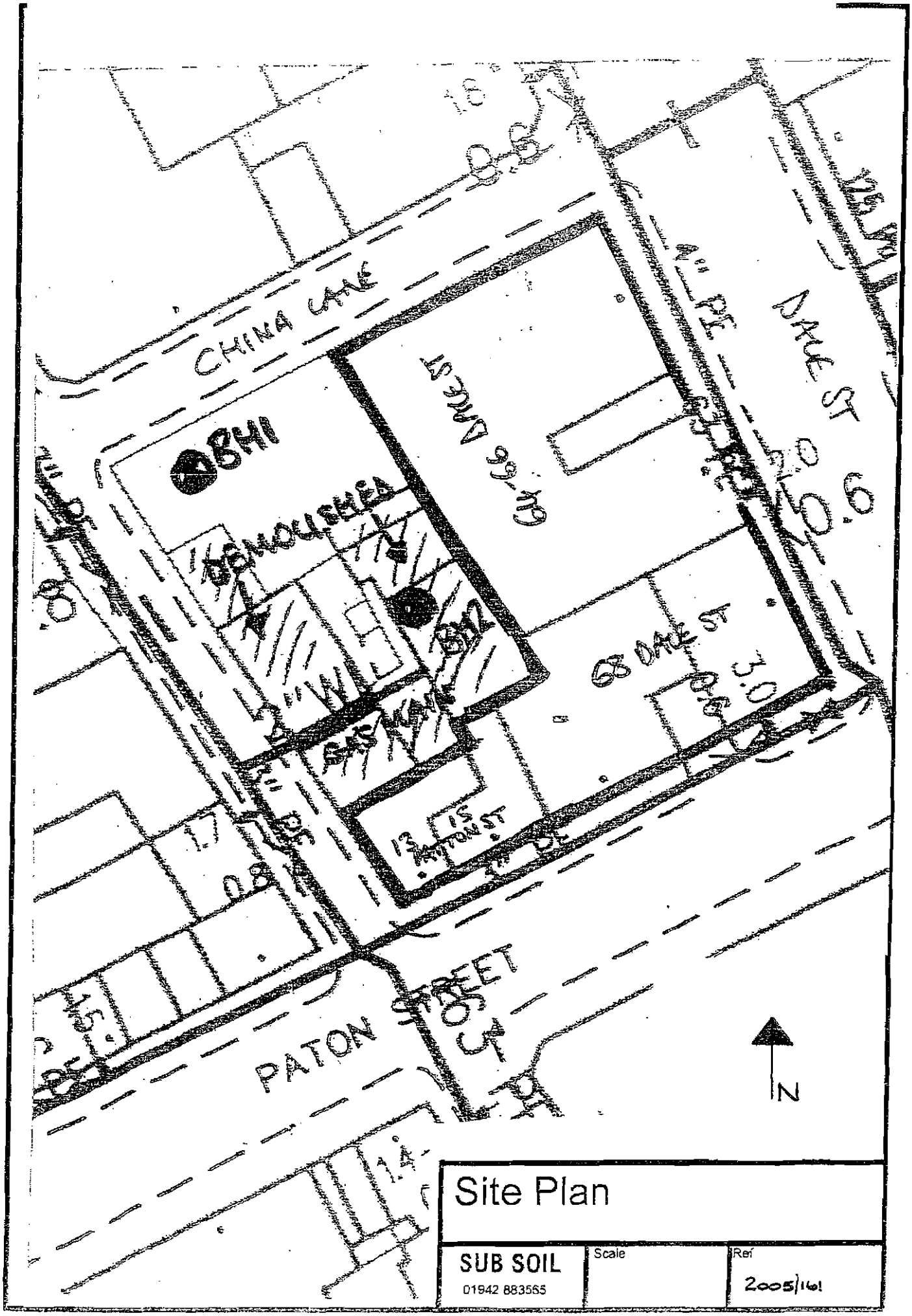
Sample				Contamination Tests carried out on samples Y/N For results see separate sheets
Hole	Depth	Type	Description	
1	0.20	1D	Topsoil, clay, sand, stone, concrete and brick fragments (MADE GROUND)	Y
	0.50	2D	Stone, clay, brick, sand and topsoil (MADE GROUND)	Y
	1.00	3D	Clay, brick, sand, stonne (MADE GROUND)	Y
2	0.20	1D	Topsoil, clay, sand, stone, concrete and brick fragments (MADE GROUND)	Y
	1.00	3D	Topsoil, clay, brick, sand, stone and concrete (MADE GROUND)	Y
	1.20 1.65	4X	Brick, sand, stone, concrete and clay (MADE GROUND)	Y

Remarks

SUB SOIL

M29 7LD 01942 883565

APPENDIX C



Site Plan

SUB SOIL	Scale	Ref
01942 883565		2005/161