

Analytical Science

Analytical Report Number: 11-28269

Project / Site name: Arundel Gasworks

Lab Sample Number				180249	180250	180251	180252	180253
Sample Reference				TP102	TP104	TP105	TP108B	TP111
Sample Number				ES1	ES2	ES1	ES1	ES2
Depth (m)				0.40-0.50	1.50-1.60	0.90-1.00	1.40-1.50	1.40-1.60
Date Sampled				15/06/2011	14/06/2011	16/06/2011	14/06/2011	15/06/2011
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Leachate Analysis)	Units	Limit of detection	Accreditation Status					
Zinc (dissolved)	ug/l	0.4	ISO 17025	11	11	6.9	9.2	3.4



4843

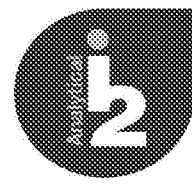


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Lab Sample Number				180249	180250	180251	180252	180253
Sample Reference				TP102	TP104	TP105	TP108B	TP111
Sample Number				ES1	ES2	ES1	ES1	ES2
Depth (m)				0.40-0.50	1.50-1.60	0.90-1.00	1.40-1.50	1.40-1.60
Date Sampled				15/06/2011	14/06/2011	16/06/2011	14/06/2011	15/06/2011
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Leachate Analysis)				Units	Limit of detection	Accreditation Status		
Monoaromatics								
Benzene	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH7 - Aliphatic >C5 - C6	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH7 - Aliphatic >C6 - C8	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH7 - Aliphatic >C8 - C10	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH7 - Aliphatic >C10 - C12	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH7 - Aliphatic >C12 - C16	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH7 - Aliphatic >C16 - C21	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH7 - Aliphatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH7 - Aromatic >C5 - C7	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH7 - Aromatic >C7 - C8	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH7 - Aromatic >C8 - C10	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH7 - Aromatic >C10 - C12	µg/l	10	NONE	< 10	< 10	< 10	< 10	57
TPH7 - Aromatic >C12 - C16	µg/l	10	NONE	< 10	< 10	< 10	< 10	470
TPH7 - Aromatic >C16 - C21	µg/l	10	NONE	< 10	< 10	< 10	< 10	1100
TPH7 - Aromatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10	< 10	19



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Lab Sample Number	180254	180255			
Sample Reference	TP113	TP115			
Sample Number	ES3	ES2			
Depth (m)	1.40-1.60	2.30-2.50			
Date Sampled	15/06/2011	16/06/2011			
Time Taken	None Supplied	None Supplied			
Analytical Parameter (Leachate Analysis)	Units	Limit of detection	Accreditation Status		

General Inorganics

pH	pH Units	N/A	ISO 17025	8.4	7.4			
Electrical Conductivity	µS/cm	10	NONE	430	370			
Total Cyanide	µg/l	10	ISO 17025	1500	15			
Complex Cyanide	µg/l	25	NONE	1500	< 25			
Free Cyanide	µg/l	25	NONE	< 25	< 25			
Free Cyanide (Low Level)	µg/l	10	NONE	14	< 10			
Thiocyanate as SCN	µg/l	30	NONE	< 30	< 30			
Sulphate as SO ₄	µg/l	100	ISO 17025	130000	160000			
Sulphide	µg/l	5	NONE	5000	< 5.0			
Chloride	mg/l	4	NONE	11	< 4.0			
Ammonium as NH ₄	µg/l	15	NONE	33000	3200			
Total Organic Carbon (TOC)	mg/l	0.1	NONE	20	2.6			

Phenols by HPLC

Catechol	µg/l	0.5	NONE	< 0.5	< 0.5			
Resorcinol	µg/l	0.5	NONE	< 0.5	< 0.5			
Butyl Phenols	µg/l	0.5	NONE	77	< 0.5			
Cresols	µg/l	0.5	NONE	10	< 0.5			
Naphthols	µg/l	0.5	NONE	< 0.5	< 0.5			
Phenol	µg/l	0.5	NONE	< 0.5	< 0.5			
Trimethylphenol	µg/l	0.5	NONE	< 0.5	< 0.5			

Total Phenols

Total Phenols (HPLC)	µg/l	3.5	NONE	88	< 3.5			
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Speciated PAHs

Naphthalene	µg/l	0.01	NONE	< 0.01	1.5			
Acenaphthylene	µg/l	0.01	NONE	3.6	< 0.01			
Acenaphthene	µg/l	0.01	NONE	33	< 0.01			
Fluorene	µg/l	0.01	NONE	11	< 0.01			
Phenanthrene	µg/l	0.01	NONE	14	< 0.01			
Anthracene	µg/l	0.01	NONE	7.2	< 0.01			
Fluoranthene	µg/l	0.01	NONE	4.7	< 0.01			
Pyrene	µg/l	0.01	NONE	3.1	< 0.01			
Benzo(a)anthracene	µg/l	0.01	NONE	1.9	< 0.01			
Chrysene	µg/l	0.01	NONE	0.91	< 0.01			
Benzo(b)fluoranthene	µg/l	0.01	NONE	1.3	< 0.01			
Benzo(k)fluoranthene	µg/l	0.01	NONE	0.53	< 0.01			
Benzo(a)pyrene	µg/l	0.01	NONE	1.1	< 0.01			
Indeno(1,2,3-cd)pyrene	µg/l	0.01	NONE	< 0.01	< 0.01			
Dibenz(a,h)anthracene	µg/l	0.01	NONE	< 0.01	< 0.01			
Benzo(ghi)perylene	µg/l	0.01	NONE	< 0.01	< 0.01			

Total PAH

Total EPA-16 PAHs	µg/l	0.2	NONE	83	1.6			
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Heavy Metals / Metalloids

Arsenic (dissolved)	µg/l	1.1	ISO 17025	2.9	< 1.1			
Cadmium (dissolved)	µg/l	0.1	ISO 17025	0.25	2.9			
Chromium (dissolved)	µg/l	0.4	ISO 17025	6.1	2.0			
Copper (dissolved)	µg/l	0.7	ISO 17025	26	15			
Iron (dissolved)	mg/l	0.004	ISO 17025	5.0	0.43			
Lead (dissolved)	µg/l	1	ISO 17025	90	630			
Mercury (dissolved)	µg/l	0.5	ISO 17025	< 0.5	< 0.5			
Nickel (dissolved)	µg/l	0.3	ISO 17025	9.1	7.3			
Selenium (dissolved)	µg/l	4	ISO 17025	< 4.0	< 4.0			

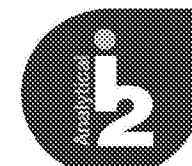


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Lab Sample Number				180254	180255			
Sample Reference				TP113	TP115			
Sample Number				ES3	ES2			
Depth (m)				1.40-1.60	2.30-2.50			
Date Sampled				15/06/2011	16/06/2011			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Leachate Analysis)				Units	Limit of detection	Accreditation Status		
Zinc (dissolved)				ug/l	0.4	ISO 17025	5.5	34



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Lab Sample Number				180254	180255			
Sample Reference				TP113	TP115			
Sample Number				ES3	ES2			
Depth (m)				1.40-1.60	2.30-2.50			
Date Sampled				15/06/2011	16/06/2011			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Leachate Analysis)				Units	Limit of detection	Accreditation Status		
Monoaromatics								
Benzene	µg/l	1	NONE	< 1.0	< 1.0			
Toluene	µg/l	1	NONE	< 1.0	< 1.0			
Ethylbenzene	µg/l	1	NONE	< 1.0	< 1.0			
p & m-xylene	µg/l	1	NONE	< 1.0	< 1.0			
o-xylene	µg/l	1	NONE	< 1.0	< 1.0			
MTBE (Methyl Tertiary Butyl Ether)	µg/l	10	NONE	< 10	< 10			
TPH7 - Aliphatic >C5 - C6	µg/l	10	NONE	< 10	< 10			
TPH7 - Aliphatic >C6 - C8	µg/l	10	NONE	< 10	< 10			
TPH7 - Aliphatic >C8 - C10	µg/l	10	NONE	< 10	< 10			
TPH7 - Aliphatic >C10 - C12	µg/l	10	NONE	< 10	< 10			
TPH7 - Aliphatic >C12 - C16	µg/l	10	NONE	< 10	< 10			
TPH7 - Aliphatic >C16 - C21	µg/l	10	NONE	< 10	< 10			
TPH7 - Aliphatic >C21 - C35	µg/l	10	NONE	< 10	< 10			
TPH7 - Aromatic >C5 - C7	µg/l	10	NONE	< 10	< 10			
TPH7 - Aromatic >C7 - C8	µg/l	10	NONE	< 10	< 10			
TPH7 - Aromatic >C8 - C10	µg/l	10	NONE	< 10	< 10			
TPH7 - Aromatic >C10 - C12	µg/l	10	NONE	360	< 10			
TPH7 - Aromatic >C12 - C16	µg/l	10	NONE	2400	< 10			
TPH7 - Aromatic >C16 - C21	µg/l	10	NONE	2900	< 10			
TPH7 - Aromatic >C21 - C35	µg/l	10	NONE	240	< 10			

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* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and topsoil/loam soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content

of a sample is calculated as the % weight of the stones not passing a 2 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
180214	TP101	ES1	0.40-0.50	Brown clay and gravel with vegetation.
180215	TP102	ES1	0.40-0.50	Light brown clay and gravel with brick.
180216	TP102	ES2	1.80-2.00	Light brown clay and sand.
180217	TP103	ES1	0.20-0.30	Black topsoil and gravel.
180218	TP104	ES1	0.40-0.50	Light brown topsoil and clay with stones and vegetation.
180219	TP104	ES2	1.50-1.60	Light brown clay and sand with stones and vegetation.
180220	TP105	ES1	0.90-1.00	Brown topsoil and gravel with vegetation.
180221	TP105	ES2	2.00-2.10	Light brown topsoil and gravel with stones.
180222	TP106	ES1	0.30-0.40	Brown topsoil and gravel with stones.
180223	TP106	ES2	0.80-0.90	Brown topsoil and sand with gravel and stones.
180224	TP106	ES3	2.60-2.80	Light brown clay.
180225	TP107	ES1	0.40-0.50	Light brown clay and gravel.
180226	TP107	ES2	2.40-2.50	Light brown clay and sand.
180227	TP108A	ES1	0.50-0.60	Brown topsoil and sand with gravel and stones.
180228	TP108B	ES1	1.40-1.50	Brown topsoil and gravel with brick.
180229	TP109A	ES1	0.40-0.50	Brown clay and gravel with stones and vegetation.
180230	TP109B	ES1	0.30-0.40	Brown clay and gravel with vegetation.
180231	TP110	ES1	0.40-0.50	Brown topsoil and gravel with stones and vegetation.
180232	TP111	ES1	0.90-1.00	Light brown topsoil and clay with gravel and stones.
180233	TP111	ES2	1.40-1.60	Brown topsoil and clay with brick and stones.
180234	TP112	ES1	0.60-0.80	Brown topsoil and clay with brick.
180235	TP112	ES2	2.50-2.60	Light brown clay and gravel with stones.
180236	TP113	ES2	0.80-0.90	Light brown topsoil and clay with stones.
180237	TP113	ES3	1.40-1.60	Light brown clay and gravel with stones.
180238	TP114	ES1	0.30-0.40	Light brown topsoil and clay with vegetation.
180239	TP115	ES1	0.90-1.00	Brown clay and gravel.
180240	TP115	ES2	2.30-2.50	Light brown clay and gravel with stones.
180241	VP200B	ES1	0.30-0.40	Brown topsoil and clay with gravel and vegetation.
180242	VP200B	ES2	0.90-1.00	Light brown clay and gravel with stones.
180243	VP201	ES1	0.30-0.40	Brown clay and gravel with brick and plastic.
180244	VP202	ES1	0.20-0.30	Brown topsoil and gravel with gravel and stones.
180245	VP203C	ES1	0.30-0.40	Brown topsoil and clay with gravel and stones.
180246	VP203C	ES2	1.00-1.10	Light brown topsoil and clay with gravel and stones.
180247	VP204	ES1	0.20-0.30	Brown topsoil and clay with gravel.
180248	VP204	ES2	1.00-1.10	Light brown sandy clay with gravel and stones.

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Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Ammonium as NH ₄ in leachate	Determination of ammonium in leachate by addition of buffer solution followed by ion selective electrode.	In-house method	L035-PL	W	NONE
Ammonium as NH ₄ in soil	Determination of ammonium in soil by extraction with potassium chloride followed by addition of buffer solution followed by ion selective electrode.	In-house method	L035-PL	W	MCERTS
Ammonium as NH ₄ in water	Determination of ammonium in water by addition of buffer solution followed by ion selective electrode.	In-house method	L035-PL	W	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
BTEX and MTBE in leachates	Determination of BTEX and MTBE in leachates by headspace GC-MS.	In-house method based on USEPA8260	L036-UK	W	NONE
BTEX and MTBE in soil	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073S-PL	W	MCERTS
BTEX and MTBE in water	Determination of BTEX and MTBE in water by headspace GC-MS. Accredited matrices: SW PW	In-house method based on USEPA8260	L036-UK	W	ISO 17025
Chloride in leachate	Determination of chloride in leachate by titration against silver nitrate.	In-house method	L024-PL	W	NONE
Chloride in water	Determination of chloride in water by titration against silver nitrate.	In-house method	L024-PL	W	ISO 17025
Chloride, water soluble, in soil	Determination of chloride by titration using silver nitrate.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L075-PL	D	MCERTS
Complex cyanide in leachate	Determination of complex cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080	W	NONE
Electrical conductivity of leachate	Determination of electrical conductivity in leachate by electrometric measurement.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L031-UK	W	NONE
Electrical conductivity of water	Determination of electrical conductivity in water by electrometric measurement.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L031-PL	W	NONE
Elemental sulphur in soil	Determination of elemental sulphur in soil by extraction in dichloromethane followed by HPLC.	In-house method based on Secondsite Property Holdings Guidance for Assessing and Managing Potential		D	NONE
Fibrous Material in soil screening	Screening of samples for fibrous material by microscopy.	In-house method based on HSG 248	A001	W	ISO 17025

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Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Free cyanide in leachate	Determination of free cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080	W	NONE
Loss on ignition of soil @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L047-PL	D	MCERTS
Metals by ICP-OES in leachate	Determination of metals in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Metals in water by ICP-OES (dissolved)	Determination of metals in water by acidification followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L019-UK	W	NONE
Monohydric phenols in leachate	Determination of phenols in leachate by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080	W	ISO 17025
Monohydric phenols in water	Determination of phenols in water by continuous flow analyser. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080	W	ISO 17025
Organic matter in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L023-PL	D	MCERTS
pH in leachate	Determination of pH in leachate by electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L005-UK	W	ISO 17025
pH in soil	Determination of pH in soil by addition of water followed by electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L005-PL	W	MCERTS
pH in water	Determination of pH in water by electrometric measurement. Accredited matrices: SW PW GW	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L005-PL	W	ISO 17025
Phenols, speciated, in leachate, by HPLC	Determination of speciated phenols by HPLC.	In house method based on Blue Book Method.	L030	W	NONE
Speciated EPA-16 PAHs in leachate	Determination of PAH compounds in leachate by extraction in hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L070-UK	W	NONE
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS

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Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Speciated EPA-16 PAHs in water	Determination of PAH compounds in water by extraction in hexane followed by GC-MS with the use of surrogate and internal standards. Accredited matrices: SW PW GW	In-house method based on USEPA 8270	L070-UK	W	ISO 17025
Stones content of soil	Stones not passing through a 2 mm sieve is determined gravimetrically and reported as a percentage of the dry weight. Sample results are not corrected for the stone content of the sample.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK	D	NONE
Sulphate in leachates	Determination of sulphate in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Sulphate in water	Determination of sulphate in water by acidification followed by ICP-OES. Accredited matrices: SW PW GW	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Sulphate, water soluble, in soil	Determination of water soluble sulphate by extraction with water followed by ICP-OES.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L038-PL	D	MCERTS
Sulphide in leachate	Determination of sulphide in leachate by ion selective electrode.	In-house method	L010-PL	W	NONE
Sulphide in water	Determination of sulphide in water by ion selective electrode.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L010-UK	W	NONE
Suspended solids in water	Determined gravimetrically with GFC filtration papers.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L004-UK	W	NONE
Thiocyanate in leachate	Determination of thiocyanate in leachate by acidification followed by addition of ferric nitrate followed by spectrophotometer.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L049-UK	W	NONE
Thiocyanate in soil	Determination of thiocyanate in soil by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by spectrophotometer.	In-house method	L049-PL	D	NONE
Thiocyanate in water	Determination of thiocyanate in water by acidification followed by addition of ferric nitrate followed by spectrophotometer.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L049-UK	W	NONE
Total cyanide in leachate	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080	W	ISO 17025
Total cyanide in water	Determination of total cyanide by distillation followed by colorimetry. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080	W	ISO 17025
Total organic carbon in leachate	Determination of total organic carbon in leachate by the measurement on a non-dispersive infrared analyser of carbon dioxide released by acidification.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	NONE
Total organic carbon in water	Determination of total organic carbon in water by the measurement on a non-dispersive infrared analyser of carbon dioxide released by acidification.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	NONE



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Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
TPH7 (Leachates)	Determination of dichloromethane extractable hydrocarbons in leachate by GC-MS, speciation by interpretation.	In-house method	L070-UK	W	NONE
TPH7 (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS, speciation by interpretation.	In-house method	L070-UK	W	NONE
TPHCWG (Soil)	Determination of pentane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method	L076-PL	W	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Our Ref: SC/06.06.11/MS550/226777
Your Ref: 17199/412310/ZA
Date: 06 June 2011
Email:



95 Kilbimie Street
Glasgow
G5 8JD

Zarina Aslam
Atkins Telecoms
Stats Enquiries Team
The Hub
500 Park Avenue
Aztec West
Almondsbury
Dear Sir / Madam



Fax:

Re: Ford Lane, Arundel.

Southern Gas Networks (SGN) acknowledges receipt of your notice of your intention to carry out work at the above location. We enclose an extract from our mains records in the location of the area covered by your proposals together with a comprehensive list of precautions for your guidance. This plan shows only those pipes owned by SGN in its role as a Licensed Gas Transporter (GT). Gas pipes owned by other GT's and also privately owned may be present in this area. Information with regard to such pipes should be obtained from the owners. The information shown on this plan is given without obligation, or warranty, the accuracy thereof cannot be guaranteed. Service pipes, valves, siphons, stub connections, etc., are not shown but their presence should be anticipated. Your attention is drawn to the information and disclaimer on these plans. The information included on the enclosed plan should not be referred to beyond a period of 28 days from the date of issue.

You will note the presence of our Low/Medium/Intermediate Pressure gas main in the proximity to your site. NO mechanical excavations are to take place above or within 0.5 m of the Low pressure and medium pressure system and 3metres of the intermediate pressure system. You should where required CONFIRM THE POSITION of mains using HAND DUG TRIAL HOLES.

A colour copy of these plans and the gas safety advice card should be passed to the senior person on site in order to prevent damage to SGN plant and potential direct or consequential costs to your organisation.

Safe digging practices, in accordance with HSE publication HSG47 "Avoiding Danger from Underground Services", must be used to verify and establish the actual position of mains, pipes, services and other apparatus on site before any mechanical plant is used. It is your responsibility to ensure that this information is provided to all persons (either direct labour or contractors) working for you on or near gas apparatus. In addition please follow the advice given on the gas safety card.

It must be stressed that both direct and consequential damage to gas plant can be dangerous both for your employees and the general public, repairs to any such damage will incur a charge. Your works should be carried out in such a manner that we are able to gain access to our apparatus throughout the duration of your operations.

If you have any further enquires please contact the telephone number below.

Yours faithfully,

Maureen Smith
Admin Assistant


CHEMEX ENVIRONMENTAL INTERNATIONAL
VOLATILE ORGANICS IN AIR

Project No :	11G48A	Project code:	ARUNDEL			Turnaround:	STD
12 Aug 11 16:12							
Lab Sample ID :	11G48A01A	11G48A02A	11G48A03A	11G48A04A	11G48A05A	11G48A06A	
Client ID :	VP201	VP202	VP200	AMB AIR	VP204	VP203	
Bottle No :	G0124367	G0167264	E069342	F073256	G0124326	A78469	
Matrix :	AIR	AIR	AIR	AIR	AIR	AIR	
Volume/Weight :	Whole tube	Whole tube	Whole tube	Whole tube	Whole tube	Whole tube	
Scaling Factor :	1.0	1.0	1.0	1.0	1.0	1.0	

COMPOUND	Concentration ng/Tube					
Dichlorodifluoromethane	<15	<15	<15	<15	<15	<15
Chloromethane	<5	<5	<5	<5	<5	<5
Vinyl chloride	<5	<5	<5	<5	<5	<5
Bromomethane	<5	<5	<5	<5	<5	<5
Chloroethane	<5	<5	<5	<5	<5	<5
Trichlorofluoromethane	<5	<5	<5	<5	<5	<5
Acetone	<50	<50	<50	<50	<50	<50
Diethyl ether	<10	<10	<10	<10	<10	<10
1,1-Dichloroethene	<5	<5	<5	<5	<5	<5
Carbon disulfide	<4	<4	<4	<4	<4	<4
Allyl chloride	<10	<10	<10	<10	<10	<10
Methylene chloride	<5	<5	<5	<5	<5	<5
Trans-1,2-dichloroethene	<5	<5	<5	<5	<5	<5
tert-butyl methyl ether	<5	17	<5	<5	<5	7
1,1-Dichloroethane	<5	<5	<5	<5	<5	<5
2-Butanone	<50	<50	<50	<50	<50	<50
cis-1,2-Dichloroethene	<5	<5	<5	<5	<5	<5
2,2-Dichloropropane	<5	<5	<5	<5	<5	<5
Chloroform	<4	7	9	<4	4	24
Tetrahydrofuran	<100	<100	<100	<100	<100	<100
1,1,1-Trichloroethane	<4	<4	<4	<4	14	<4
1,2-Dichloroethane	<5	<5	<5	<5	<5	<5
1-Chlorobutane	<5	<5	<5	<5	<5	<5
1,1-Dichloropropene	<5	<5	<5	<5	<5	<5
Benzene	7200	1400	30	150	15	38
Carbon tetrachloride	<5	<5	<5	<5	<5	<5
2-Nitropropane	<10	<10	<10	<10	<10	<10
Methyl methacrylate	<10	<10	<10	<10	<10	<10
2-Hexanone	<15	<15	<15	<15	<15	<15
4-Methyl-2-pentanone	<25	<25	<25	<25	<25	<25
1,2-Dichloropropane	<5	<5	<5	<5	<5	<5
Trichloroethene	<5	<5	<5	<5	<5	<5
Dibromomethane	<5	<5	<5	<5	<5	<5
Bromodichloromethane	<5	<5	<5	<5	<5	<5
trans-1,3-Dichloropropene	<5	<5	<5	<5	<5	<5
cis-1,3-Dichloropropene	<5	<5	<5	<5	<5	<5
Toluene	3000	6000	78	530	100	130

CHEMEX ENVIRONMENTAL INTERNATIONAL
VOLATILE ORGANICS IN AIR

Project No :	11G48A	Project code:	ARUNDEL		Turnaround:	STD
12 Aug 11 16:12						
Lab Sample ID :	11G48A01A	11G48A02A	11G48A03A	11G48A04A	11G48A05A	11G48A06A
Client ID :	VP201	VP202	VP200	AMB AIR	VP204	VP203
Bottle No :	G0124367	G0167264	E069342	F073256	G0124326	A78469
Matrix :	AIR	AIR	AIR	AIR	AIR	AIR
Volume/Weight :	Whole tube	Whole tube	Whole tube	Whole tube	Whole tube	Whole tube
Scaling Factor :	1.0	1.0	1.0	1.0	1.0	1.0

COMPOUND	Concentration ng/Tube					
1,1,2-Trichloroethane	<5	<5	<5	<5	<5	<5
1,3-Dichloropropane	<5	<5	<5	<5	<5	<5
Ethyl methacrylate	<10	<10	<10	<10	<10	<10
Dibromochloromethane	<5	<5	<5	<5	<5	<5
1,2-Dibromoethane	<5	<5	<5	<5	<5	<5
Tetrachloroethene	<5	<5	<5	<5	<5	<5
Chlorobenzene	<4	<4	<4	<4	<4	<4
1,1,1,2-Tetrachloroethane	<5	<5	<5	<5	<5	<5
Ethylbenzene	4700	1500	30	39	34	40
m&p-Xylene	45000	8400	190	1700	170	470
Styrene	<5	630	13	<5	15	13
Bromoform	<5	<5	<5	<5	<5	<5
o-Xylene	19000	<4	87	460	73	150
1,1,2,2-Tetrachloroethane	<5	<5	<5	<5	<5	<5
1,2,3-Trichloropropane	<5	<5	<5	<5	<5	<5
Isopropylbenzene	630	120	<4.5	<4.5	<4.5	<4.5
trans-1,4-Dichloro-2-butene	<10	<10	<10	<10	<10	<10
Bromobenzene	<5	<5	<5	<5	<5	<5
2-Chlorotoluene	<5	<5	<5	<5	<5	<5
n-Propylbenzene	600	4000	56	<5	36	12
4-Chlorotoluene	<5	<5	<5	<5	<5	<5
1,3,5-Trimethylbenzene	5000	3900	52	270	34	120
Pentachloroethane	<10	<10	<10	<10	<10	<10
1,2,4-Trimethylbenzene	17000	4900	220	290	130	180
tert-Butylbenzene	<5	<5	<5	<5	<5	<5
1,3-Dichlorobenzene	<5	<5	<5	<5	<5	<5
sec-Butylbenzene	<5	48	<5	<5	<5	<5
1,4-Dichlorobenzene	<5	<5	<5	<5	<5	<5
4-Isopropyltoluene	910	<5	<5	<5	<5	<5
1,2-Dichlorobenzene	<5	<5	<5	<5	<5	<5
n-Butylbenzene	<4.5	<4.5	5	<4.5	<4.5	15
Hexachloroethane	<10	<10	<10	<10	<10	<10
1,2-Dibromo-3-chloropropane	-	-	-	-	-	-
1,2,4-Trichlorobenzene	-	-	-	-	-	-
Naphthalene	32000	<500	<500	2400	<500	1400
1,2,3-Trichlorobenzene	-	-	-	-	-	-
Hexachlorobutadiene	<100	<100	<100	<100	<100	<100

CHEMEX ENVIRONMENTAL INTERNATIONAL
VOLATILE ORGANICS IN AIR

Project No :	11G48A	Project code:	ARUNDEL	Turnaround:	STD
12 Aug 11 16:12					
Lab Sample ID :	11G48A07A	0807BLKB	0807BLKA		
Client ID :	TRIP BLANK 6592	BLANK	BLANK		
Bottle No :	F071466	BLANK0807B	BLANK0807A		
Matrix :	AIR	AIR	AIR		
Volume/Weight :	Whole tube	Whole tube	Whole tube		
Scaling Factor :	1.0	1.0	1.0		

COMPOUND	Concentration ng/Tube		
Dichlorodifluoromethane	<15	<15	<15
Chloromethane	<5	<5	<5
Vinyl chloride	<5	<5	<5
Bromomethane	<5	<5	<5
Chloroethane	<5	<5	<5
Trichlorofluoromethane	<5	<5	<5
Acetone	<50	<50	<50
Diethyl ether	<10	<10	<10
1,1-Dichloroethene	<5	<5	<5
Carbon disulfide	<4	<4	<4
Allyl chloride	<10	<10	<10
Methylene chloride	<5	<5	<5
Trans-1,2-dichloroethene	<5	<5	<5
tert-butyl methyl ether	<5	<5	<5
1,1-Dichloroethane	<5	<5	<5
2-Butanone	<50	<50	<50
cis-1,2-Dichloroethene	<5	<5	<5
2,2-Dichloropropane	<5	<5	<5
Chloroform	<4	<4	<4
Tetrahydrofuran	<100	<100	<100
1,1,1-Trichloroethane	<4	<4	<4
1,2-Dichloroethane	<5	<5	<5
1-Chlorobutane	<5	<5	<5
1,1-Dichloropropene	<5	<5	<5
Benzene	<4	<4	<4
Carbon tetrachloride	<5	<5	<5
2-Nitropropane	<10	<10	<10
Methyl methacrylate	<10	<10	<10
2-Hexanone	<15	<15	<15
4-Methyl-2-pentanone	<25	<25	<25
1,2-Dichloropropane	<5	<5	<5
Trichloroethene	<5	<5	<5
Dibromomethane	<5	<5	<5
Bromodichloromethane	<5	<5	<5
trans-1,3-Dichloropropene	<5	<5	<5
cis-1,3-Dichloropropene	<5	<5	<5
Toluene	<5	<5	<5

CHEMEX ENVIRONMENTAL INTERNATIONAL
VOLATILE ORGANICS IN AIR

Project No :	11G48A	Project code:	ARUNDEL	Turnaround:	STD
12 Aug 11 16:12					
Lab Sample ID :	11G48A07A	0807BLKB	0807BLKA		
Client ID :	TRIP BLANK 6592	BLANK	BLANK		
Bottle No :	F071466	BLANK0807B	BLANK0807A		
Matrix :	AIR	AIR	AIR		
Volume/Weight :	Whole tube	Whole tube	Whole tube		
Scaling Factor :	1.0	1.0	1.0		

COMPOUND	Concentration ng/Tube		
1,1,2-Trichloroethane	<5	<5	<5
1,3-Dichloropropane	<5	<5	<5
Ethyl methacrylate	<10	<10	<10
Dibromochloromethane	<5	<5	<5
1,2-Dibromoethane	<5	<5	<5
Tetrachloroethene	<5	<5	<5
Chlorobenzene	<4	<4	<4
1,1,1,2-Tetrachloroethane	<5	<5	<5
Ethylbenzene	<4	<4	<4
m&p-Xylene	<7.5	<7.5	<7.5
Styrene	<5	<5	<5
Bromoform	<5	<5	<5
o-Xylene	<4	<4	<4
1,1,2,2-Tetrachloroethane	<5	<5	<5
1,2,3-Trichloropropane	<5	<5	<5
Isopropylbenzene	<4.5	<4.5	<4.5
trans-1,4-Dichloro-2-butene	<10	<10	<10
Bromobenzene	<5	<5	<5
2-Chlorotoluene	<5	<5	<5
n-Propylbenzene	<5	<5	<5
4-Chlorotoluene	<5	<5	<5
1,3,5-Trimethylbenzene	<5	<5	<5
Pentachloroethane	<10	<10	<10
1,2,4-Trimethylbenzene	<5	<5	<5
tert-Butylbenzene	<5	<5	<5
1,3-Dichlorobenzene	<5	<5	<5
sec-Butylbenzene	<5	<5	<5
1,4-Dichlorobenzene	<5	<5	<5
4-Isopropyltoluene	<5	<5	<5
1,2-Dichlorobenzene	<5	<5	<5
n-Butylbenzene	<4.5	<4.5	<4.5
Hexachloroethane	<10	<10	<10
1,2-Dibromo-3-chloropropane	-	-	-
1,2,4-Trichlorobenzene	-	-	-
Naphthalene	<500	<500	<500
1,2,3-Trichlorobenzene	-	-	-
Hexachlorobutadiene	<100	<100	<100

CHEMEX ENVIRONMENTAL INTERNATIONAL
VOLATILE ORGANICS IN AIR

Project No : 11G48A Project code: ARUNDEL Turnaround: STD

12 Aug 11 16:12

Lab Sample ID :	11G48A01A	11G48A02A	11G48A03A	11G48A04A	11G48A05A	11G48A06A
Client ID :	VP201	VP202	VP200	AMB AIR	VP204	VP203
Bottle No :	G0124367	G0167264	E069342	F073256	G0124326	A78469
Matrix :	AIR	AIR	AIR	AIR	AIR	AIR
Volume/Weight :	Whole tube	Whole tube	Whole tube	Whole tube	Whole tube	Whole tube
Scaling Factor :	1.0	1.0	1.0	1.0	1.0	1.0
Lab QC No:	0807	0807	0807	0807	0807	0807

ALIPHATICS (ng/Tube)

C5-C6	-	-	-	-	1070	70
>C6-C8	-	-	-	-	-	-
>C8-C10	479	740	-	-	-	37
>C10-C12	240	116	383	-	41	216
>C12-C16	-	-	-	-	-	-
>C16-C21	-	-	-	-	-	-
>C21-C35	-	-	-	-	-	-

AROMATICICS (ng/Tube)

C5-C7	7200	1400	30	150	15	38
>C7-C8	3000	6000	78	530	100	130
>C8-C10	92750	23498	704	2759	525	985
>C10-C12	33917	868	612	2400	348	1607
>C12-C16	-	-	-	-	-	-
>C16-C21	-	-	-	-	-	-
>C21-C35	-	-	-	-	-	-

CHEMEX ENVIRONMENTAL INTERNATIONAL
VOLATILE ORGANICS IN AIR

Project No : 11G48A Project code: ARUNDEL Turnaround: STD

12 Aug 11 16:12

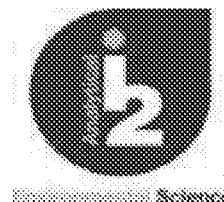
Lab Sample ID : 11G48A07A 0807BLKB 0807BLKA
Client ID : TRIP BLANK 6592 BLANK BLANK
Bottle No : F071466 BLANK0807B BLANK0807A
Matrix : AIR AIR AIR
Volume/Weight : Whole tube Whole tube Whole tube
Scaling Factor : 1.0 1.0 1.0
Lab QC No: 0807 0807 0807

ALIPHATICS (ng/Tube)

C5-C6	-	-	-
>C6-C8	-	-	-
>C8-C10	-	-	-
>C10-C12	-	-	-
>C12-C16	-	-	-
>C16-C21	-	-	-
>C21-C35	-	-	-

AROMATICS (ng/Tube)

C5-C7	0	0	0
>C7-C8	0	0	0
>C8-C10	0	0	0
>C10-C12	0	0	0
>C12-C16	-	-	-
>C16-C21	-	-	-
>C21-C35	-	-	-



Lucy Hay
Atkins Ltd
SWAH
Ashley Avenue
Epsom
KT18 5AL

i2 Analytical Ltd.
Building 19,
BRE,
Garston,
Watford,
WD25 9XX

Analytical Report Number : 11-28669

Project / Site name: Arundel

Samples received on: 08/07/2011

Your job number:

Samples instructed on: 08/07/2011

Your order number:

Analysis completed by: 19/07/2011

Report Issue Number: 1

Report issued on: 19/07/2011

Samples Analysed: 6 water samples

Signed:

Dr Claire Stone
Quality Manager
For & on behalf of i2 Analytical Ltd.

Signed:

Thurstan Plummer
Organics Technical Manager
For & on behalf of i2 Analytical Ltd.

Other office located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting

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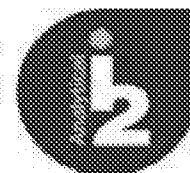
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ARUN DISTRICT COUNCIL AB/45/21/PL

The results included within the report are representative of the samples submitted for analysis.

Page 1 of 7



i2 Science

Analytical Report Number: 11-28669

Project / Site name: Arundel

Lab Sample Number	182891	182892	182893	182894	182895
Sample Reference	BH101S	BH101D	BH102	BH103	BH104
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	3.50	7.50	7.50	7.00	8.00
Date Sampled	07/07/2011	07/07/2011	07/07/2011	07/07/2011	07/07/2011
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status		

General Inorganics

pH	pH units	N/A	ISO 17025	7.6	8.4	6.7	6.8	6.9
Electrical Conductivity	µS/cm	10	NONE	3500	3600	1000	820	860
Total Cyanide	µg/l	10	ISO 17025	280	260	< 10	< 10	< 10
Complex Cyanide	µg/l	10	NONE	280	260	< 10	< 10	< 10
Free Cyanide	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
Thiocyanate as SCN	µg/l	30	NONE	< 30	< 30	< 30	< 30	< 30
Sulphate as SO ₄	µg/L	45	ISO 17025	670000	650000	120000	39000	42000
Sulphide	µg/l	5	NONE	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Chloride	mg/l	4	ISO 17025	7.9	300	48	68	73
Ammonium as NH ₄	µg/l	15	ISO 17025	520000	520000	28000	440	370
Total Organic Carbon (TOC)	mg/l	0.1	NONE	310	450	7.9	3.8	3.2
Total Suspended Solids	mg/l	5	NONE	1100	1800	840	110	940

Phenols by HPLC

Catechol	µg/l	0.5	NONE	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Resorcinol	µg/l	0.5	NONE	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ethylphenol & Dimethylphenol	µg/l	0.5	NONE	42	86	< 0.5	< 0.5	< 0.5
Cresols	µg/l	0.5	NONE	82	95	7.0	< 0.5	< 0.5
Naphthols	µg/l	0.5	NONE	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Phenol	µg/l	0.5	NONE	110	170	8.9	< 0.5	< 0.5
Trimethylphenol	µg/l	0.5	NONE	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5

Total Phenols

Total Phenols (HPLC)	µg/l	3.5	NONE	240	350	16	< 3.5	< 3.5
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Speciated PAHs

Naphthalene	µg/l	0.01	ISO 17025	2200	830	1.9	< 0.01	< 0.01
Acenaphthylene	µg/l	0.01	ISO 17025	130	39	12	< 0.01	< 0.01
Acenaphthene	µg/l	0.01	ISO 17025	56	18	11	< 0.01	< 0.01
Fluorene	µg/l	0.01	ISO 17025	51	9.0	8.3	< 0.01	< 0.01
Phenanthrene	µg/l	0.01	ISO 17025	57	8.7	0.57	< 0.01	< 0.01
Anthracene	µg/l	0.01	ISO 17025	11	2.9	0.38	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	ISO 17025	9.4	1.3	0.33	< 0.01	< 0.01
Pyrene	µg/l	0.01	ISO 17025	7.2	1.1	0.36	< 0.01	< 0.01
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Total PAH

Total EPA-16 PAHs	µg/l	0.2	ISO 17025	2500	910	35	< 0.2	< 0.2
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Heavy Metals / Metalloids

Arsenic (dissolved)	µg/l	1	ISO 17025	38	58	19	2.3	3.2
Cadmium (dissolved)	µg/l	0.1	ISO 17025	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Chromium (dissolved)	µg/l	0.4	ISO 17025	4.8	11	< 0.4	0.7	0.8
Copper (dissolved)	µg/l	0.7	ISO 17025	2.6	1.2	< 0.7	1.2	1.6
Iron (dissolved)	mg/l	0.004	ISO 17025	0.20	0.33	0.10	< 0.004	< 0.004
Lead (dissolved)	µg/l	1	ISO 17025	< 1.0	< 1.0	1.6	< 1.0	< 1.0
Mercury (dissolved)	µg/l	0.5	ISO 17025	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Nickel (dissolved)	µg/l	0.3	ISO 17025	12	23	3.1	1.1	2.8
Selenium (dissolved)	µg/l	4	ISO 17025	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Zinc (dissolved)	µg/l	0.4	ISO 17025	< 0.4	2.1	0.4	< 0.4	< 0.4

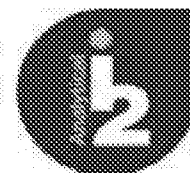
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ARUN DISTRICT COUNCIL AB45/21/PL

The results included within the report are representative of the samples submitted for analysis.

Page 2 of 7



Environmental Science

Analytical Report Number: 11-28669

Project / Site name: Arundel

Lab Sample Number	182891	182892	182893	182894	182895
Sample Reference	BH101S	BH101D	BH102	BH103	BH104
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	3.50	7.50	7.50	7.00	8.00
Date Sampled	07/07/2011	07/07/2011	07/07/2011	07/07/2011	07/07/2011
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status		

Monoaromatics

Benzene	µg/l	1	ISO 17025	12000	9500	8.5	< 1.0	< 1.0
Toluene	µg/l	1	ISO 17025	4200	4200	2.3	< 1.0	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	110	110	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/l	1	ISO 17025	990	780	1.3	< 1.0	< 1.0
o-xylene	µg/l	1	ISO 17025	420	350	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Petroleum Hydrocarbons

TPH7 - Aliphatic >C5 - C6	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH7 - Aliphatic >C6 - C8	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH7 - Aliphatic >C8 - C10	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH7 - Aliphatic >C10 - C12	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH7 - Aliphatic >C12 - C16	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH7 - Aliphatic >C16 - C21	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH7 - Aliphatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH7 - Aliphatic (C5 - C35)	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10

TPH7 - Aromatic >C5 - C7	µg/l	10	NONE	12000	9500	< 10	< 10	< 10
TPH7 - Aromatic >C7 - C8	µg/l	10	NONE	4200	4200	< 10	< 10	< 10
TPH7 - Aromatic >C8 - C10	µg/l	10	NONE	1600	1300	< 10	< 10	< 10
TPH7 - Aromatic >C10 - C12	µg/l	10	NONE	3000	1000	28	< 10	< 10
TPH7 - Aromatic >C12 - C16	µg/l	10	NONE	300	170	59	< 10	< 10
TPH7 - Aromatic >C16 - C21	µg/l	10	NONE	88	38	95	< 10	< 10
TPH7 - Aromatic >C21 - C35	µg/l	10	NONE	16	12	44	< 10	< 10
TPH7 - Aromatic (C5 - C35)	µg/l	10	NONE	21000	16000	230	< 10	< 10

U/S = Unsuitable Sample I/S = Insufficient Sample

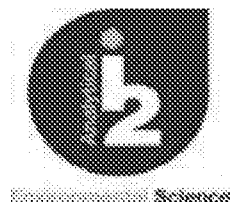
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ARUN DISTRICT COUNCIL AB/45/21/PL

The results included within the report are representative of the samples submitted for analysis.

Page 3 of 7



Analytical Report Number: 11-28669

Project / Site name: Arundel

Lab Sample Number	182896						
Sample Reference	BH105						
Sample Number	None Supplied						
Depth (m)	6.50						
Date Sampled	07/07/2011						
Time Taken	None Supplied						
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status				

General Inorganics

pH	pH units	N/A	ISO 17025	7.0			
Electrical Conductivity	µS/cm	10	NONE	1400			
Total Cyanide	µg/l	10	ISO 17025	310			
Complex Cyanide	µg/l	10	NONE	290			
Free Cyanide	µg/l	10	NONE	15			
Thiocyanate as SCN	µg/l	30	NONE	< 30			
Sulphate as SO ₄	µg/L	45	ISO 17025	480000			
Sulphide	µg/l	5	NONE	< 5.0			
Chloride	mg/l	4	ISO 17025	74			
Ammonium as NH ₄	µg/l	15	ISO 17025	25000			
Total Organic Carbon (TOC)	mg/l	0.1	NONE	12			
Total Suspended Solids	mg/l	5	NONE	1500			

Phenols by HPLC

Catechol	µg/l	0.5	NONE	< 0.5			
Resorcinol	µg/l	0.5	NONE	< 0.5			
Ethylphenol & Dimethylphenol	µg/l	0.5	NONE	< 0.5			
Cresols	µg/l	0.5	NONE	< 0.5			
Naphthols	µg/l	0.5	NONE	< 0.5			
Phenol	µg/l	0.5	NONE	< 0.5			
Trimethylphenol	µg/l	0.5	NONE	< 0.5			

Total Phenols

Total Phenols (HPLC)	µg/l	3.5	NONE	< 3.5			
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Speciated PAHs

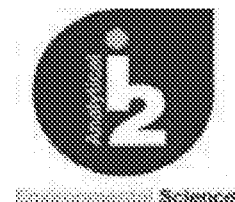
Naphthalene	µg/l	0.01	ISO 17025	< 0.01			
Acenaphthylene	µg/l	0.01	ISO 17025	0.83			
Acenaphthene	µg/l	0.01	ISO 17025	0.63			
Fluorene	µg/l	0.01	ISO 17025	0.57			
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01			
Anthracene	µg/l	0.01	ISO 17025	< 0.01			
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01			
Pyrene	µg/l	0.01	ISO 17025	< 0.01			
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01			
Chrysene	µg/l	0.01	ISO 17025	< 0.01			
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01			
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01			
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01			
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	< 0.01			
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01			
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	< 0.01			

Total PAH

Total EPA-16 PAHs	µg/l	0.2	ISO 17025	2.0			
-------------------	------	-----	-----------	-----	--	--	--

Heavy Metals / Metalloids

Arsenic (dissolved)	µg/l	1	ISO 17025	3.0			
Cadmium (dissolved)	µg/l	0.1	ISO 17025	< 0.1			
Chromium (dissolved)	µg/l	0.4	ISO 17025	< 0.4			
Copper (dissolved)	µg/l	0.7	ISO 17025	< 0.7			
Iron (dissolved)	mg/l	0.004	ISO 17025	0.12			
Lead (dissolved)	µg/l	1	ISO 17025	< 1.0			
Mercury (dissolved)	µg/l	0.5	ISO 17025	< 0.5			
Nickel (dissolved)	µg/l	0.3	ISO 17025	8.5			
Selenium (dissolved)	µg/l	4	ISO 17025	< 4.0			
Zinc (dissolved)	µg/l	0.4	ISO 17025	0.6			



Analytical Report Number: 11-28669

Project / Site name: Arundel

Lab Sample Number				182896				
Sample Reference				BH105				
Sample Number				None Supplied				
Depth (m)				6.50				
Date Sampled				07/07/2011				
Time Taken				None Supplied				
Analytical Parameter (Water Analysis)				Units	Limit of detection	Accreditation Status		

Monoaromatics

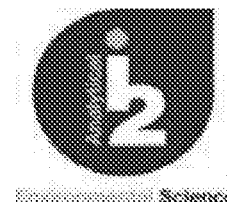
Benzene	µg/l	1	ISO 17025	< 1.0				
Toluene	µg/l	1	ISO 17025	< 1.0				
Ethylbenzene	µg/l	1	ISO 17025	< 1.0				
p & m-xylene	µg/l	1	ISO 17025	< 1.0				
o-xylene	µg/l	1	ISO 17025	< 1.0				
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0				

Petroleum Hydrocarbons

TPH7 - Aliphatic >C5 - C6	µg/l	10	NONE	< 10				
TPH7 - Aliphatic >C6 - C8	µg/l	10	NONE	< 10				
TPH7 - Aliphatic >C8 - C10	µg/l	10	NONE	< 10				
TPH7 - Aliphatic >C10 - C12	µg/l	10	NONE	< 10				
TPH7 - Aliphatic >C12 - C16	µg/l	10	NONE	< 10				
TPH7 - Aliphatic >C16 - C21	µg/l	10	NONE	< 10				
TPH7 - Aliphatic >C21 - C35	µg/l	10	NONE	< 10				
TPH7 - Aliphatic (C5 - C35)	µg/l	10	NONE	< 10				

TPH7 - Aromatic >C5 - C7	µg/l	10	NONE	< 10				
TPH7 - Aromatic >C7 - C8	µg/l	10	NONE	< 10				
TPH7 - Aromatic >C8 - C10	µg/l	10	NONE	< 10				
TPH7 - Aromatic >C10 - C12	µg/l	10	NONE	< 10				
TPH7 - Aromatic >C12 - C16	µg/l	10	NONE	< 10				
TPH7 - Aromatic >C16 - C21	µg/l	10	NONE	< 10				
TPH7 - Aromatic >C21 - C35	µg/l	10	NONE	< 10				
TPH7 - Aromatic (C5 - C35)	µg/l	10	NONE	< 10				

U/S = Unsuitable Sample I/S = Insufficient Sample

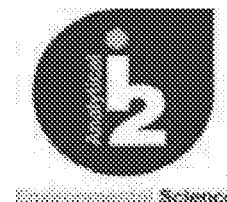


Analytical Report Number : 11-28669

Project / Site name: Arundel

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Ammonium as NH ₄ in water	Determination of ammonium in water by addition of buffer solution followed by ion selective electrode.	In-house method	L035-PL	W	ISO 17025
BTEX and MTBE in water	Determination of BTEX and MTBE in water by headspace GC-MS. Accredited matrices: SW PW	In-house method based on USEPA8260	L036-UK	W	ISO 17025
Chloride in water	Determination of chloride in water by titration against silver nitrate.	In-house method	L024-PL	W	ISO 17025
Complex cyanide in water	Determination of complex cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080	W	NONE
Electrical conductivity of water	Determination of electrical conductivity in water by electrometric measurement.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L031-PL	W	NONE
Free cyanide (Low level) in water	Determination of free cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080	W	NONE
Metals in water by ICP-OES (dissolved)	Determination of metals in water by acidification followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Monohydric phenols in water	Determination of phenols in water by continuous flow analyser. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080	W	ISO 17025
pH in water	Determination of pH in water by electrometric measurement. Accredited matrices: SW PW GW	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L005-PL	W	ISO 17025
Phenols, speciated, in water, by HPLC	Determination of speciated phenols by HPLC.	In house method based on Blue Book Method.	L030	W	NONE
Speciated EPA-16 PAHs in water	Determination of PAH compounds in water by extraction in hexane followed by GC-MS with the use of surrogate and internal standards. Accredited matrices: SW PW GW	In-house method based on USEPA 8270	L070-UK	W	ISO 17025
Sulphate in water	Determination of sulphate in water by acidification followed by ICP-OES. Accredited matrices: SW PW GW	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Sulphide in water	Determination of sulphide in water by ion selective electrode.	In-house method	L010-PL	W	NONE
Suspended solids in water	Determined gravimetrically with GFC filtration papers.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L004-UK	W	NONE
Thiocyanate in water	Determination of thiocyanate in water by acidification followed by addition of ferric nitrate followed by spectrophotometer.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L049-UK	W	NONE



Analytical Report Number : 11-28669

Project / Site name: Arundel

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Total cyanide in water	Determination of total cyanide by distillation followed by colorimetry. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L060	W	ISO 17025
Total organic carbon in water	Determination of total organic carbon in water by the measurement on a non-dispersive infrared analyser of carbon dioxide released by acidification.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	NONE
TPH7 (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS, speciation by interpretation.	In-house method	L070-UK	W	NONE

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

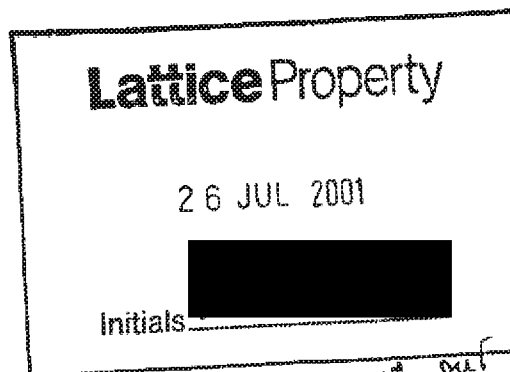
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

A71430/GTG.2000078/Arundel/R004rev0/mg

23 July 2001

4418

Mr Win Bowen
Construction Manager
Lattice Property Holdings Ltd
Aviary Court
Wade Road
Basingstoke
Hants RG24 8GZ



Dear Win

**FORD ROAD, ARUNDEL, MENTOR No. 015162
ENVIRONMENTAL GROUNDWATER MONITORING LETTER REPORT**

Introduction

WS Atkins was commissioned by Lattice Property Holdings Limited (LPH) in February 2001 to undertake further monitoring of groundwater contamination at their premises at Ford Road, Arundel, BN18 9DX resulting from use of the site for works associated with historical gas production, gas storage and transmission. Residential housing lies to the south and west of the site. Grazing land and open ground lies to the east and south, and Ford Road forms the north and north east boundary. The River Arun lies approximately 40 metres to the south east of the site. This letter report provides an [REDACTED] summary of the additional groundwater monitoring undertaken on this solely Lattice owned land, hereafter referred to as the study site.

Having been the subject of an extensive intrusive investigation, undertaken in June 2000, information on current site status, site history and proposed remedial requirements is reported in WS Atkins Environmental Assessment Site Investigation Report (WSA Ref. A71430/GTG.2000078/R002rev1/December2000). This current report should be read in conjunction with the December 2000 Site Investigation Report.

Letter Report Format

The following sections of this report contain:

- a description of the study site geology, hydrology and hydrogeology as determined by the June 2000 site investigation;
- details of the further groundwater monitoring undertaken within the study site area in February and March 2001 to confirm groundwater quality and movement;
- details of sampling and analysis undertaken and analytical results;

-
-

Geology

Made ground was encountered to a maximum depth of 2.0m bgl. The solid geology consists of Cretaceous Upper Chalk (which was encountered during the investigation). Overlying this are sandy silty clay alluvium associated with the River Arun. Historical features and areas of potential foundations are shown in Figure 3. The boreholes were logged in accordance with BS 5930, 1999 (Ref. 1) at the time of the initial investigation. No perched water was encountered in the boreholes and appropriate bentonite seals were placed at the base of the alluvial layers to prevent downward migration of contamination. The logs are provided in Appendix A.

Hydrology

A drainage ditch is located approximately 5m off-site from the north eastern boundary. The River Arun flows in a southerly direction approximately 40m to the south east of the site. 75% of the study site has a gravel surface finish and it is estimated that almost all precipitation will directly enter the ground.

Hydrogeology

The Upper Chalk is classified as a major aquifer. The water table was encountered during the initial site investigation, and was found to lie between 2.4 and 3.9m bgl. The direction of the deep groundwater flow could not be confirmed after two monitoring rounds, this was anticipated to be due to the tidal influence of the River Arun. The recent groundwater level monitoring has confirmed this tidal influence.

Site Investigation

Site investigation of the study site took place between 27th February and 13th March 2001. The works involved the purging and sampling of the 5 No. borehole locations on the site, followed by the installation of a Unidata 6508D STARLOG datalogger with 10m depth probe into three borehole locations (BH1, BH3 and BH5, Figure 2). The probe was placed approximately 5m bgl in each location and remained in place for two weeks after installation in order to record both spring and neap tide events. During this two week interval the datalogger recorded the depth of water above the probe at 20 minute intervals. Graphical data of the approximately 1000 pressure measurements recorded by the probes are presented in Graph 1.

Due to concern over the variation in chemical results obtained from this sampling round (analysed by ALcontrol Geochem) relative to the initial June 2000 data (analysed by TES Bretby) a further round of samples were collected for TPH analysis in May 2001. At the request of Lattice Property these additional samples were analysed solely by ALcontrol Geochem.

Sampling and Analysis

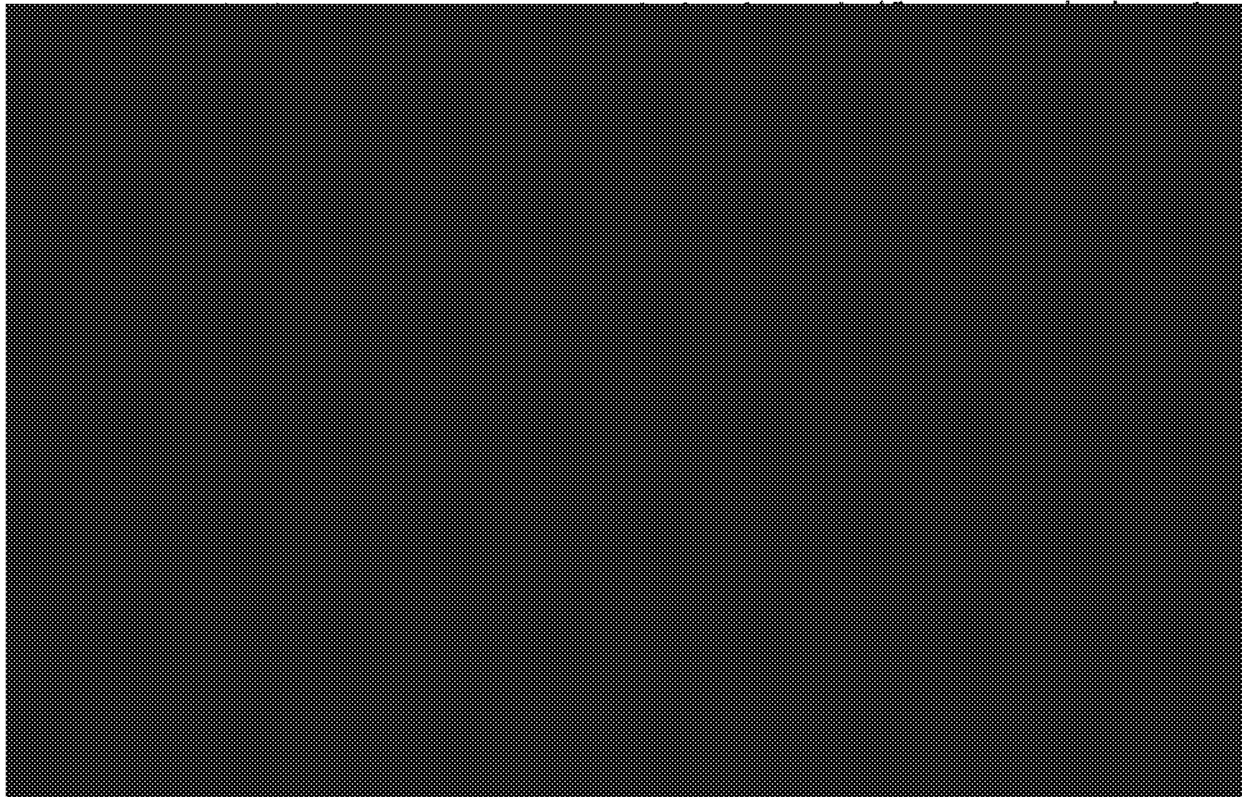
Analysis of March and May 2001 samples was carried out by ALcontrol Geochem, a UKAS accredited and LPH approved laboratory. The results are given in Appendix B. The March 2001 water samples were tested for the analytical suite specified in Table 1. The May 2001 samples were solely tested for Total Petroleum Hydrocarbons by GC-FID. Of the five samples collected in May 2001, one sample (BH2) was broken in transit to the laboratory.

Table 1: Analytical Suite

Waters (5 samples)	
pH	Total Phenols
Moisture Content	Polycyclic Aromatic Hydrocarbons
Loss on ignition	(PAH) – total of 16 priority PAHs
Easily Liberatable Cyanide	Elemental Sulphur
Complex Cyanide	Water Soluble Sulphate
Total Cyanide	Exchangeable Ammonia
Arsenic	Water Soluble Chloride
Selenium	BTEX (Benzene, Toluene, Ethylbenzene
Cadmium	and Xylene)
Chromium	TPH (Total Petroleum Hydrocarbons,
Lead	with carbon banding)
Mercury	

Chemical Results

March 2001



The chemical results of the March 2001 monitoring round are presented in Appendix B.

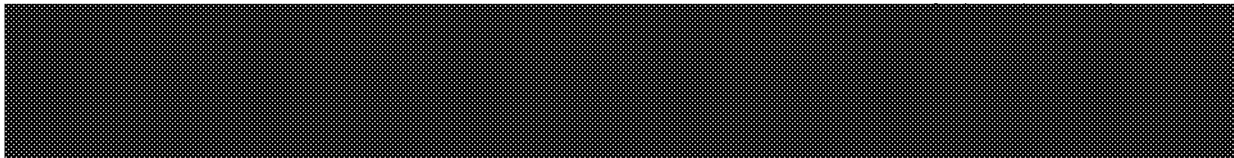
May 2001



The chemical results of the May 2001 monitoring round are presented in Appendix B.

Water level monitoring

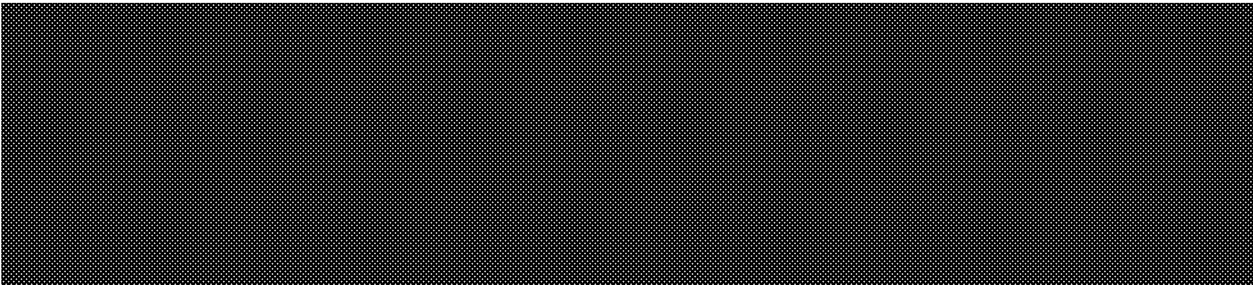
Graphs and plots of the levels are shown in Graph 1, and Figures 4 to 7 respectively. The tidal influence is demonstrated by up to 2400 mm in BH5. Interpretation of the data suggests that the groundwater flow direction is generally to the east, i.e. towards the tidal River Arun with a maximum gradient of approximately 0.010. A gentler gradient (approximately 0.006) from the east to west is demonstrated for shorter periods of high tide. These reversals are associated with the larger magnitude spring high tides, and it is reasonably assumed that this occurs over a bi-monthly cycle.



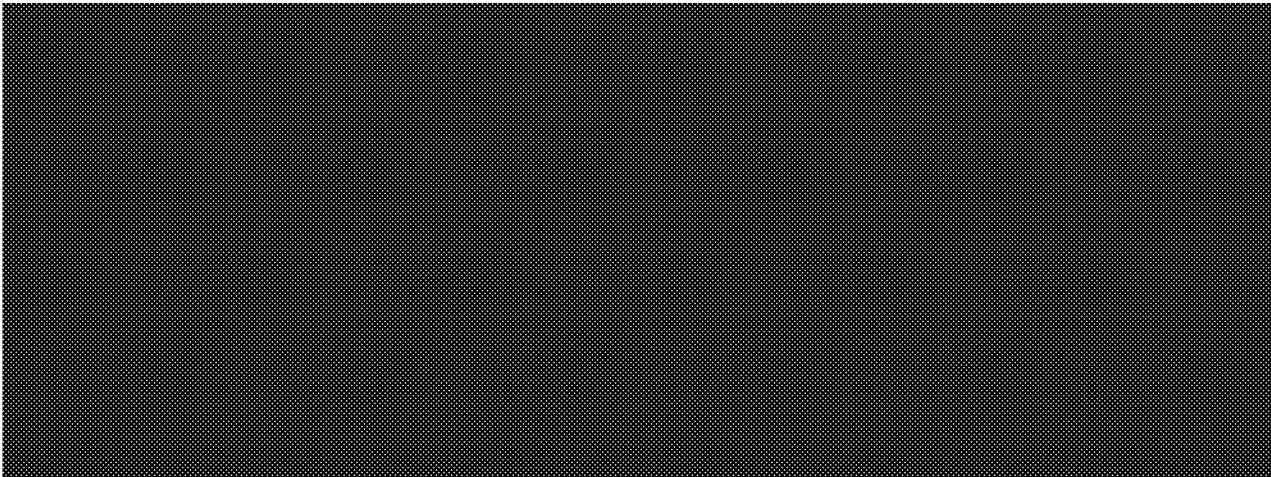
Quality Assurance

The further groundwater monitoring was designed, specified and undertaken by competent staff of WS Atkins Consultants Ltd (WSA), maintaining BSI EN ISO 9001: 1994 registered status. Quality assured procedures for ensuring quality both in specification, procurement and in implementation have been in place prior to and during the monitoring works.

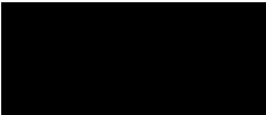
Risk Assessment



Risk Management Approach



Yours sincerely,
For and behalf of WS Atkins Consultants Ltd



MW Reed
Project Manager

References

1. British Standard 5930. Code of Practice for Site Investigation (Annex F) 1999.
2. Guidance for Assessing and Managing Potential Contamination on Former Gasworks and Associated Sites. BG plc Property Division, May 1999, Version 2.4.

List of Figures

Figure 1 Study Site Location Plan

Figure 2 Topographical Survey (A3) (including investigation locations)

Figure 3 Study site layout plan with historical information (including adjacent land)

Figure 4 Piezometric Surfaces of 6th March 2001 Through Neap Tide Cycle

Figure 5 Piezometric Surfaces of 6th March 2001 Through Neap Tide Cycle

Figure 6 Piezometric Surfaces of 11th/12th March 2001 Through Spring Tide Cycle

Figure 7 Piezometric Surfaces of 11th/12th March 2001 Through Spring Tide Cycle

List of Graphs

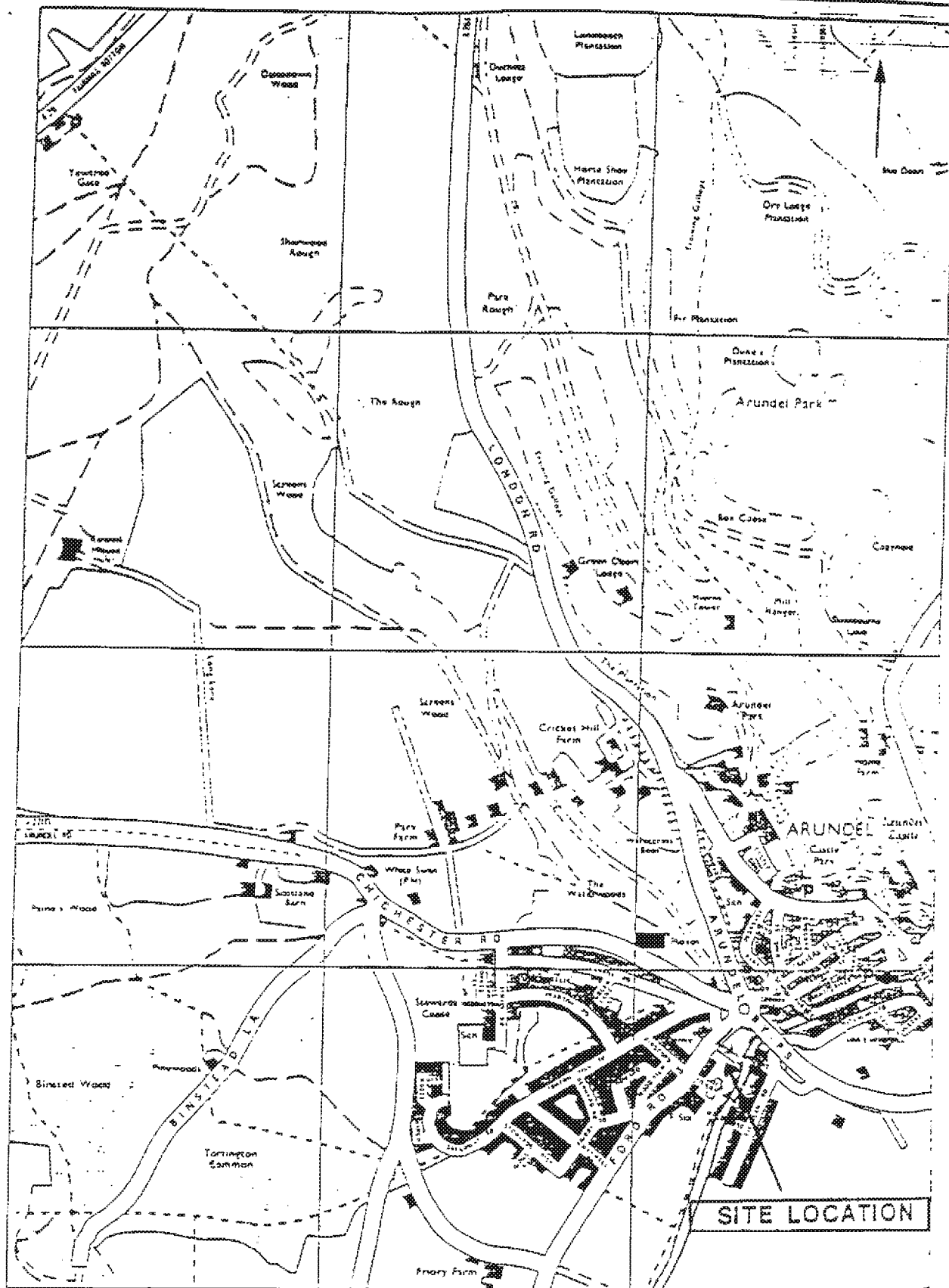
Graph 1 Lattice Property Arundel Hydrograph 27/02/01 – 13/03/01.

Appendices

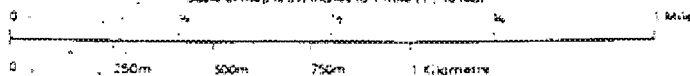
Appendix A: Borehole Logs

Appendix B: Results of Chemical Analysis, March 2001

Appendix C : Results of Chemical Analysis, May 2001.



Scale of Map is 3 1/2 inches to 1 mile (1 : 18100)



Arundel, Ford Road
Site Location

WS Atkins Environment

a division of WS Atkins Consultants Ltd.

Woodcote Grove, Ashley Road,
Epsom, Surrey, KT18 5BW

Tel. (0372) 726140

Fax (0372) 740055

11/12/2000

Drawn
KM

Checked
NJL

Approved
JES

Scale
N/A

Drawing Number
Figure 1

Reference
A71430



Drawing Number
A71430/GTG.2000078/Figure 2

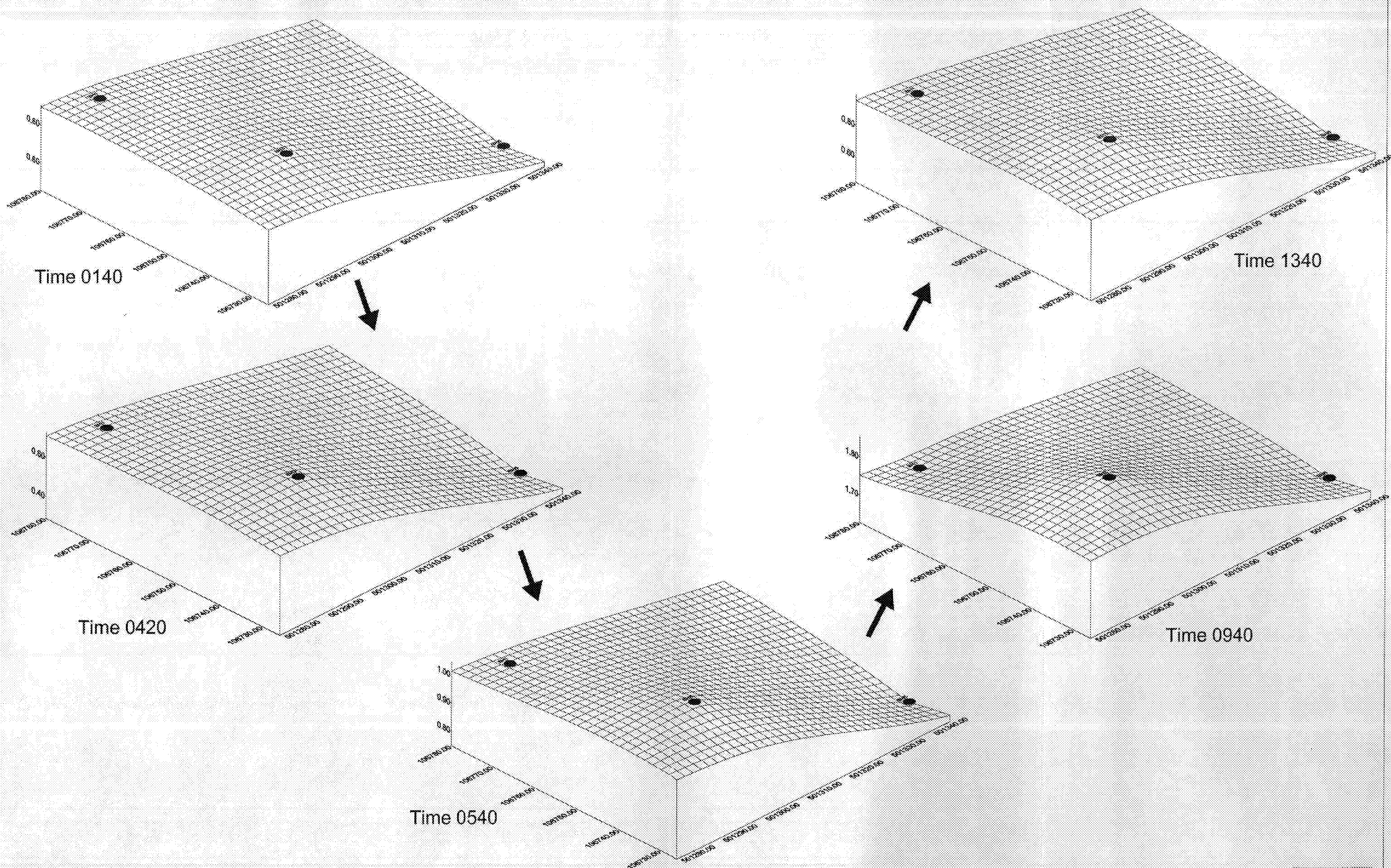
LEGEND		
Number	Description	Feature Still Present
1	Gas Holder	Demolished/No Longer Present
2	Drainage Ditch	Demolished/No Longer Present
3	Buildings	Demolished/No Longer Present
4	Small Circular Structure (Tank/Wall)	Demolished/No Longer Present
5	Buildings	Demolished/No Longer Present
6	Gas Holder	Demolished/No Longer Present
7	Gas Holder	Demolished/No Longer Present
8	Small Circular Tank	Demolished/No Longer Present
9	Gas Holder	Demolished/No Longer Present
10	Electricity Substation	Feature Still Present
11	Above Ground Tank	Demolished/No Longer Present
12	Governor Station	Feature Still Present
13	Toilet	Demolished/No Longer Present

[illegible]

The map shows a topographic view of the River Ayni area. Elevation contours are marked with values such as 920, 930, 940, 950, 960, 970, 980, 990, 1000, 1010, 1020, 1030, 1040, 1050, 1060, 1070, 1080, 1090, 1100, 1110, 1120, 1130, 1140, 1150, 1160, 1170, 1180, 1190, 1200, 1210, 1220, 1230, 1240, 1250, 1260, 1270, 1280, 1290, 1300, 1310, 1320, 1330, 1340, 1350, 1360, 1370, 1380, 1390, 1400, 1410, 1420, 1430, 1440, 1450, 1460, 1470, 1480, 1490, 1500, 1510, 1520, 1530, 1540, 1550, 1560, 1570, 1580, 1590, 1600, 1610, 1620, 1630, 1640, 1650, 1660, 1670, 1680, 1690, 1700, 1710, 1720, 1730, 1740, 1750, 1760, 1770, 1780, 1790, 1800, 1810, 1820, 1830, 1840, 1850, 1860, 1870, 1880, 1890, 1900, 1910, 1920, 1930, 1940, 1950, 1960, 1970, 1980, 1990, 2000, 2010, 2020, 2030, 2040, 2050, 2060, 2070, 2080, 2090, 2100, 2110, 2120, 2130, 2140, 2150, 2160, 2170, 2180, 2190, 2200, 2210, 2220, 2230, 2240, 2250, 2260, 2270, 2280, 2290, 2300, 2310, 2320, 2330, 2340, 2350, 2360, 2370, 2380, 2390, 2400, 2410, 2420, 2430, 2440, 2450, 2460, 2470, 2480, 2490, 2500, 2510, 2520, 2530, 2540, 2550, 2560, 2570, 2580, 2590, 2600, 2610, 2620, 2630, 2640, 2650, 2660, 2670, 2680, 2690, 2700, 2710, 2720, 2730, 2740, 2750, 2760, 2770, 2780, 2790, 2800, 2810, 2820, 2830, 2840, 2850, 2860, 2870, 2880, 2890, 2900, 2910, 2920, 2930, 2940, 2950, 2960, 2970, 2980, 2990, 3000, 3010, 3020, 3030, 3040, 3050, 3060, 3070, 3080, 3090, 3100, 3110, 3120, 3130, 3140, 3150, 3160, 3170, 3180, 3190, 3200, 3210, 3220, 3230, 3240, 3250, 3260, 3270, 3280, 3290, 3300, 3310, 3320, 3330, 3340, 3350, 3360, 3370, 3380, 3390, 3400, 3410, 3420, 3430, 3440, 3450, 3460, 3470, 3480, 3490, 3500, 3510, 3520, 3530, 3540, 3550, 3560, 3570, 3580, 3590, 3600, 3610, 3620, 3630, 3640, 3650, 3660, 3670, 3680, 3690, 3700, 3710, 3720, 3730, 3740, 3750, 3760, 3770, 3780, 3790, 3800, 3810, 3820, 3830, 3840, 3850, 3860, 3870, 3880, 3890, 3900, 3910, 3920, 3930, 3940, 3950, 3960, 3970, 3980, 3990, 4000, 4010, 4020, 4030, 4040, 4050, 4060, 4070, 4080, 4090, 4100, 4110, 4120, 4130, 4140, 4150, 4160, 4170, 4180, 4190, 4200, 4210, 4220, 4230, 4240, 4250, 4260, 4270, 4280, 4290, 4300, 4310, 4320, 4330, 4340, 4350, 4360, 4370, 4380, 4390, 4400, 4410, 4420, 4430, 4440, 4450, 4460, 4470, 4480, 4490, 4500, 4510, 4520, 4530, 4540, 4550, 4560, 4570, 4580, 4590, 4600, 4610, 4620, 4630, 4640, 4650, 4660, 4670, 4680, 4690, 4700, 4710, 4720, 4730, 4740, 4750, 4760, 4770, 4780, 4790, 4800, 4810, 4820, 4830, 4840, 4850, 4860, 4870, 4880, 4890, 4900, 4910, 4920, 4930, 4940, 4950, 4960, 4970, 4980, 4990, 5000, 5010, 5020, 5030, 5040, 5050, 5060, 5070, 5080, 5090, 5100, 5110, 5120, 5130, 5140, 5150, 5160, 5170, 5180, 5190, 5200, 5210, 5220, 5230, 5240, 5250, 5260, 5270, 5280, 5290, 5300, 5310, 5320, 5330, 5340, 5350, 5360, 5370, 5380, 5390, 5400, 5410, 5420, 5430, 5440, 5450, 5460, 5470, 5480, 5490, 5500, 5510, 5520, 5530, 5540, 5550, 5560, 5570, 5580, 5590, 5600, 5610, 5620, 5630, 5640, 5650, 5660, 5670, 5680, 5690, 5700, 5710, 5720, 5730, 5740, 5750, 5760, 5770, 5780, 5790, 5800, 5810, 5820, 5830, 5840, 5850, 5860, 5870, 5880, 5890, 5900, 5910, 5920, 5930, 5940, 5950, 5960, 5970, 5980, 5990, 6000, 6010, 6020, 6030, 6040, 6050, 6060, 6070, 6080, 6090, 6100, 6110, 6120, 6130, 6140, 6150, 6160, 6170, 6180, 6190, 6200, 6210, 6220, 6230, 6240, 6250, 6260, 6270, 6280, 6290, 6300, 6310, 6320, 6330, 6340, 6350, 6360, 6370, 6380, 6390, 6400, 6410, 6420, 6430, 6440, 6450, 6460, 6470, 6480, 6490, 6500, 6510, 6520, 6530, 6540, 6550, 6560, 6570, 6580, 6590, 6600, 6610, 6620, 6630, 6640, 6650, 6660, 6670, 6680, 6690, 6700, 6710, 6720, 6730, 6740, 6750, 6760, 6770, 6780, 6790, 6800, 6810, 6820, 6830, 6840, 6850, 6860, 6870, 6880, 6890, 6900, 6910, 6920, 6930, 6940, 6950, 6960, 6970, 6980, 6990, 7000, 7010, 7020, 7030, 7040, 7050, 7060, 7070, 7080, 7090, 7100, 7110, 7120, 7130, 7140, 7150, 7160, 7170, 7180, 7190, 7200, 7210, 7220, 7230, 7240, 7250, 7260, 7270, 7280, 7290, 7300, 7310, 7320, 7330, 7340, 7350, 7360, 7370, 7380, 7390, 7400, 7410, 7420, 7430, 7440, 7450, 7460, 7470, 7480, 7490, 7500, 7510, 7520, 7530, 7540, 7550, 7560, 7570, 7580, 7590, 7600, 7610, 7620, 7630, 7640, 76

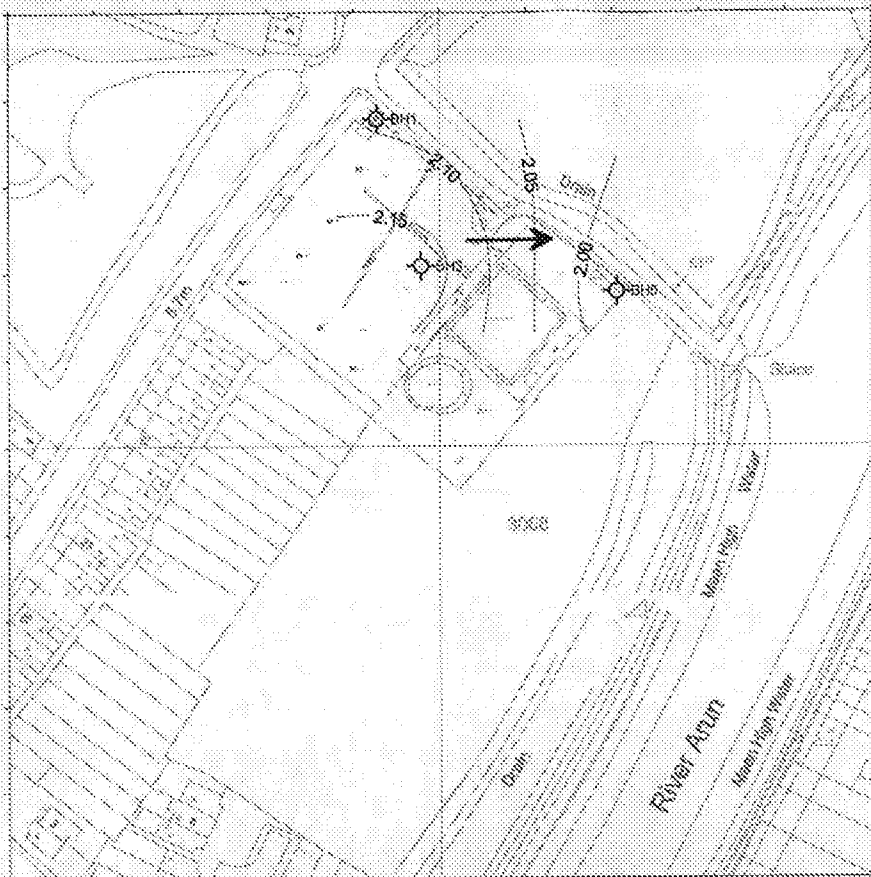
The map shows a topographic representation of the River Acton area. A grid is overlaid on the map. A large arrow points from a central location towards the river, indicating the direction of flow. The map includes labels for 'River Acton', 'Main Drain', and 'Proposed Drain'. The map also shows a residential area with streets and a large open area labeled '3025'.

Project	Lattice Property - Arundel
Title	Piezometric surfaces on 6th March 2001 through neap tide cycle

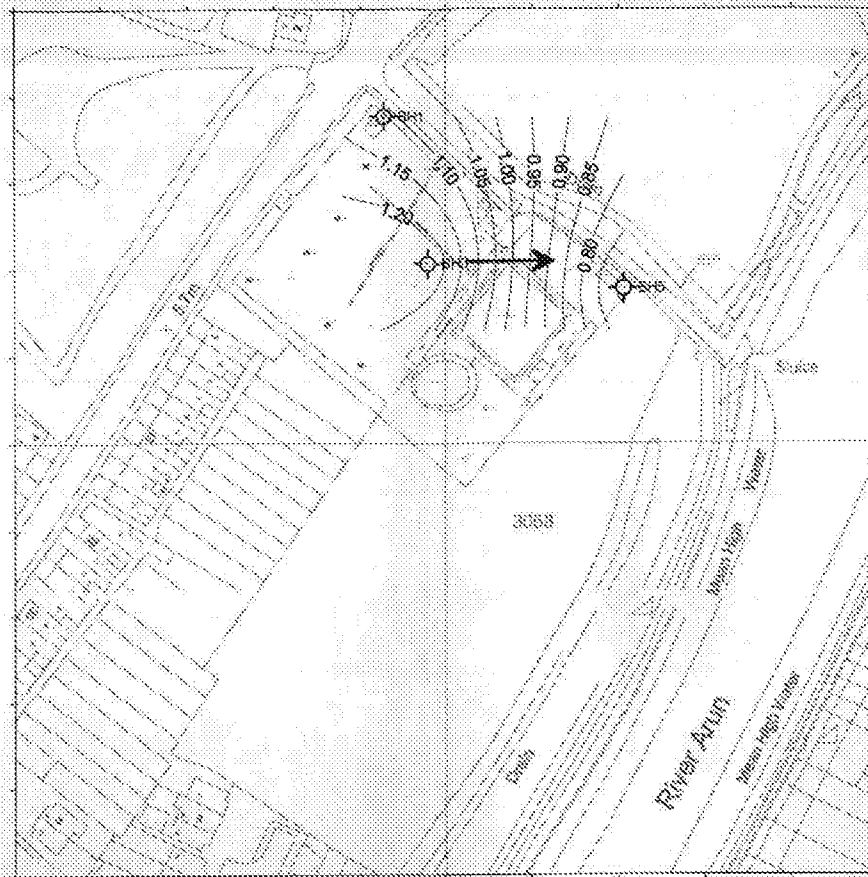


Project Lattice Property - Arundel	Scale Drawn LN Chk'd MW Date 19/07/01 Date 19/07/01 Date 23/7/01
Title Piezometric surfaces of 6th March 2001 through neap tide cycle	Job No. AF4842/GTG2000078/Arundel Figure 5

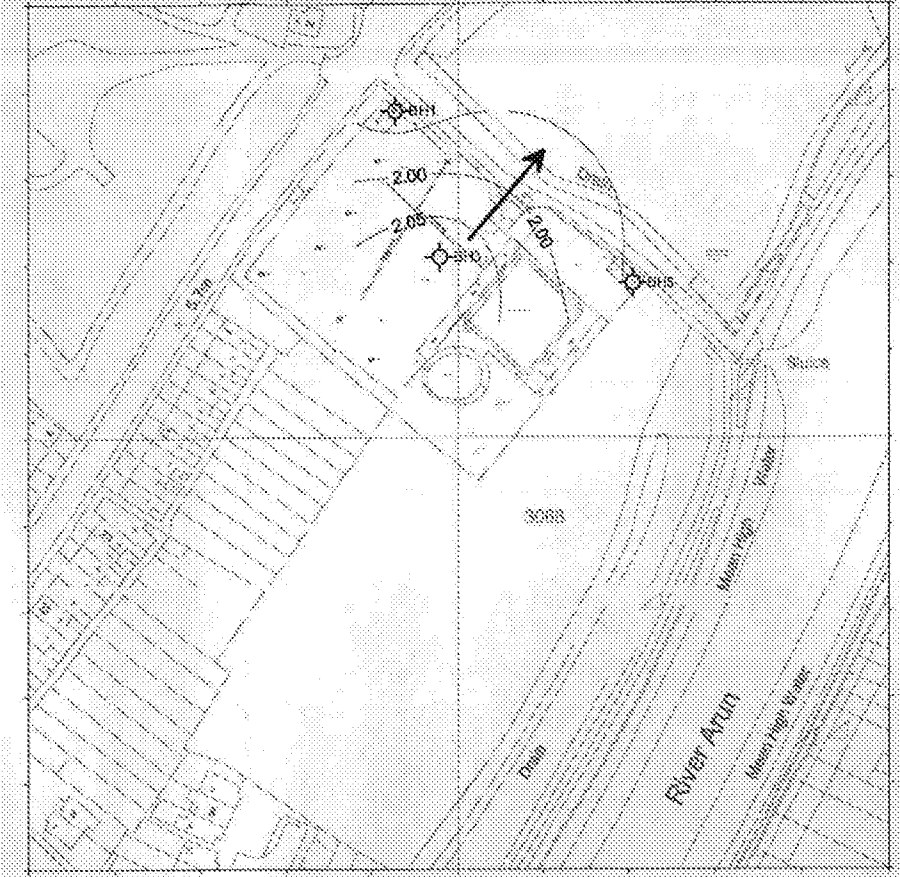
ws/Alkins



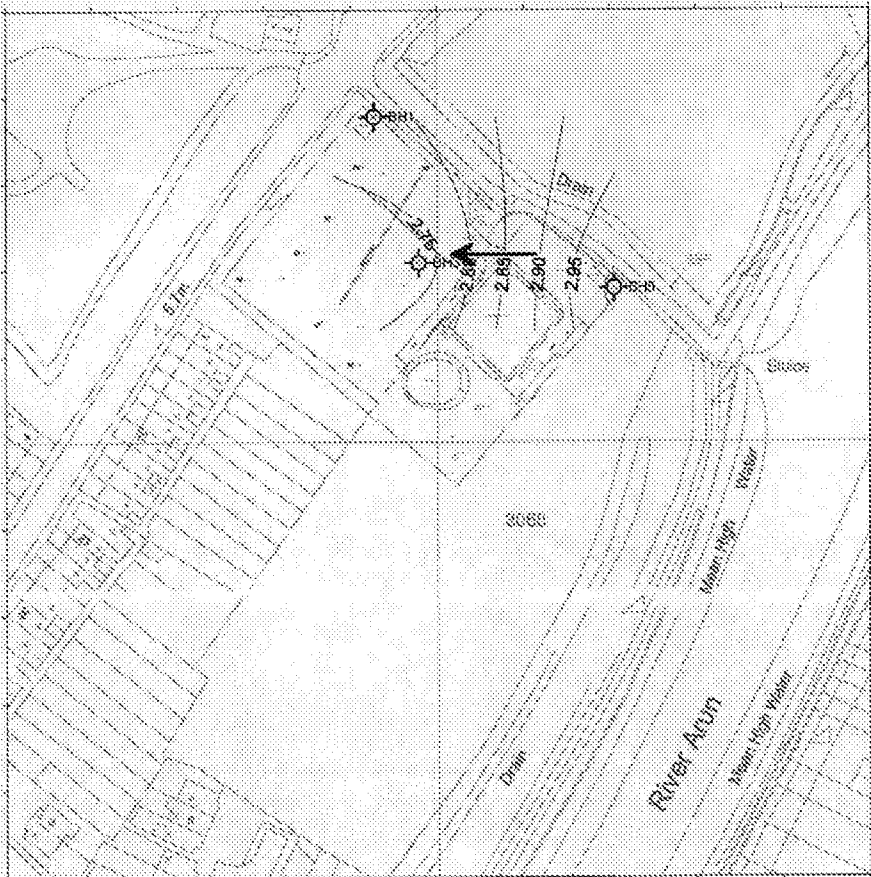
TIME 1540 (11/3)



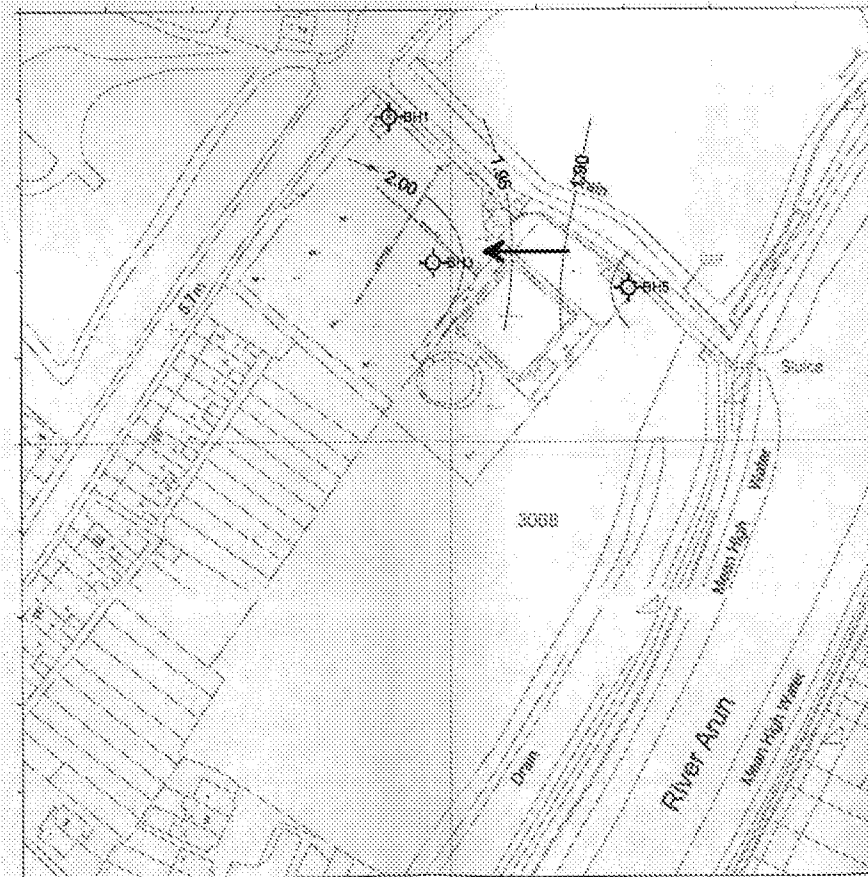
TIME 2200 (11/3)



TIME 2340 (11/3)



TIME 0240 (12/3)

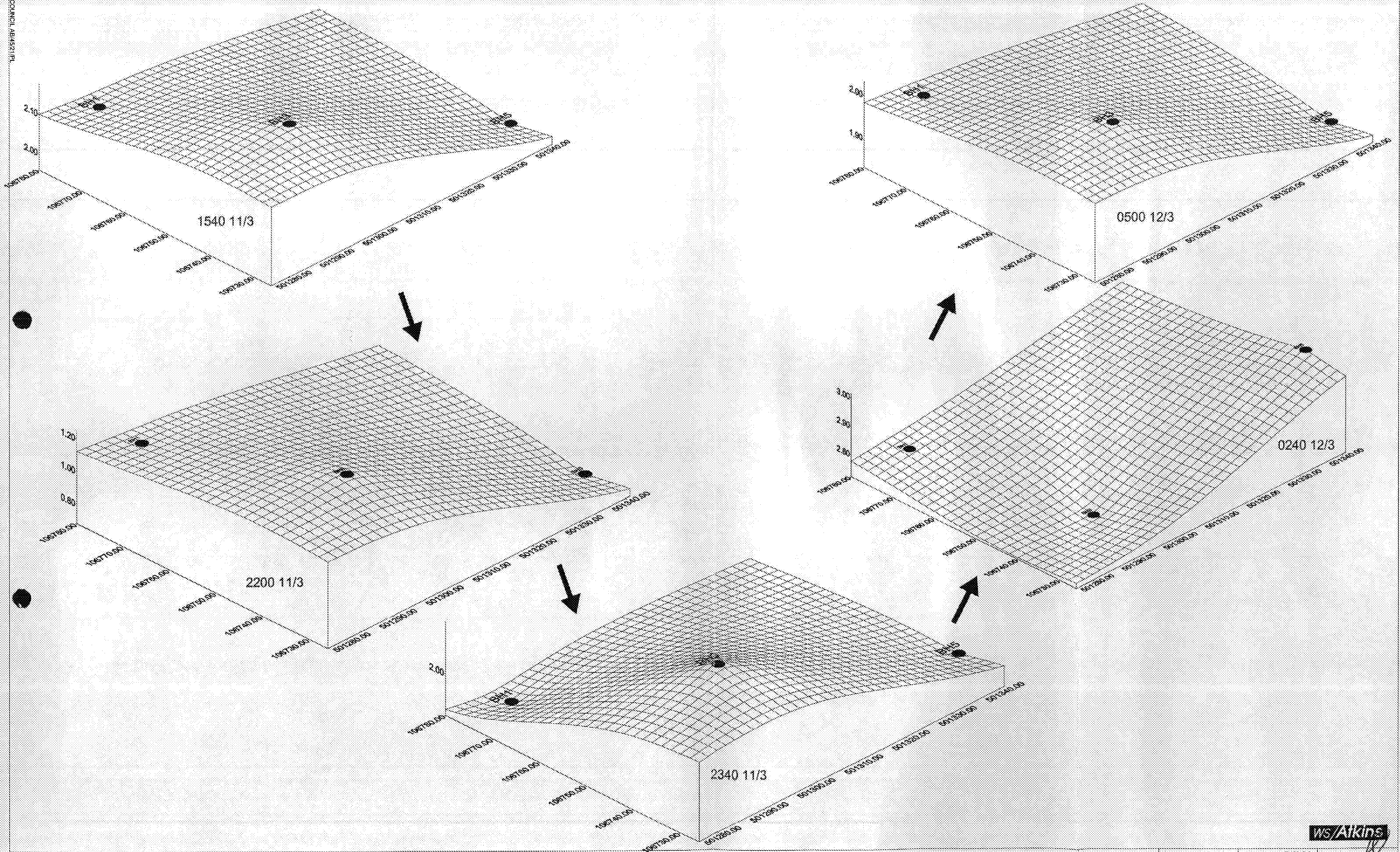


TIME 0500 (12/3)

Project
Lattice Property - Arundel

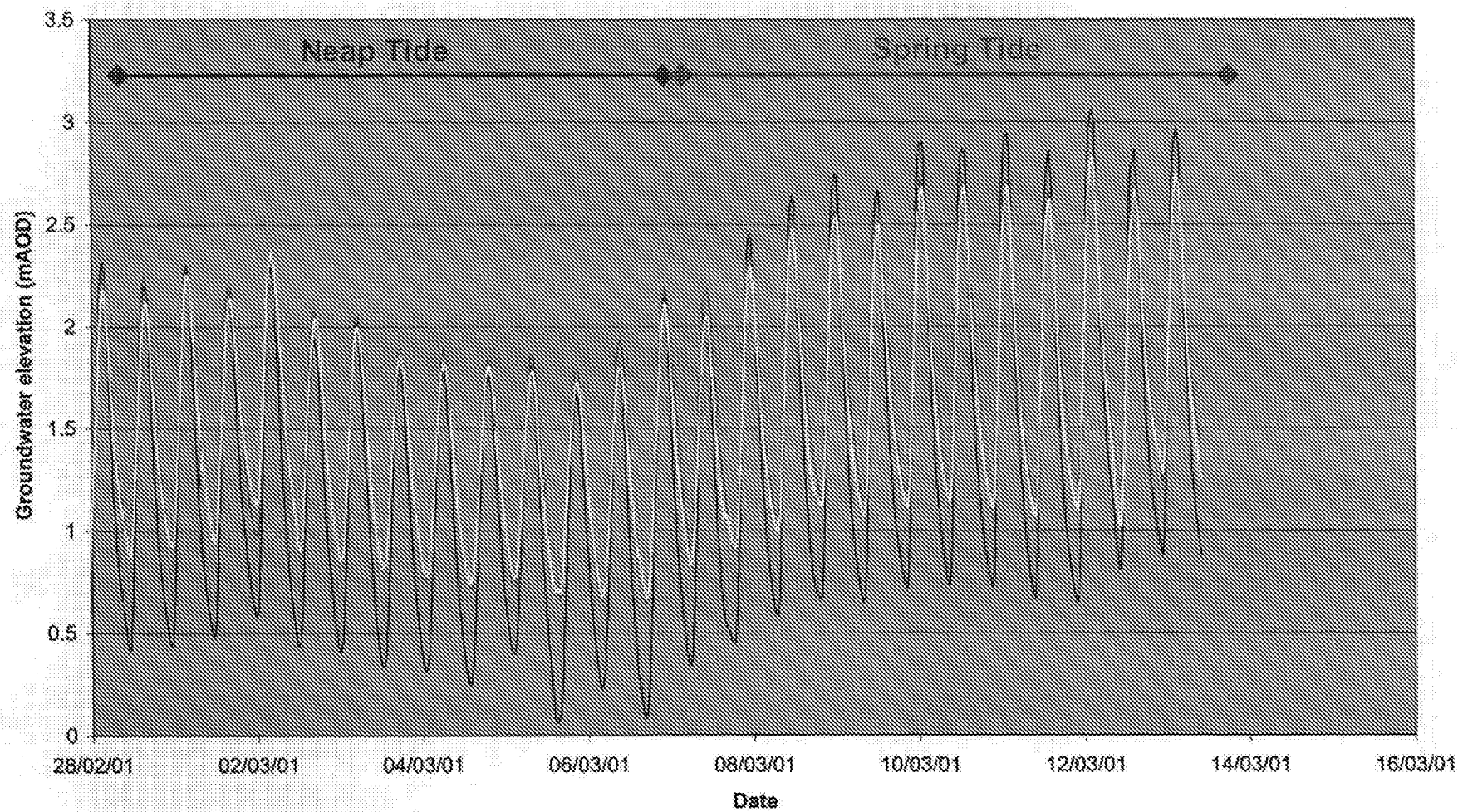
Title
Piezometric surfaces on 11/12th March 2001 through spring tide cycle

Scale	Drawn LN	Chk'd MW	Auth'd <i>ws/Atkins</i>
	Date 19/7/01	Date 19/7/01	Date 25/7/01
Job No. A71430/GTG2000078/Arundel		Figure 6	



Project		Lattice Property - Arundel				
Title		Piezometric surfaces on 11/12th March 2001 through spring tide cycle.				
Scale		NTS	Drawn LN	Chk'd MW	Auth'd <i>WS/Aikins</i>	
Job No.		AF4842/GTG2000078/Arundel	Date 19/07/01	Date 19/07/01	Date 25/7/01	
					Figure 7	

Graph 1: Lattice Property Arundel
Hydrograph



Appendix A:
Borehole Logs

A71430/GTG.2000078/ArundeI/R004rev0/mg

BOREHOLE LOG

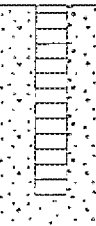
Boring Contractor : ESL				Job No : A71430/ 015162		Borehole No : BH1			
Boring method : CFA				Client : Lattice Property		Sheet 1 of 2			
Boring diameter : 100		Casing diameter : 50		Site : Arundel		Ground level : 3.67 (Relative to Ordnance datum)			
Boring equipment :				Project : Arundel Site Investigation		Date commenced : 07/06/2000	Date completed : 07/06/2000		
Easting : 501285.29		Northing : 106775.30							
Sample Details			Groundwater Details		Depth (mBGL)	Level (mAOD) 3.67	Key	Description of Strata	
Reference	Type (Soil/Water)	Depth (mBGL)	Strike	Well					
01	S	1.00	▽		0.80	2.87		Soft to firm brown sandy clay with much gravel and cobble of builders rubble fill. MADE GROUND	
02	S	2.00							Firm light brown very gravelly CLAY. Gravel of flint. NATURAL GROUND.
03	S	3.00							Red brown silty sandy with only occasional gravel at 1.8m. Brown without sand/ silt, very gravelly at 2.5m.
04	S	5.00							Soft to firm wet light brown with occasional fine chalk gravel (not flint) at 2.5m.
05	S	7.00					6.50	-2.83	
								Continued Next Sheet	
Groundwater Depth to water strike				Remarks :				Logged By : ESL	
Struck (m): Flow Remarks : 3.30									

ARUN DISTRICT COUNCIL AB/45/21/PL

BOREHOLE LOG

Boring Contractor : ESL				Job No : A71430/ 015162		Borehole No : BH2		
Boring method : CFA				Client : Lattice Property		Sheet 1 of 2		
Boring diameter : 100		Casing diameter : 50		Site : Arundel		Ground level : 3.40 (Relative to Ordnance datum)		
Boring equipment :				Project : Arundel Site Investigation		Date commenced : 08/06/2000	Date completed : 08/06/2000	
Easting : 501272.21		Northing : 106727.31						
Sample Details			Groundwater Details		Depth (mBGL)	Level (mAOD) 3.40	Key	Description of Strata
Reference	Type (Soil/Water)	Depth (mBGL)	Strike	Well				
					0.20	3.20		Loose light brown coarse gravel fill. MADE GROUND
01	S	1.00						Soft to firm red/brown very silty CLAY. NATURAL GROUND. Much flint gravel at 0.7m.
02	S	2.00						Soft sandy with only very occasional gravel at 1.8m.
03	S	3.00						Light brown without sand at 4.0m.
04	S	5.00						
05	S	7.00			6.50	-3.10		Soft wet white to light brown completely decomposed CHALK with very occasional flint gravel. NATURAL GROUND. With occasional hard core stones at 7.2m.
								Continued Next Sheet
Groundwater Depth to water strike						Remarks :		Logged By : ESL
Struck (m): Flow Remarks : 2.68								

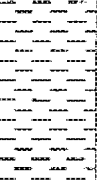
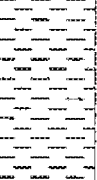
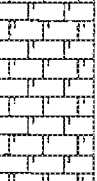
Boring Contractor : ESL				Job No : A71430/ 015162		Borehole No : BH2	
Boring method : CFA				Client : Lattice Property		Sheet 2 of 2	
Boring diameter : 100		Casing diameter : 50		Site : Arundel		Ground level : 3.40 (Relative to Ordnance datum)	
Boring equipment :				Project : Arundel Site Investigation		Date commenced : 08/06/2000	Date completed : 08/06/2000
Easting : 501272.21		Northing : 106727.31					

Sample Details			Groundwater Details		Depth (mBGL)	Level (mAOD) 3.40	Key	Description of Strata
Reference	Type (Soil/Water)	Depth (mBGL)	Strike	Well				
06	S	9.00			10.00	-6.60		Soft wet white to light brown completely decomposed CHALK with very occasional flint gravel. NATURAL GROUND.
								End of Borehole at 10.00 m

Groundwater		Remarks :	Logged By : ESL
Struck (m): Flow Remarks : 2.68			

BOREHOLE LOG

Boring Contractor : ESL				Job No : A71430/ 015162		Borehole No : BH3	
Boring method : CFA				Client : Lattice Property		Sheet 1 of 2	
Boring diameter : 100		Casing diameter : 50		Site : Arundel		Ground level : 3.22 (Relative to Ordnance datum)	
Boring equipment :				Project : Arundel Site Investigation		Date commenced : 07/06/2000	Date completed : 07/06/2000
Easting : 501295.70		Northing : 106741.54					

Sample Details			Groundwater Details		Depth (mBGL)	Level (mAOD) 3.22	Key	Description of Strata
Reference	Type (Soil/Water)	Depth (mBGL)	Strike	Well				
					0.60	2.62		Soft to firm black /brown sandy CLAY fill, with much gravel and builders rubble. With odour. MADE GROUND
01	S	1.00						Soft to firm light brown CLAY. No odour. NATURAL GROUND Red /brown with flint gravel at 0.8m. Very gravelly at 1.3m.
02	S	2.00						
03	S	3.00						With gravel at 2.8m. Soft light brown light grey with fine chalk gravel (no flint) at 3.0m. Light grey with odour at 3.2m.
04	S	5.00						Light brown with flint gravel (no chalk) and slight odour at 4.3m.
					5.80	-2.58		White very light brown completely decomposed CHALK with occasional hard core stones. NATURAL GROUND.
05	S	7.00						
Continued Next Sheet								

Groundwater  Depth to water strike	Remarks :	Logged By : ESL
Struck (m): Flow Remarks : 3.20		

ARUN DISTRICT COUNCIL AB/45/21/PL

BOREHOLE LOG

Boring Contractor : ESL				Job No : A71430/ 015162		Borehole No : BH4	
Boring method : CFA				Client : Lattice Property		Sheet 1 of 2	
Boring diameter : 100		Casing diameter : 50		Site : Arundel		Ground level : 2.51 (Relative to Ordnance datum)	
Boring equipment :				Project : Arundel Site Investigation		Date commenced : 06/06/2000 Date completed : 06/06/2000	
Easting : 501304.21		Northing : 106696.39					

Sample Details			Groundwater Details		Depth (mBGL)	Level (mAOD) 2.51	Key	Description of Strata
Reference	Type (Soil/Water)	Depth (mBGL)	Strike	Well				
					0.50	2.01		Firm brown silty gravelly clay fill. MADE GROUND
01	S	1.00						Soft to firm light brown CLAY. NATURAL GROUND With gravel at 1.0m
02	S	2.00						Very gravelly at 2.5m.
03	S	3.00						Red / brown stiff silty with very occasional gravel at 3.5m.
04	S	5.00						Firm light brown and gravelly at 4.2m.
					5.90	-3.39		Soft wet white decomposed CHALK with occasional hard core stones and occasional flinty gravel. No odour. NATURAL GROUND.
05	S	7.00						
								Continued Next Sheet

Groundwater  Depth to water strike		Remarks :	Logged By : ESL
Struck (m): 2.28	Flow Remarks :		

ARUN DISTRICT COUNCIL AB/45/21/PL

BOREHOLE LOG

Boring Contractor : ESL				Job No : A71430/ 015162		Borehole No : BH5	
Boring method : CFA				Client : Lattice Property		Sheet 1 of 2	
Boring diameter : 100		Casing diameter : 50		Site : Arundel		Ground level : 2.55 (Relative to Ordnance datum)	
Boring equipment :				Project : Arundel Site Investigation		Date commenced : Date completed :	
Easting : 501341.00		Northing : 106735.55				06/06/2000 06/06/2000	

Sample Details			Groundwater Details		Depth (mBGL)	Level (mAOD)	Key	Description of Strata
Reference	Type (Soil/Water)	Depth (mBGL)	Strike	Well				
					0.10 0.30	2.45 2.25		Asphalt, MADE GROUND Loose red, grey, brown builders rubble. MADE GROUND
01	S	1.00						Soft to firm light brown CLAY. NATURAL GROUND. Band of gravel at 1.1m.
02	S	2.00						
03	S	3.00						With much gravel at 2.5m. Band of gravel at 3.7m.
04	S	5.00						Band of gravel at 4.5m. Damp at 5.0m.
05	S	7.00			6.00	-3.45		Soft white light grey decomposed CHALK with occasional hard core stones and occasional flint gravel. Wet with hydrocarbon odour. NATURAL GROUND.
								Continued Next Sheet

Groundwater	Remarks :
Struck (m): Flow Remarks :	Logged By : ESL

ARUN DISTRICT COUNCIL AB/45/21/PL

Appendix B:
Results of Chemical Analysis
March 2001

A71430/GTG.2000078/Arundel/R004rev0/mg