

[illegible]



SDG: 120120-48
Job: H_ATKINS_LDC-35
Client Reference:

Location: Coed Darcy Urban Village
Customer: Atkins Global Ltd
Attention: Selina Bamforth

Order Number: CD0210
Report Number: 169194
Superseded Report:

SOLID Results Legend X Test N No Determination Possible	Lab Sample No(s)		5045605	5045607	5045606	5045608	5045609
	Customer Sample Reference		QIC 1	TIC 1	QIC 2	TIC 2	TIC 3
	AGS Reference						
	Depth (m)						
	Container		60g VOC (ALE215) 400g Tub (ALE214) 250g Amber Jar (AL 60g VOC (ALE215) 400g Tub (ALE214) 250g Amber Jar (AL 60g VOC (ALE215) 400g Tub (ALE214) 250g Amber Jar (AL 60g VOC (ALE215) 400g Tub (ALE214) 250g Amber Jar (AL 60g VOC (ALE215) 400g Tub (ALE214) 250g Amber Jar (AL 60g VOC (ALE215) 400g Tub (ALE214) 250g Amber Jar (AL				
Asbestos Identification (Soil)	All	NDPs: 0 Tests: 3	X	X	X		
EPH CWG (Aliphatic) GC (S)	All	NDPs: 0 Tests: 18		X	X	X	X
EPH CWG (Aromatic) GC (S)	All	NDPs: 0 Tests: 18		X	X	X	X
GRO by GC-FID (S)	All	NDPs: 0 Tests: 18	X	X	X	X	X
Metals by iCap-OES (Soil)	Arsenic	NDPs: 0 Tests: 18		X	X	X	X
	Cadmium	NDPs: 0 Tests: 18		X	X	X	X
	Chromium	NDPs: 0 Tests: 18		X	X	X	X
	Copper	NDPs: 0 Tests: 18		X	X	X	X
	Lead	NDPs: 0 Tests: 18		X	X	X	X
	Mercury	NDPs: 0 Tests: 18		X	X	X	X
	Nickel	NDPs: 0 Tests: 18		X	X	X	X
	Selenium	NDPs: 0 Tests: 18		X	X	X	X
	Vanadium	NDPs: 0 Tests: 18		X	X	X	X
	Zinc	NDPs: 0 Tests: 18		X	X	X	X
PAH by GCMS	All	NDPs: 0 Tests: 15			X		



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SOLID Results Legend X Test N No Determination Possible	Lab Sample No(s)		5045605	5045607	5045606	5045608	5045609
	Customer Sample Reference		QIC 1	TIC 1	QIC 2	TIC 2	TIC 3
	AGS Reference						
	Depth (m)						
	Container		60g VOC (ALE215) 400g Tub (ALE214) 250g Amber Jar (AL 60g VOC (ALE215) 400g Tub (ALE214) 250g Amber Jar (AL 60g VOC (ALE215) 400g Tub (ALE214) 250g Amber Jar (AL 60g VOC (ALE215) 400g Tub (ALE214)	60g VOC (ALE215) 400g Tub (ALE214) 250g Amber Jar (AL 60g VOC (ALE215) 400g Tub (ALE214) 250g Amber Jar (AL 60g VOC (ALE215) 400g Tub (ALE214) 250g Amber Jar (AL 60g VOC (ALE215) 400g Tub (ALE214)	60g VOC (ALE215) 400g Tub (ALE214) 250g Amber Jar (AL 60g VOC (ALE215) 400g Tub (ALE214) 250g Amber Jar (AL 60g VOC (ALE215) 400g Tub (ALE214) 250g Amber Jar (AL 60g VOC (ALE215) 400g Tub (ALE214)	60g VOC (ALE215) 400g Tub (ALE214) 250g Amber Jar (AL 60g VOC (ALE215) 400g Tub (ALE214) 250g Amber Jar (AL 60g VOC (ALE215) 400g Tub (ALE214) 250g Amber Jar (AL 60g VOC (ALE215) 400g Tub (ALE214)	60g VOC (ALE215) 400g Tub (ALE214) 250g Amber Jar (AL 60g VOC (ALE215) 400g Tub (ALE214) 250g Amber Jar (AL 60g VOC (ALE215) 400g Tub (ALE214) 250g Amber Jar (AL 60g VOC (ALE215) 400g Tub (ALE214)
pH	All	NDPs: 0 Tests: 18	X	X	X	X	X
Sample description	All	NDPs: 0 Tests: 18		X	X	X	X
Semi Volatile Organic Compounds	All	NDPs: 0 Tests: 3		X		X	X
TPH CWG GC (S)	All	NDPs: 0 Tests: 18		X	X	X	X
VOC MS (S)	All	NDPs: 0 Tests: 3			X		X



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Sample Descriptions

Grain Sizes

very fine	<0.063mm	fine	0.063mm - 0.1mm	medium	0.1mm - 2mm	coarse	2mm - 10mm	very coarse	>10mm
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Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Description	Grain size	Inclusions	Inclusions 2
5045591	DVCS 1		Dark Brown	Sandy Loam	0.063 - 0.1 mm	Stones	Vegetation
5045593	DVCS 2		Dark Brown	Loamy Sand	0.063 - 0.1 mm	Stones	Vegetation
5045598	DVCS 3		Dark Brown	Loamy Sand	0.063 - 0.1 mm	Stones	None
5045600	DVCS 4		Light Brown	Loamy Sand	0.063 - 0.1 mm	Oil/Petroleum	Stones
5045601	DVCS 5		Dark Brown	Loamy Sand	0.063 - 0.1 mm	Stones	Vegetation
5045602	DVCS 6		Dark Brown	N/A	> 10 mm	Stones	None
5045603	DVCS 7		Light Brown	Sandy Clay Loam	0.063 - 0.1 mm	Oil/Petroleum	Stones
5045605	QIC 1		Light Brown	N/A	> 10 mm	Stones	Brick
5045606	QIC 2		Light Brown	N/A	> 10 mm	Stones	Brick
5045585	SP43 1		Light Brown	Silt Loam	0.063 - 0.1 mm	Stones	None
5045586	SP43 2		Light Brown	Silt Loam	0.063 - 0.1 mm	Stones	None
5045587	SP46 1		Dark Brown	Loamy Sand	0.063 - 0.1 mm	Stones	None
5045588	SP46 2		Light Brown	Silt Loam	0.063 - 0.1 mm	Stones	None
5045589	SP47 1		Light Brown	N/A	> 10 mm	Stones	None
5045590	SP47 2		Light Brown	N/A	> 10 mm	Stones	None
5045607	TIC 1		Light Brown	N/A	> 10 mm	Stones	Crushed Brick
5045608	TIC 2		Light Brown	N/A	> 10 mm	Stones	None
5045609	TIC 3		Light Brown	N/A	> 10 mm	Stones	None

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

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

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

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Semi Volatile Organic Compounds

Results Legend		Customer Sample R	TIC 1	TIC 2	TIC 3			
#	ISO17025 accredited.							
M	mCERTS accredited.	Depth (m) Sample Type Date Sampled Date Received SDG Ref Lab Sample No.(s) AGS Reference	Soil/Solid 19/01/2012 20/01/2012 120120-48 5045607	Soil/Solid 19/01/2012 20/01/2012 120120-48 5045608	Soil/Solid 19/01/2012 20/01/2012 120120-48 5045609			
S	Deviating sample.							
aq	Aqueous / settled sample.							
diss.filt	Dissolved / filtered sample.							
tot.unfilt	Total / unfiltered sample.							
*	Subcontracted test.							
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery							
(F)	Trigger breach confirmed							
Component	LOD/Units	Method						
Phenol	<100 µg/kg	TM157	<100	<100	<100			
Pentachlorophenol	<100 µg/kg	TM157	<100	<100	<100			
n-Nitroso-n-dipropylamine	<100 µg/kg	TM157	<100	<100	<100			
Nitrobenzene	<100 µg/kg	TM157	<100	<100	<100			
Isophorone	<100 µg/kg	TM157	<100	<100	<100			
Hexachloroethane	<100 µg/kg	TM157	<100	<100	<100			
Hexachlorocyclopentadiene	<100 µg/kg	TM157	<100	<100	<100			
Hexachlorobutadiene	<100 µg/kg	TM157	<100	<100	<100			
Hexachlorobenzene	<100 µg/kg	TM157	<100	<100	<100			
n-Dioctyl phthalate	<100 µg/kg	TM157	<100	<100	<100			
Dimethyl phthalate	<100 µg/kg	TM157	<100	<100	<100			
Diethyl phthalate	<100 µg/kg	TM157	<100	<100	<100			
n-Dibutyl phthalate	<100 µg/kg	TM157	<100	<100	<100			
Dibenzofuran	<100 µg/kg	TM157	<100	<100	<100			
Carbazole	<100 µg/kg	TM157	<100	<100	<100			
Butylbenzyl phthalate	<100 µg/kg	TM157	<100	<100	<100			
bis(2-Ethylhexyl) phthalate	<100 µg/kg	TM157	247	213	466			
bis(2-Chloroethoxy)methane	<100 µg/kg	TM157	<100	<100	<100			
bis(2-Chloroethyl)ether	<100 µg/kg	TM157	<100	<100	<100			
Azobenzene	<100 µg/kg	TM157	<100	<100	<100			
4-Nitrophenol	<100 µg/kg	TM157	<100	<100	<100			
4-Nitroaniline	<100 µg/kg	TM157	<100	<100	<100			
4-Methylphenol	<100 µg/kg	TM157	<100	<100	<100			
4-Chlorophenylphenylether	<100 µg/kg	TM157	<100	<100	<100			
4-Chloroaniline	<100 µg/kg	TM157	<100	<100	<100			
4-Chloro-3-methylphenol	<100 µg/kg	TM157	<100	<100	<100			
4-Bromophenylphenylether	<100 µg/kg	TM157	<100	<100	<100			
3-Nitroaniline	<100 µg/kg	TM157	<100	<100	<100			
2-Nitrophenol	<100 µg/kg	TM157	<100	<100	<100			
2-Nitroaniline	<100 µg/kg	TM157	<100	<100	<100			
2-Methylphenol	<100 µg/kg	TM157	<100	<100	<100			
1,2,4-Trichlorobenzene	<100 µg/kg	TM157	<100	<100	<100			
2-Chlorophenol	<100 µg/kg	TM157	<100	<100	<100			
2,6-Dinitrotoluene	<100 µg/kg	TM157	<100	<100	<100			
2,4-Dinitrotoluene	<100 µg/kg	TM157	<100	<100	<100			

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TPH CWG (S)

Results Legend			Customer Sample R		DVCS 1	DVCS 2	DVCS 3	DVCS 4	DVCS 5	DVCS 6
#	ISO17025 accredited.		Depth (m) Sample Type Date Sampled Date Received SDG Ref Lab Sample No.(s) AGS Reference							
M	mCERTS accredited.									
S	Deviating sample.									
aq	Aqueous / settled sample.									
diss.filt	Dissolved / filtered sample.									
tot.unfilt	Total / unfiltered sample.									
*	Subcontracted test.									
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery									
(F)	Trigger breach confirmed									
Component		LOD/Units	Method							
GRO Surrogate % recovery**		%	TM089		64	59	57	83	80	40
GRO >C5-C12		<44 µg/kg	TM089		151	1920	8510	9170	<44	<44
Methyl tertiary butyl ether (MTBE)		<5 µg/kg	TM089		<5	<5	<5	<5	<5	<5
Benzene		<10 µg/kg	TM089		<10	<10	<10	13.4	<10	<10
Toluene		<2 µg/kg	TM089		<2	<2	<2	<2	<2	<2
Ethylbenzene		<3 µg/kg	TM089		<3	<3	<3	<3	<3	<3
m,p-Xylene		<6 µg/kg	TM089		<6	<6	<6	<6	<6	<6
o-Xylene		<3 µg/kg	TM089		<3	<3	<3	<3	<3	<3
sum of detected mpo xylene by GC		<9 µg/kg	TM089		<9	<9	<9	<9	<9	<9
sum of detected BTEX by GC		<24 µg/kg	TM089		<24	<24	<24	<24	<24	<24
Aliphatics >C5-C6		<10 µg/kg	TM089		<10	<10	39.1	11.2	<10	<10
Aliphatics >C6-C8		<10 µg/kg	TM089		15	30.7	1010	1110	<10	<10
Aliphatics >C8-C10		<10 µg/kg	TM089		23	257	2240	2360	<10	<10
Aliphatics >C10-C12		<10 µg/kg	TM089		54.1	870	2230	2470	<10	<10
Aliphatics >C12-C16		<100 µg/kg	TM173		12500	44600	49700	86700	18900	8570
Aliphatics >C16-C21		<100 µg/kg	TM173		48800	132000	264000	176000	113000	67600
Aliphatics >C21-C35		<100 µg/kg	TM173		138000	243000	399000	205000	188000	98200
Aliphatics >C35-C44		<100 µg/kg	TM173		113000	85200	142000	41500	47700	30100
Total Aliphatics >C12-C44		<100 µg/kg	TM173		313000	505000	854000	509000	368000	204000
Aromatics >EC5-EC7		<10 µg/kg	TM089		<10	<10	<10	13.4	<10	<10
Aromatics >EC7-EC8		<10 µg/kg	TM089		<10	<10	<10	<10	<10	<10
Aromatics >EC8-EC10		<10 µg/kg	TM089		16.1	175	1490	1570	<10	<10
Aromatics >EC10-EC12		<10 µg/kg	TM089		35.7	579	1490	1650	<10	<10
Aromatics >EC12-EC16		<100 µg/kg	TM173		4290	8070	8660	50000	9470	3980
Aromatics >EC16-EC21		<100 µg/kg	TM173		21400	50000	91500	116000	41900	19600
Aromatics >EC21-EC35		<100 µg/kg	TM173		127000	224000	442000	204000	183000	94800
Aromatics >EC35-EC44		<100 µg/kg	TM173		66100	98900	194000	79300	81300	20700
Aromatics >EC40-EC44		<100 µg/kg	TM173		26700	40200	76600	35000	34900	3300
Total Aromatics >EC12-EC44		<100 µg/kg	TM173		219000	381000	736000	449000	316000	139000
Total Aliphatics & Aromatics >C5-C44		<100 µg/kg	TM173		532000	888000	1600000	968000	684000	344000
Total Aliphatics >C5-35		<100 µg/kg	TM173		200000	421000	718000	474000	321000	174000
Total Aromatics >C5-35		<100 µg/kg	TM173		153000	283000	545000	373000	235000	118000
Total Aliphatics & Aromatics >C5-35		<100 µg/kg	TM173		352000	704000	1260000	847000	555000	293000



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TPH CWG (S)

Results Legend			Customer Sample R		DVCS 7	QIC 1	QIC 2	SP43 1	SP43 2	SP46 1
#	ISO17025 accredited.		Depth (m) Sample Type Date Sampled Date Received SDG Ref Lab Sample No.(s) AGS Reference		Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid
M	mCERTS accredited.				19/01/2012	19/01/2012	19/01/2012	19/01/2012	19/01/2012	19/01/2012
S	Deviating sample.				20/01/2012	20/01/2012	20/01/2012	20/01/2012	20/01/2012	20/01/2012
aq	Aqueous / settled sample.				120120-48	120120-48	120120-48	120120-48	120120-48	120120-48
diss.filt	Dissolved / filtered sample.				5045603	5045605	5045606	5045585	5045586	5045587
tot.unfilt	Total / unfiltered sample.									
*	Subcontracted test.									
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery									
(F)	Trigger breach confirmed									
Component	LOD/Units	Method								
GRO Surrogate % recovery**	%	TM089			58	79	73	88	93	51
GRO >C5-C12	<44 µg/kg	TM089			17900	92.7	127	<44	249	82.5
Methyl tertiary butyl ether (MTBE)	<5 µg/kg	TM089			<5	<5	<5	<5	<5	<5
Benzene	<10 µg/kg	TM089			<10	<10	<10	<10	<10	<10
Toluene	<2 µg/kg	TM089			<2	26.2	25	2.24	7.08	3.3
Ethylbenzene	<3 µg/kg	TM089			71.2	<3	<3	<3	<3	<3
m,p-Xylene	<6 µg/kg	TM089			<6	<6	<6	<6	<6	<6
o-Xylene	<3 µg/kg	TM089			<3	<3	<3	<3	<3	<3
sum of detected mpo xylene by GC	<9 µg/kg	TM089			<9	<9	<9	<9	<9	<9
sum of detected BTEX by GC	<24 µg/kg	TM089			71.2	26.2	25	<24	<24	<24
Aliphatics >C5-C6	<10 µg/kg	TM089			28.3	<10	<10	<10	<10	<10
Aliphatics >C6-C8	<10 µg/kg	TM089			1470	<10	13	<10	16.5	14.3
Aliphatics >C8-C10	<10 µg/kg	TM089			3380	<10	15.2	<10	28.3	11
Aliphatics >C10-C12	<10 µg/kg	TM089			6420	18.5	29.3	<10	100	18.7
Aliphatics >C12-C16	<100 µg/kg	TM173			181000	19500	38000	5280	6930	5620
Aliphatics >C16-C21	<100 µg/kg	TM173			579000	47900	49900	9350	14600	14700
Aliphatics >C21-C35	<100 µg/kg	TM173			859000	170000	201000	31100	49100	49900
Aliphatics >C35-C44	<100 µg/kg	TM173			225000	48100	55400	18100	25100	38100
Total Aliphatics >C12-C44	<100 µg/kg	TM173			1840000	285000	344000	63800	95700	108000
Aromatics >EC5-EC7	<10 µg/kg	TM089			<10	<10	<10	<10	<10	<10
Aromatics >EC7-EC8	<10 µg/kg	TM089			<10	26.2	25	<10	<10	<10
Aromatics >EC8-EC10	<10 µg/kg	TM089			2320	14.2	18.5	<10	23.6	15.4
Aromatics >EC10-EC12	<10 µg/kg	TM089			4280	12	19.5	<10	67.3	12.1
Aromatics >EC12-EC16	<100 µg/kg	TM173			164000	17200	6170	2920	3600	3400
Aromatics >EC16-EC21	<100 µg/kg	TM173			398000	65700	22000	11700	13600	12500
Aromatics >EC21-EC35	<100 µg/kg	TM173			862000	178000	107000	48800	59100	63600
Aromatics >EC35-EC44	<100 µg/kg	TM173			317000	64700	50500	19300	3560	31500
Aromatics >EC40-EC44	<100 µg/kg	TM173			140000	23500	20500	7580	<100	12000
Total Aromatics >EC12-EC44	<100 µg/kg	TM173			1740000	326000	185000	82700	79900	111000
Total Aliphatics & Aromatics >C5-C44	<100 µg/kg	TM173			3600000	611000	529000	147000	176000	219000
Total Aliphatics >C5-35	<100 µg/kg	TM173			1630000	237000	288000	45700	70800	70200
Total Aromatics >C5-35	<100 µg/kg	TM173			1430000	261000	135000	63400	76500	79500
Total Aliphatics & Aromatics >C5-35	<100 µg/kg	TM173			3060000	498000	423000	109000	147000	150000



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TPH CWG (S)

Results Legend		Customer Sample R	SP46 2	SP47 1	SP47 2	TIC 1	TIC 2	TIC 3
#	ISO17025 accredited. M mCERTS accredited. S Deviating sample. aq Aqueous / settled sample. diss.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted test. ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery (F) Trigger breach confirmed							
		Depth (m) Sample Type Date Sampled Date Received SDG Ref Lab Sample No.(s) AGS Reference	Soil/Solid 19/01/2012 20/01/2012 120120-48 5045588	Soil/Solid 19/01/2012 20/01/2012 120120-48 5045589	Soil/Solid 19/01/2012 20/01/2012 120120-48 5045590	Soil/Solid 19/01/2012 20/01/2012 120120-48 5045607	Soil/Solid 19/01/2012 20/01/2012 120120-48 5045608	Soil/Solid 19/01/2012 20/01/2012 120120-48 5045609
Component	LOD/Units	Method						
GRO Surrogate % recovery**	%	TM089	94	79	93	74	76	50
GRO >C5-C12	<44 µg/kg	TM089	71.9	<44	<44	184	200	1380
Methyl tertiary butyl ether (MTBE)	<5 µg/kg	TM089	<5 #	<5 #	<5 #	<5 #	<5 #	<5 #
Benzene	<10 µg/kg	TM089	<10 M	<10 #	<10 #	<10 M	<10 #	<10 #
Toluene	<2 µg/kg	TM089	<2 M	<2 #	2.08 #	6.6 M	8.58 #	5.42 #
Ethylbenzene	<3 µg/kg	TM089	<3 M	<3 #	<3 #	<3 M	3.22 #	<3 #
m,p-Xylene	<6 µg/kg	TM089	<6 M	<6 #	<6 #	8.8 M	15 #	13 #
o-Xylene	<3 µg/kg	TM089	<3 M	<3 #	<3 #	3.3 M	4.29 #	<3 #
sum of detected mpo xylene by GC	<9 µg/kg	TM089	<9	<9	<9	12.1	19.3	13
sum of detected BTEX by GC	<24 µg/kg	TM089	<24	<24	<24	<24	31.1	<24
Aliphatics >C5-C6	<10 µg/kg	TM089	<10	<10	<10	<10	<10	<10
Aliphatics >C6-C8	<10 µg/kg	TM089	<10	<10	<10	15.4	20.4	53.1
Aliphatics >C8-C10	<10 µg/kg	TM089	11.6	<10	<10	24.2	21.5	280
Aliphatics >C10-C12	<10 µg/kg	TM089	23.2	<10	<10	59.4	60.1	500
Aliphatics >C12-C16	<100 µg/kg	TM173	2880	1670	2030	18300	5700	37800
Aliphatics >C16-C21	<100 µg/kg	TM173	3860	3910	4130	99700	24500	189000
Aliphatics >C21-C35	<100 µg/kg	TM173	14300	47600	36700	718000	137000	1410000
Aliphatics >C35-C44	<100 µg/kg	TM173	4540	21300	15400	134000	29900	354000
Total Aliphatics >C12-C44	<100 µg/kg	TM173	25600	74500	58300	970000	197000	1990000
Aromatics >EC5-EC7	<10 µg/kg	TM089	<10	<10	<10	<10	<10	<10
Aromatics >EC7-EC8	<10 µg/kg	TM089	<10	<10	<10	<10	<10	<10
Aromatics >EC8-EC10	<10 µg/kg	TM089	<10	<10	<10	30.8	36.5	199
Aromatics >EC10-EC12	<10 µg/kg	TM089	16.2	<10	<10	39.6	39.7	333
Aromatics >EC12-EC16	<100 µg/kg	TM173	<100	1480	<100	5300	3610	11100
Aromatics >EC16-EC21	<100 µg/kg	TM173	860	4390	4290	41400	14100	67800
Aromatics >EC21-EC35	<100 µg/kg	TM173	22100	74400	59400	460000	99200	404000
Aromatics >EC35-EC44	<100 µg/kg	TM173	17800	55800	40700	157000	40400	168000
Aromatics >EC40-EC44	<100 µg/kg	TM173	7630	23200	16800	55600	16500	80100
Total Aromatics >EC12-EC44	<100 µg/kg	TM173	40700	136000	104000	663000	157000	650000
Total Aliphatics & Aromatics >C5-C44	<100 µg/kg	TM173	66400	211000	163000	1630000	355000	2640000
Total Aliphatics >C5-35	<100 µg/kg	TM173	21100	53200	42900	836000	167000	1640000
Total Aromatics >C5-35	<100 µg/kg	TM173	23000	80200	63700	507000	117000	483000
Total Aliphatics & Aromatics >C5-35	<100 µg/kg	TM173	44000	133000	107000	1340000	284000	2120000



CERTIFICATE OF ANALYSIS

SDG: 120120-48
Job: H_ATKINS_LDC-35
Client Reference:

Location: Coed Darcy Urban Village
Customer: Atkins Global Ltd
Attention: Selina Bamforth

Order Number: CD0210
Report Number: 169194
Superseded Report:

VOC MS (S)

Results Legend			Customer Sample R	TIC 1	TIC 2	TIC 3			
#	ISO17025 accredited.								
M	mCERTS accredited.		Depth (m) Sample Type Date Sampled Date Received SDG Ref Lab Sample No.(s) AGS Reference	Soil/Solid 19/01/2012 20/01/2012 120120-48 5045607	Soil/Solid 19/01/2012 20/01/2012 120120-48 5045608	Soil/Solid 19/01/2012 20/01/2012 120120-48 5045609			
S	Deviating sample.								
aq	Aqueous / settled sample.								
diss.filt	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
*	Subcontracted test.								
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery								
(F)	Trigger breach confirmed								
Component	LOD/Units	Method							
Dibromofluoromethane**	%	TM116		87.8	107	107			
				\$	\$	\$			
Toluene-d8**	%	TM116		90.5	103	101			
				\$	\$	\$			
4-Bromofluorobenzene**	%	TM116		117	107	105			
				\$	\$	\$			
Dichlorodifluoromethane	<4 µg/kg	TM116		<8	<80	<80			
				\$ #	\$ #	\$ #			
Chloromethane	<7 µg/kg	TM116		<14	<140	<140			
				\$ #	\$ #	\$ #			
Vinyl Chloride	<10 µg/kg	TM116		<20	<200	<200			
				\$ #	\$ #	\$ #			
Bromomethane	<13 µg/kg	TM116		<26	<260	<260			
				\$ #	\$ #	\$ #			
Chloroethane	<14 µg/kg	TM116		<28	<280	<280			
				\$ #	\$ #	\$ #			
Trichlorofluoromethane	<6 µg/kg	TM116		<12	<120	<120			
				\$ #	\$ #	\$ #			
1,1-Dichloroethene	<10 µg/kg	TM116		<20	<200	<200			
				\$ #	\$ #	\$ #			
Carbon Disulphide	<7 µg/kg	TM116		<14	<140	<140			
				\$ #	\$ #	\$ #			
Dichloromethane	<10 µg/kg	TM116		<20	<200	<200			
				\$ #	\$ #	\$ #			
Methyl Tertiary Butyl Ether	<11 µg/kg	TM116		<22	<220	<220			
				\$ #	\$ #	\$ #			
trans-1-2-Dichloroethene	<11 µg/kg	TM116		<22	<220	<220			
				\$ #	\$ #	\$ #			
1,1-Dichloroethane	<8 µg/kg	TM116		<16	<160	<160			
				\$ #	\$ #	\$ #			
cis-1-2-Dichloroethene	<5 µg/kg	TM116		<10	<100	<100			
				\$ #	\$ #	\$ #			
2,2-Dichloropropane	<12 µg/kg	TM116		<24	<240	<240			
				\$ #	\$ #	\$ #			
Bromochloromethane	<14 µg/kg	TM116		<28	<280	<280			
				\$ #	\$ #	\$ #			
Chloroform	<8 µg/kg	TM116		<16	<160	<160			
				\$ #	\$ #	\$ #			
1,1,1-Trichloroethane	<7 µg/kg	TM116		<14	<140	<140			
				\$ #	\$ #	\$ #			
1,1-Dichloropropene	<11 µg/kg	TM116		<22	<220	<220			
				\$ #	\$ #	\$ #			
Carbontetrachloride	<14 µg/kg	TM116		<28	<280	<280			
				\$ #	\$ #	\$ #			
1,2-Dichloroethane	<5 µg/kg	TM116		<10	<100	<100			
				\$ #	\$ #	\$ #			
Benzene	<9 µg/kg	TM116		<18	<180	<180			
				\$ #	\$ #	\$ #			
Trichloroethene	<9 µg/kg	TM116		<18	<180	<180			
				\$ #	\$ #	\$ #			
1,2-Dichloropropane	<12 µg/kg	TM116		<24	<240	<240			
				\$ #	\$ #	\$ #			
Dibromomethane	<9 µg/kg	TM116		<18	<180	<180			
				\$ #	\$ #	\$ #			
Bromodichloromethane	<7 µg/kg	TM116		<14	<140	<140			
				\$ #	\$ #	\$ #			
cis-1-3-Dichloropropene	<14 µg/kg	TM116		<28	<280	<280			
				\$ #	\$ #	\$ #			
Toluene	<5 µg/kg	TM116		<10	<100	<100			
				\$ #	\$ #	\$ #			
trans-1-3-Dichloropropene	<14 µg/kg	TM116		<28	<280	<280			
				\$	\$	\$			
1,1,2-Trichloroethane	<10 µg/kg	TM116		<20	<200	<200			
				\$ #	\$ #	\$ #			
1,3-Dichloropropane	<7 µg/kg	TM116		<14	<140	<140			
				\$ #	\$ #	\$ #			
Tetrachloroethene	<5 µg/kg	TM116		<10	<100	<100			
				\$ #	\$ #	\$ #			
Dibromochloromethane	<13 µg/kg	TM116		<26	<260	<260			
				\$ #	\$ #	\$ #			



CERTIFICATE OF ANALYSIS

SDG: 120120-48
Job: H_ATKINS_LDC-35
Client Reference:

Location: Coed Darcy Urban Village
Customer: Atkins Global Ltd
Attention: Selina Bamforth

Order Number: CD0210
Report Number: 169194
Superseded Report:

VOC MS (S)

Results Legend		Customer Sample R	TIC 1	TIC 2	TIC 3			
#	ISO17025 accredited.							
M	mCERTS accredited.	Depth (m) Sample Type Date Sampled Date Received SDG Ref Lab Sample No.(s) AGS Reference	Soil/Solid 19/01/2012 20/01/2012 120120-48 5045607	Soil/Solid 19/01/2012 20/01/2012 120120-48 5045608	Soil/Solid 19/01/2012 20/01/2012 120120-48 5045609			
S	Deviating sample.							
aq	Aqueous / settled sample.							
diss.filt	Dissolved / filtered sample.							
tot.unfilt	Total / unfiltered sample.							
*	Subcontracted test.							
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery							
(F)	Trigger breach confirmed							
Component	LOD/Units	Method						
1.2-Dibromoethane	<12 µg/kg	TM116	<24 \$ #	<240 \$ #	<240 \$ #			
Chlorobenzene	<5 µg/kg	TM116	<10 \$ #	<100 \$ #	<100 \$ #			
1.1.1.2-Tetrachloroethane	<10 µg/kg	TM116	<20 \$ #	<200 \$ #	<200 \$ #			
Ethylbenzene	<4 µg/kg	TM116	<8 \$ #	<80 \$ #	<80 \$ #			
p/m-Xylene	<14 µg/kg	TM116	<28 \$ #	<280 \$ #	<280 \$ #			
o-Xylene	<10 µg/kg	TM116	<20 \$ #	<200 \$ #	<200 \$ #			
Styrene	<10 µg/kg	TM116	<20 \$ #	<200 \$ #	<200 \$ #			
Bromoform	<10 µg/kg	TM116	<20 \$ #	<200 \$ #	<200 \$ #			
Isopropylbenzene	<5 µg/kg	TM116	<10 \$ #	<100 \$ #	<100 \$ #			
1.1.2.2-Tetrachloroethane	<10 µg/kg	TM116	<20 \$ #	<200 \$ #	<200 \$ #			
1.2.3-Trichloropropane	<17 µg/kg	TM116	<34 \$ #	<340 \$ #	<340 \$ #			
Bromobenzene	<10 µg/kg	TM116	<20 \$ #	<200 \$ #	<200 \$ #			
Propylbenzene	<11 µg/kg	TM116	<22 \$ #	<220 \$ #	<220 \$ #			
2-Chlorotoluene	<9 µg/kg	TM116	<18 \$ #	<180 \$ #	<180 \$ #			
1.3.5-Trimethylbenzene	<8 µg/kg	TM116	<16 \$ #	<160 \$ #	<160 \$ #			
4-Chlorotoluene	<12 µg/kg	TM116	<24 \$ #	<240 \$ #	<240 \$ #			
tert-Butylbenzene	<12 µg/kg	TM116	<24 \$ #	<240 \$ #	<240 \$ #			
1.2.4-Trimethylbenzene	<9 µg/kg	TM116	<18 \$ #	<180 \$ #	<180 \$ #			
sec-Butylbenzene	<10 µg/kg	TM116	<20 \$ #	<200 \$ #	<200 \$ #			
4-Isopropyltoluene	<11 µg/kg	TM116	<22 \$ #	<220 \$ #	<220 \$ #			
1.3-Dichlorobenzene	<6 µg/kg	TM116	<12 \$ #	<120 \$ #	<120 \$ #			
1.4-Dichlorobenzene	<5 µg/kg	TM116	<10 \$ #	<100 \$ #	<100 \$ #			
n-Butylbenzene	<10 µg/kg	TM116	<20 \$ #	<200 \$ #	<200 \$ #			
1.2-Dichlorobenzene	<12 µg/kg	TM116	<24 \$ #	<240 \$ #	<240 \$ #			
1.2-Dibromo-3-chloropropene	<14 µg/kg	TM116	<28 \$ #	<280 \$ #	<280 \$ #			
Tert-amyl methyl ether	<15 µg/kg	TM116	<30 \$	<300 \$	<300 \$			
1.2.4-Trichlorobenzene	<6 µg/kg	TM116	<12 \$ #	<120 \$ #	<120 \$ #			
Hexachlorobutadiene	<12 µg/kg	TM116	<24 \$	<240 \$	<240 \$			
Naphthalene	<13 µg/kg	TM116	<26 \$ #	<260 \$ #	<260 \$ #			
1.2.3-Trichlorobenzene	<6 µg/kg	TM116	<12 \$ #	<120 \$ #	<120 \$ #			



SDG:	120120-48	Location:	Coed Darcy Urban Village	Order Number:	CD0210
Job:	H_ATKINS_LDC-35	Customer:	Atkins Global Ltd	Report Number:	169194
Client Reference:		Attention:	Selina Bamforth	Superseded Report:	

Asbestos Identification

		Date of Analysis	Analysed By	Comments	Amosite (Brown) Asbestos	Chrysotile (White) Asbestos	Crocidolite (Blue) Asbestos	Fibrous Actinolite	Fibrous Anthophyllite	Fibrous Tremolite	Non-Asbestos Fibre
Customer Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	QIC 1 NS Z SOLID 19/01/2012 00:00:00 120120-48 5,045,605 TM048	31/01/12	Kevin Bowron	Loose fibres in soil	Detected (#)	Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Customer Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	QIC 2 NS Z SOLID 19/01/2012 00:00:00 120120-48 5,045,605 TM048	31/01/12	Kevin Bowron	ACM debris and loose fibres in soil	Not Detected (#)	Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Detected
Customer Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	TIC 1 NS Z SOLID 19/01/2012 00:00:00 120120-48 5,045,607 TM048	31/01/12	Kevin Bowron	Loose fibres in soil	Not Detected (#)	Detected (#)	Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected



CERTIFICATE OF ANALYSIS

SDG: 120120-48
Job: H_ATKINS_LDC-35
Client Reference:

Location: Coed Darcy Urban Village
Customer: Atkins Global Ltd
Attention: Selina Bamforth

Order Number: CD0210
Report Number: 169194
Superseded Report:

Notification of Deviating Samples

Sample Number	Customer Sample Ref.	Depth (m)	Matrix	Test Name	Component Name	Comment
5071337	TIC 3		SOLID	VOC MS (S)	1.1.1.2-Tetrachloroethane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	1.1.1-Trichloroethane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	1.1.2.2-Tetrachloroethane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	1.1.2-Trichloroethane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	1.1-Dichloroethane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	1.1-Dichloroethene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	1.1-Dichloropropene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	1.2.3-Trichlorobenzene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	1.2.3-Trichloropropane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	1.2.4-Trichlorobenzene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	1.2.4-Trimethylbenzene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	1.2-Dibromo-3-chloropropane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	1.2-Dibromoethane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	1.2-Dichlorobenzene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	1.2-Dichloroethane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	1.2-Dichloropropane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	1.3.5-Trimethylbenzene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	1.3-Dichlorobenzene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	1.3-Dichloropropane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	1.4-Dichlorobenzene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	2.2-Dichloropropane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	2-Chlorotoluene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	4-Bromofluorobenzene**	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	4-Chlorotoluene	Volatile Analysis performed on vessel with headspace due to testing requirement



CERTIFICATE OF ANALYSIS

SDG: 120120-48
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Location: Coed Darcy Urban Village
Customer: Atkins Global Ltd
Attention: Selina Bamforth

Order Number: CD0210
Report Number: 169194
Superseded Report:

Sample Number	Customer Sample Ref.	Depth (m)	Matrix	Test Name	Component Name	Comment
5071337	TIC 3		SOLID	VOC MS (S)	4-Isopropyltoluene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	Benzene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	Bromobenzene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	Bromochloromethane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	Bromodichloromethane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	Bromoform	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	Bromomethane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	Carbon Disulphide	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	Carbontetrachloride	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	Chlorobenzene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	Chloroethane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	Chloroform	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	Chloromethane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	cis-1-2-Dichloroethene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	cis-1-3-Dichloropropene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	Dibromochloromethane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	Dibromofluoromethane**	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	Dibromomethane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	Dichlorodifluoromethane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	Dichloromethane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	Ethylbenzene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	Hexachlorobutadiene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	Isopropylbenzene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	Methyl Tertiary Butyl Ether	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	Naphthalene	Volatile Analysis performed on vessel with headspace due to testing requirement



CERTIFICATE OF ANALYSIS

SDG: 120120-48
Job: H_ATKINS_LDC-35
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Location: Coed Darcy Urban Village
Customer: Atkins Global Ltd
Attention: Selina Bamforth

Order Number: CD0210
Report Number: 169194
Superseded Report:

Sample Number	Customer Sample Ref.	Depth (m)	Matrix	Test Name	Component Name	Comment
5071337	TIC 3		SOLID	VOC MS (S)	n-Butylbenzene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	o-Xylene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	p/m-Xylene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	Propylbenzene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	sec-Butylbenzene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	Styrene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	Tert-amyl methyl ether	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	tert-Butylbenzene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	Tetrachloroethene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	Toluene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	Toluene-d8**	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	trans-1-2-Dichloroethene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	trans-1-3-Dichloropropene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	Trichloroethene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	Trichlorofluoromethane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071337	TIC 3		SOLID	VOC MS (S)	Vinyl Chloride	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	1.1.1.2-Tetrachloroethane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	1.1.1-Trichloroethane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	1.1.2.2-Tetrachloroethane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	1.1.2-Trichloroethane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	1.1-Dichloroethane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	1.1-Dichloroethene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	1.1-Dichloropropene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	1.2.3-Trichlorobenzene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	1.2.3-Trichloropropane	Volatile Analysis performed on vessel with headspace due to testing requirement



CERTIFICATE OF ANALYSIS

SDG: 120120-48
Job: H_ATKINS_LDC-35
Client Reference:

Location: Coed Darcy Urban Village
Customer: Atkins Global Ltd
Attention: Selina Bamforth

Order Number: CD0210
Report Number: 169194
Superseded Report:

Sample Number	Customer Sample Ref.	Depth (m)	Matrix	Test Name	Component Name	Comment
5071338	TIC 2		SOLID	VOC MS (S)	1.2.4-Trichlorobenzene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	1.2.4-Trimethylbenzene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	1.2-Dibromo-3-chloropropane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	1.2-Dibromoethane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	1.2-Dichlorobenzene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	1.2-Dichloroethane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	1.2-Dichloropropane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	1.3.5-Trimethylbenzene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	1.3-Dichlorobenzene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	1.3-Dichloropropane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	1.4-Dichlorobenzene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	2.2-Dichloropropane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	2-Chlorotoluene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	4-Bromofluorobenzene**	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	4-Chlorotoluene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	4-Isopropyltoluene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	Benzene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	Bromobenzene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	Bromochloromethane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	Bromodichloromethane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	Bromoform	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	Bromomethane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	Carbon Disulphide	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	Carbontetrachloride	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	Chlorobenzene	Volatile Analysis performed on vessel with headspace due to testing requirement



CERTIFICATE OF ANALYSIS

SDG: 120120-48
Job: H_ATKINS_LDC-35
Client Reference:

Location: Coed Darcy Urban Village
Customer: Atkins Global Ltd
Attention: Selina Bamforth

Order Number: CD0210
Report Number: 169194
Superseded Report:

Sample Number	Customer Sample Ref.	Depth (m)	Matrix	Test Name	Component Name	Comment
5071338	TIC 2		SOLID	VOC MS (S)	Chloroethane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	Chloroform	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	Chloromethane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	cis-1-2-Dichloroethene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	cis-1-3-Dichloropropene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	Dibromochloromethane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	Dibromofluoromethane**	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	Dibromomethane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	Dichlorodifluoromethane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	Dichloromethane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	Ethylbenzene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	Hexachlorobutadiene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	Isopropylbenzene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	Methyl Tertiary Butyl Ether	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	Naphthalene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	n-Butylbenzene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	o-Xylene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	p/m-Xylene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	Propylbenzene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	sec-Butylbenzene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	Styrene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	Tert-amyl methyl ether	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	tert-Butylbenzene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	Tetrachloroethene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	Toluene	Volatile Analysis performed on vessel with headspace due to testing requirement



CERTIFICATE OF ANALYSIS

SDG: 120120-48
Job: H_ATKINS_LDC-35
Client Reference:

Location: Coed Darcy Urban Village
Customer: Atkins Global Ltd
Attention: Selina Bamforth

Order Number: CD0210
Report Number: 169194
Superseded Report:

Sample Number	Customer Sample Ref.	Depth (m)	Matrix	Test Name	Component Name	Comment
5071338	TIC 2		SOLID	VOC MS (S)	Toluene-d8**	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	trans-1-2-Dichloroethene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	trans-1-3-Dichloropropene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	Trichloroethene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	Trichlorofluoromethane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071338	TIC 2		SOLID	VOC MS (S)	Vinyl Chloride	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	1.1.1.2-Tetrachloroethane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	1.1.1-Trichloroethane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	1.1.2.2-Tetrachloroethane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	1.1.2-Trichloroethane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	1.1-Dichloroethane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	1.1-Dichloroethene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	1.1-Dichloropropene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	1.2.3-Trichlorobenzene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	1.2.3-Trichloropropane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	1.2.4-Trichlorobenzene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	1.2.4-Trimethylbenzene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	1.2-Dibromo-3-chloropropane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	1.2-Dibromoethane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	1.2-Dichlorobenzene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	1.2-Dichloroethane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	1.2-Dichloropropane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	1.3.5-Trimethylbenzene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	1.3-Dichlorobenzene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	1.3-Dichloropropane	Volatile Analysis performed on vessel with headspace due to testing requirement



CERTIFICATE OF ANALYSIS

SDG: 120120-48
Job: H_ATKINS_LDC-35
Client Reference:

Location: Coed Darcy Urban Village
Customer: Atkins Global Ltd
Attention: Selina Bamforth

Order Number: CD0210
Report Number: 169194
Superseded Report:

Sample Number	Customer Sample Ref.	Depth (m)	Matrix	Test Name	Component Name	Comment
5071448	TIC 1		SOLID	VOC MS (S)	1.4-Dichlorobenzene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	2.2-Dichloropropane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	2-Chlorotoluene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	4-Bromofluorobenzene**	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	4-Chlorotoluene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	4-Isopropyltoluene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	Benzene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	Bromobenzene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	Bromochloromethane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	Bromodichloromethane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	Bromoform	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	Bromomethane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	Carbon Disulphide	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	Carbontetrachloride	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	Chlorobenzene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	Chloroethane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	Chloroform	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	Chloromethane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	cis-1-2-Dichloroethene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	cis-1-3-Dichloropropene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	Dibromochloromethane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	Dibromofluoromethane**	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	Dibromomethane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	Dichlorodifluoromethane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	Dichloromethane	Volatile Analysis performed on vessel with headspace due to testing requirement



CERTIFICATE OF ANALYSIS

SDG: 120120-48
Job: H_ATKINS_LDC-35
Client Reference:

Location: Coed Darcy Urban Village
Customer: Atkins Global Ltd
Attention: Selina Bamforth

Order Number: CD0210
Report Number: 169194
Superseded Report:

Sample Number	Customer Sample Ref.	Depth (m)	Matrix	Test Name	Component Name	Comment
5071448	TIC 1		SOLID	VOC MS (S)	Ethylbenzene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	Hexachlorobutadiene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	Isopropylbenzene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	Methyl Tertiary Butyl Ether	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	Naphthalene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	n-Butylbenzene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	o-Xylene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	p/m-Xylene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	Propylbenzene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	sec-Butylbenzene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	Styrene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	Tert-amyl methyl ether	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	tert-Butylbenzene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	Tetrachloroethene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	Toluene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	Toluene-d8**	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	trans-1-2-Dichloroethene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	trans-1-3-Dichloropropene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	Trichloroethene	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	Trichlorofluoromethane	Volatile Analysis performed on vessel with headspace due to testing requirement
5071448	TIC 1		SOLID	VOC MS (S)	Vinyl Chloride	Volatile Analysis performed on vessel with headspace due to testing requirement

Note : Test results may be compromised



SDG:	120120-48	Location:	Coed Darcy Urban Village	Order Number:	CD0210
Job:	H_ATKINS_LDC-35	Customer:	Atkins Global Ltd	Report Number:	169194
Client Reference:		Attention:	Selina Bamforth	Superseded Report:	

Table of Results - Appendix

REPORT KEY

Results expressed as (e.g.) 1.03E-07 is equivalent to 1.03x10 ⁻⁷							
NDP	No Determination Possible	#	ISO 17025 Accredited	*	Subcontracted Test	M	MCERTS Accredited
NFD	No Fibres Detected	PFD	Possible Fibres Detected	»	Result previously reported (Incremental reports only)	EC	Equivalent Carbon (Aromatics C8-C35)

Note: Method detection limits are not always achievable due to various circumstances beyond our control

Method No	Reference	Description	Wet/Dry Sample ¹	Surrogate Corrected
PM001		Preparation of Samples for Metals Analysis		
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material		
TM048	HSG 248, Asbestos: The analysts' guide for sampling, analysis and clearance procedures	Identification of Asbestos in Bulk Material		
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) and BTEX (MTBE) compounds by Headspace GC-FID (C4-C12)		
TM116	Modified: US EPA Method 8260, 8120, 8020, 624, 610 & 602	Determination of Volatile Organic Compounds by Headspace / GC-MS		
TM133	BS 1377: Part 3 1990;BS 6068-2.5	Determination of pH in Soil and Water using the GLpH pH Meter		
TM157	HP 6890 Gas Chromatograph (GC) system and HP 5973 Mass Selective Detector (MSD).	Determination of SVOC in Soils by GC-MS extracted by sonication in DCM/Acetone		
TM173	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	Determination of Speciated Extractable Petroleum Hydrocarbons in Soils by GC-FID		
TM181	US EPA Method 6010B	Determination of Routine Metals in Soil by iCap 6500 Duo ICP-OES		
TM218	Microwave extraction – EPA method 3546	Microwave extraction - EPA method 3546		

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



CERTIFICATE OF ANALYSIS

SDG: 120120-48
Job: H_ATKINS_LDC-35
Client Reference:

Location: Coed Darcy Urban Village
Customer: Atkins Global Ltd
Attention: Selina Bamforth

Order Number: CD0210
Report Number: 169194
Superseded Report:

Test Completion Dates

Lab Sample No(s)	5045591	5045593	5045598	5045600	5045601	5045602	5045603	5045605	5045606	5045585
Customer Sample Ref.	DVCS 1	DVCS 2	DVCS 3	DVCS 4	DVCS 5	DVCS 6	DVCS 7	QIC 1	QIC 2	SP43 1
AGS Ref.										
Depth										
Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID
Asbestos Identification (Soil)								01-Feb-2012	01-Feb-2012	
Asbestos Prep								26-Jan-2012	26-Jan-2012	
EPH CWG (Aliphatic) GC (S)	25-Jan-2012	25-Jan-2012	25-Jan-2012	25-Jan-2012	25-Jan-2012	25-Jan-2012	25-Jan-2012	26-Jan-2012	26-Jan-2012	25-Jan-2012
EPH CWG (Aromatic) GC (S)	25-Jan-2012	25-Jan-2012	25-Jan-2012	25-Jan-2012	25-Jan-2012	25-Jan-2012	25-Jan-2012	26-Jan-2012	26-Jan-2012	25-Jan-2012
GRO by GC-FID (S)	25-Jan-2012	25-Jan-2012	25-Jan-2012	25-Jan-2012	25-Jan-2012	25-Jan-2012	25-Jan-2012	26-Jan-2012	26-Jan-2012	25-Jan-2012
Metals by iCap-OES (Soil)	25-Jan-2012	25-Jan-2012	25-Jan-2012	25-Jan-2012	25-Jan-2012	25-Jan-2012	25-Jan-2012	26-Jan-2012	26-Jan-2012	25-Jan-2012
PAH by GCMS	26-Jan-2012	26-Jan-2012	26-Jan-2012	26-Jan-2012	26-Jan-2012	26-Jan-2012	26-Jan-2012	26-Jan-2012	26-Jan-2012	26-Jan-2012
pH	23-Jan-2012	23-Jan-2012	23-Jan-2012	23-Jan-2012	23-Jan-2012	23-Jan-2012	23-Jan-2012	25-Jan-2012	25-Jan-2012	23-Jan-2012
Sample description	23-Jan-2012	23-Jan-2012	23-Jan-2012	23-Jan-2012	23-Jan-2012	23-Jan-2012	23-Jan-2012	23-Jan-2012	23-Jan-2012	23-Jan-2012
TPH CWG GC (S)	25-Jan-2012	25-Jan-2012	25-Jan-2012	25-Jan-2012	25-Jan-2012	25-Jan-2012	25-Jan-2012	26-Jan-2012	26-Jan-2012	25-Jan-2012

Lab Sample No(s)	5045586	5045587	5045588	5045589	5045590	5045607	5045608	5045609
Customer Sample Ref.	SP43 2	SP46 1	SP46 2	SP47 1	SP47 2	TIC 1	TIC 2	TIC 3
AGS Ref.								
Depth								
Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID
Asbestos Identification (Soil)						01-Feb-2012		
Asbestos Prep						26-Jan-2012		
EPH CWG (Aliphatic) GC (S)	25-Jan-2012	25-Jan-2012	25-Jan-2012	25-Jan-2012	25-Jan-2012	26-Jan-2012	25-Jan-2012	25-Jan-2012
EPH CWG (Aromatic) GC (S)	25-Jan-2012	25-Jan-2012	25-Jan-2012	25-Jan-2012	25-Jan-2012	26-Jan-2012	25-Jan-2012	25-Jan-2012
GRO by GC-FID (S)	25-Jan-2012	25-Jan-2012	25-Jan-2012	25-Jan-2012	25-Jan-2012	26-Jan-2012	25-Jan-2012	25-Jan-2012
Metals by iCap-OES (Soil)	25-Jan-2012	25-Jan-2012	25-Jan-2012	25-Jan-2012	25-Jan-2012	26-Jan-2012	25-Jan-2012	25-Jan-2012
PAH by GCMS	26-Jan-2012	26-Jan-2012	26-Jan-2012	26-Jan-2012	26-Jan-2012			
pH	23-Jan-2012	24-Jan-2012	23-Jan-2012	23-Jan-2012	23-Jan-2012	23-Jan-2012	23-Jan-2012	23-Jan-2012
Sample description	23-Jan-2012	23-Jan-2012	23-Jan-2012	23-Jan-2012	23-Jan-2012	23-Jan-2012	23-Jan-2012	23-Jan-2012
Semi Volatile Organic Compounds						27-Jan-2012	26-Jan-2012	26-Jan-2012
TPH CWG GC (S)	25-Jan-2012	25-Jan-2012	25-Jan-2012	25-Jan-2012	25-Jan-2012	26-Jan-2012	25-Jan-2012	25-Jan-2012
VOC MS (S)						26-Jan-2012	26-Jan-2012	26-Jan-2012



CERTIFICATE OF ANALYSIS

SDG:	120120-48	Location:	Coed Darcy Urban Village	Order Number:	CD0210
Job:	H_ATKINS_LDC-35	Customer:	Atkins Global Ltd	Report Number:	169194
Client Reference:		Attention:	Selina Bamforth	Superseded Report:	

Appendix

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

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

3. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 2 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALcontrol Laboratories reserve the right to charge for samples received and stored but not analysed.

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

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

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

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

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

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

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

11. Results relate only to the items tested.

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

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

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

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

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

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

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

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

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

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

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

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

SOLID MATRICES EXTRACTION SUMMARY				
ANALYSIS	D&C OR WET	EXTRACTION SOLVENT	EXTRACTION METHOD	ANALYSIS
SOLVENTEXTRACTABLE MATTER	D&C	DCM	SOX THERM	GRAVIMETRIC
CYCLOHEXANE EXT. MATTER	D&C	CYCLOHEXANE	SOX THERM	GRAVIMETRIC
ELEMENTAL SULPHUR	D&C	DCM	SOX THERM	HPLC
PHENOLS BY GCMS	WET	DCM	SOX THERM	GC-MS
HERBICIDES	D&C	HEXANE/ACETONE	SOX THERM	GC-MS
PESTICIDES	D&C	HEXANE/ACETONE	SOX THERM	GC-MS
EPH (DFO)	D&C	HEXANE/ACETONE	END OVER END	GC-FID
EPH (MIN OIL)	D&C	HEXANE/ACETONE	END OVER END	GC-FID
EPH (CLEANED UP)	D&C	HEXANE/ACETONE	END OVER END	GC-FID
EPH CWGBY GC	D&C	HEXANE/ACETONE	END OVER END	GC-FID
PCBAROCLOR 1254/PCB CON	D&C	HEXANE/ACETONE	END OVER END	GC-MS
POLYAROMATIC HYDROCARBONS (MS)	WET	HEXANE/ACETONE	MICROWAVE TM218.	GC-MS
>C6-C40	WET	HEXANE/ACETONE	SHAKER	GC-FID
POLYAROMATIC HYDROCARBONS RAPID GC	WET	HEXANE/ACETONE	SHAKER	GC-FID
SEMI VOLATILE ORGANIC COMPOUNDS	WET	DOM/ACETONE	SONICATE	GC-MS

LIQUID MATRICES EXTRACTION SUMMARY			
ANALYSIS	EXTRACTION SOLVENT	EXTRACTION METHOD	ANALYSIS
PAHMS	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC-MS
EPH	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC-FID
EPH CWG	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC-FID
MINERAL OIL	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC-FID
PCB7 CONGENERS	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC-MS
PCBAROCLOR 1254	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC-MS
SVOC	DCM	LIQUID/LIQUID SHAKE	GC-MS
FREE SULPHUR	DCM	SOLID PHASE EXTRACTION	HPLC
PESTICIDOPP	DCM	LIQUID/LIQUID SHAKE	GC-MS
TRIAZINE HERBS	DCM	LIQUID/LIQUID SHAKE	GC-MS
PHENOLS MS	ACETONE	SOLID PHASE EXTRACTION	GC-MS
TPH by INFRARED (IR)	TCE	STIRRED EXTRACTION (STIR-BAR)	IR
MINERAL OIL by IR	TCE	STIRRED EXTRACTION (STIR-BAR)	IR
GLYCOLS	NONE	DIRECT INJECTION	GC-FID

Identification of Asbestos in Bulk Materials & Soils

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

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

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace -Where only one or two asbestos fibres were identified.

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

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

Appendix F

Hotspot removal

AF:1 Hotspots removal

The Commercial area was remediated and validated by a combination of the following:

1. Total turnover and removal of contaminated ground identified on site via VO assessment followed by validation testing of the base and sides of the excavations
2. Validation trial pits undertaken and assessed using both VO and chemical test data. Contaminated areas were identified and contaminated materials removed in discrete excavations

As part of the validation process, hotspots were identified via chemical testing that required further excavation and removal to achieve the S106 requirements. The locations of hotspots and samples are summarised on Drawing 5041216-REM-DWG-0001615 with details provided below.

AF 1.1 Asbestos

The s106 RTC states that:

All soils must meet in bulk, considering both dispersed fibres and pieces of ACM, the RBSL for ACM to at least 1m below FFL. Any visible ACM encountered during construction in the first 1m below FFL is to be removed.

The RTC for asbestos is >0.03%

Hotspot a.

Initial testing identified an exceedance in CAV115 of asbestos relating to a hand dug pit sample. The area was excavated to 0.5m below existing ground levels in an area approximately 45m by 15m, with the impacted ground removed.

Validation of the base and backfill was undertaken. The excavation area had gently sloping sides and therefore some of the base of excavation validation samples were counted as side validation samples. Overall the frequency of sampling required by the section 106 was met i.e. perimeter 120m x 0.5m deep = 60m²; base area = 553m²; minimum number of samples required = 4 + 2, compared to 10 BofE / validation samples taken. The area was subsequently upfilled by an additional 0.5m to ensure that the localised exceedance in CAAH 5 is below 1m. This additional 0.5m of validated fill will also mean that validation samples CAAH 2 and 8, where asbestos was detected but no quantification done, will be at greater than 1m depth and therefore no asbestos RTC is applicable. In addition to this, the S106 requires a 0.5m clean cover layer to be placed above the remediated site level, which means that these base of the hotspot removal will ultimately lie at 1.5m below FFL.

Total area of excavation: 553 m²

Total depth of excavation: 0.5m

Total volume of excavation: 277m³

See drawing 5041216-REM-DWG-0001615-A for details.

	Depth (mbgl)	Date	Sample type	Asbestos Quantification - %
CAV115	0.1	15/03/2013	Validation	0.751
CAV116	0.1	15/03/2013	Validation	0.0029
CAV115	0.3	18/06/2013	Revalidation	<0.001
CAAH 1	0.5	22/05/2013	BofE validation	0.0054
CAAH 2	0.5	22/05/2013	BofE validation	Not tested
CAAH 3	0.5	22/05/2013	BofE validation	0.0048
CAAH 4	0.5	22/05/2013	BofE validation	Trace only
CAAH 5	0.5	22/05/2013	BofE validation	0.187
CAAH 6	0.5	22/05/2013	BofE validation	Trace only
CAAH 7	0.5	22/05/2013	BofE validation	0.0039

CAAH 8	0.5	22/05/2013	BofE validation	Not tested
CAAH 9	0.5	22/05/2013	BofE validation	<0.001
CAAH 10	0.5	22/05/2013	BofE validation	ND*
CAAH 11	0.5	22/05/2013	BofE validation	0.029
CAAH 12	0.5	22/05/2013	BofE validation	ND*
CAAH 13	0.5	22/05/2013	BofE validation	0.0064
CAAH 14	0.5	22/05/2013	BofE validation	ND*

*Duplicate sample taken and tested in April 2015 with no asbestos detected
ND = No asbestos detected

Hotspot b

Initial testing identified an exceedance in CAV141 on the 26/06/13 at 0.3mbgl of asbestos relating to a hand dug pit sample. The area was excavated to 0.5m below existing ground levels in an approximate 5m by 5m excavation, with the impacted ground removed.

Validation of base and sides was undertaken, with additional exceedances noted in the base and north and south side walls of the initial excavation. Further excavation below the base to 0.8mbgl was undertaken and extended laterally by a further 5m to the north, west and south, and all these samples complied with the S106 asbestos RTC. The further excavation to the west was not strictly necessary, given that Sample CAV141W did not exceed the RTC, however, the additional samples effectively provide an increased frequency of testing for the west sidewall of the initial excavation.

Total area of excavation: 209m²

Total depth of excavation: 0.8m

Total volume of excavation: 167m³

See drawing 5041216-REM-DWG-0001615-C for details.

	Depth (mbgl)	Date	Sample type	Asbestos Quantification - %
CAV141	0.30-	26/06/2013	Validation	0.8982
CAV141 BASE 1	0.50-	21/08/2013	BofE validation	1.28
CAV141 BASE 2	0.50-	21/08/2013	BofE validation	0.242
CAV141 E	0.30-	21/08/2013	Side validation	0.0176
CAV141 N	0.30-	21/08/2013	Side validation	0.0845
CAV141 S	0.30-	21/08/2013	Side validation	0.127
CAV141 W	0.30-	21/08/2013	Side validation	0.001
CAV 500	0.80-	18/09/2013	BofE validation	0.001
CAV 501	0.80-	18/09/2013	BofE validation	ND
CAV 502	0.80-	18/09/2013	BofE validation	0.001
CAV 503	0.80-	18/09/2013	BofE validation	0.001
CAV 504	0.80-	18/09/2013	BofE validation	0.001
CAV 505	0.80-	18/09/2013	BofE validation	0.0022
CAV 506	0.80-	18/09/2013	BofE validation	0.001
CAV 507	0.80-	18/09/2013	BofE validation	0.001
CAV 508	0.80-	18/09/2013	BofE validation	0.001
CAV 509	0.40-	18/09/2013	Side validation	0.001
CAV 510	0.40-	18/09/2013	Side validation	0.001

Hotspot c

Initial testing identified an exceedance in CAV101 on the 15/03/13 of asbestos relating to a hand dug pit sample at 0.1mbgl. The area was excavated to 0.5m below existing ground levels in an approximate 5m by 5m excavation, with the impacted ground removed. Validation of base and sides was undertaken, with an additional exceedance (CAV101-1) noted in the base of the excavation. Further excavation was undertaken below the base of the initial excavation down to 1mbgl and further base validation samples taken. All the side and deepened base validation samples complied with the S106 asbestos RTC.

Total area of excavation: 31m²

Total depth of excavation: 1m

Total volume of excavation: 31m³

See drawing 5041216-REM-DWG-0001615-C for details.

	Depth (mbgl)	Date	Sample type	Asbestos Quantification - %
CAV101	0.1	15/03/2013	Validation	0.591
CAV101-1	0.5	11/06/2013	BofE validation	0.0447
CAV101-2	0.5	11/06/2013	BofE validation	ND*
CAV101-3	0.5	11/06/2013	BofE validation	<0.001
CAV101 BASE 1	1.00-	19/08/2013	BofE validation	<0.001
CAV101 BASE 2	1.00-	19/08/2013	BofE validation	0.0093
CAV101 E	0.30-	11/06/2013	Side validation	<0.001
CAV101 N	0.30-	11/06/2013	Side validation	0.0014
CAV101 S	0.30-	11/06/2013	Side validation	ND
CAV101 W	0.30-	11/06/2013	Side validation	<0.001

*Duplicate sample taken and tested in March 2015 with no asbestos detected

Hotspot d

Initial testing identified an exceedance in CAV09 (erroneously labelled as CAU09 in Appendix E) on the 13/03/13 at 0.2mbgl from a trial pit sample. The area was excavated to 0.5m below existing ground levels in an approximate 5m by 5m excavation, with the impacted ground removed. Validation of the base and sides was undertaken, with additional exceedances noted in the West sidewall and a near exceedance in the North sidewall. Further excavation was undertaken, to the north and west sidewalls, making the total area of excavation approximately 10m x 10m. The further validation of the sides complied with the S106 asbestos RTC.

Total area of excavation: 130m²

Total depth of excavation: 0.5m

Total volume of excavation: 65m³

See drawing 5041216-REM-DWG-0001615-D for details.

	Depth (mbgl)	Date	Sample type	Asbestos Quantification - %
CAU009	0.20-	13/03/2013	Validation	0.0291
CAV09 1	0.50-	11/06/2013	BofE validation	0.0054
CAV09 2	0.50-	11/06/2013	BofE validation	ND*
CAV09 3	0.50-	11/06/2013	BofE validation	0.0019
CAV09 E	0.30-	11/06/2013	Side validation	0.0117
CAV09 N	0.30-	11/06/2013	Side validation	0.0266
CAV09 S	0.30-	11/06/2013	Side validation	0.0059
CAV09 W	0.30-	11/06/2013	Side validation	0.0568
CDV009 BASE 1	0.50-	21/08/2013	BofE validation	0.0129
CDV009 BASE 2	0.50-	21/08/2013	BofE validation	0.0042
CDV009 N	0.30-	21/08/2013	Side validation	0.0093
CD009 NW	0.30-	21/08/2013	Side validation	0.0057
CDV009 W	0.30-	21/08/2013	Side validation	<0.001

*Duplicate sample taken and tested in March 2015 with no asbestos detected

Hotspot e

Initial testing identified an exceedance in CAV034 on the 15/03/13 at 0.3mbgl from a trial pit sample. The area was excavated to 0.5m below existing ground levels in an approximate 5m by 5m excavation, with the impacted ground removed. Validation of the base and sides was undertaken, with an additional exceedance noted in the South sidewall (CAV34S). Further excavation was undertaken a further 5m to the south of the exceedance, and validation of the base and all sides of the excavation complied with the S106 asbestos RTC.

Total area of excavation: 206m²

Total depth of excavation: 0.5m

Total volume of excavation: 103m³

See drawing 5041216-REM-DWG-0001615-F for details.

	Depth (mbgl)	Date	Sample type	Asbestos Quantification - %
CAV034	0.30-	15/03/2013	Validation	0.032
CAV34 1	0.50-	11/06/2013	BofE validation	0.0149
CAV34 2	0.50-	11/06/2013	BofE validation	0.007*
CAV34 3	0.50-	11/06/2013	BofE validation	0.0199
CAV34 E	0.30-	11/06/2013	Side validation	0.0166
CAV34 S	0.30-	11/06/2013	Side validation	0.218
CAV34 N	0.30-	11/06/2013	Side validation	ND
CAV34 W	0.30-	11/06/2013	Side validation	0.0166
CAV034 BASE1	0.50-	19/08/2013	BofE validation	0.0223
CAV034 BASE2	0.50-	19/08/2013	BofE validation	0.0064
CAV034 E	0.30-	19/08/2013	Side validation	0.0094
CAV034 N	0.30-	19/08/2013	Side validation	<0.001
CAV034 S	0.30-	19/08/2013	Side validation	0.0034
CAV034 W	0.30-	19/08/2013	Side validation	0.001

*Duplicate sample taken and tested in March 2015

Hotspot f

Initial testing identified an exceedance in CAV039E on the 21/06/13 at 0.6mbgl in the east side wall, during the removal of hydrocarbon contaminated material. The hydrocarbon removal excavation was initially taken to 0.8m bgl and a set of validation samples taken. The excavation was subsequently deepened to a maximum depth of 2m to remove an olfactory exceedance of the S106. The area was further excavated to the east of sample CAV039E to a depth of 0.5m below existing ground level in an approximate 5m by 5m excavation, with the asbestos impacted ground removed. Validation of the base and sides (tests suffixed (A)) was undertaken with all results complying with the S106 asbestos RTC.

Total area of excavation: 52m² + 25m² (extended area)

Total depth of excavation: 2m + 0.5m

Total volume of excavation: 104m³ + 12.5m³

See drawing 5041216-REM-DWG-0001615-E for details.

	Depth (mbgl)	Date	Sample type	Asbestos Quantification - %
CAV039 Base 1	0.80-	21/06/2013	BofE validation	<0.001
CAV039 Base 2	0.80-	21/06/2013	BofE validation	0.001
CAV039 E	0.60-	21/06/2013	Side validation	0.0872
CAV039 N	0.60-	21/06/2013	Side validation	0.0001
CAV039 S	0.60-	21/06/2013	Side validation	0.0013
CAV039 W	0.60-	21/06/2013	Side validation	0.0047
CAV039 BASE1 (A)	0.50-	19/08/2013	BofE validation	<0.001
CAV039 BASE2 (A)	0.50-	19/08/2013	BofE validation	0.001
CAV039 E (A)	0.30-	19/08/2013	Side validation	0.0043
CAV039 S (A)	0.30-	19/08/2013	Side validation	0.0129
CAV039 N (A)	0.30-	19/08/2013	Side validation	0.0216
CAV039 W (A)	0.30-	19/08/2013	Side validation	<0.001

Hotspot g.

Initial testing identified an exceedance in CAV040 on the 19/03/13 at 0.2mbgl in a validation trial pit sample. The area was excavated to 0.5m below existing ground level in an approximately 12m by 6m excavation, with the impacted ground removed. Validation of the base and sides of the excavation complied with the S106 asbestos RTC. All of the samples indicated an asbestos detection, and all were subsequently tested of quantification except CAV40 2. However, none of the quantification results exceeded the asbestos RTC.

Total area of excavation: 72m²

Total depth of excavation: 0.5m

Total; volumes of excavation: 36m³

See drawing 5041216-REM-DWG-0001615-E for details.

	Depth (mbgl)	Date	Sample type	Asbestos Quantification - %
CAV40	0.2	19/03/2013	Validation	0.0949
CAV40 E	0.30-	11/06/2013	Side validation	<0.001
CAV40 N	0.30-	11/06/2013	Side validation	0.0058
CAV40 S	0.30-	11/06/2013	Side validation	0.0023
CAV40 W	0.30-	11/06/2013	Side validation	0.002
CAV40 1	0.50-	11/06/2013	BofE validation	0.003
CAV40 2	0.50-	11/06/2013	BofE validation	Not tested
CAV40 3	0.50-	11/06/2013	BofE validation	0.0011

AF 1.2 Lead

The RTC for lead for <1m depth is 750mg/kg. This is the same for a soil SOM of 1% and 3%.

There is no s106 RTC for greater than 1m depth for lead.

Hotspot h

Initial testing identified an area with exceedance of lead, relating to three validation trial pits; CAV043 (21st June 2013) and CAV143 and 144 (26th June 2013). The impacted material was removed in one large excavation to a depth of 0.5mbgl. Validation of the base and sides of this excavation was undertaken, with additional exceedances identified in the E and W sidewalls and the base. Two further rounds of hotspot removals were undertaken, relating to the east and west sidewalls, which were extended approximately 10m further east and between approximately 5m and 10m further west respectively, to a depth of 0.5m in both cases. Following the third round of lead removal, all samples from the base and side excavations achieved the S106 criteria for lead. The eastern side of the extended hotspot excavation joined with the excavation for asbestos Hotspot D and therefore a side validation sample could not be taken. A Validation sample at the location of Hotspot D (CAV09 (shown as CAU09 on laboratory test certificate)) indicated a lead concentration of 250mg/kg i.e. less than the RTC.

Total area of excavation: 818m²

Total depth of excavation: 0.5m

Total volume of excavation: 409m³

See drawing 5041216-REM-DWG-0001615-D for details.

	Depth (mbgl)	Date	Sample type	Lead (mg/kg)
CAV043	0.3	21/06/2013	Validation	1270
CAV143	0.2	26/06/2013	Validation	1900
CAV144	0.35	26/06/2013	Validation	5830
CAV143 BASE1	0.50-	20/08/2013	BofE validation	1060

CAV143 BASE2	0.50-	20/08/2013	BofE validation	138
CAV144 BASE1	0.50-	20/08/2013	BofE validation	60.5
CAV144 BASE2	0.50-	20/08/2013	BofE validation	96.4
CAV143 E	0.30-	20/08/2013	Side validation	68.7
CAV144 E	0.30-	20/08/2013	Side validation	6150
CAV144 N	0.30-	20/08/2013	Side validation	35.2
CAV143 S	0.30-	20/08/2013	Side validation	211
CAV143 W	0.30-	20/08/2013	Side validation	773
CAV144 W	0.30-	20/08/2013	Side validation	51.2
CAV043 BASE 1	0.50-	21/08/2013	BofE validation	18.5
CAV043 BASE 2	0.50-	21/08/2013	BofE validation	16.4
CAV043 E	0.30-	21/08/2013	Side validation	125
CAV043 N	0.30-	21/08/2013	Side validation	87.5
CAV043 S	0.30-	21/08/2013	Side validation	95.6
CAV043 W	0.30-	21/08/2013	Side validation	274
CAV 511	0.50-	18/09/2013	BofE validation	48.3
CAV 512	0.50-	18/09/2013	BofE validation	41
CAV 513	0.50-	18/09/2013	BofE validation	40.5
CAV 514	0.50-	18/09/2013	BofE validation	38.2
CAV 515	0.50-	18/09/2013	BofE validation	82.6
CAV 516	0.30-	18/09/2013	Side validation	553
CAV 517	0.30-	18/09/2013	Side validation	313
CAV 518	0.30-	18/09/2013	Side validation	171
CAV 519	0.30-	18/09/2013	Side validation	177
CAV 520	0.30-	18/09/2013	Side validation	1520
CAV 521	0.50-	18/09/2014	BofE validation	261
CAV 522	0.50-	18/09/2015	BofE validation	150
CAV 523	0.30-	18/09/2016	Side validation	91.5
CAV 524	0.30-	18/09/2017	Side validation	235
CAV 525	0.50-	18/09/2018	BofE validation	175
CAV 526	0.50-	18/09/2019	BofE validation	222
CAV 527	0.50-	18/09/2020	BofE validation	162
CAV 528	0.50-	18/09/2021	BofE validation	195
CAV 529	0.50-	18/09/2022	BofE validation	170
CAV 530	0.50-	18/09/2023	BofE validation	136
CAV 531	0.50-	27/09/2013	BofE validation	103
CAV 532	0.30-	27/09/2013	Side validation	115
CAV 533	0.30-	27/09/2013	Side validation	91.7
CAV 534	0.30-	27/09/2013	Side validation	109
CAV 535	0.30-	27/09/2013	Side validation	89.5

AF 1.3 Benzene

The RTC for benzene for both <1m and >1m depth is 5mg/kg (5,000ug/kg). This is for a soil SOM of both 1% and 3%.

Hotspot i

Initial testing identified an area with exceedances of benzene, relating to BofE samples CAEMV037 and CAEMV077. The exceedances were excavated in one large excavation, to an approximate depth of 0.5mbgl. The reported exceedances were found to relate to a distinct band of approximately 150mm thickness of soft stained grey clay. Excavated materials possessed a VO score of 3,4. Sample results from this hotspot removal

achieved the RTC in the area of CAEM077, however the base sample taken from around location CAEMV037 still indicated elevated levels of benzene (4,820µg/kg), albeit less than the RTC. The hotspot was reinvestigated, with a total area of 188m² re-excavated to a depth of 2m below the original base of validation level. A total of eight samples were taken from the base and sides of the excavation. The source of the elevated benzene was easily identifiable as a layer of stained grey clay, and this was visually 'chased out' in all directions by the hotspot removal. Consequently, the number of side validation samples was reduced below the S106 requirement. In total six validation samples were taken from the sides of the hotspot excavation (perimeter length 74m).

Results from this hotspot removal indicate that benzene in both the sides and base of excavation were less than detection (<9µg/kg) in six of the eight samples. The remaining two samples in the sides of excavation reported 96.1 and 170µg/kg, well below the RTC of 5,000µg/kg.

Total area of excavation: 188m²

Total depth of excavation: 2m

Total volume of excavation: m³

See drawing 5041216-REM-DWG-0001615-B for details.

	Depth (mbgl)	Date	Sample type	Benzene (ug/kg)
CAEMV037	-	29/11/2012	BofE	8420
CAEMV077	-	25/01/3013	BofE	5280
CAEM 077 HS SIDE	0.2	04/04/2013	Side validation	1760
CAEM 077 HS BASE	0.5	04/04/2013	BofE validation	286
CAEM 037 HS SIDE	0.2	04/04/2013	Side validation	<50
CAEM 037 HS BASE	0.5	04/04/2013	BofE validation	4820
CAEMV037 A	1.6	02/05/2013	BofE validation	<9
CAEMV037 B	1.6	02/05/2013	BofE validation	<9
CAEMV037 C	1	02/05/2013	Side validation	170
CAEMV037 D	1.6	03/05/2013	BofE validation	<9
CAEMV037 E	1.6	03/05/2013	BofE validation	<9
CAEMV037 F	1.6	03/05/2013	BofE validation	<9
CAEMV037 G	1	03/05/2013	Side validation	96.1
CAEMV037 H	1	03/05/2013	Side validation	<9
CAEMV037 I	1	03/05/2013	Side validation	<9

AF 1.4 Vinyl Chloride

The RTC for vinyl chloride for 1% SOM is 0.045mg/kg (45ug/kg) for <1m depth and 0.154mg/kg (154ug/kg) for >1m depth. The RTC for 3% SOM is 0.174mg/kg (174ug/kg) for <1m depth and 0.214mg/kg (214ug/kg) for >1m depth.

Hotspot j

Initial testing identified an isolated area with an exceedance of vinyl chloride, relating to BofE sample CAEMV050. This was excavated to 1.6m below existing ground level in a 4m by 3m excavation, with the impacted clay removed. The reported exceedance was found to relate to a band of approximately 300mm thickness of grey gravelly clay, with a VO score of 2,3. Based on the potentially low olfactory score that may be exhibited by vinyl chloride, the excavation was taken deeper than the visibly impacted clay to ensure that all impacted material was removed. The source of the elevated vinyl chloride was the layer of grey clay, and this was visually 'chased out' in all directions by the hotspot removal. Consequently, the number of side validation samples was reduced below the S106 requirement.

Results from this hotspot removal indicate that vinyl chloride in both the sides and base of excavation were less than the laboratory limit of detection (<10µg/kg).

Total area of excavation: 12m²

Total depth of excavation: 1.6m

Total; volumes of excavation: 19m³

See drawing 5041216-REM-DWG-0001615-B for details.

	Depth (mbgl)	Date	Sample type	Vinyl Chloride (ug/kg)
CAEMV050	BoFE	12/12/2012	Validation	854
CAEM 050 HS BASE	1.6	04/04/2013	Base validation	<10
CAEM 050 HS SIDE	0.8	04/04/2013	Side validation	<10





St. Modwen Developments Ltd

Coed Darcy

New Compound Area (Monitor Phase 29)

Validation Report

October 2014

Coed Darcy

New Compound Area (Monitor Phase 29)

Validation Report

October 2014

Notice

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Atkins Limited

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Glossary of Terms

Term	Meaning / Definition
CSM	Conceptual Site Model
RSBL	Risk Based Screening Level
TPH	Total Petroleum Hydrocarbons
UXO	Unexploded Ordnance
PAH	Polycyclic Aromatic Hydrocarbons
BTEX	Benzene, Toluene, Ethylbenzene and Xylene
FFL	Finished Floor Level*
ACM	Asbestos Containing Material
RAP	Remedial Action Plan
VO	Visual/Olfactory Observations
BGL	Below Ground Level
SSSI	Site of Special Scientific Interest

Executive Summary

Atkins has been commissioned by St. Modwen Developments Ltd to provide consultancy advice with regard to the redevelopment of the former Llandarcy Oil Refinery as Coed Darcy.

This report provides confirmation of the scope of remedial and plot preparatory works across an area which is proposed for use as a Principal Contractors compound in the short term. Based on the current Masterplan, this area is shown as an area of residential housing within the final development.

The area has been reprofiled and a validation exercise has been undertaken. With the inclusion of the highlighted development requirements, this area is considered suitable for use as a residential development and as a compound in the short term, as proposed.

1. Introduction

1.1 Client Brief & Scope of Works

Atkins Limited has been commissioned by St. Modwen Developments Ltd to provide consultancy advice with regard to the redevelopment of the former Llandarcy Oil Refinery as Coed Darcy.

This report relates to an area which is proposed for residential housing on the current Masterplan. In the short term, however, this area will be utilised as the main site compound for the Principal Contractor. The extent of this area is presented on Drawing 5041216-REM-DRG-1563. For the purpose of Monitor Sign off, this area has been proposed as Monitor Phase 29.

Details of the proposed development levels and final layouts for this area are unknown. In the absence of information relating to proposed development levels, ground levels for the purpose of the following assessment have been taken from the as built topographical survey for this area as shown on Atkins Drawing 5041216-REM-DRG-1684.

This report will present the following:

- A summary of background information;
- A summary of remedial works undertaken.
- A summary of the reclamation and plot preparation works
- A summary of outstanding construction phase requirements relating to the proposed redevelopment of this area as residential housing.

It is anticipated that this document will form a submission under **Planning Condition 45** of the Outline Planning Permission for the site (P2005/0393), details of which are as below:

Upon completion of each phase of the remediation scheme and prior to the start of construction works to any building in each phase or development area, a report that provides verification that the required works regarding contamination have been carried out in accordance within the approved remediation scheme for that phase of development area, shall be submitted to and approved in writing by the Local Planning Authority. Post remediation sampling and monitoring results shall be included in the report to demonstrate that the required remediation objectives have been fully met. Future monitoring proposals and reporting timescales shall also be included in the submitted report and such monitoring shall be carried out as approved by the Local Planning Authority.

In order to maintain consistency for both historic and recent data, Atkins continues to use the same assessment standards as those used in the S106 Agreement (Dewey & LeBoeuf ref. GNP/JNR/13773-2). Details of the visual and olfactory classification system, defined within the S106, is provided as Table 1.1.

Table 1.1 – Scale of Aesthetic Criteria

Class	Visual	Olfactory
0	No visible staining of soil, no visible suspect ACM*.	No detectable odour on soil.
1	Occasional staining of soil, no visible suspect ACM*.	Faint odour on soil.
2	Frequent staining of soil.	Distinct but not strong odour on soil.
3	Occasional heavy staining of soil.	Strong odour on soil.
4	Heavy staining of soil.	Strong odour discernable in ambient air.
5	Visible hydrocarbon present.	Overwhelming odour.

**visible suspect Asbestos containing materials (ACMs). ACM refers to asbestos containing material visible to the naked eye which a reasonable and prudent person used to managing asbestos may suspect to be asbestos containing.*

A discussion of the adopted thresholds has been previously provided as part of the Outline Remediation Strategy for Residential Phase 2 (Atkins report 5041216-REM-RPT-992).

The adopted thresholds comprise a combination of the S106 Risk Based Screening levels (RBSLs) and Remedial Target Concentrations (RTCs) derived by Atkins (Atkins report 5041216-REM-REP-000216v3). For ease of reference, a table showing a summary of the adopted thresholds relating to this area is provided in Appendix C.

1.2 Remediation Summary

Pre-remediation contours for the site are shown on Drawing 5041216-REM-DRG-1685.

Monitor Phase 29 was initially cleared of unacceptable material including existing surface hardstanding.

Excavation was then undertaken down to natural bedrock beneath this area. Total earthworks, including structures breakout and remediation excavations, comprised the removal of approximately 10,000m³ of soils. A negligible amount of concrete was excavated from this area as part of the reclamation works and was taken to a stockpile for crushing.

Approximately 3,000m³ of unacceptable soils were removed from Monitor Phase 29, due to the presence of hydrocarbon staining or odours in excess of VO=2.

Backfill materials within Monitor Phase 29 comprised suitable site won materials (refer to Section 5.3.1).

1.3 Sources of Information

The following principal sources of information have been reviewed as part of the preparation of this report:

1. Section 106 Deed of planning Obligations (Dewey & LeBoeuf report GNP/NJR/13773-2). February 2008;
2. Atkins report 5041216-REM-REP-000216 v3 Derivation of Remediation Target Criteria (January 2010).
3. Atkins report 5041216-REM-RPT-992. Geo-environmental Assessment and Outline Remediation Strategy, Proposed Residential Phase 2, July 2013

1.4 Limitations

The assessment of groundwater conditions, outlined within the following document, is based on the data available at the time of writing. Groundwater levels may vary due to atmospheric, seasonal or other effects.

The scope of the remedial works undertaken was based on existing levels across this area as shown on Drawing 5041216-REM-DRG-1685. In the absence of any information relating to proposed development levels, final levels for the purpose of the validation, have been taken from the current 'as built' information relating to post remediation levels across this area (Drawing 5041216-REM-DRG-1684).

The suitability of the remedial works may need to be reassessed once proposed development levels across this area are confirmed.

2. Review of Available Information

2.1 General

The former refinery has been subject to a number of previous investigations on behalf of the former owners, BP. Salient detail from previous reports relating to Monitor Phase 29 is summarised below.

2.2 The Site

2.2.1 General

Early historic maps record much of the former refinery to have been undeveloped, being shown as woodland.

Llandarcy Oil Refinery was first developed in 1921 to produce motor spirit, lubricating oil and fuel oils from crude oil. The refinery continued to expand until the late 1970s, however, from the mid 1980s a series of rationalisations occurred with notice being given to close the site in 1997.

Monitor Phase 29 lies within the former processing area, in the central part of the former refinery (refer to Drawing 5041216-REM-DRG-1563).

A summary of anticipated remedial works relating to this area, in line with the requirements of the S106, has been previously provided in Atkins report 5041216-REM-RPT-992. This report has been approved in line with requirements of **Planning Condition 44** of the Outline Planning Permission for the redevelopment of the former refinery.

Further detail relating to Monitor Phase 29 is provided below.

2.3 Site Context

Monitor Phase 29 occupies an area of approximately 2,436m², within the central part of the former refinery.

Information on existing ground levels across Monitor Phase 29, prior to the start of remediation works are presented on Drawing 5041216-REM-DRG-1685.

Selected photographs of this area during the reclamation works are presented in Appendix A.

2.4 Historical Use

Maps detailing the historical development of the Phase 2 area, including Monitor Phase 29, have been previously presented in Atkins report 5041216-REM-RPT-992 and suggest a number of small tanks historically within this area

Monitor Phase 29 is located upslope of the former Edeleanu Unit (SO₂ solvent dewaxing plant) and downslope of the former LPG Unit. Discussion with former BP employees (pers. Comm. John Smith) suggests the tanks within Monitor Phase 29 did not relate to either of these areas.

There are no Special Process Areas or Exclusion areas, as designated by URS, within the vicinity.

2.5 Published Geology

The British Geological Survey Sheet for Swansea (Sheet 247) Drift Edition suggests this part of the refinery to be underlain by Glacial Drift (undifferentiated) overlying Carboniferous, Upper Pennant Measures. Solid strata are suggested to dip towards the north.

There are no recorded faults shown to cross beneath this area.

2.6 Hydrogeology & Hydrology

Monitor Phase 29 lies within the catchment of the River Neath, which lies approximately 1km east of the site.

The underlying sandstones are considered to be a Secondary A Aquifer, which are defined by the Environment Agency as;

'permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers.'

2.7 Quarrying & Mining

Historical quarrying and terracing is known to have taken place within the former refinery, as evident by the east-west trending sandstone exposed rock faces between the middle and upper terrace. These lie upslope, to the south of Monitor Phase 29.

Geological maps for the site (BGS Sheet 247, 1:50,000 and Sheet 79 NW, 1:10,560) suggest that there are two seams (Hughes and Bodwr) which subcrop within the vicinity of Tank Farm Road, to the south of Monitor Phase 29. There are no recorded mine entries within the vicinity of Monitor Phase 29 (Refer to Appendix F).

Based upon the location of the recorded subcrops and an average dip of approximately 8°, as reported on geological maps, these two seams are anticipated to lie in excess of 50m depth beneath the study area, being shallowest towards the south. A thin (around 100mm) outcrop of coal was also identified during the reclamation of an area of proposed residential housing to the south east of Monitor Phase 29.

Further investigation relating to the presence and depth of potential coal/mineworkings, beneath both Monitor Phase 29 and the adjacent areas, is proposed and will be reported under separate cover.

2.8 Pre Remediation Ground Conditions

Consistent with the reported geology shown on geological maps (refer to section 2.4), the findings of historical ground investigation across Monitor Phase 29 indicates Made Ground and glacial soils overlying sandstone bedrock.

Made Ground across Monitor Phase 29 is described to have comprised soft to firm silty or gravelly clays, with some brick and clinker fragments.

Natural glacial soils are described as firm brown or orange brown gravelly clays, locally silts/sands.

Slight to very strong hydrocarbon odours and sheens, up to VO4/5, are recorded as having been observed within the Made Ground and natural soils during previous ground investigations.

Based on previous investigation, groundwater beneath Monitor Phase 29 is generally reported to comprise perched groundwater and seepages within the shallow natural soils. 'True' groundwater is considered to lie within the underlying sandstone bedrock.

Historical monitoring on wells within this area (URS Report FR1287) does not record any free product and suggests groundwater levels of around 1.4m/1.5m bgl (WSMW013 and WSMW042), within natural sandy soils.

3. Outline Remediation Strategy

3.1 Section 106 Deed of Planning Obligations Requirements

Monitor Phase 29 has been previously assessed (Atkins report 5041216-REM-RPT-992) as falling within an area of '**residential end use where groundwater is in rock**' scenario, as defined within the S106. These areas are defined as '*areas where there is limited soil material over bedrock, little perched water groundwater is present in the soil, and the water table is normally first encountered in bedrock*'.

Based upon this classification, the remediation requirements outlined below are stated in the S106 (Schedule 8, Section 4.0) as being the minimum remediation requirements required in order to release this area for redevelopment as residential housing.

- *All oil saturated soils should be removed.*
- *All soils must be remediated so as to meet the RBSLs for TPH, BTEX and PAHs at the relevant depth relative to FFL and aesthetic criteria Class 2 or better at greater than 1m below FFL.*
- *The aesthetic quality of soils shall be Class 1 or better for at least the first metre below FFL.*
- *Soils where there is visible ash and clinker, or metal concentrations above RBSLs, are to be removed so that none is retained within the first metre below FFL in garden areas.*
- *Where it is not practicable to address groundwater contamination within bedrock, this must be controlled eg, where seeps, sheens and iron staining discharge from the bedrock. Acceptable methodologies for remediation may include, but are not limited to, the use of land drainage via interceptors. Control measures should result in no visible discharge at the surface and little or no odour observable.*
- *All soils potentially containing dispersed asbestos fibres or visible ACM must be removed or remediated to meet in bulk, considering both dispersed fibres and pieces of ACM, the appropriate ACM RBSL, or to meet the requirements of relevant Environmental Authorities, whichever is the more conservative.*

Due to the presence of significant seepages within natural soils beneath Monitor Phase 29 identified during previous investigation (refer to section 2.8), it could be argued that this area should be considered more representative of a '**residential end use where groundwater is in soil**' scenario, as defined within the S106. These areas are defined as '*areas where there is sufficient soil material over bedrock to commonly contain perched groundwater such that the water table is normally first encountered in soil*'. *limited soil material over bedrock, little perched water groundwater is present in the soil, and the water table is normally first encountered in bedrock*'.

Based upon this alternative possible classification, the remediation requirements outlined below are stated in the S106 (Schedule 8, Section 4.0) as being the minimum remediation requirements required in order to release this area for redevelopment as residential housing.

- *All oil saturated soils and free product should be removed.*
- *All soils must be remediated so as to meet the RBSLs for TPH, BTEX and PAHs at the minimum depth of 0.5m below the likely seasonal minimum groundwater depth following development of the intended Urban Village. This depth is to be established by consideration of all available groundwater level monitoring data relevant for each area. All soil must meet aesthetic criteria Class 2 or better to the same depth.*
- *All soil must meet aesthetic criteria Class 1 or better to at least 1m below FFL.*
- *Soils where there is visible ash and clinker or metal concentrations above RBSLs to be replaced to at least 1m below FFL.*

- *All soil potentially containing dispersed asbestos fibres or visible ACM must be removed or remediated to meet in bulk, considering both dispersed fibres and pieces of ACM, the appropriate ACM RBSL, or the requirements of relevant Environmental Authorities, whichever is the more conservative, to a minimum depth of 2m below FFL.*
- *Where there is a risk of the migration in ground of hazardous gas or vapour or contaminated liquid into remediated areas, the Developer shall take all necessary measures appropriate to prevent this occurring, including monitoring whatever measures are put in place after their installation to continue to demonstrate their effectiveness. Such measures could include the installation of interception trenches and management of discharge from these.*
- *Where necessary, seeps, sheens and iron rich discharges from the bedrock must be permanently controlled such that there is no visible discharge at surface and little or no odour detectable. Acceptable methodologies for remediation may include, but are not limited to the use of land drainage via interceptors.*

3.2 Proposed Scope of Works

3.2.1 General

In order to comply with the remediation requirements defined in the S106, the following scope of remedial works was proposed within Atkins report 5041216-REM-RPT-992 relating to both Monitor Phase 29 and the wider area.

- *Removal of all oil saturated soils and/or free product.*
- *Removal of visible ash and clinker at <1m FFL.*
- *Removal of all soils with a visual/olfactory (VO) rating exceeding Class 2.*
- *Further investigation and removal of all identified asbestos contaminated materials.*
- *Removal of 'hotspots' of increased contamination*

In addition to the above, a number of additional works were proposed in order to facilitate the subsequent redevelopment of this area as residential housing in the long term.

- *Removal of all remaining structural remnants, including concrete, brickwork and other identified 'obstructions'*
- *Removal of remaining 'live' services, including redundant drainage.*
- *Reprofiling of the final surface to achieve a stable, free draining surface.*

4. Remedial Works and Plot Preparation

4.1 Introduction and Revised Strategy

A number of phases of investigation, reclamation and plot preparatory works have been carried out across Monitor Phase 29, as below:

- Initial phase of demolition and removal of above ground structures and surface hardstanding (December 2008 to February 2009).
- Reclamation and remediation, including the removal of below ground structural remnants and unsuitable soils (August to September 2013)
- Validation site investigation (October 2013 and January 2014)
- Outstanding hotspot removal (November 2013 and March 2014)
- Additional validation sampling (October 2014)

By combining the reclamation, remediation and plot preparatory programme for this area, additional clarity on remediation has been provided through the wholesale excavation of soils and segregation of 'unacceptable' materials. This also helps provide additional assurance relating to the removal of building remnant infrastructure and other potential obstructions. Parties involved in the reclamation and remediation works are as follows:

Client – St Modwen Developments Ltd

Principle Contractor – Hawk Ltd

Employers Representative – Prosurv Consult

Employers Technical Representative – Atkins Ltd

Further details on the scope of works, undertaken across Monitor Phase 29, is provided below:

All works were carried out under the full time attendance of an Atkins Site Engineer.

4.2 Reclamation and Remediation Works

Excavation works across Monitor Phase 29 were undertaken during August and September 2013.

Pre remediation levels are shown on drawing 5041216-REM-DRG-1685.

In situ materials were excavated from this level down to bedrock, to enable the full removal of any structures and any contaminated soils present. It is noted that, despite the reference to significant seepages and shallow perched water within natural soils encountered during historical investigation, only minor seepages were noted during the excavation of materials from within this area and that, as such, the sides of the excavation were generally noted as being stable and a '**residential end use where groundwater is in rock**' scenario is considered to apply to this area, as discussed in Section 3.1.

The excavation of materials from across Monitor Phase 29 was overseen by an Atkins Site Engineer who assisted with the segregation of suitable materials for re-use and the removal of unacceptable materials.

The earthworks included approximately:

- The removal of approximately 3,000m³ of soils with VO score greater than 2
- The removal and replacement of approximately 7,000m³ of soils deemed suitable for reuse
- The removal of a negligible amount of surface hardstanding/below ground structures

The total volume of backfill materials required in order to achieve the post remediation ground levels was approximately 10,700m³. Backfill materials comprised suitable site won materials

excavated from both Monitor Phase 29 (approximately 7,000m³) and also soils generated during ongoing reclamation works within an area of proposed residential housing to be constructed by St Modwen Homes, which lies to the south east of Monitor Phase 29.

These materials (approximately 3,700m³) generally comprised natural soils, further detail of which is discussed in Section 5.3

Excavated materials proposed for re-use were sampled within stockpiles prior to their re-use.

4.3 Post Remediation and Reprofiling Levels

Final 'as built' levels are shown on Drawing 5041216-REM-DRG-1684.

5. Validation/Verification

5.1 Requirements of the S106

The S106 (Schedule 8, Part 3, Paragraph 8) sets out the requirements for validation testing as part of the ongoing redevelopment of the refinery, relevant details from which are presented in Table 5.1.

Table 5.1 - Minimum Validation Testing Frequencies _ Residential End Use

Testing for the Validation Suite at the following frequency:	Shallow Soils (Residential <1m FFL)	Deeper Soils (Residential >1m below FFL)
0.5m-1m below FFL in-situ	Regular grid of 1 per 50m ² , sample over 0.5m depth.	n/a
>1m below FFL in-situ.	n/a	Regular grid of 1 per 100m ² , sample over 1.0m depth.
Face of remedial excavations <1m deep.	1 per 10m ² , minimum of 1 per face, worst case VO sample	n/a
Face of remedial excavations >1m deep.	n/a	1 per 10m ² , minimum of 1 per face, worst case VO sample.
Along redundant service excavations.	1 per 20m of trench, worst case VO sample.	1 per 20m of trench, worst case VO sample.
Stockpiled excavated materials for re-use	1 per 50m ³ ex situ composite of 5 sub samples	1 per 100m ³ ex situ composite of 5 sub samples
Soil Treated ex situ and homogenised	1 per 200m ³ , composite of 5 regular sub samples.	1 per 200m ³ , composite of 5 regular sub samples.

¹ Validation suite to reflect prior use of the originating brownfield site and the design and purpose of the relevant area of Coed Darcy.

VO = visual/olfactory (i.e. aesthetic) observation

Due to the depth of hydrocarbon impacted natural soils (VO>2) within Monitor Phase 29, excavations were taken down to bedrock at a depth of approximately 6.5m bgl (refer to Drawing 5041216-REM-DRG-1686) and well below the level of perched groundwater recorded during previous monitoring within this area (refer to section 2.8). Selected photographs taken during the remedial works are presented in Appendix A.

In line with the depth of fill materials placed within Monitor Phase 29 (>6m), it was not possible to validate the full depth of backfill materials from the finished surface, consistent with the previous approach on other plots within the refinery. Further to discussion with the Monitor, it was agreed that post remediation trial pitting would be supplemented by sampling of stockpiled materials prior to re-use as backfill, visual/olfactory inspection and sampling of the bedrock at the base of excavation. An inspection of the bedrock surface was undertaken on a 50m² grid, to assess for the presence of any visual/olfactory contamination, and supplemented with readings obtained using a Photo Ionisation Detector (PID).

5.2 Bedrock Validation

Details of the base of excavation, based on the visual/olfactory inspection, are shown on Drawing 5041216-REM-DRG-1687. A total of 24 observations were recorded.

The results of the visual inspection indicated staining/odours up to a class of VO=1 at two locations within the base of Monitor Phase 29. PID readings at these locations recorded values of between 0.0ppm and 0.2ppm.

The results of this assessment is compliant with the S106 requirements for a residential area, which permits the retention of staining and/or odours up to Class 2 at depths of <1m below FFL.

Based on the recorded values reported using the PID, the retention of such materials is not considered to pose a risk to the final development of this area or its use as a compound in the short term.

NCA1 to 3 represent excavations into the sandstone bedrock at the base of the remedial excavations. Bedrock samples were obtained from these locations, to a maximum depth of 1.95m beneath the surface of the sandstone. Logs for these excavations are presented within Appendix B, the locations of which are shown on drawing 5041216-REM-DRG-1686.

The excavations (NCA 1 to 3) confirm the weathered bedrock to comprise cobbles and boulders within a matrix of silty sandy gravel. No seeps or sheens were observed and the excavated sandstone was recorded to possess a VO scores of 0,0 throughout the full depth of the excavation.

A total of nine samples of weathered sandstone were recovered from the excavations for contamination testing, as presented upon the summary sheets in Appendix D. The results of the samples tested show that the levels of contamination lie below the adopted threshold values for a residential end use, and are, therefore, suitable for retention in this area.

5.3 Validation of Fill Materials

5.3.1 Stockpile Sampling

Details of finished levels, on completion of the works, are shown on Drawing 5041216-REM-DRG-1684. In the absence of information on finished plot levels, it has been assumed that this final profile represents the base of the clean cover (ie FFL-0.5m) in terms of validation in line with the requirements of the S106.

Backfill materials within Monitor Phase 29, comprised both suitable excavated materials and also suitable surplus materials excavated during plot preparatory works within an area of proposed residential housing to the south east (Phase 2). These 'overburden' materials had been placed in a stockpile awaiting re-use.

Geotechnical analysis (Particle Size Distribution) on samples of these soils, indicate these soils to comprise a 'firm dark brown/grey slightly sandy very gravelly clay' or Class 2C 'Stony Cohesive General Fill' (Manual of Contract Documents for Highway Works, MCHW).

In order to confirm the suitability of these materials for re-use, a total of 25 samples (PH2 OB1 to OB25) were analysed for a range of determinands in order to assess their compliance with the S106 thresholds for a residential end use.

A summary of the results of the analysis (refer to Appendix D) indicates the following exceedences of the permitted thresholds for re-use at shallow depth (<1m below FFL) within a proposed residential area.

- Copper 2 no. up to 197mg/kg (PH2 OB 19)
- Mercury 5 no. up to 4.63mg/kg (PH2 OB 9)
- Zinc 1 no. 660mg/kg (PH2 OB 19)
- Benzo(a)pyrene 5 no. up to 2.3mg/kg (PH2 OB 12)
- TPH C16-C21 Aromatic 3 no. up to 165,000ug/kg (PH2 OB 23)

Due to the presence of reported exceedences of the adopted thresholds for retention at shallow depth, these stockpiled materials were placed at depth (>1m below FFL) within Monitor Phase 29. A total of approximately 3,700m³ of these materials were used in Monitor Phase 29 as part of the works.

5.3.2 Post Remediation Trial Pitting/Sampling

A total of 23 trial pits (NCA4 to 26) were excavated across the finished surface of Monitor Phase 29 to obtain deep samples for validation. A further 22 sample locations (NCA27 to 49) represent

hand dug shallow pits across the final surface in order to obtain validation samples at the appropriate shallow residential frequency. These shallow, hand dug excavations were not logged hence no trial pits logs are provided.

Trial pits were undertaken to depths of between 2.1m and 5.3m bgl across the surface of Monitor Phase 29, as shown on Drawing 5041216-REM-DRG-1688. Copies of trial pit logs for these pits are provided in Appendix B.

The results of the validation pitting confirms ground conditions across Monitor Phase 29 to comprise granular materials (light grey angular to subangular cobbles with sand and gravels) from ground level to a maximum depth of 0.80m and underlain by reworked natural soils (brown and orange brown silty sandy gravelly clays) to between 0.30m and >5.30m depth. Gravels comprised sandstone, brick and occasional concrete.

No ash or clinker was observed at any of the trial pit locations.

In line with the S106, VO scores were applied to each strata encountered. Evidence of contamination, up to a maximum Class of VO=2, was noted within thirteen trial pit locations (NCA4 to NCA6, NCA8, NCA12 to NCA15, NCA18 and NCA21 to NCA24). All of these locations lie beneath 0.5m depth beneath current ground levels (>1m below FFL) and are therefore considered to be suitable for retention in situ.

Consistent with observation made during the excavations, perched water was encountered within fifteen of the trial pits during excavation. Flows were recorded to be generally 'low' but 'high' flows were reported within (NCA18 to NCA20 and NCA24 to NCA26). Given the absence of significant seepages encountered during the reclamation works, it is considered that these 'high' flows may be associated with a prolonged period of wet weather and high rainfalls at the time of the validation.

No seeps or sheens were observed on any of the flows, or from the sides and base of any of the excavated trial pits.

Excluding the bedrock validation (NCA 1 to 3) and samples taken from the 'Phase 2' stockpiled material, prior to its re-use as backfill within Monitor Phase 29 (refer to section 5.3.1), a total of 158 samples (112 from FFL>1m depth and 46 from FFL<1m depth) were tested as part of the validation of this area and compared to the adopted thresholds for a residential end use. The lab results are presented within Appendix E, with summary sheets presented within Appendix D.

A review of the 112 samples obtained from FFL>1 (or >0.5m below current ground levels) indicates no exceedences of the adopted thresholds for a residential end use below 1m depth. Based upon the recorded area of 2436m², this equates to a sampling frequency of 1 test per 21.75m² relating to the deeper backfill materials within Monitor Phase 29. In conjunction with the samples taken from the Phase 2 stockpile (PH2 OB1 to OB25) and assuming a total fill volume of 9482m³ (10,700m³ minus 1218m³) this equates to a sampling frequency of approximately 1 test per 69m³ for deeper soils beneath Monitor Phase 29.

A review of the 46 samples obtained from between ground level and 0.5m depth (<1m below FFL) indicated a number of exceedences when compared to the adopted thresholds for residential end use at shallow depths. These are:

- *Mercury – 1no. – 6.24mg/kg within NCA23 @ 0.2m depth*
- *TPH C6-7 Aromatic – 1no. – 0.108mg/kg within NCA 17 @ 0.3m depth*
- *TPH C16-21 Aromatic – 5no. – up to a maximum of 207mg/kg within NCA12 @ 0.3m depth*
- *Benzo(a)pyrene – 6no. – up to a maximum of 2.3mg/kg within NCA15 @ 0.3m depth*

Due to the presence of such reported exceedences of the adopted thresholds, additional shallow hotspot removal was subsequently carried out across Monitor Phase 29, as discussed in Section 5.3.

A total of 110 samples, taken as part of the validation pitting, were screened for the presence of asbestos. Due to the presence of asbestos (predominantly chrysotile), 46 samples were

subsequently scheduled for quantification. The results of all asbestos testing are presented on the summary sheets in Appendix D.

The result of asbestos quantification indicates asbestos concentrations of between <0.001% and 1.2%. The only reported exceedences of the permitted threshold of 0.02% were as follows:

- NCA4 at 0.3m depth (0.0346%)
- NCA8 at 1.0m depth (1.2%)

Due to the reported concentrations, these locations were treated as hotspots and removed from Monitor Phase 29 as discussed below.

5.3 Hotspot Removal

As the hotspots represented exceedences of the adopted threshold for retention at shallow depth (<1m below FFL), the majority of excavations were undertaken to a depth of 0.5m bgl (1m below FFL) and backfilled with locally sourced stockpiled materials (refer to 5.3.1). The extents of the hotspot excavations are shown on drawing 5041216-REM-DRG-1681. Due to confusion relating to sampling obtained during the initial excavation, an additional phase of validation sampling was carried out in October 2014 in order to obtain further samples to confirm the suitability of soils within this area for retention.

Validation (VAL) samples were collected to represent the base (B), sides (N,S,E,W) and fill (FILL) material at each location. A summary of the results of validation analysis is presented in Appendix D.

Due to the depth of the recorded exceedence, the excavation at NCA8 was taken to 1.00m below existing ground levels.

Comparison of the results of validation screening relating to the hotspot excavations, indicates the following exceedences of the adopted thresholds for retention at shallow depth (<1m) within a residential end use:

- *Arsenic – 1no. – 192mg/kg within VAL14B @ 0.60m depth*
- *TPH C16-21 Aromatic – 2no. - maximum of 127mg/kg within VAL13N @ 0.40m depth*
- *Benzo(a)pyrene – 2no. – maximum of 1.67mg/kg within VAL13N @ 0.4m depth*

It is noted that sample VAL 14B was taken from the base of the excavation at this location and is reported to relate to a depth of 0.6m below 'as built' levels. As such, this sample was re assessed against the thresholds for >1m below FFL and is considered to be suitable for retention in situ at this depth.

VAL13N represents the northern extent of the excavated trench and close to an existing site haul road. Further excavation northwards from this location is not possible whilst this road remains in use.

Statistical assessment of the results of analysis for shallow soils (including hotspot validation samples) across Monitor Phase 29 indicates the recorded concentrations of benzo(a)pyrene and TPH at VAL13N to represent an outlier or hotspot. Inclusive of these maximum recorded concentrations, the base of excavation samples relating to the validation and the shallow (<1m below FFL) validation samples, the Upper Confidence Limits for both TPH (29,8112mg/kg) and benzo(a)pyrene (297ug/kg) lie below the permitted thresholds. Based upon the localised extent of the reported exceedences, the need for a 'cover' of clean materials within proposed garden areas and the absence of detailed information relating to development layouts at the time of writing, these soils are considered suitable for retention at the time of writing.

Validation relating to the removal of asbestos at NCA4 and 8, indicates concentrations below the permitted threshold for retention in situ (refer to Appendix D). Additional asbestos screening on 16 validation samples taken during October 2013 indicate a single 'trace' of Chrysotile in one sample.

Inclusive of the relevant shallow samples (>1m below FFL), hotspot validation, fill and base samples, reassessment of the results all laboratory analysis relating to soils at shallow depth (0.0m to 0.5m bgl) across Monitor Phase 29 indicates no exceedences of the adopted thresholds for a residential end use at shallow depth. Based on a total of 86 samples relating to this depth beneath Monitor Phase 29 (2,436m²), this equates to a frequency of 1 per 28.3m² or 1 sample per 14.1m³ and well within the frequencies required by the S106.

A high pH recorded on some of the most recent validation samples is considered to relate to the presence of concrete within the shallow fill and the placement of a recent layer of crushed concrete across this area which is currently in use as a site compound.

5.4 Final Levels

Final levels across Monitor Phase 29 are presented on Drawing 5041216-REM-DRG-1684.

For the purpose of contamination assessment, it has been assumed that this surface represents the base of clean cover materials within the final development, as required by the S106.

Where additional fill materials are required as part of the proposed development of this area, proposed fill materials should be tested, prior to placement, in order to confirm their suitability for re-use.

5.5 Summary

A summary of the status of Monitor Phase 29, in line with the requirements of the S106 is presented in Table 5.2 below:

Table 5.2 – Validation Summary

Requirement	Status	Comment
Chemical quality of soils in situ	N/A	Retained bedrock inspected and sampled (refer to section 5.2) and demonstrated to be compliant with the requirements of the S106.
VO quality of soils in situ	Complete	A maximum recorded VO of 2 was recorded for retained fill materials (>0.5m depth) and in situ bedrock during validation pitting (refer to sections 5.2 and 5.3). This is acceptable in line with the requirements of the S106 for deep fill (>1m below FFL) within a residential area. The maximum VO recorded within fill materials between ground level and 0.5m beneath current levels (<1m below FFL) is 1.
Observations of groundwater for the presence of free phase product	N/A	The result of historical monitoring within Monitor Phase 29 (refer to section 2.8) indicates perched groundwater to lie at shallow depth (1.4/1.5m) within natural soils, however, only localised seepages were noted during reclamation works within this area. No evidence of any sheens or free product was recorded at any time during the works.
Chemical and VO quality of imported material	N/A	No imported materials were utilised within Monitor Phase 29.
Compliance with adopted thresholds	Complete	Refer to Section 5 and Appendix D.

Requirement	Status	Comment
Removal of oil saturated soils	Complete	No oil saturated soils were encountered within this area during the works.
Asbestos Assessment	Complete	Where levels of asbestos were observed to exceed the screening value, these soils were excavated and been removed from the site (Refer to Section 5.3).
Control of seeps, sheens and iron staining from - bedrock	Complete	Bedrock lies at depth beneath Monitor Phase 29. Minor localised seepages were recorded within natural soils during excavation. No evidence of any sheens were observed within these or the subsequent validation pits.

6. Post Remediation Constraints and Development Requirements

6.1 Gas Protective Measures

The S106 requires the installation of gas membrane beneath proposed housing, as indicated below;

'As a minimum...the preventative measures shall include'

1.2.1 The installation of a proprietary and appropriate ground gas resistant membrane and appropriate venting system in all structures that will be entered by people and any structure where there is a potential for gas accumulation if ground gas is present. The Developer shall develop and adopt a Quality Assurance programme to which Coed Darcy Limited does not object to validate the integrity of the membrane and the adequacy of the venting system installed in each such structure.

It is recommended that the exact details of the proposed gas protection system to be installed beneath plots are agreed with the relevant regulatory authorities prior to installation.

6.2 Service Installation

The adopted thresholds for TPH C₁₆-C₄₀ (refer to Appendix C) lie in excess of 500mg/kg, which precludes the use of conventional polyethylene water supply pipes (UKWIR Report ref 10/WM/03/21 'Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites', 2010).

Due to the absence of any details relating to the specific route of any water supply pipes within the final development, it is recommended that a need for barrier pipe is assumed for the purpose of initial assessment.

Specific assessment is recommended once finished development levels and proposed service routes are defined.

6.3 Ground and Construction Workers

This report and assessment of contamination risks does not specifically address occupational risks to workers involved in activities which could include exposure to sub-surface material.

A separate assessment should, however, be undertaken for all ground and construction workers involved in future works across this area, which will need to take account the levels of residual contamination and the type of activity being undertaken. Based upon the widespread excavation of hydrocarbon impacted soils from across Monitor Phase 29, it is considered that the likelihood of encountering significant contamination during any redevelopment of this area is low.

The adoption of good hygiene procedures and suitable Personal Protective Equipment (PPE) will help to minimise the risks posed by exposure to such soils.

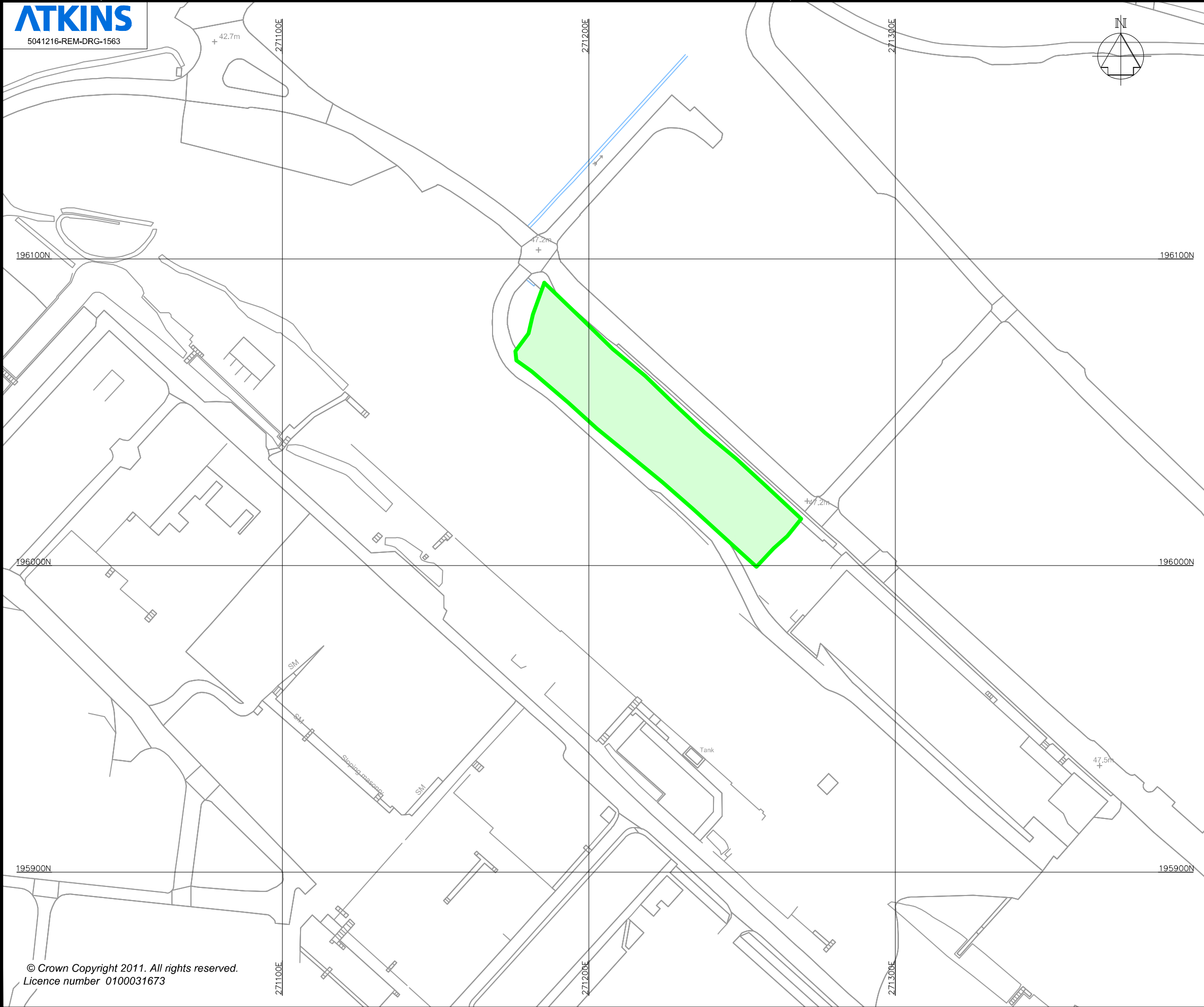
6.4 Clean cover

In addition to the requirements outlined above, the S106 (Schedule 10, Section 8) also requires the placement of a cover of clean materials within proposed garden areas in the final development as detailed below:

'To provide them with a minimum thickness of suitable garden soils in residential areas, soils for landscaping in public and commercial areas and sub-base for hard surfaced areas, the Developer shall build up the final elevation after completion of the RAP and Redevelopment Remediation Works with a minimum of 0.5m of quality controlled fill materials suitable for the use to which they

are to be put and of better quality than all RBSLs for the relevant end use and meeting aesthetic type 0 for a residential end use and type 1 or better for a commercial end use'.

It is envisaged that these materials across Monitor Phase 29 will ultimately be placed by the Developer of this area.



Key

Monitor Phase Boundary

REVISIONS	Drawn By	Checked By	Date	
A	BOUNDARY REVISED	MJ	AP	25/03/14

PURPOSE OF ISSUE	Rev.	Authorised for issue	Date
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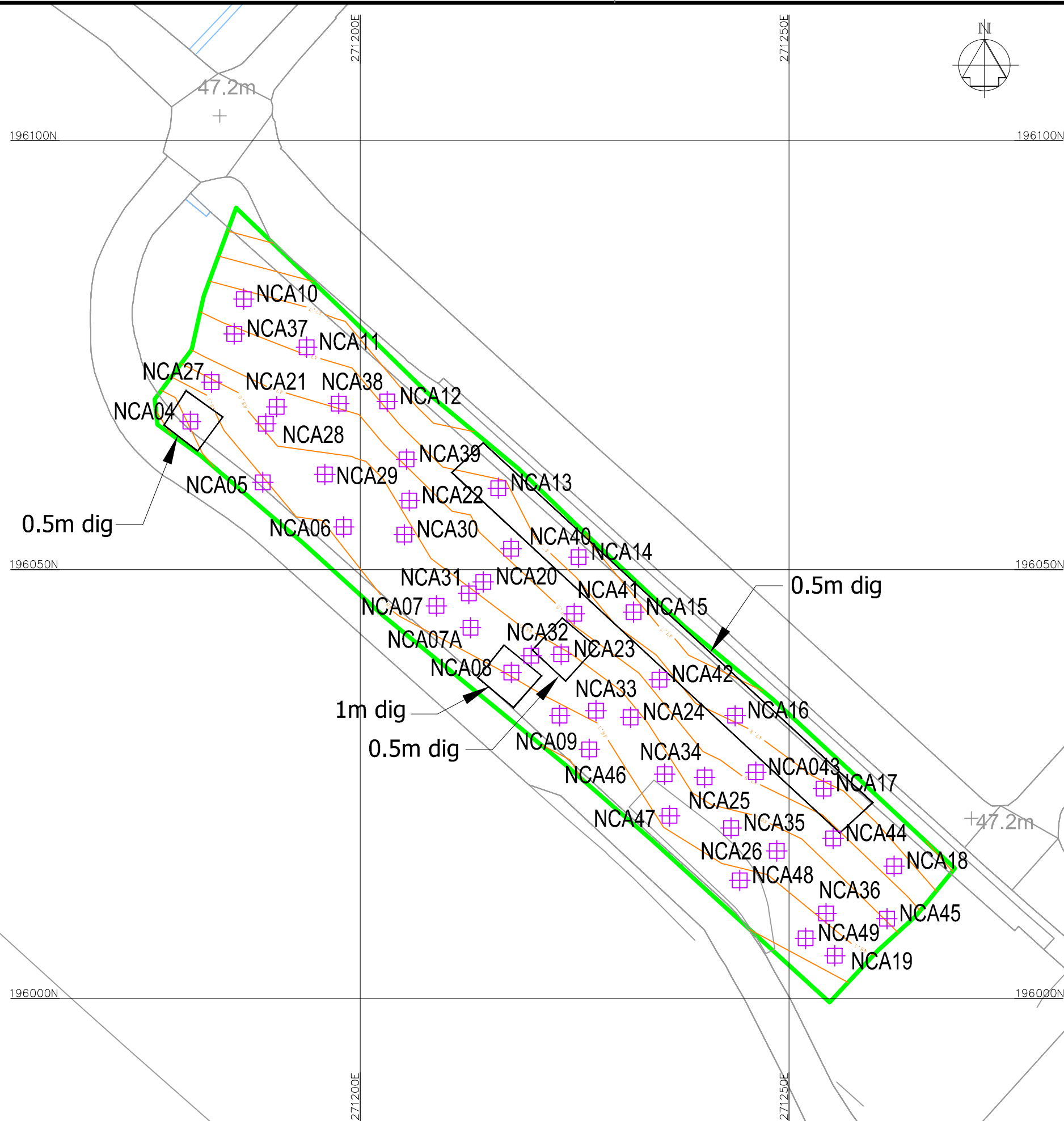
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MONITOR PHASE 29

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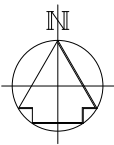
Monitor Phase Boundary

NCA10 Ground investigation

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5041216-REM-DRG-1684



Key

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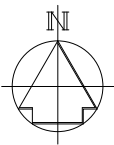
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5041216-REM-DRG-1685



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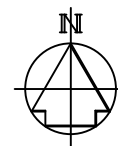
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- NCA1 EXCAVATION LOCATION

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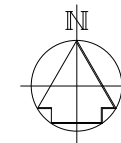
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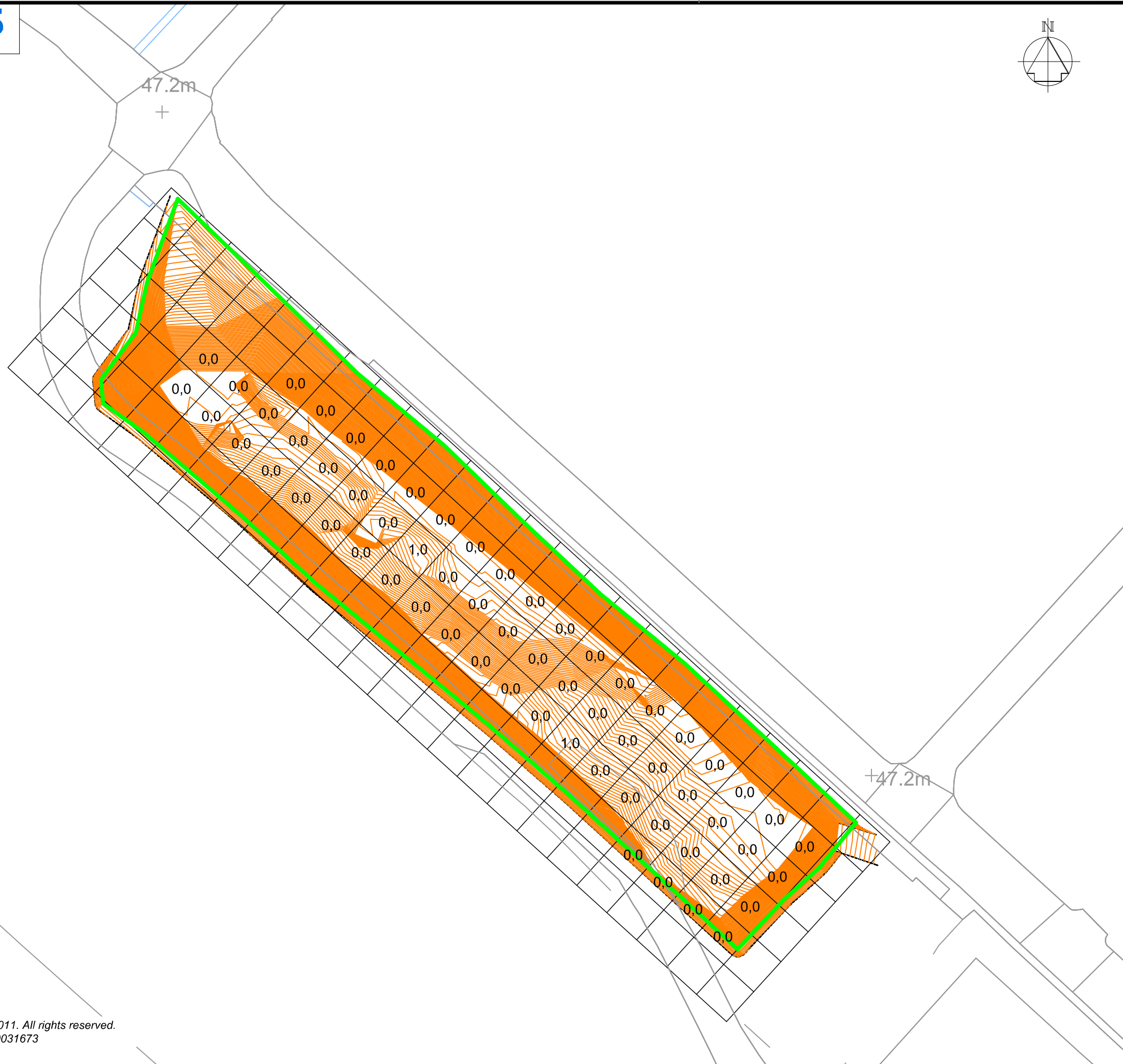
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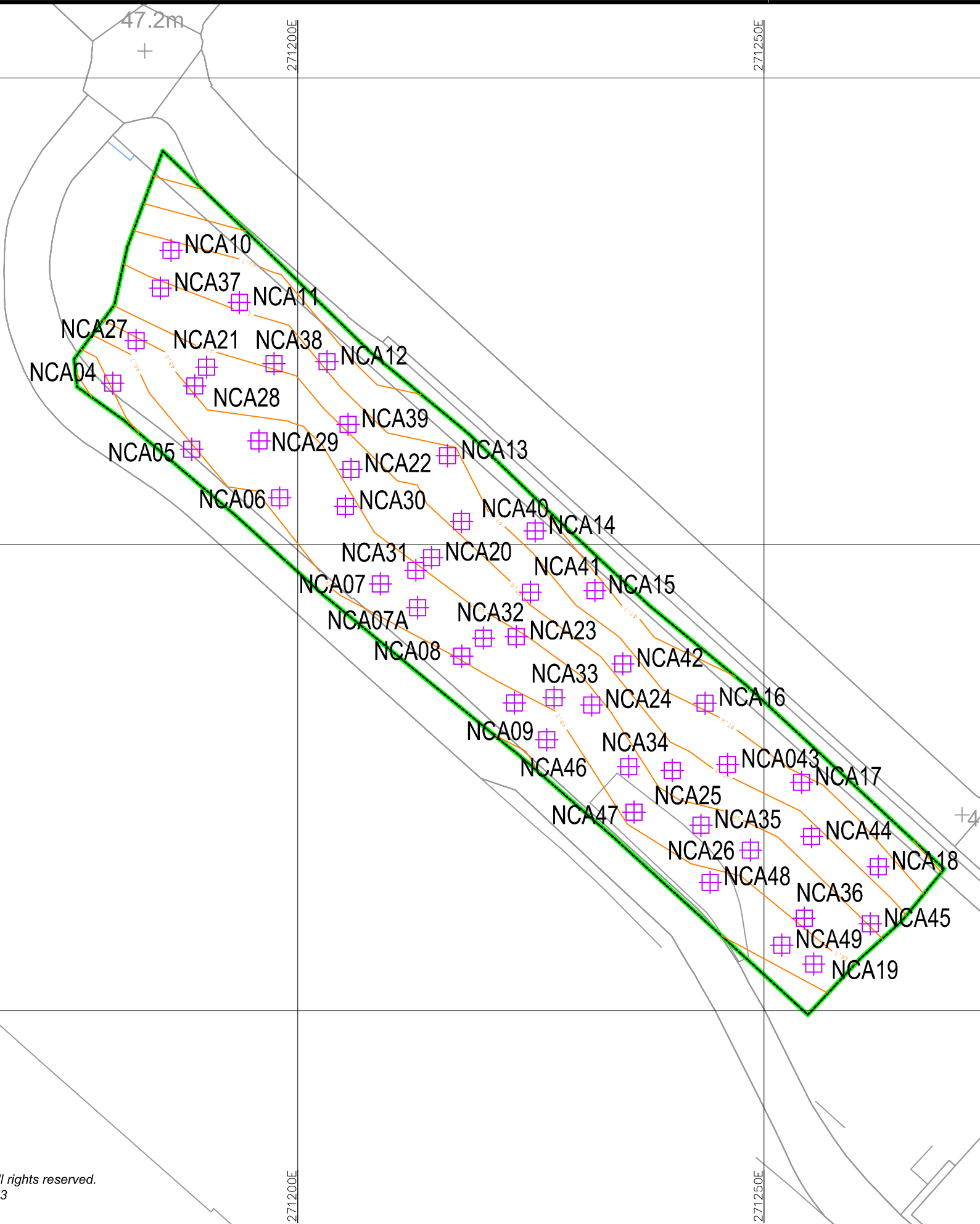
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22	NCA24	271231.514	196032.770	48.053
23	NCA25	271240.152	196025.763	47.949
24	NCA26	271248.556	196017.200	48.088
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26	NCA28	271188.967	196066.993	47.950
27	NCA29	271195.854	196061.084	48.079
28	NCA30	271205.122	196054.074	48.021
29	NCA31	271212.657	196047.223	48.104
30	NCA32	271219.918	196039.952	48.093
31	NCA33	271227.483	196033.552	48.101
32	NCA34	271235.480	196026.152	48.062
33	NCA35	271243.232	196019.866	48.116
34	NCA36	271254.305	196009.912	48.079
35	NCA37	271185.289	196077.467	47.812
36	NCA38	271197.474	196069.366	47.855
37	NCA39	271205.399	196062.856	47.887
38	NCA40	271217.574	196052.441	47.855
39	NCA41	271224.944	196044.857	47.902
40	NCA42	271234.872	196037.176	47.849
41	NCA43	271246.109	196026.378	47.843
42	NCA44	271255.128	196018.662	47.842
43	NCA45	271261.403	196009.301	48.023
44	NCA46	271226.697	196029.051	48.136
45	NCA47	271236.058	196021.283	48.098
46	NCA48	271244.240	196013.758	48.128
47	NCA49	271251.916	196007.016	48.199

- Key
- Monitor Phase Boundary
 - NCA10 Ground investigation

REVISIONS	Drawn By	Checked By	Date
PURPOSE OF ISSUE	Rev.	Authorised for issue	Date
Atkins Limited Telford Office Cornerstone House Stafford Park 13 Telford TF3 3AZ Birmingham Office The Axis, 10 Holliday Street Birmingham West Midlands B1 1TF Tel 01952 201234 Fax 01952 200981 © Tel 0121 483 5000 Fax 0121 483 5252 THIS DRAWING IS NOT TO BE SCALED			
CLIENT ST.MODWEN			
PROJECT COED DARCY			
DRAWING TITLE NEW COMPOUND AREA VALIDATION TRIAL PIT LOCATION PLAN			
SCALES	DRAWN	CHECKED	CO-ORD CHECK
1:500	MJ	ML	
	DATE	DATE	DATE
	17.03.14	17.03.14	
DRAWING NO	SHEET A3		PLOT DATE
5041216-REM-DRG-1688			26.03.14
	REV		-

Appendix A Photographs



Photograph 1: Excavation of materials from within Monitor Phase 29



Photographs 2 to 5: Backfill of Monitor Phase 29





Photograph 6: Upfilling with top 0.5m of suitable fill materials

Appendix B Exploratory Role Logs

ATKINS				Trial Pit o CA			
				Start Date 07/08/2013		round Level -	
Site Validation Ground Investigation				End Date 07/08/2013		Easting -	
				Logged By AP		Orthing -	
Client St Modwen Developments				Excavation Method			
Project o 5122307				Plant 210 Excavator			
Shoring Support							
Samples & In-Situ Tests			Strata Details				
Depth (m)	Type	HSV (kPa)	Water	Legend	Depth	Description	
0.30	ES				0.45	Dark brown slightly silty sandy angular to subrounded fine to coarse GRAVEL of sandstone with medium cobble content. Cobbles are angular to subangular of sandstone. VO (0,0)	
1.00	ES				(1.50)		
2.00	ES				1.95	Orangish brown stained orange and yellow angular COBBLES and BOULDERS with silty sandy gravel. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of sandstone. (Weathered Bedrock) VO (0,0)	
						End of Trial Pit at 1.95 m	
Groundwater Observations				Stability Pit sides stable		Pit Dimensions	
						pit depth mbgl 1.95  pit Length m - pit width m -	
General Remarks						Logger AP	
						Date of Logging -	
						Checker	
						Date of Checking -	

ATKINS				Trial pit o CA			
				Sheet 1 of 1			
Start ate 07/08/2013 End ate 07/08/2013 Logged By AP				round Level - Easting - orthing -			
Site Validation Ground Investigation Client St Modwen Developments ro ect o 5122307				E cavation ethod lant 210 Excavator Shoring Support			
Samples & In-Situ Tests			Strata Details				
Depth (m)	Type	HSV (kPa)	Water	Legend	Depth	Description	
0.30	ES				0.30	Light brown mottled orange and brown slightly silty SAND and GRAVEL with medium cobble content. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of sandstone. Cobbles are angular to subangular of sandstone. VO (0,0)	
1.00	ES				(1.40)		
1.70	ES				1.70	Brown mottled orange angular to subangular COBBLES and BOULDERS of sandstone with some silty sand angular to subangular fine to coarse gravel of sandstone. (Weathered bedrock) VO (0,0)	
				End of Trial Pit at 1.70 m			
roundwater Observations				Stability Pit sides stable		pit imensions pit epth mbgl 1.70  pit Length m - pit idth m -	
eneral Remar s						Logger	AP
						ate of Logging	-
						Chec er	
						ate of Chec ing	-

ATKINS				Trial Pit o CA			
				Start Date 07/08/2013		Round Level -	
Site Validation Ground Investigation				End Date 07/08/2013		Easting -	
				Logged By AP		Orthing -	
Client St Modwen Developments				Excavation Method			
Project o 5122307				Plant 210 Excavator			
Shoring Support							
Samples & In-Situ Tests			Strata Details				
Depth (m)	Type	HSV (kPa)	Water	Legend	Depth	Description	
0.40	ES				(0.60)	Dark brown slightly silty fine to coarse SAND with angular to subangular fine to coarse gravel and angular to subrounded cobbles of sandstone. VO (0,0)	
1.00	ES				0.60		
1.60	ES				(1.00)	Orange brown COBBLES and BOULDERS with silty sand. Gravel is angular to subangular fine to coarse of sandstone. (Weathered bedrock) VO (0,0)	
					1.60	End of Trial Pit at 1.60 m	
Groundwater Observations				Stability Pit sides stable		Pit Dimensions	
						pit depth mbgl 1.60  pit Length m - pit width m -	
General Remarks						Logger AP	
						Date of Logging -	
						Checker	
						Date of Checking -	

ATKINS				Trial Pit of CA			
				Start Date 09/10/2013 End Date 09/10/2013 Logged By JL		Ground Level - Easting - Northing -	
Site Validation Ground Investigation Client St Modwen Developments Project ID 5122307				Excavation Method Plant 210 Excavator Shoring Support			
Samples & In-Situ Tests			Strata Details				
Depth (m)	Type	HSV (kPa)	Water	Legend	Depth	Description	
0.30	ES				0.30	Light grey angular to subangular COBBLES of sandstone with fine to coarse gravels of sandstone and silty sand. VO (0,0)	
1.00	ES				(0.90)	Orangish brown, becoming dark brown at 0.9m depth, silty sandy gravelly CLAY. Gravel is angular to subangular fine to coarse of sandstone, brick and concrete. VO (0,0)	
2.00	ES				(1.00)	Brown becoming light brown with depth silty sandy gravelly CLAY. Gravel is angular to subangular fine to coarse of sandstone, brick, concrete and organic debris. VO (0,0)	
3.00	ES				(2.00)	Orangish brown slightly gravelly sandy CLAY. Gravel is angular to subangular fine to coarse of brick. VO (0,1)	
4.00	ES				4.20	Grey slightly gravelly clayey SAND. Gravel is subangular medium of sandstone. VO (1,2)	
5.00	ES				4.80	Soft orange CLAY with some brick and concrete. VO (1,1)	
					5.20	End of Trial Pit at 5.20 m	
Groundwater Observations Perched water - low flow			Stability Pit sides stable		Pit Dimensions pit depth mbgl 5.20 pit width m - pit length m -		
General Remarks					Logger JL		
					Date of Logging -		
					Checker		
					Date of Checking -		

ATKINS				Trial Pit of CA			
				Start Date 09/10/2013 End Date 09/10/2013 Logged By JL		Ground Level - Easting - Orthing -	
Site Validation Ground Investigation Client St Modwen Developments Project ID 5122307				Excavation Method Plant 210 Excavator Shoring Support			
Samples & In-Situ Tests			Strata Details				
Depth (m)	Type	HSV (kPa)	Water	Legend	Depth	Description	
0.20	ES				(0.80)	Light grey angular to subangular COBBLES of sandstone with fine to coarse gravels of sandstone and silty sand. VO (0,0)	
1.20	ES				0.80	Grey mottled orange brown silty clayey gravelly SAND. Gravel is angular to subangular fine to medium occasionally coarse of sandstone, brick and metal fragments. VO (0,0)	
2.00	ES				(2.90)		
3.30	ES						
4.00	ES				3.70	Orangish brown silty sandy slightly gravelly CLAY. Some consolidated soft clay. Gravel is angular to subangular fine to medium of sandstone and brick. VO (0,0)	
					4.00	4.60	4.90
5.30	ES				5.30	Grey and orange silty sandy slightly gravelly CLAY with some consolidated soft clay. Gravel is angular to subangular medium to coarse of brick. VO (0,1)	
				End of Trial Pit at 5.30 m			
Groundwater Observations Hand pit remained dry during excavation.			Stability Pit sides stable		Pit Dimensions pit depth mbgl 5.30 pit length m - pit width m -		
General Remarks					Logger JL		
					Date of Logging -		
					Checker		
					Date of Checking -		

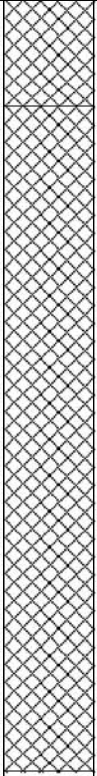
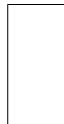
ATKINS				Trial Pit of CA			
				Start Date 09/10/2013 End Date 09/10/2013 Logged By JL		Ground Level - Easting - Northing -	
Site Validation Ground Investigation Client St Modwen Developments Project ID 5122307				Excavation Method Plant 210 Excavator Shoring Support			
Samples & In-Situ Tests			Strata Details				
Depth (m)	Type	HSV (kPa)	Water	Legend	Depth	Description	
0.40	ES				(0.70)	Light grey angular to subangular COBBLES of sandstone with fine to coarse gravel of sandstone and silty sand. VO (0,0)	
1.30	ES				0.70	Grey orange brown silty clayey slightly gravelly SAND. Gravel is subangular fine to medium of sandstone and brick. Rare angular cobbles of sandstone. VO (0,0)	
2.30	ES				1.90	Light brown sandy slightly gravelly CLAY with some consolidated soft clay. Gravel is angular to subangular fine to coarse of brick and rare clay pipe. VO (0,1)	
3.10	ES				3.00	Brown sandy CLAY. Frequent subangular fine gravel of brick and clay pipe. VO (0,1)	
4.10	ES				4.20	Grey and light brown sandy slightly gravelly CLAY with low cobble content. Gravel is angular medium to coarse of brick and sandstone. Cobbles are angular of brick. VO (0,0)	
5.10	ES				5.20	End of Trial Pit at 5.20 m	
Groundwater Observations Hand pit remained dry during excavation.				Stability Pit sides stable		Pit Dimensions pit depth mbgl 5.20 pit width m - pit length m -	
General Remarks						Logger	JL
						Date of Logging	-
						Checker	
						Date of Checking	-

ATKINS				Trial Pit of CA			
				Start Date 09/10/2013		Round Level -	
Site Validation Ground Investigation Client St Modwen Developments Project ID 5122307				End Date 09/10/2013		Easting -	
				Logged By JL		Orthing -	
Samples & In-Situ Tests				Excavation Method			
				Plant 210 Excavator			
Strata Details				Shoring Support			
Depth (m)	Type	HSV (kPa)	Water	Legend	Depth	Description	
0.30	ES				0.30	Light grey angular to subangular COBBLES of sandstone with fine to coarse gravel of sandstone and silty sand. VO (0,0)	
1.20	ES				(0.90)	Grey silty clayey slightly gravelly SAND,. Gravel is angular to subangular fine to coarse of sandstone and brick. Rare organic debris. VO (0,0)	
2.30	ES				(2.00)	Brown sandy slightly gravelly CLAY with consolidated soft clay. Gravel is subangular fine to medium of sandstone, brick and concrete. Rare organic debris. VO (0,0)	
3.10	ES				3.20	Dark brown clayey slightly gravelly SAND. Gravel is angular to subangular fine to medium of sandstone, brick and occasional concrete. VO (0,0)	
4.00	ES				(2.00)		
5.20	ES				5.20	End of Trial Pit at 5.20 m	
Groundwater Observations Perched water - low flow				Stability Pit sides stable		Pit Dimensions	
						pit depth mbgl 5.20 pit length m - pit width m -	
General Remarks						Logger JL	
						Date of Logging -	
						Checker	
						Date of Checking -	

ATKINS				Trial Pit of CA				
				Start Date 09/10/2013		Ground Level -		
Site Validation Ground Investigation Client St Modwen Developments Project ID 5122307				End Date 09/10/2013		Easting -		
				Logged By JL		Sighting -		
Excavation Method				Plant 210 Excavator				
Shoring Support								
Samples & In-Situ Tests			Strata Details					
Depth (m)	Type	HSV (kPa)	Water	Legend	Depth	Description		
0.30	ES				0.30	Light grey angular to subangular COBBLES of sandstone with fine to coarse gravel of sandstone and silty sand. VO (0,0)		
1.00	ES					Brown silty sandy slightly gravelly CLAY with consolidated soft clay. Gravel is angular to subangular fine to coarse of brick, concrete, metal and organic debris. VO (0,0)		
2.20	ES					(4.50)		
3.00	ES							
4.30	ES							
5.10	ES				4.80 5.10	Grey brown sandy slightly gravelly CLAY. Gravel is subangular fine to medium of sandstone, brick, cement and metal debris. VO (0,1) End of Trial Pit at 5.10 m		
Groundwater Observations Perched water - low flow			Stability Pit sides stable			Pit Dimensions		
						pit depth mbgl 5.10 pit length m - pit width m -		
General Remarks						Logger JL		
						Date of Logging -		
						Checker		
						Date of Checking -		

ATKINS				Trial Pit of CA			
				Start Date 09/10/2013 End Date 09/10/2013 Logged By JL		Ground Level - Easting - Orthing -	
Site Validation Ground Investigation Client St Modwen Developments Project ID 5122307				Excavation Method Plant 210 Excavator Shoring Support			
Samples & In-Situ Tests			Strata Details				
Depth (m)	Type	HSV (kPa)	Water	Legend	Depth	Description	
0.30	ES				0.40	Light grey angular to subangular COBBLES of sandstone with fine to coarse gravel of sandstone and silty sand. VO (0,0)	
1.30	ES				(1.50)	Grey silty clayey slightly gravelly SAND. Gravel is angular to subangular fine to coarse of sandstone, brick and concrete. VO (0,0)	
2.00	ES				1.90	Brown sandy slightly gravelly CLAY with consolidated soft clay. Gravel is angular to subangular fine to medium of sandstone, brick, concrete and occasional organic debris. VO (0,0)	
3.00	ES				(3.40)		
4.10	ES						
5.30	ES				5.30	End of Trial Pit at 5.30 m	
Groundwater Observations Perched water - low flow			Stability Pit sides stable			Dimensions Depth m 5.30 Length m - Width m -	
General Remarks						Logger	JL
						Date of Logging	-
						Checker	
						Date of Checking	-

ATKINS				Trial Pit of CA			
				Start Date 09/10/2013		Round Level -	
Site Validation Ground Investigation Client St Modwen Developments Project ID 5122307				End Date 09/10/2013		Easting -	
				Logged By JL		Orthing -	
Samples & In-Situ Tests				Excavation Method			
				Plant 210 Excavator Shoring Support			
Strata Details							
Depth (m)	Type	HSV (kPa)	Water	Legend	Depth	Description	
0.30	ES				(1.00)	Dark grey silty sandy angular medium to coarse GRAVEL of sandstone. VO (0,0)	
1.00	ES				1.00	Grey brown silty clayey slightly gravelly SAND. Gravel is angular to subangular medium to coarse of sandstone and brick. VO (0,0)	
2.40	ES				(2.40)		
3.20	ES		▽		3.40		
4.00	ES				(0.80)	Firm dark grey slightly gravelly CLAY with low cobble content. Cobbles are subangular of sandstone. Gravel is angular to subangular medium to coarse of sandstone. VO (0,0)	
5.10	ES				4.20	End of Trial Pit at 5.20 m	
Groundwater Observations Perched water - low flow				Stability Pit sides stable		Pit Dimensions	
						pit depth mbgl 5.20 pit length m - pit width m -	
General Remarks						Logger JL	
						Date of Logging -	
						Checker	
						Date of Checking -	

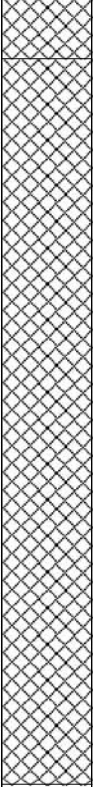
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				Sheet 1 of 1			
				Start Date 09/10/2013 End Date 09/10/2013 Logged By JL		Ground Level - Easting - Orthing -	
Site Validation Ground Investigation Client St Modwen Developments Project ID 5122307				Excavation Method Plant 210 Excavator Shoring Support			
Samples & In-Situ Tests			Strata Details				
Depth (m)	Type	HSV (kPa)	Water	Legend	Depth	Description	
0.50	ES				(0.70)	Light grey angular to subangular COBBLES of sandstone with fine to coarse gravel of sandstone and silty sand. VO (0,0)	
0.80	ES				0.70	Grey brown silty sandy slightly gravelly CLAY. Gravel is angular to subangular fine to coarse of sandstone and brick. VO (0,0)	
2.20	ES						
3.00	ES				(4.40)		
4.10	ES						
5.00	ES				5.10	End of Trial Pit at 5.10 m	
Groundwater Observations Perched water - low flow			Stability Pit sides stable			Dimensions Depth m 5.10  Width m - Length m -	
General Remarks						Logger	JL
						Date of Logging	-
						Checker	
						Date of Checking	-

ATKINS				Trial Pit of CA			
				Start Date 09/10/2013 End Date 09/10/2013 Logged By JL		Ground Level - Easting - Orthing -	
Site Validation Ground Investigation Client St Modwen Developments Project ID 5122307				Excavation Method Plant 210 Excavator Shoring Support			
Samples & In-Situ Tests			Strata Details				
Depth (m)	Type	HSV (kPa)	Water	Legend	Depth	Description	
0.30	ES				(0.80)	Light grey angular to subangular COBBLES of sandstone with fine to coarse gravel of sandstone and silty sand. VO (0,0)	
1.00	ES				0.80	Dark grey brown silty clayey slightly gravelly SAND. Gravel is angular to subangular medium to coarse of sandstone, brick and clay pipe. VO (0,1)	
2.10	ES				(3.30)		
3.10	ES						
4.20	ES				4.10	Soft orange brown consolidated slightly gravelly CLAY. Gravel is subangular medium of sandstone and brick. VO (0,0)	
5.20	ES				4.90	Grey brown sandy slightly gravelly CLAY. Gravel is angular to subangular fine to medium of sandstone. VO (0,0) End of Trial Pit at 5.20 m	
				5.20			
Groundwater Observations Perched water - low flow				Stability Pit sides stable		Dimensions Depth m 5.20 Length m - Width m -	
General Remarks						Logger JL	
						Date of Logging -	
						Checker	
						Date of Checking -	

ATKINS				Trial Pit of CA			
				Sheet 1 of 1			
				Start Date 15/10/2013 End Date 15/10/2013 Logged By JL		Ground Level - Easting - Northing -	
Site Validation Ground Investigation Client St Modwen Developments Project ID 5122307				Excavation Method Plant 210 Excavator Shoring Support			
Samples & In-Situ Tests			Strata Details				
Depth (m)	Type	HSV (kPa)	Water	Legend	Depth	Description	
0.30	ES				(0.80)	Light grey angular to subangular COBBLES of sandstone with fine to coarse gravel of sandstone and silty sand. VO (0,0)	
					0.80		
					(0.60)	Grey brown clayey silty slightly gravelly fine to coarse SAND. Gravel is angular to subangular fine to coarse of sandstone and brick. VO (0,0)	
1.40	ES				1.40		
					(0.90)	Light brown silty sandy slightly gravelly CLAY with consolidated soft clay. Gravel is angular to subangular fine to coarse of sandstone, brick and concrete. VO (0,0)	
					2.30		
2.40	ES					Light brown clayey slightly gravelly SAND. Gravel is angular to subangular fine to coarse of sandstone, brick and concrete. VO (0,1)	
3.30	ES				(2.80)		
4.20	ES						
5.10	ES				5.10	End of Trial Pit at 5.10 m	
Groundwater Observations Hand pit remained dry during excavation.				Stability Pit sides stable		Dimensions Depth m 5.10 Length m - Width m -	
General Remarks						Logger JL	
						Date of Logging -	
						Checker	
						Date of Checking -	

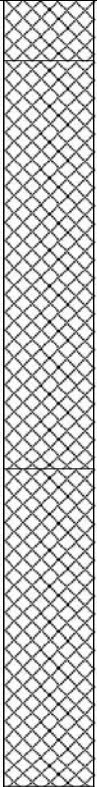
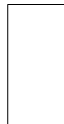
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				Start Date 15/10/2013		Round Level -	
Site Validation Ground Investigation Client St Modwen Developments Project o 5122307				End Date 15/10/2013		Easting -	
				Logged By JL		Orthing -	
Samples & In-Situ Tests				Excavation Method			
				Plant 210 Excavator			
Strata Details				Shoring Support			
Depth (m)	Type	HSV (kPa)	Water	Legend	Depth	Description	
0.20	ES				0.30	Light grey angular to subangular COBBLES of sandstone with fine to coarse gravel of sandstone and silty sand. VO (0,0)	
1.10	ES				(3.30)	Light brown silty sandy slightly sandy CLAY with consolidated soft clay. Gravel is angular to subangular fine to coarse of sandstone, brick and concrete. VO (0,0)	
2.30	ES						
3.10	ES						
4.20	ES				3.60	Brown clayey slightly gravelly SAND. Gravel is angular to subangular fine to medium of sandstone, brick and concrete. VO (0,1)	
5.00	ES				(1.40)		
					5.00	End of Trial Pit at 5.00 m	
Groundwater Observations Hand pit remained dry during excavation.				Stability Pit sides stable		Pit Dimensions	
						pit depth mbgl 5.00 pit length m - pit width m -	
General Remarks						Logger JL	
						Date of Logging -	
						Checker	
						Date of Checking -	

ATKINS				Trial Pit of CA			
				Start Date 15/10/2013 End Date 15/10/2013 Logged By JL		Ground Level - Easting - Orthing -	
Site Validation Ground Investigation Client St Modwen Developments Project ID 5122307				Excavation Method Plant 210 Excavator Shoring Support			
Samples & In-Situ Tests			Strata Details				
Depth (m)	Type	HSV (kPa)	Water	Legend	Depth	Description	
0.30	ES				0.30	Light grey angular to subangular COBBLES of sandstone with fine to coarse gravel of sandstone and silty sand. VO (0,0)	
0.90	ES				(3.30)	Brown silty sandy slightly gravelly CLAY with consolidated soft clay. Gravel is angular to subangular fine to coarse of sandstone, brick and concrete. VO (0,1)	
2.70	ES						
3.10	ES						
4.00	ES				3.60	Brown clay slightly gravelly fine to coarse SAND. Gravel is angular to subangular fine to medium of sandstone, brick and concrete. Rare organic fragments. VO (0,0)	
					(1.60)		
5.20	ES				5.20	End of Trial Pit at 5.20 m	
Groundwater Observations Hand pit remained dry during excavation.				Stability Pit sides stable		Dimensions Depth mbgl 5.20 Length m - Width m -	
General Remarks						Logger	JL
						Date of Logging	-
						Checker	
						Date of Checking	-

ATKINS				Trial Pit o CA			
				Start Date 15/10/2013		round Level -	
Site Validation Ground Investigation Client St Modwen Developments Project o 5122307				End Date 15/10/2013		Easting -	
				Logged By JL		Orthing -	
Samples & In-Situ Tests				Excavation Method			
				Plant 210 Excavator			
Strata Details				Shoring Support			
Depth (m)	Type	HSV (kPa)	Water	Legend	Depth	Description	
0.40	ES				0.40	Light grey angular to subangular COBBLES of sandstone with fine to coarse gravel of sandstone and silty sand. VO (0,0)	
1.20	ES					Brown silty clayey slightly gravelly SAND. Gravel is subangular fine to coarse of sandstone, brick and concrete. VO (0,0)	
2.20	ES						
3.10	ES				(4.80)		
4.00	ES						
5.20	ES				5.20	End of Trial Pit at 5.20 m	
Groundwater Observations Hand pit remained dry during excavation.				Stability Pit sides stable		Pit Dimensions	
						pit depth mbgl 5.20  pit Length m - pit width m -	
General Remarks						Logger JL	
						Date of Logging -	
						Checker	
						Date of Checking -	

ATKINS				Trial Pit of CA			
				Start Date 15/10/2013 End Date 15/10/2013 Logged By JL		Ground Level - Easting - Orthing -	
Site Validation Ground Investigation Client St Modwen Developments Project ID 5122307				Excavation Method Plant 210 Excavator Shoring Support			
Samples & In-Situ Tests			Strata Details				
Depth (m)	Type	HSV (kPa)	Water	Legend	Depth	Description	
0.30	ES				0.30	Light grey angular to subangular COBBLES of sandstone with fine to coarse gravel of sandstone and silty sand. VO (0,0)	
1.00	ES				(3.60)	Brown silty sandy slightly gravelly CLAY with consolidated soft clay. Gravel is angular to subangular fine to medium of sandstone, brick and concrete. VO (0,0)	
2.30	ES						
3.20	ES						
4.00	ES				3.90	Brown clay silty slightly gravelly SAND. Gravel is angular to subangular fine to medium of sandstone, brick and concrete. VO (0,0)	
5.00	ES				(1.10)	End of Trial Pit at 5.00 m	
Groundwater Observations Perched water -high flow			Stability Pit sides stable			Dimensions Depth mbgl 5.00 Length m - Width m -	
General Remarks						Logger	JL
						Date of Logging	-
						Checker	
						Date of Checking	-

ATKINS				Trial Pit of CA			
				Start Date 16/10/2013		Ground Level -	
Site Validation Ground Investigation Client St Modwen Developments Project No 5122307				End Date 16/10/2013		Easting -	
				Logged By JL		Sighting -	
Excavation Method				Plant 210 Excavator			
Shoring Support							
Samples & In-Situ Tests			Strata Details				
Depth (m)	Type	HSV (kPa)	Water	Legend	Depth	Description	
0.30	ES				0.30	Light grey angular to subangular COBBLES of sandstone with fine to coarse gravel of sandstone and silty sand. VO (0,0)	
1.00	ES				(1.80)	Grey brown silty sandy slightly gravelly CLAY with consolidated soft clay. Gravel is angular to subangular fine to medium of sandstone, brick and concrete. Rare organic material. VO (0,0)	
2.10	ES				2.10	Brown clayey slightly gravelly SAND. Gravel is angular to subangular medium to coarse of sandstone, brick and concrete. VO (0,1)	
3.10	ES				(2.10)		
4.00 4.20	ES ES				4.20	Brown silty sandy slightly gravelly CLAY with consolidated soft clay. Gravel is angular to subangular fine to coarse of sandstone, brick and concrete. VO (0,1)	
					(0.80)		
					5.00	End of Trial Pit at 5.00 m	
Groundwater Observations Perched water -high flow			Stability Pit sides stable			Pit Dimensions pit depth mbgl 5.00 pit length m - pit width m -	
General Remarks						Logger JL	
						Date of Logging -	
						Checker	
						Date of Checking -	

ATKINS				Trial Pit of CA			
				Start Date 16/10/2013 End Date 16/10/2013 Logged By JL		Ground Level - Easting - Northing -	
Site Validation Ground Investigation Client St Modwen Developments Project ID 5122307				Excavation Method Plant 210 Excavator Shoring Support			
Samples & In-Situ Tests			Strata Details				
Depth (m)	Type	HSV (kPa)	Water	Legend	Depth	Description	
0.40	ES				0.40	Light grey angular to subangular COBBLES of sandstone with fine to coarse gravel of sandstone and silty sand. VO (0,0)	
1.20	ES				(2.70)	Brown silty sandy CLAY with consolidated soft clay. Rare brick and concrete. VO (0,0)	
2.00	ES						
3.10	ES				3.10	Light brown sandy slightly gravelly CLAY. Gravel is subangular fine to medium sandstone, brick, concrete and metal. VO (0,0)	
4.30	ES				(2.10)		
5.20	ES				5.20	End of Trial Pit at 5.20 m	
Groundwater Observations Perched water - high flow			Stability Pit sides stable			Dimensions Depth m 5.20  Length m - Width m -	
General Remarks						Logger	JL
						Date of Logging	-
						Checker	
						Date of Checking	-

ATKINS				Trial Pit of CA			
				Start Date 16/10/2013 End Date 16/10/2013 Logged By JL		Ground Level - Easting - Northing -	
Site Validation Ground Investigation Client St Modwen Developments Project ID 5122307				Excavation Method Plant 210 Excavator Shoring Support			
Samples & In-Situ Tests			Strata Details				
Depth (m)	Type	HSV (kPa)	Water	Legend	Depth	Description	
0.30	ES				0.30	Light grey angular to subangular COBBLES of sandstone with fine to coarse gravel of sandstone and silty sand. VO (0,0)	
1.00	ES						Brown silty sandy slightly gravelly CLAY with consolidated soft clay. Gravel is angular to subangular fine to coarse of sandstone, brick and concrete. Rare organic debris. VO (0,0)
2.00	ES						
3.10	ES					(4.90)	
4.10	ES						
5.20	ES					5.20	End of Trial Pit at 5.20 m
Groundwater Observations Perched water - high flow			Stability Pit sides stable			Dimensions Depth m 5.20 Length m - Width m -	
General Remarks						Logger	JL
						Date of Logging	-
						Checker	
						Date of Checking	-

ATKINS				Trial Pit of CA			
				Start Date 16/10/2013 End Date 16/10/2013 Logged By JL		Ground Level - Easting - Orthing -	
Site Validation Ground Investigation Client St Modwen Developments Project ID 5122307				Excavation Method Plant 210 Excavator Shoring Support			
Samples & In-Situ Tests			Strata Details				
Depth (m)	Type	HSV (kPa)	Water	Legend	Depth	Description	
0.30	ES				0.30	Light grey angular to subangular COBBLES of sandstone with fine to coarse gravel of sandstone and silty sand. VO (0,0)	
1.10	ES				(2.30)	Dark brown silty sandy slightly gravelly CLAY with consolidated soft clay. Gravel is angular to subangular fine to coarse of sandstone and concrete. VO (0,0)	
2.10	ES				2.60	Light brown sandy slightly gravelly CLAY. Gravel is subangular fine to coarse of sandstone, brick and concrete. VO (0,1)	
3.20	ES				(2.20)		
4.20	ES				4.80	Dark grey sandy slightly gravelly CLAY. Gravel is subangular fine to medium of sandstone, brick and concrete. VO (1,1)	
5.40	ES			(0.60) 5.40			
					End of Trial Pit at 5.40 m		
Groundwater Observations Hand pit remained dry during excavation.				Stability Pit sides stable		Dimensions Depth m 5.40 Length m - Width m -	
General Remarks						Logger JL	
						Date of Logging -	
						Checker	
						Date of Checking -	

ATKINS				Trial Pit of CA			
				Start Date 16/10/2013 End Date 16/10/2013 Logged By JL		Ground Level - Easting - Orthing -	
Site Validation Ground Investigation Client St Modwen Developments Project ID 5122307				Excavation Method Plant 210 Excavator Shoring Support			
Samples & In-Situ Tests			Strata Details				
Depth (m)	Type	HSV (kPa)	Water	Legend	Depth	Description	
0.30	ES				0.30	Light grey angular to subangular COBBLES of sandstone with fine to coarse gravel of sandstone and silty sand. VO (0,0)	
1.20	ES						Brown silty sandy slightly gravelly CLAY. Gravel is subangular fine to medium of sandstone, brick and concrete. VO (0,0)
2.60	ES					(4.50)	
3.10	ES						
4.20	ES						
5.20	ES				4.80 5.20	Dark grey sandy slightly gravelly CLAY. Gravel is subangular fine to medium of sandstone, brick and concrete. VO (0,1) End of Trial Pit at 5.20 m	
Groundwater Observations Perched water - low flow			Stability Pit sides stable			Pit Dimensions pit depth mbgl 5.20 pit length m - pit width m -	
General Remarks						Logger	JL
						Date of Logging	-
						Checker	
						Date of Checking	-

ATKINS				Trial Pit o CA			
				Start Date 22/10/2013 End Date 22/10/2013 Logged By JL		Ground Level - Easting - Orthing -	
Site Validation Ground Investigation Client St Modwen Developments Project ID 5122307				Excavation Method Plant 210 Excavator Shoring Support			
Samples & In-Situ Tests			Strata Details				
Depth (m)	Type	HSV (kPa)	Water	Legend	Depth	Description	
0.20	ES				0.20	Light grey angular to subangular COBBLES of sandstone with fine to medium gravel of sandstone and silty sand. VO (0,0)	
0.60	ES				0.60		
1.00	ES					Grey silty clayey slightly gravelly SAND. Gravel is angular to subangular fine to medium of sandstone, brick and concrete. VO (0,1)	
					(3.00)	Brown sandy slightly gravelly CLAY with consolidated soft clay. Gravel is angular to subangular fine to coarse of brick and concrete with rare sandstone. VO (0,0)	
2.80	ES				3.60	Brown sandy slightly gravelly CLAY. Gravel is angular to subangular fine to coarse of sandstone, brick and concrete. VO (0,1)	
4.10	ES			(1.80)			
5.40	ES				5.40	End of Trial Pit at 5.40 m	
Groundwater Observations Hand pit remained dry during excavation.				Stability Pit sides stable		Dimensions Depth m 5.40 Length m - Width m -	
General Remarks						Logger	JL
						Date of Logging	-
						Checker	
						Date of Checking	-

ATKINS				Trial Pit of CA			
				Start Date 22/10/2013 End Date 22/10/2013 Logged By JL		Ground Level - Easting - Northing -	
Site Validation Ground Investigation Client St Modwen Developments Project No 5122307				Excavation Method Plant 210 Excavator Shoring Support			
Samples & In-Situ Tests			Strata Details				
Depth (m)	Type	HSV (kPa)	Water	Legend	Depth	Description	
0.30	ES				0.30	Light grey angular to subangular COBBLES of sandstone with fine to coarse gravels of sandstone and silty sand. VO (0,0)	
1.00	ES						
2.10	ES				(3.50)		
3.30	ES						
4.00	ES				3.80	Brown silty sandy slightly gravelly CLAY with consolidated soft clay. Gravel is angular to subangular fine to coarse of sandstone and brick. VO (0,0)	
					(1.50)		
5.30	ES				5.30	End of Trial Pit at 5.30 m	
Groundwater Observations Perched water - high flow				Stability Pit sides unstable		Dimensions Depth m 5.30 Length m - Width m -	
General Remarks						Logger JL	
						Date of Logging -	
						Checker	
						Date of Checking -	

ATKINS				Trial Pit of CA			
				Start Date 22/10/2013 End Date 22/10/2013 Logged By JL		Ground Level - Easting - Northing -	
Site Validation Ground Investigation Client St Modwen Developments Project ID 5122307				Excavation Method Plant 210 Excavator Shoring Support			
Samples & In-Situ Tests			Strata Details				
Depth (m)	Type	HSV (kPa)	Water	Legend	Depth	Description	
0.30	ES				0.30	Light grey angular to subangular COBBLES of sandstone with fine to coarse gravels of sandstone and silty sand. VO (0,0)	
1.10	ES						Brown sandy slightly gravelly CLAY with consolidated soft clay. Gravel is angular to subangular fine to coarse of brick and concrete. VO (0,0)
2.00	ES						
3.10	ES					(5.21)	
4.20	ES						
5.50	ES				5.51	End of Trial Pit at 5.50 m	
Groundwater Observations Perched water - high flow			Stability Pit sides stable			Pit Dimensions pit depth mbgl 5.50 pit Length m - pit width m -	
General Remarks						Logger	JL
						Date of Logging	-
						Checker	
						Date of Checking	-

ATKINS				Trial Pit o CA			
				Start Date 22/10/2013		round Level -	
Site Validation Ground Investigation Client St Modwen Developments Project o 5122307				End Date 22/10/2013		Easting -	
				Logged By JL		Orthing -	
Samples & In-Situ Tests				Excavation Method			
				Plant 210 Excavator			
Strata Details				Shoring Support			
Depth (m)	Type	HSV (kPa)	Water	Legend	Depth	Description	
0.30	ES				0.30	Light grey angular to subangular COBBLES of sandstone with fine to coarse gravel of sandstone and silty sand. VO (0,0)	
1.00	ES				(1.80)	Brown sandy slightly gravelly CLAY with consolidated soft clay. Gravel is angular to subangular fine to coarse of brick and concrete. VO (0,0)	
2.10	ES				2.10	End of Trial Pit at 2.10 m	
Groundwater Observations perched water - high flow				Stability Pit sides stable		Pit Dimensions	
						pit depth mbgl 2.10 pit width m - pit length m -	
General Remarks						Logger JL	
						Date of Logging -	
						Checker	
						Date of Checking -	

Appendix C Adopted Thresholds

Lowest of the Remedial Target Criterion/Risk Based Screening Level for Parks land use, Deep Soil (>1m)

Contaminant	Minimum of RTC (1%) / RBSL mg/kg	Minimum of RTC (3%) / RBSL mg/kg
Benzo(a)pyrene	>sat	>sat
Benzene	48	48
Toluene	>sat	>sat
Ethylbenzene	>sat	>sat
Xylene	478	1330
TPH aromatic C7-C8	>sat	>sat
TPH aromatic C8-C10	>sat	>sat
TPH aromatic C10-C12	>sat	>sat
TPH aromatic C12-C16	>sat	>sat
TPH aliphatic C6-C8	>sat	>sat
TPH aliphatic C8-C10	>sat	>sat
TPH aliphatic C10-C12	>sat	>sat
TPH aliphatic C12-C16	>sat	>sat
TPH aromatic C16-C21	>sat	>sat
TPH aromatic C21-C35	>sat	>sat
TPH aliphatic C16-C21	>sat	>sat
TPH aliphatic C21-C35	>sat	>sat
Total TPH (Phase 1)	>sat	>sat
Total TPH (Process Area)	>sat	>sat
Total TPH (North Tank Farm)	>sat	>sat
Total TPH (South Tank Farm)	>sat	>sat
1,2-Dichloroethane	6	6
1,1,1-Trichloroethane	>sat	>sat
Tetrachloroethene	1780	1780
Trichloroethene	269	269
Vinyl chloride	8.21	11.4
Dichloromethane	6220	6220
Cis-1,2-Dichloroethene	881	881
Trans-1,2 Dichloroethene	881	881
Acenaphthene	>sat	>sat
Anthracene	>sat	>sat
Benzo(a)anthracene	>sat	>sat
Benzo(b)fluoranthene	>sat	>sat
Benzo(g,h,i)perylene	>sat	>sat
Benzo(k)fluoranthene	>sat	>sat
Chrysene	>sat	>sat
Dibenz(ah)anthracene	>sat	>sat
Fluoranthene	>sat	>sat
Fluorene	>sat	>sat
Indeno(1,2,3-cd)pyrene	>sat	>sat
Pyrene	>sat	>sat
Phenol	>sat	>sat
Mercury (methyl)	>sat	>sat
Mercury (elemental)	>sat	>sat
Naphthalene	>sat	>sat
TPH aromatic C5-C7	432	928
TPH aliphatic C5-C6	>sat	>sat
1,1,1,2-Tetrachloroethane	>sat	>sat
1,1,2,2-Tetrachloroethane	>sat	>sat
Carbon tetrachloride	301	778
Chlorobenzene	>sat	>sat

Notes
1. Where the lower of the vapour or aqueous saturation limits has been exceeded by the RTC calculated, the hazard quotient is considered to be less than 1 and as such >sat has been presented
2. Xylene - Users must consider total exposure from all xylene isomers and not consider them in isolation. It should be noted that the value presented is the lowest of the aqueous or vapour saturation limits. The lowest saturation limit of the three isomers has been presented.
3. TPH aromatic C7-C8 is considered to comprise toluene only by Atkins
4. TPH >C16 are not considered to be volatile according to TPHCWG. Consequently the inhalation of vapour pathways have not been considered and therefore no value has been presented here
5. 'Total' TPH RBSL derived for an area of development, based on individual RBSL and available mass fraction TPH data in soil at time of derivation, using the inverse weighted average approach.
6. Benzo(a)pyrene RBSL to be compared against sum of 16 US EPA Priority List PAHs using Toxicity Equivalence approach
7. Asbestos has not been considered here as it is being considered in a separate report
8. Additivity for TPHs and PAHs to be undertaken in line with guidance in Atkins report 5041216-REM-RPT-00216
9. TPH aromatic C5-C7 is considered to comprise benzene only

Contaminant	Minimum of RTC (1%) / RBSL mg/kg	Minimum of RTC (3%) / RBSL mg/kg
Arsenic	64 a	64 a
Chromium	78 a	78 a
Cadmium	2.6	2.6
Mercury (inorganic)	1 b	1 b
Nickel	75 b	75 b
Selenium	3 b	3 b
Lead	337 a	337 a
Vanadium	351	351
Copper	143 a	143 a
Zinc	478 a	478 a
Benzo(a)pyrene	0.9	0.9
Benzene	13	13
Toluene	8110	8110
Ethylbenzene	4740	4740
Xylene	7940	7940
TPH aromatic C7-C8	21300	21300
TPH aromatic C8-C10	2230	2310
TPH aromatic C10-C12	2300	2340
TPH aromatic C12-C16	2330	2350
TPH aliphatic C6-C8	294000 *	294000 *
TPH aliphatic C8-C10	5740 *	5740 *
TPH aliphatic C10-C12	5700	5830
TPH aliphatic C12-C16	5800	5860
TPH aromatic C16-C21	1450	1450
TPH aromatic C21-C35	1450	1450
TPH aliphatic C16-C35	159000	159000
TPH aliphatic C21-C35	159000	159000
Total TPH (Phase 1)	9060	9060
Total TPH (Process Area)	10800	10800
Total TPH (North Tank Farm)	9420	9420
Total TPH (South Tank Farm)	6350	6350
1,2-Dichloroethane	4.5	4.5
1,1,1-Trichloroethane	27900	27900
Tetrachloroethene	641	641
Trichloroethene	193	193
Vinyl chloride	0.7	0.7
Dichloromethane	241	241
Cis-1,2-Dichloroethene	392	468
Trans-1,2 Dichloroethene	632	632
Acenaphthene	5340	5350
Anthracene	26800	26800
Benzo(a)anthracene	20.8	21.1
Benzo(b)fluoranthene	21.3	21.3
Benzo(g,h,i)perylene	218	218
Benzo(k)fluoranthene	215	215
Chrysene	2090	2090
Dibenz(ah)anthracene	2.16	2.16
Fluoranthene	3570	3570
Fluorene	3570	3570
Indeno(1,2,3-cd)pyrene	21.2	21.2
Pyrene	2680	2680
Phenol	859	859
Mercury (methyl)	19.4	19.4
Mercury (elemental)	4.3	12.9
Naphthalene	955	1340
TPH aromatic C5-C7	26.2	27.5
TPH aliphatic C5-C6	294000	294000
1,1,1,2-Tetrachloroethane	498	533
1,1,2,2-Tetrachloroethane	516	539
Carbon tetrachloride	111	128
Chlorobenzene	170	170

Notes
1. It is assumed that no visible free product is present within the top 1.0m of soil
2. Metal RTC derived considering Soil Codes and background data
a – based on background soil concentration
b – based on Soil Code
3. Xylene - the lowest RTC of the three isomers has been presented. Users must consider total exposure from all xylene isomers and not consider them in isolation
4. TPH aromatic C7-C8 is considered to comprise toluene only by Atkins
* 5. The RTC for TPH aliphatic C5-C6, TPH aliphatic C6-C8 and TPH aliphatic C8-C10 are based on a value produced from following the approach outlined in SR4 for substances at saturation
6. TPH >C16 are not considered to be volatile according to TPHCWG. Consequently the inhalation of vapour pathways have not been considered
7. 'Total' TPH RBSL derived for an area of development, based on individual RBSL and available mass fraction TPH data in soil at time of derivation, using the inverse weighted average approach.
8. Benzo(a)pyrene RBSL to be compared against sum of 16 US EPA Priority List PAHs using Toxicity Equivalence approach
9. Asbestos has not been considered here as it is being considered in a separate report
10. Additivity for TPHs and PAHs to be undertaken in line with guidance in Atkins report 5041216-REM-RPT-00216
11. Elemental mercury is based on the inhalation pathway only and the saturation limit has been presented
12. TPH aromatic C5-C7 is considered to comprise benzene only

Contaminant	Minimum of RTC (1%) / RBSL mg/kg	Minimum of RTC (3%) / RBSL mg/kg
Benzo(a)pyrene	>sat	>sat
Benzene	0.4	0.4
Toluene	52	52
Ethylbenzene	140	140
Xylene	58	58
TPH aromatic C7-C8	146	146
TPH aromatic C8-C10	71	209
TPH aromatic C10-C12	1390	1390
TPH aromatic C12-C16	>sat	>sat
TPH aliphatic C6-C8	>sat	>sat
TPH aliphatic C8-C10	42.5	125
TPH aliphatic C10-C12	>sat	>sat
TPH aliphatic C12-C16	>sat	>sat
TPH aliphatic C16-C21	>sat	>sat
TPH aliphatic C21-C35	>sat	>sat
TPH aromatic C16-C21	>sat	>sat
TPH aromatic C21-C35	>sat	>sat
Total TPH (Phase 1)	9180	9180
Total TPH (Process Area)	4100	4100
Total TPH (North Tank Farm)	3800	3800
Total TPH (South Tank Farm)	2790	2790
1,2-Dichloroethane	0.0111	0.0176
1,1,1-Trichloroethane	10.8	25.9
Tetrachloroethene	2.3	6.12
Trichloroethene	0.188	0.463
Vinyl chloride	0.00093	0.00129
Dichloromethane	4.19	6.04
Cis-1,2-Dichloroethene	0.206	0.392
Trans-1,2 Dichloroethene	0.332	0.689
Acenaphthene	>sat	>sat
Anthracene	>sat	>sat
Benzo(a)anthracene	>sat	>sat
Benzo(b)fluoranthene	>sat	>sat
Benzo(g,h,i)perylene	>sat	>sat
Benzo(k)fluoranthene	>sat	>sat
Chrysene	>sat	>sat
Dibenz(ah)anthracene	>sat	>sat
Fluoranthene	>sat	>sat
Fluorene	>sat	>sat
Indeno(1,2,3-cd)pyrene	>sat	>sat
Pyrene	>sat	>sat
Phenol	1030	2340
Mercury (methyl)	27.7	62.5
Mercury (elemental)	0.291	0.87
Naphthalene	2.8	8.02
TPH aromatic C5-C7	0.46	0.987
TPH aliphatic C5-C6	112	246
1,1,1,2-Tetrachloroethane	1.84	5.09
1,1,2,2-Tetrachloroethane	4.71	11.3
Carbon tetrachloride	0.0309	0.0801
Chlorobenzene	17.9	47.9

Notes

- Where the lower of the vapour or aqueous saturation limits have been exceeded by the RTC calculated, the hazard quotient is considered to be less than 1 and as such >sat has been presented
- Xylene - the lowest RTC of the three isomers has been presented. Users must consider total exposure from all xylene isomers and not consider them in isolation
- TPH >C16 are not considered to be volatile according to TPHCWG. Consequently the inhalation of vapour pathways have not been considered and therefore no RTC value has been presented here
- 'Total' TPH RBSL derived for an area of development, based on individual RBSL and available mass fraction TPH data in soil at time of derivation, using the inverse weighted average approach.
- Benzo(a)pyrene RBSL to be compared against sum of 16 US EPA Priority List PAHs using Toxicity Equivalence approach
- TPH aromatic C7-C8 is considered to comprise toluene only by Atkins
- Asbestos has not been considered here as it is being considered in a separate report
- Additivity for TPHs and PAHs to be undertaken in line with guidance in Atkins report 5041216-REM-RPT-00216
- TPH aromatic C5-C7 is considered to comprise benzene only

Lowest of the Remedial Target Criterion/Risk Based Screening Level for Residential with the Consumption of Produce land use, Shallow Soil.

Contaminant	Minimum of RTC (1%) / RBSL mg/kg	Minimum of RTC (3%) / RBSL mg/kg
Arsenic	64 a	64 a
Chromium	78 a	78 a
Cadmium	2.6	2.6
Mercury (inorganic)	1 b	1 b
Nickel	50	50
Selenium	3 b	3 b
Lead	337 a	337 a
Vanadium	113	115
Copper	143 a	143 a
Zinc	478 a	478 a
Benzo(a)pyrene	0.9	0.9
Benzene	0.0493	0.12
Toluene	36	36
Ethylbenzene	38.2	41
Xylene	17.2	32
TPH aromatic C7-C8	86.9	125
TPH aromatic C8-C10	14.8	94
TPH aromatic C10-C12	57.3	118
TPH aromatic C12-C16	131	131
TPH aliphatic C6-C8	69.8	8340
TPH aliphatic C8-C10	9.76	87.1
TPH aliphatic C10-C12	1780 *	3200
TPH aliphatic C12-C16	4510	4510
TPH aromatic C16-C21	82	82
TPH aromatic C21-C35	888	1130
TPH aliphatic C16-C21	94200	94200
TPH aliphatic C21-C35	94800	94800
Total TPH (Phase 1)	1720	1720
Total TPH (Process Area)	2600	2600
Total TPH (North Tank Farm)	1100	1100
Total TPH (South Tank Farm)	1020	1020
1,2-Dichloroethane	0.0019	0.0102
1,1,1-Trichloroethane	2.23	17.3
Tetrachloroethene	0.455	3.62
Trichloroethene	0.0382	0.304
Vinyl chloride	0.000202	0.00082
Dichloromethane	0.458	1.56
Cis-1,2-Dichloroethene	0.0393	0.255
Trans-1,2-Dichloroethene	0.0671	0.464
Acenaphthene	588 *	1380
Anthracene	8270	14800
Benzo(a)anthracene	7.56	16.5
Benzo(b)fluoranthene	20	23.9
Benzo(g,h,i)perylene	235	248
Benzo(k)fluoranthene	216	243
Chrysene	1500	2220
Dibenz(ah)anthracene	1.97	2.39
Fluoranthene	822	1630
Fluorene	615	1390
Indeno(1,2,3-cd)pyrene	19.2	23.6
Pyrene	563	1150
Phenol	162	349
Mercury (methyl)	6.28	11.3
Mercury (elemental)	0.0607	0.583
Naphthalene	0.585	5.05
TPH aromatic C5-C7	0.0493	0.192
TPH aliphatic C5-C6	30.1	172
1,1,1,2-Tetrachloroethane	0.353	2.78
1,1,2,2-Tetrachloroethane	0.695	3.63
Carbon tetrachloride	0.00656	0.0541
Chlorobenzene	1.06	3.38

Notes

1. It is assumed that no visible free product is present within the top 1.0m of soil
2. Metal RTC derived considering Soil Codes and background data
- a – based on background soil concentration
- b – based on Soil Code
3. Xylene - the lowest RTC of the three isomers has been presented. Users must consider total exposure from all xylene isomers and not consider them in isolation
4. TPH aromatic C7-C8 is considered to comprise toluene only by Atkins
- * 5. The RTC for TPH aliphatic C10-C12 and acenaphthene is based on a value produced from following the approach outlined in SR4 for substances at saturation
6. 'Total' TPH RBSL derived for an area of development, based on individual RBSL and available mass fraction TPH data in soil at time of derivation, using the inverse weighted average approach.
7. Benzo(a)pyrene RBSL to be compared against sum of 16 US EPA Priority List PAHs using Toxicity Equivalence approach
8. Asbestos has not been considered here as it is being considered in a separate report
9. Additivity for TPHs and PAHs to be undertaken in line with guidance in Atkins report 5041216-REM-RPT-00216
10. Phenol is derived by comparing the oral exposure to the oral HCV and the dermal and inhalation exposure to the inhalation HCV
11. Elemental mercury is based on inhalation pathways only
12. TPH aromatic C5-C7 is considered to comprise benzene only

Contaminant	Minimum of RTC/RBSL mg/L
Benzo(a)pyrene	>sat
Benzene	0.0888
Toluene	47
Ethylbenzene	13.4
Xylene	4.1
TPH aromatic C7-C8	20
TPH aromatic C8-C10	0.985
TPH aromatic C10-C12	3.87
TPH aromatic C12-C16	>sat
TPH aromatic C16-C21	>sat
TPH aromatic C21-C35	>sat
TPH aliphatic C6-C8	1.4
TPH aliphatic C8-C10	0.0296
TPH aliphatic C10-C12	0.0228
TPH aliphatic C12-C16	>sat
TPH aliphatic C16-C21	>sat
TPH aliphatic C21-C35	>sat
1,2-Dichloroethane	0.0373
1,1,1-Trichloroethane	13.1
Tetrachloroethene	1.66
Trichloroethene	0.222
Vinyl chloride	0.00248
Dichloromethane	13
Cis-1,2 Dichloroethene	0.547
Trans-1,2 Dichloroethene	0.675
Acenaphthene	>sat
Anthracene	>sat
Benzo(a)anthracene	>sat
Benzo(b)fluoranthene	>sat
Benzo(k)fluoranthene	>sat
Chrysene	>sat
Dibenz(ah)anthracene	>sat
Fluoranthene	>sat
Fluorene	>sat
Indeno(1,2,3-cd)pyrene	>sat
Pyrene	>sat
Phenol	1700
Mercury (methyl)	45.5
Mercury (elemental)	0.00463
Naphthalene	0.952
TPH aromatic C5-C7	0.0888
TPH aliphatic C5-C6	1.93
1,1,1,2-Tetrachloroethane	1.05
1,1,2,2-Tetrachloroethane	6.89
Carbon Tetrachloride	0.0229
Chlorobenzene (mono)	13.7

Notes
1. Xylene - the lowest RTC of the three isomers has been presented. Users must consider total exposure from all xylene isomers and not consider them in isolation
2. TPH aromatic C7-C8 is considered to comprise toluene only by Atkins
3. Where indoor and outdoor values were presented by RBCA, these have been integrated in line with SNIFFER (2003). Where both indoor and outdoor values derived by RBCA were greater than the saturation limit, >sat has been presented. Where indoor values were presented by RBCA, and the outdoor values were >sat, only the indoor values have been presented. Therefore >sat indicates that the theoretical RTC is greater than solubility limit.
4. TPH >C16 are not considered to be volatile according to TPHCWG. Consequently the inhalation of vapour pathways have not been considered
7. Additivity for TPHs and PAHs to be undertaken in line with guidance in Atkins report 5041216-REM-RPT-00216
8. TPH aromatic C5-C7 is considered to comprise benzene only by Atkins

Appendix A: Data Assessment

Phase 2 Overburden (Backfill Materials)

Sample	Arsenic as As, dry weight	Cadmium as Cd, dry weight	Chromium as Cr, dry weight	Copper as Cu, dry weight	Lead as Pb, dry weight	Mercury as Hg, dry weight	Nickel as Ni, dry weight	Selenium as Se, dry weight	Vanadium as V, dry weight	Zinc as Zn, dry weight	VPH >C5 - C6, aliphatic	VPH >C6 - C8, aliphatic	VPH >C8 - C10, aliphatic	EPH >C10 C12, aliphatic	EPH >C12 C16, aliphatic	EPH >C16 C21, aliphatic	EPH >C21 C35, aliphatic	EPH >C35 C44, aliphatic	VPH >C6 - C7, aromatic	VPH >C7 - C8, aromatic	VPH >C8 - C10, aromatic	EPH >C10 C12, aromatic	EPH >C12 C16, aromatic	EPH >C16 C21, aromatic	EPH >C21 C35, aromatic
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
PH2 OB1	24.9	0.69	14.3	195	78.8	0.251	22.5	1.24	32.4	170	<10	23.3	23.3	27.8	15800	73500	280000	89700	<10	<10	17.8	18.9	6030	41600	279000
PH2 OB2	17.6	0.476	13.4	106	77.1	0.206	20.9	<1	21.5	174	11.2	33.6	85.1	218	19500	50900	167000	59900	<10	<10	61.6	146	7530	22600	113000
PH2 OB3	29	0.734	13.6	88.8	67.7	0.25	26.8	<1	24.9	200	10.9	26.1	26.1	65.2	10500	48700	189000	53900	<10	<10	20.6	43.4	4950	22800	170000
PH2 OB4	39.3	0.819	14.5	105	50	0.235	29	<1	26.6	175	10.9	27.4	60.2	48.1	16100	48000	161000	41700	<10	<10	42.7	32.8	4840	23100	140000
PH2 OB5	13.3	0.421	45	68.7	55.5	<0.14	17.6	<1	39.8	141	<10	48.3	169	315	12200	44200	274000	67300	<10	<10	118	210	5380	22100	127000
PH2 OB6	45.9	0.521	16.6	93.7	68	0.22	26.4	1.03	22.3	149	13.4	52.6	98.6	805	28900	68000	167000	27800	<10	11.2	78.4	536	26700	141000	346000
PH2 OB 7	37.3	0.606	21.1	115	103	0.516	33	<1	21	312	<10	20.7	24.2	38	5080	26700	97300	15900	<10	<10	23	25.3	3040	17400	129000
PH2 OB 8	26	0.426	17.4	90	74.8	1.71	29.7	1.09	20	191	<10	13.4	28	69.4	7660	24900	67900	6950	<10	<10	19	47	3440	15800	94300
PH2 OB 9	56.5	0.399	18.8	111	74.2	4.63	31	<1	19.2	259	<10	<10	<10	17.1	14200	29500	82100	15600	<10	<10	<10	11.4	5430	20900	122000
PH2 OB 10	21	0.358	14.8	68.4	73.9	0.546	29.6	<1	17	165	<10	11.2	20.2	59.4	3700	21700	70700	11200	<10	<10	15.7	39.2	<100	10300	77300
PH2 OB 11	22.1	0.404	24.3	44.6	49.8	0.152	22.7	<1	21.3	119	12.2	261	543	823	25800	46500	103000	36500	<10	<10	362	548	7400	22300	111000
PH2 OB 12	19.3	0.289	15.7	56.7	88.8	2.55	23.1	<1	21.2	174	<10	68.3	421	585	28100	101000	102000	12800	<10	<10	287	390	30900	77700	144000
PH2 OB 13	24.8	0.712	14.6	57.3	60	<0.14	22.4	1.17	21.4	158	<10	224	1730	2080	37200	75100	178000	72700	<10	<10	1160	1390	8760	40100	177000
PH2 OB 14	20.7	0.591	15.6	72	100	0.697	23.8	<1	22.2	253	11.3	33.9	269	2360	24000	49800	107000	37000	<10	<10	181	1570	8180	32100	131000
PH2 OB 15	22.7	0.825	16.2	62	78.4	1.4	31.6	1.02	21	210	<10	390	599	894	23600	44500	127000	43200	<10	<10	399	596	7340	25700	128000
PH2 OB 16	15.8	1.34	14.2	33	42.5	0.168	23.8	<1	14.4	119	<10	64.9	276	550	29100	72000	336000	133000	<10	<10	184	366	10600	38200	165000
PH2 OB 17	13.4	1.01	13	28.8	55.2	0.37	23.4	<1	13.8	117	<10	44.3	188	685	5880	17600	77900	24200	<10	<10	126	457	4400	12700	76200
PH2 OB 18	27.4	1.31	12.8	58.4	70.6	0.151	21.5	<1	18	258	<10	26.9	27.9	58	13200	43300	61200	15200	<10	<10	23.6	38.7	6700	30800	104000
PH2 OB 19	31.6	1.63	28.2	197	361	0.687	29.5	<1	25.3	660	<10	16	34.1	68.2	10900	28800	98600	43900	<10	<10	24.5	45.8	5580	23300	156000
PH2 OB 20	11.5	0.878	12.2	23.9	26.2	<0.14	21.3	<1	13.3	83.9	11	970	6300	8480	49700	95500	388000	120000	<10	<10	4200	5660	18100	48800	129000
PH2 OB 21	8.18	0.915	13.5	12.1	11	<0.14	21.2	<1	13.4	50.8	14.2	1090	5940	14500	91100	162000	58400	6490	<10	<10	3960	9700	31900	73200	44300
PH2 OB 22	9.02	0.816	18.1	17.3	14.2	<0.14	18.7	<1	18.1	52.6	<10	<10	<10	<10	7900	14800	19500	3830	<10	<10	<10	<10	3790	8280	17300
PH2 OB 23	15.5	1.04	14.9	27.9	36	0.341	21.8	<1	16.9	107	84	2800	5980	11600	76000	116000	136000	28700	<10	<10	3980	7710	53100	165000	356000
PH2 OB 24	9.85	1.03	15.5	18.3	15.6	<0.14	19.9	<1	16.9	56.8	14.8	69.5	312	1070	8730	13400	20300	5270	<10	<10	207	711	<100	9430	37000
PH2 OB 25	11.3	1.29	13.3	22.3	43.8	3.71	20.4	<1	18.3	105	12.1	46	646	6160	85800	147000	316000	109000	<10	<10	432	4100	31700	106000	229000
maximum	56.5	1.63	45	197	361	4.63	33	1.24	39.8	660	84	2800	6300	14500	91100	162000	388000	133000	0	11.2	4200	9700	53100	165000	356000
rbsl <1	64	2.6	130	143	-	1	50	3	416	478	-	8335000	112000	3204000	4513000	-	-	94820000	-	125000	94000	118000	131000	82000	1130000
rbsl >1	-	-	-	-	-	-	-	-	-	-	-	-	158000	-	-	-	-	-	-	146000	257000	1394000	-	-	-

Exceedences of shallow residential thresholds

Phase 2 Overburden (Backfill Materials)

Sample	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)Anthracene	Chrysene	Benzo(b)Fluoranthene	Benzo(k)Fluoranthene	Benzo(a)Pyrene	Indeno(123-cd)Pyrene	Dibenzo(ah)Anthracene	Benzo(ghi)Perylene
	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
PH2 OB1	<260	<100	<100	<100	453	<100	689	649	488	729	521	476	615	461	112	504
PH2 OB2	<26	<100	<100	169	1090	282	2160	1910	1630	1920	1710	1290	1760	971	316	1040
PH2 OB3	<260	<100	<100	<100	437	<100	324	370	264	486	321	207	232	130	<100	151
PH2 OB4	<260	<100	<100	<100	363	<100	514	477	403	562	445	313	388	220	<100	242
PH2 OB5	<260	<100	<100	<100	652	164	1250	1100	795	847	689	640	796	426	116	417
PH2 OB6	220	<100	<100	842	8520	648	1250	3650	1640	4220	854	394	719	336	287	495
PH2 OB 7	259	<100	<100	<100	1060	131	1010	994	643	1150	709	505	635	363	147	453
PH2 OB 8	224	<100	<100	<100	863	<100	714	765	503	791	521	408	493	283	121	370
PH2 OB 9	431	<100	216	192	1690	1630	1790	1480	1110	1350	921	796	1070	570	213	655
PH2 OB 10	322	<100	<100	140	2150	261	2070	3220	2770	5060	2350	1130	1620	659	752	1120
PH2 OB 11	<100	<100	<100	<100	215	<100	254	245	157	267	151	138	154	<100	<100	<100
PH2 OB 12	622	<100	377	412	3260	737	3980	2970	2470	2660	1820	1740	2300	1130	434	1210
PH2 OB 13	<100	<100	<100	<100	395	<100	467	436	285	419	236	234	277	140	<100	165
PH2 OB 14	318	<100	171	164	1250	214	1220	1010	721	1000	551	488	563	286	<100	319
PH2 OB 15	121	<100	<100	<100	559	<100	674	631	459	696	468	373	439	245	<100	305
PH2 OB 16	<100	<100	<100	<100	595	150	1010	709	689	611	489	389	542	224	<100	234
PH2 OB 17	<100	<100	<100	<100	194	<100	326	247	247	287	199	162	225	<100	<100	116
PH2 OB 18	<100	<100	<100	<100	295	<100	503	397	392	452	452	315	380	199	<100	208
PH2 OB 19	358	<200	364	259	2710	300	3290	3140	2200	3430	2160	1860	2280	1320	444	1640
PH2 OB 20	<100	<100	<100	<100	125	<100	397	304	226	206	127	122	148	<100	<100	<100
PH2 OB 21	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
PH2 OB 22	<100	<100	<100	<100	<100	<100	116	116	116	183	160	<100	<100	<100	<100	<100
PH2 OB 23	<100	<100	<100	<100	149	<100	184	338	194	331	268	211	232	139	<100	151
PH2 OB 24	<100	<100	<100	<100	181	<100	452	330	325	481	401	239	250	147	<100	129
PH2 OB 25	<100	<100	<100	<100	423	<100	488	602	341	530	478	336	423	262	<100	289
maximum	622	0	377	842	8520	1630	3980	3650	2770	5060	2350	1860	2300	1320	752	1640
RBSL <1	5850	-	1380000	1390000	-	14800000	1630000	1150000	16500	2220000	23900	243000	900	23600	2390	248000
RBSL >1		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Exceedences of shallow residential thresholds

Bedrock Validation (NCA 1 to 3)

Sample	Depth below bedrock surface (m)	Arsenic as As, dry weight mg/kg	Cadmium as Cd, dry weight mg/kg	Chromium as Cr, dry weight mg/kg	Copper as Cu, dry weight mg/kg	Lead as Pb, dry weight mg/kg	Mercury as Hg, dry weight mg/kg	Nickel as Ni, dry weight mg/kg	Selenium as Se, dry weight mg/kg	Vanadium as V, dry weight mg/kg	Zinc as Zn, dry weight mg/kg	VPH >C5 - C6, aliphatic ug/kg	VPH >C6 - C8, aliphatic ug/kg	VPH >C8 - C10, aliphatic ug/kg	EPH >C10 - C12, aliphatic ug/kg	EPH >C12 - C16, aliphatic ug/kg	EPH >C16 - C21, aliphatic ug/kg	EPH >C21 - C35, aliphatic ug/kg	EPH >C35 C44, aliphatic ug/kg	VPH >C6 - C7, aromatic ug/kg	VPH >C7 - C8, aromatic ug/kg	VPH >C8 - C10, aromatic ug/kg	EPH >C10 - C12, aromatic ug/kg	EPH >C12 - C16, aromatic ug/kg	EPH >C16 C21, aromatic ug/kg	EPH >C21 - C35, aromatic ug/kg
NCA 1	0.30-	7.76	<0.02	14.2	15.3	20.3	<0.14	36.7	<1	13.6	68.7	<10	<10	<10	<10	140	441	2250	<100	<10	<10	<10	<10	<100	<100	<100
NCA 1	1.00-	7.99	<0.02	13.4	11.5	17.3	<0.14	30.4	<1	11.4	60.7	<10	<10	14.6	15.7	1340	551	<100	<100	<10	<10	13.4	11.2	1350	1620	2410
NCA 1	1.95-	10.4	<0.02	15.8	18.5	18.5	<0.14	39.1	<1	15.8	74	<10	<10	<10	<10	154	484	2080	<100	<10	<10	<10	<10	<100	<100	<100
NCA 2	0.25-	9.12	<0.02	14.1	6.46	14.9	<0.14	36.3	<1	15.2	70.7	<10	<10	<10	<10	687	1940	5920	<100	<10	<10	<10	<10	378	353	<100
NCA 2	1.00-	9.85	<0.02	15.1	5.17	9.78	<0.14	33.2	<1	14.9	61.4	<10	<10	<10	<10	<100	<100	<100	<100	<10	<10	<10	<10	<100	<100	<100
NCA 2	1.70-	8.91	<0.02	12.4	10.5	13.5	<0.14	34.4	<1	11.2	66.7	<10	<10	<10	<10	349	771	1330	<100	<10	<10	<10	<10	<100	<100	<100
NCA 3	0.40-	8.43	<0.02	13.8	10.3	15.5	<0.14	32.4	<1	15.5	52.9	<10	18.4	46	69	<100	<100	830	<100	<10	<10	33.4	46	<100	<100	<100
NCA 3	1.00-	12	<0.02	14.9	6.52	15.3	<0.14	40	<1	17.5	60.2	<10	<10	<10	<10	<100	234	7140	2250	<10	<10	<10	<10	<100	<100	<100
NCA 3	1.60-	4.48	0.123	4.5	1.44	4.17	0.275	4	<1	3.67	42	<10	<10	<10	<10	200	447	622	227	<10	<10	<10	<10	<100	<100	<100
maximum		12	0.123	15.8	18.5	20.3	0.275	40	0	17.5	74	0	18.4	46	69	1340	1940	7140	2250	0	0	33.4	46	1350	1620	2410
resi <1		64	2.6	130	143	337	1	50	3	113	478	-	69800	9760	1780000	4510000	94200000	94800000	94820000	49.3	86900	14800	57300	131000	82000	888000
resi >1		-	-	-	-	-	-	-	-	-	-	-	-	158000	-	-	-	-	-	-	146000	257000	1394000	-	-	-

Sample Ref	Depth (m bgl)	Arsenic as As, dry weight mg/kg	Cadmium as Cd, dry weight mg/kg	Chromium as Cr, dry weight mg/kg	Copper as Cu, dry weight mg/kg	Lead as Pb, dry weight mg/kg	Mercury as Hg, dry weight mg/kg	Nickel as Ni, dry weight mg/kg	Selenium as Se, dry weight mg/kg	Vanadium as V, dry weight mg/kg	Zinc as Zn, dry weight mg/kg	VPH >C5 - C6, aliphatic ug/kg	VPH >C6 - C8, aliphatic ug/kg	VPH >C8 - C10, aliphatic ug/kg	EPH >C10 - C12, aliphatic ug/kg	EPH >C12 - C16, aliphatic ug/kg	EPH >C16 - C21, aliphatic ug/kg	EPH >C21 - C35, aliphatic ug/kg	EPH >C35 C44, aliphatic ug/kg	VPH >C6 - C7, aromatic ug/kg	VPH >C7 - C8, aromatic ug/kg	VPH >C8 C10, aromatic ug/kg	EPH >C8 C12, aromatic ug/kg	EPH >C12 C16, aromatic ug/kg	EPH >C16 C21, aromatic ug/kg	EPH >C21 C35, aromatic ug/kg
		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
NCA4	0.30-	12	0.165	13.2	32.9	80.1	0.495	27.3	<1	13.9	237	11.1	44.4	597	1520	317000	230000	405000	189000	<10	<10	433	1010	605	939	3410
NCA5	0.20-	6.51	<0.02	16.8	13.6	17.2	0.143	40	<1	14.6	83.5	14	42	16.1	18.3	6940	25800	60200	15700	<10	<10	22.6	11.8	2480	9450	48800
NCA6	0.40-	6.66	<0.02	15.8	13.3	23.8	<0.14	39.6	<1	13.4	88.1	20.7	81.6	200	408	7250	15700	32900	10800	<10	<10	151	272	2530	6470	24500
NCA7	0.40-	8.82	<0.02	30.2	13	17.4	<0.14	49.3	<1	14.8	79.7	23.7	78.5	44.1	54.8	15500	45400	99400	33600	<10	<10	45.2	36.6	2250	13300	63900
NCA8	0.30-	8.46	0.578	15.1	15.5	19	<0.14	34.9	<1	14.5	96.8	13.7	43.1	22.1	25.2	5610	15400	38300	11900	<10	<10	26.3	16.8	1910	7860	38600
NCA9	0.30-	9.45	0.698	16.4	19	24.9	<0.14	41.9	<1	16.2	89.9	<10	13.4	<10	<10	2680	9290	40200	26600	<10	<10	11.3	<10	1280	7490	48300
NCA10	0.50-	9.04	0.181	16.1	12.4	17.3	<0.14	46	<1	15.4	84	16.1	60.2	31.2	37.6	10600	21300	39700	11000	<10	<10	34.4	25.8	4640	9910	37800
NCA11	0.50-	7.28	0.169	16.7	13.1	18.7	<0.14	43.2	<1	15.8	80.1	11.8	40.7	16.1	17.1	12400	34600	66300	19900	<10	<10	26.8	11.8	3360	15500	65500
NCA12	0.30-	18	0.41	12.1	33.1	142	0.559	20.9	<1	14.1	244	17.5	72.1	2290	4270	442000	380000	635000	226000	<10	25.1	1530	2850	116000	207000	263000
NCA13	0.30-	14.8	0.194	13.9	28.5	90.5	0.494	20	<1	14.6	179	14.1	71.5	1600	2150	249000	187000	468000	156000	<10	30.4	1070	1430	72300	120000	192000
NCA14	0.20-	12.7	0.165	11.6	29.3	94.5	0.594	22	<1	14.2	212	18.4	212	5480	7110	270000	206000	400000	161000	<10	38.9	3650	4740	68400	122000	212000
NCA15	0.30-	14.1	0.159	13.7	21.5	67	0.708	24.3	<1	19.8	156	<10	83.1	2730	3000	400000	285000	433000	290000	<10	<10	1840	2000	99400	153000	228000
NCA 16	0.40-	15.8	0.0542	13.5	65.1	31.8	0.228	27	<1	14.9	180	<10	56.9	99.6	98.6	16800	38700	105000	41700	<10	<10	71.2	65.7	6620	53600	186000
NCA 17	0.30-	13.5	0.11	16.1	39.4	101	0.31	31.4	<1	18	184	17.8	57.7	160	395	12100	16400	40400	10200	108	14.4	115	264	3620	10900	47900
NCA18	0.30-	11.1	0.726	18.6	28.9	27.2	<0.14	44	<1	16.1	104	12.2	36.6	37.7	30	10300	25200	58900	20300	<10	<10	37.7	20	3330	12700	64800
NCA19	0.40-	7.35	0.615	16	13.7	19.9	<0.14	44.1	<1	14.3	78.8	18.4	71.5	49.9	132	5470	8320	19100	5190	<10	<10	44.4	88.9	2990	6500	27100
NCA20	0.30-	18.5	0.701	15.4	73.5	61	0.294	28.6	<1	17.8	194	23	78.2	550	1280	63700	59700	88500	35000	<10	<10	370	852	15400	32700	95700
NCA21	0.30-	8.61	0.594	13.8	19.3	47.2	0.167	29.2	<1	13.1	253	18.4	73.6	2370	3680	136000	109000	327000	123000	<10	18.4	1590	2450	36600	61900	118000
NCA22	0.30-	5.84	0.65	16.7	8.88	15.1	<0.14	41.9	<1	13.4	76.9	23.6	70.9	39.7	54.8	16400	38500	66600	19300	<10	<10	38.7	36.5	3780	15800	64200
NCA23	0.20-	13.8	0.793	14.5	28.2	64.9	6.24	30.7	<1	16	156	28.9	123	1530	2570	134000	123000	409000	138000	<10	22.2	1050	1710	43000	85400	173000
NCA 24	0.30-	18.2	0.314	19.2	48.2	84.8	0.764	29.6	<1	20.3	213	<10	70.7	288	570	5580	16600	54400	15300	<10	<10	192	381	<100	3560	39200
NCA 25	0.30-	18.1	0.265	13.9	43	62.8	0.495	29.6	<1	18	171	12.5	155	903	1200	35000	40400	117000	69200	<10	10.3	602	803	9130	23700	82600
NCA 26	0.30-	14.8	0.106	13.8	32.4	289	<0.14	30.1	<1	16.1	106	23.4	74.5	61.7	99	3000	5550	12500	3230	<10	<10	505	66	<100	2300	12400
NCA 27	0.30-	7.74	0.77	16.2	14.3	21.1	<0.14	34.2	<1	16.3	91	19.4	68.9	36.6	44.2	3550	9310	<100	<100	<10	<10	45.2	29.1	2670	6520	27200
NCA 28	0.30-	9.92	0.741	15.7	21.5	25.8	<0.14	37.6	<1	16.9	98.8	14.3	53.9	33	29.7	4980	18600	1080000	81100	<10	12.1	44	19.8	3090	13000	640000
NCA 29	0.20-	9.87	0.775	16.6	21.4	29.1	<0.14	37.5	<1	17	105	33.3	133	83.3	94.4	5300	16500	<100	10400	<10	14.4	78.8	63.3	3230	9200	44800
NCA 30	0.30-	11.2	1.06	16.8	24.5	32.2	<0.14	43.1	<1	17.8	117	14.1	47.7	30.4	28.2	4120	11000	<100	4720	<10	11.9	38	18.4	3200	7160	28800
NCA 31	0.20-	3.83	0.757	15.6	8.13	13.2	<0.14	40.4	<1	12.7	77.2	16	47.9	26.6	23.4	<100	4050	16400	3980	<10	<10	37.2	16	2930	8270	34000
NCA 32	0.30-	4.52	0.707	14.2	6.67	17.6	<0.14	31.8	<1	11.2	85.6	18	69	39.3	47.7	8000	17500	35600	12200	<10	<10	50.9	31.8	3060	10200	35500
NCA 33	0.20-	8.97	0.993	16.3	20.2	106	<0.14	37.6	<1	14.1	294	11.9	42.3	28.2	23.9	3480	10200	27300	9380	<10	<10	35.8	16.3	1870	6660	29400
NCA 34	0.30-	5.91	0.691	14.1	10.8	14.6	<0.14	30.4	<1	14.1	70.7	21.4	81.5	78.3	142	4230	10500	24800	7700	<10	<10	70.8	94.3	1630	6230	28700
NCA 35	0.20-	7.64	0.774	14	14.1	24.1	<0.14	33.1	<1	14.1	80	18.4	72.6	45.5	57.4	3570	10800	26100	7790	<10	<10	48.7	37.9	2160	7260	32100
NCA 36	0.30-	7.22	0.686	19.5	14.2	18.9	<0.14	33.6	<1	15.2	74.8	10.8	43.1	29.1	45.3	3230	11500	26900	8220	<10	<10	30.2	30.2	2130	7580	34600
NCA 37	0.30-	5.51	0.884	15.8	12.3	17	<0.14	37.5	<1	16	87.8	14.9	55.4	42.6	53.3	2220	7990	22500	7730	<10	<10	46.9	35.2	936	4680	25500
NCA 38	0.20-	4.86	0.574	14.9	10.8	12.8	<0.14	35.4	<1	13.5	79	<10	56.1	41.3	68.8	4760	9480	19600	4400	<10	<10	40.2	45.5	2360	6080	21200
NCA 39	0.30-	7.63	0.995	25.3	16.3	19.3	0.149	34.4	<1	19.8	84	18.6	66.6	42.6	57.9	2700	11200	25000	5080	<10	<10	47	38.2	1600	9910	31500
NCA 40	0.20-	17.8	1.08	24.5	43.9	33.5	0.189	31.2	<1	19.4	115	22.4	77.3	63.8	93	3470	8290	20200	5740	<10	<10	60.5	61.6	1160	5450	23000
NCA 41	0.30-	7.21	0.656	15.5	15.3	18.3	<0.14	35.3	<1	14	81.8	19.4	68.9	36.6	45.2	2430	13400	28900	8300	<10	<10	42	30.2	1420	10800	38400
NCA 42	0.20-	7.47	0.7	14.3	15.7	20.6	<0.14	34.7	<1	14.8	76.8	18.2	63.2	34.3	46.1	4070	22300	46700	14600	<10	<10	41.8	31.1	2010	19300	69200
NCA 43	0.30-	6.41	0.718	15.1	12.6	18.5	<0.14	36.9	<1	14	82.9	19.4	71	97.8	112	4500	14100	26400	5180	<10	<10	84.9	75.3	3280	15000	29500
NCA 44	0.20-	7.74	0.905	37.5	16.7	21.1	0.149	29.7	<1	21.9	90.9	11.9	44.2	31.3	41	5560	12800	32600	9560	<10	<10	34.5	27	6120	17700	53600
NCA 45	0.30-	3.46	0.612	16.1	5.23	11.3	<0.14	32.1	<1	13.4	71.9	14.5	49.7	31.1	29	3540	9270	25100	8370	<10	<10	40.4	19.7	2110	6360	29400
NCA 46	0.30-	10.8	0.884	16.2	17.9	23.5	<0.14	39.1	<1	14.4	89.2	17.5	71	55.7	85.2	4220	14600	43700	19300	<10	<10	57.9	56.8	2440	11300	56100
NCA 47	0.20-	5.13	0.772	15.3	11.8	14.8	<0.14	39.7	<1	14.4	79.6	14.8	50.7	32.7	31.7	1780	7300	21100	6960	<10	<10	43.3	21.1	1680	8000	35100
NCA 48	0.30-	6.96	0.897	15.5	13.3	18.8	<0.14	35.7	<1	16.9	83.8	15.3	57.9	29.5	42.6	3420	9640	24100	5730	<10	<10	43.7	28.4	1880	6610	28700
NCA 49	0.20-	8.1	0.729	14.9	25.8	20.3	<0.14	34.6	<1	15.1	83	17.3	62.9	39	58.5	3310	11900	34700	11200	<10	<10	43.4				

Coed Darcy_Monitor Phase 29

Soils Validation (Shallow)

[illegible]

Soils Validation (Deep)

Sample Ref	Depth (m bgl)	Arsenic as As, dry weight mg/kg	Cadmium as Cd, dry weight mg/kg	Chromium as Cr, dry weight mg/kg	Copper as Cu, dry weight mg/kg	Lead as Pb, dry weight mg/kg	Mercury as Hg, dry weight mg/kg	Nickel as Ni, dry weight mg/kg	Selenium as Se, dry weight mg/kg	Vanadium as V, dry weight mg/kg	Zinc as Zn, dry weight mg/kg	VPH >C5 - C6, aliphatic ug/kg	VPH >C6 - C8, aliphatic ug/kg	VPH >C8 - C10, aliphatic ug/kg	EPH >C10 - C12, aliphatic ug/kg	EPH >C12 - C16, aliphatic ug/kg	EPH >C16 - C21, aliphatic ug/kg	EPH >C21 - C35, aliphatic ug/kg	EPH >C35 - C44, aliphatic ug/kg	VPH >C6 - C7, aromatic ug/kg	VPH >C7 - C8, aromatic ug/kg	VPH >C8 - C10, aromatic ug/kg	EPH >C10 - C12, aromatic ug/kg	EPH >C12 - C16, aromatic ug/kg	EPH >C16 - C21, aromatic ug/kg	EPH >C21 - C35, aromatic ug/kg	
NCA4	1.00	20.5	0.276	16.1	54.9	102	2.18	30.5	<1	20	232	14.3	48.4	197	491	36600	47500	148000	57800	<10	37.4	149	327	9770	30000	128000	
NCA4	2.00	22.4	0.25	15.3	62.9	166	1.4	26.9	<1	21.5	407	18.2	255	842	1060	72000	81700	152000	49900	<10	17.1	562	707	20500	45300	131000	
NCA4	3.00	20.5	0.257	16.7	66.4	107	0.963	25.4	<1	21.9	231	18.1	310	807	1010	46300	59300	152000	64600	<10	538	670	11000	38100	134000		
NCA4	4.00	15.2	0.16	17.3	38.2	43.8	0.431	31.9	<1	17.9	114	<10	22.4	33	66.1	42900	57800	142000	56400	<10	<10	22.4	43.7	6500	26300	107000	
NCA4	5.00	12.4	<0.02	19.7	32.2	34.9	0.246	38.8	<1	19.5	110	<10	31.2	42	91.2	35200	38000	82500	36700	<10	<10	33.6	60	9930	20100	61300	
NCA5	1.20	20.7	0.453	16.1	55.5	67.1	0.531	23.2	<1	16.9	140	<10	11.3	49.7	188	32700	34100	105000	54800	<10	<10	37.3	124	6300	16900	73700	
NCA5	2.00	23.2	0.442	19.7	66.2	165	0.786	26.7	<1	24.9	289	11.4	228	838	1020	50000	73700	200000	72900	<10	<10	559	681	8000	23900	147000	
NCA5	3.30	16.6	0.207	16.8	40.5	80.3	0.621	24.7	<1	23.1	183	12.4	136	647	1120	66900	92900	239000	71300	<10	<10	432	747	13200	52300	197000	
NCA5	4.00	18.4	0.174	16	48.1	57.5	0.442	31.3	<1	20	175	15.1	161	510	897	29500	39900	91300	30400	<10	<10	340	599	4940	19300	79500	
NCA5	5.00	17.1	0.147	15.2	46.5	60.5	0.878	28.3	<1	18.1	223	19.0	230	1260	1810	123000	126000	648000	129000	<10	64.4	842	1080	23300	54100	130000	
NCA6	1.30	19	0.201	10.4	39.3	31.5	0.377	16.5	<1	11.7	103	<10	52.7	797	1430	121000	20000	81800	<10	13.2	191	951	23600	51800	108000		
NCA6	2.30	23.7	0.343	17.9	75.5	199	0.882	31	<1	23.2	329	20.2	60.5	329	763	47900	64000	137000	52200	<10	13.4	222	508	9910	32300	131000	
NCA6	3.10	28.5	0.403	17.1	67.5	116	0.803	27.9	<1	21.8	230	24.9	236	906	1250	50300	65900	164000	67500	<10	<10	605	832	8370	30800	123000	
NCA6	4.10	22.1	0.303	17	55.4	239	0.613	28.9	<1	21.8	273	30.5	434	957	1210	43900	60400	148000	58600	<10	<10	637	808	6820	35800	150000	
NCA6	5.10	20	0.368	16.2	56.6	89.4	0.749	26.1	<1	18.8	194	13.6	57.4	348	699	42700	49700	129000	45200	<10	90.4	234	466	12600	31700	93800	
NCA7	1.20	15.4	0.657	12.1	30.4	153	0.771	24	<1	14.6	161	<10	109	2420	3190	308000	359000	475000	154000	<10	14.4	1620	2130	93900	199000	376000	
NCA7	2.30	10.2	0.608	15.3	17.8	18.8	<0.14	28.4	<1	14.7	79.7	<10	17.5	56.6	113	6410	15400	176000	43400	<10	<10	39.1	75.1	2480	9400	49600	
NCA7	3.10	21.1	1.03	16.5	56.7	119	1.14	32.6	<1	22.4	242	249	1810	6440	7370	13400	23600	53900	25200	19.6	<10	4290	4920	5340	15900	72700	
NCA7	4.00	22.6	0.909	15.9	58.7	98.3	2.84	25.7	<1	20.7	212	26.8	994	2120	2160	49500	58900	207000	71900	<10	<10	1410	1480	10800	35300	179000	
NCA7	5.20	18.7	0.964	14.1	68.1	120	0.692	28	<1	17.6	243	29.8	155	1530	2480	52100	68500	157000	59800	16.7	53.3	1020	1660	51900	142500		
NCA8	1.00	20	1.24	17.3	66.1	218	0.512	34.4	<1	19.5	640	12.8	202	805	1310	51600	55100	112000	49800	<10	<10	537	871	11600	32400	114000	
NCA8	2.20	32.4	0.764	29.1	64.1	150	0.538	28.4	<1	24	1860	16.8	150	446	685	64800	82600	122000	47400	<10	<10	297	457	21100	53600	137000	
NCA8	3.00	20.6	0.84	39.9	56	205	0.516	30.8	1.11	54.5	197	33.5	338	806	1130	24600	36300	83400	34600	<10	<10	537	755	9500	28400	121000	
NCA8	4.30	20.7	1.03	18.2	85.5	108	0.788	35.2	<1	23.8	352	<10	30.8	48.4	113	96800	113000	319000	119000	<10	<10	33	75.9	24300	63900	209000	
NCA8	5.10	23.5	1.07	15.6	81.6	273	2.46	32.1	<1	20	610	12.1	69.3	845	1370	84900	99800	236000	94000	<10	18.7	567	915	30100	73800	175000	
NCA9	1.30	11.6	0.763	18.4	30.3	39.4	0.274	33.7	<1	20.1	137	<10	22.4	48.2	125	7100	13200	37100	11700	<10	<10	33.6	84	1370	7680	43500	
NCA9	2.00	18.6	0.78	18.2	44.4	66.2	0.432	27.4	<1	21.4	229	13.8	94.7	309	585	51800	49700	125000	52200	<10	<10	13.8	210	390	15600	34800	124000
NCA9	3.00	18.5	0.793	17.3	48.4	95.2	0.522	20.9	<1	16.7	264	16.1	293	543	744	34500	37900	98500	37200	<10	12.4	363	496	8860	27800	89900	
NCA9	4.10	7.99	0.81	13.7	19.2	37.4	<0.14	32.6	<1	19.9	437	11.4	44.8	323	754	55900	49600	78200	21900	<10	12.5	224	592	16900	30400	51000	
NCA9	5.30	17.4	0.923	18.1	36.3	63.9	0.376	33.3	<1	18.1	182	21.8	125	503	849	21300	29300	64300	23500	<10	<10	337	566	6040	27300	103000	
NCA10	1.00	11	0.0933	12.5	22.1	43.8	2.39	25	<1	15.2	145	10.9	82.7	5150	6070	228000	294000	1160000	447000	<10	28.3	3440	4050	45700	135000	256000	
NCA10	2.40	18.6	0.371	16.3	42.8	55.3	1.56	27.5	<1	18	134	30.8	118	351	675	19200	34100	143000	194000	<10	14.3	237	449	6800	23100	165000	
NCA10	3.20	7.22	<0.02	14.1	19.4	14.8	<0.14	30.2	<1	14.2	63.8	<10	14.4	36.6	51.1	939	653	645	518	<10	<10	25.5	34.4	881	633	1410	
NCA10	4.00	9.18	<0.02	20.6	25.7	20.2	<0.14	42.3	<1	18.4	80.6	<10	<10	<10	<10	529	1010	1620	<100	<10	<10	<10	<10	2360	3350	9180	
NCA10	5.10	9.24	<0.02	14.4	24.2	15.2	<0.14	30.6	<1	13.5	70.8	<10	28.9	63.3	123	<100	<100	<100	<100	<10	<10	47.7	82.1	72600	134000	197000	
NCA11	0.80	15.8	0.109	15.4	28.3	49.5	1.23	24.2	<1	14.8	128	13.2	38	376	898	125000	153000	592000	269000	<10	14.3	254	593	345000	1620000	4150000	
NCA11	2.20	230	0.130	14.7	14.9	10.3	0.159	24.3	<1	15.9	59.4	13.0	1370	1370	1370	31700	20000	96200	38700	<10	67.1	909	671	10100	34000	101000	
NCA11	3.00	20.1	0.309	16.7	64.2	88.8	1.27	31	<1	21.3	209	17.9	138	454	902	32600	52900	123000	47700	<10	<10	339	600	7550	26900	123000	
NCA11	4.10	18.7	0.168	15.4	44.4	70.2	0.71	26.8	<1	18.9	140	19.4	42.2	113	296	13500	19200	31000	10000	<10	<10	75.2	190	6020	17000	58300	
NCA11	5.00	18.7	0.34	15.5	46.6	52.9	0.615	28.4	1.13	20.5	131	57.5	61	130	357	16500	30600	62100	17700	<10	<10	92	238	4530	18800	73600	
NCA12	1.00	21.4	0.392	30	589	76.3	0.631	32.9	<1	17.3	519	11.2	47	647	1320	189000	159000	312000	155000	<10	<10	438	881	33200	66200	145000	
NCA12	2.10	28.1	0.245	14.6	65	66	0.795	24.6	<1	16.6	138	<10	13.6	85.9	238	19100	31600	47600	16200	<10	<10	65.5	159	3840	14300	55200	
NCA12	3.10	20.2	0.163	15.2	52.5	120	0.782	29.3	<1	25.1	241	48.6	296	1170	1990	59200	77000	107000	27900	<10	<10	779	1330	25700	64100	158000	
NCA12	4.20	21.4	0.708	17.4	73.1	112	0.591	31.3	<1	24.2	333	392	1830	1890	2620	44600	64400	99900	38900	<10	<10	1260	1750	13500	40100	117000	
NCA12	5.20	25.9	1.5	17.3	54.2	193	2.51	28.3	<1	20.4	437	171	383	441	760	28800	40300	98700	33900	<10	21.7	294	587	8880	29600	118000	
NCA13	1.70	8.44	<0.02	14.7	14.8	10.3	0.159	24.3	<1	15.9	59.4	13.0	1370	1370	1370	31700	20000	96200	38700	<10	67.1	909	671	10100	34000	101000	
NCA13	2.40	18.5	0.248	14.3	43.5	68.3	0.443	24.4	<1	16.1	142	15.5	193	1090	1600	49100	52900	162000	43100	<10	<10	738	1070	15100	42200	141000	
NCA13	3.30	20.2	0.261	16.3	64.7	92.2	0.76	26.2	<1	26.9	214	22	78.9	263</													

Soils Validation (Deep)

Sample	Depth (m bgl)	Acenaphthylene ug/kg	Acenaphthene ug/kg	Anthracene ug/kg	Benzo(a)Anthracene ug/kg	Benzo(b)Fluoranthene ug/kg	Benzo(k)Fluoranthene ug/kg	Benzo(a)Pyrene ug/kg	Benzo(ghi)Perylene ug/kg	Chrysene ug/kg	Fluoranthene ug/kg	Fluorene ug/kg	Indeno(123-cd)Pyrene ug/kg	Phenanthrene ug/kg	Pyrene ug/kg	Naphthalene ug/kg	Dibenzo(ah)Anthracene ug/kg
NCA4	1.00-	<100	<100	<100	115	398	383	342	437	269	514	670	<100	229	500	636	129
NCA4	2.00-	<100	<100	<100	338	339	291	393	244	529	465	<100	219	387	495	<100	<100
NCA4	3.00-	<100	<100	<100	189	198	211	244	161	301	293	<100	130	181	306	<100	<100
NCA4	4.00-	<100	<100	<100	159	163	146	182	146	246	185	<100	185	165	250	<100	<100
NCA4	5.00-	<100	<100	<100	<100	<100	<100	<100	<100	139	<100	<100	<100	180	<100	<100	<100
NCA5	1.20-	<100	<100	<100	505	543	416	544	671	544	638	<100	302	365	589	<100	<100
NCA5	2.00-	<100	<100	<100	117	597	609	462	598	356	758	875	<100	333	600	720	214
NCA5	3.30-	<100	<100	<100	117	726	755	611	758	508	905	977	<100	455	605	906	178
NCA5	4.00-	<100	<100	<100	166	211	157	200	138	257	243	<100	119	193	251	<100	<100
NCA5	5.00-	<100	<100	<100	132	404	405	426	273	550	757	<100	239	610	729	128	<100
NCA6	1.30-	<100	<100	<100	188	823	853	684	916	563	1000	1190	125	501	744	1060	141
NCA6	2.30-	<100	<100	<100	173	177	685	719	534	503	922	990	133	422	837	944	188
NCA6	3.10-	<100	<100	<100	416	483	382	487	358	601	680	<100	316	484	655	<100	<100
NCA6	4.10-	<100	<100	<100	151	171	750	627	615	762	524	929	1130	130	456	858	1010
NCA6	5.10-	<100	<100	<100	231	261	231	300	202	335	355	<100	173	282	353	<100	<100
NCA7	1.20-	<100	265	261	1510	1390	911	1450	810	1530	1670	332	763	690	1720	148	241
NCA7	2.30-	<100	<100	<100	<100	<100	<100	<100	<100	142	<100	<100	<100	131	124	<100	<100
NCA7	3.10-	<100	<100	<100	204	215	205	243	152	288	274	<100	129	202	305	<100	<100
NCA7	4.00-	<100	<100	<100	482	485	377	472	301	590	708	<100	264	377	622	<100	<100
NCA7	5.20-	<100	<100	<100	114	499	386	494	294	565	637	<100	264	796	751	163	<100
NCA8	1.00-	<100	<100	<100	403	405	241	436	251	563	586	<100	217	444	556	<100	<100
NCA8	2.20-	<100	<100	<100	216	208	165	215	134	300	309	<100	116	192	327	<100	<100
NCA8	3.00-	<100	<100	<100	221	350	449	380	352	528	591	<100	294	490	583	<100	<100
NCA8	4.30-	<100	<100	<100	513	578	455	593	365	741	703	113	311	597	838	273	<100
NCA8	5.10-	<100	<100	<100	216	212	183	234	148	254	380	<100	127	293	350	<100	<100
NCA9	1.30-	<100	<100	<100	128	132	116	153	115	187	197	<100	<100	140	203	<100	<100
NCA9	2.00-	<100	<100	<100	338	331	293	366	239	442	487	<100	193	330	496	<100	<100
NCA9	3.00-	<100	<100	<100	410	387	316	409	229	528	614	<100	201	387	554	<100	<100
NCA9	4.10-	<100	<100	<100	187	175	185	246	135	239	251	<100	122	133	296	<100	<100
NCA9	5.20-	<100	<100	<100	410	277	115	259	223	751	575	<100	167	729	664	124	<100
NCA10	1.00-	<100	<100	<100	114	660	707	543	738	508	895	892	156	450	547	946	160
NCA10	2.40-	<100	<100	<100	199	719	681	638	859	538	1020	1160	165	489	1040	1060	154
NCA10	3.20-	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	125	<100	<100	<100
NCA10	4.00-	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
NCA10	5.10-	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	113	<100	<100	<100
NCA11	0.80-	<100	286	597	1840	1680	1470	1960	1210	2130	3130	286	1070	2310	2380	405	372
NCA11	2.20-	<100	<100	<100	164	172	171	211	340	334	267	<100	<100	307	290	<100	<100
NCA11	3.00-	<100	<100	<100	608	608	489	880	376	782	890	<100	536	431	536	<100	<100
NCA11	4.10-	<100	<100	<100	146	152	129	166	<100	208	231	<100	<100	150	217	<100	<100
NCA11	5.00-	<100	<100	<100	<100	<100	<100	138	<100	177	178	<100	<100	206	174	<100	<100
NCA12	1.00-	<100	<100	<100	803	826	762	1030	640	1040	1010	<100	591	418	1020	149	164
NCA12	2.10-	<100	<100	<100	409	480	402	511	384	573	514	<100	313	300	443	<100	<100
NCA12	3.10-	<100	<100	<100	613	723	544	723	516	838	896	<100	429	543	792	129	147
NCA12	4.20-	<100	<100	<100	191	179	147	193	116	258	147	<100	<100	293	286	<100	<100
NCA12	5.20-	<100	<100	<100	392	342	337	431	261	534	675	<100	225	454	650	<100	<100
NCA13	1.40-	<100	<100	<100	623	705	624	853	705	527	546	<100	449	572	671	147	134
NCA13	2.40-	<100	<100	<100	338	389	271	350	228	513	481	<100	203	472	501	<100	<100
NCA13	3.30-	<100	<100	<100	131	593	676	526	673	682	780	837	<100	473	638	815	146
NCA13	4.20-	<100	<100	<100	496	554	436	545	365	645	731	<100	306	465	746	118	<100
NCA13	5.10-	<100	<100	<100	662	740	585	724	497	864	928	<100	414	599	931	165	140
NCA14	1.10-	<100	<100	<100	183	222	701	608	717	989	940	<100	331	948	1010	187	131
NCA14	2.30-	<100	<100	<100	606	681	482	643	410	816	787	<100	369	543	820	120	124
NCA14	3.10-	<100	<100	<100	539	547	470	594	391	717	766	<100	333	490	813	136	<100
NCA14	4.20-	<100	<100	<100	273	1050	1040	811	1020	598	1250	1560	229	549	1110	1430	229
NCA14	5.00-	<100	<100	<100	353	468	468	296	461	557	557	<100	225	380	577	167	181
NCA15	2.20-	<100	<100	<100	443	527	418	501	349	594	613	<100	291	490	590	631	<100
NCA15	3.10-	<100	<100	<100	139	642	685	533	691	432	809	1020	<100	377	640	963	172
NCA15	4.00-	<100	<100	<100	111	202	728	567	733	467	900	1170	133	404	736	1110	188
NCA15	5.20-	<100	<100	<100	371	404	298	392	259	513	519	<100	217	383	560	<100	<100
NCA16	1.20-	<100	<100	<100	240	278	190	250	187	375	329	<100	153	307	355	<100	<100
NCA16	2.20-	<100	<100	<100	113	497	521	418	559	357	610	747	<100	283	476	720	<100
NCA16	3.10-	<100	<100	<100	317	344	246	325	232	461	479	<100	180	388	476	<100	<100
NCA16	4.00-	<100	<100	<100	256	685	752	572	735	490	944	992	318	395	596	977	168
NCA16	5.00-	<100	<100	<100	469	465	327	444	297	638	636	155	128	481	662	191	115
NCA17	1.00-	<100	<100	<100	156	156	146	181	125	204	255	<100	<100	148	236	<100	<100
NCA17	2.30-	<100	<100	<100	136	1610	1450	1300	1590	910	1820	2370	<100	817	620	2440	118
NCA17	3.20-	<100	<100	<100	204	1360	1040	1310	759	1600	2390	384	707	1030	2060	221	207
NCA17	4.00-	<100	<100	<100	438	513	381	513	333	641	656	138	285	534	648	132	<100
NCA17	5.00-	<100	<100	<100	209	227	169	228	139	311	309	<100	118	243	315	<100	<100
NCA18	1.00-	<100	<100	<100	323	357	298	393	244	455	522	<100	204	481	505	120	<100
NCA18	2.10-	<100	<100	<100	231	222	195	265	154	326	401	<100	126	317	380	<100	<100
NCA18	3.10-	<100	<100	<100	448	403	298	391	257	1040	574	<100	188	886	861	115	<100
NCA18	4.00-	<100	<100	<100	491	465	312	444	297	638	636	155	128	481	662	191	<100
NCA18	4.20-	<100	<100	<100	197	170	222	152	403	282	408	<100	<100	408	327	<100	<100
NCA19	1.20-	<100	<100	<100	272	202	202	235	129	354	507	<100	<100	203	488	<100	<100
NCA19	2.00-</																