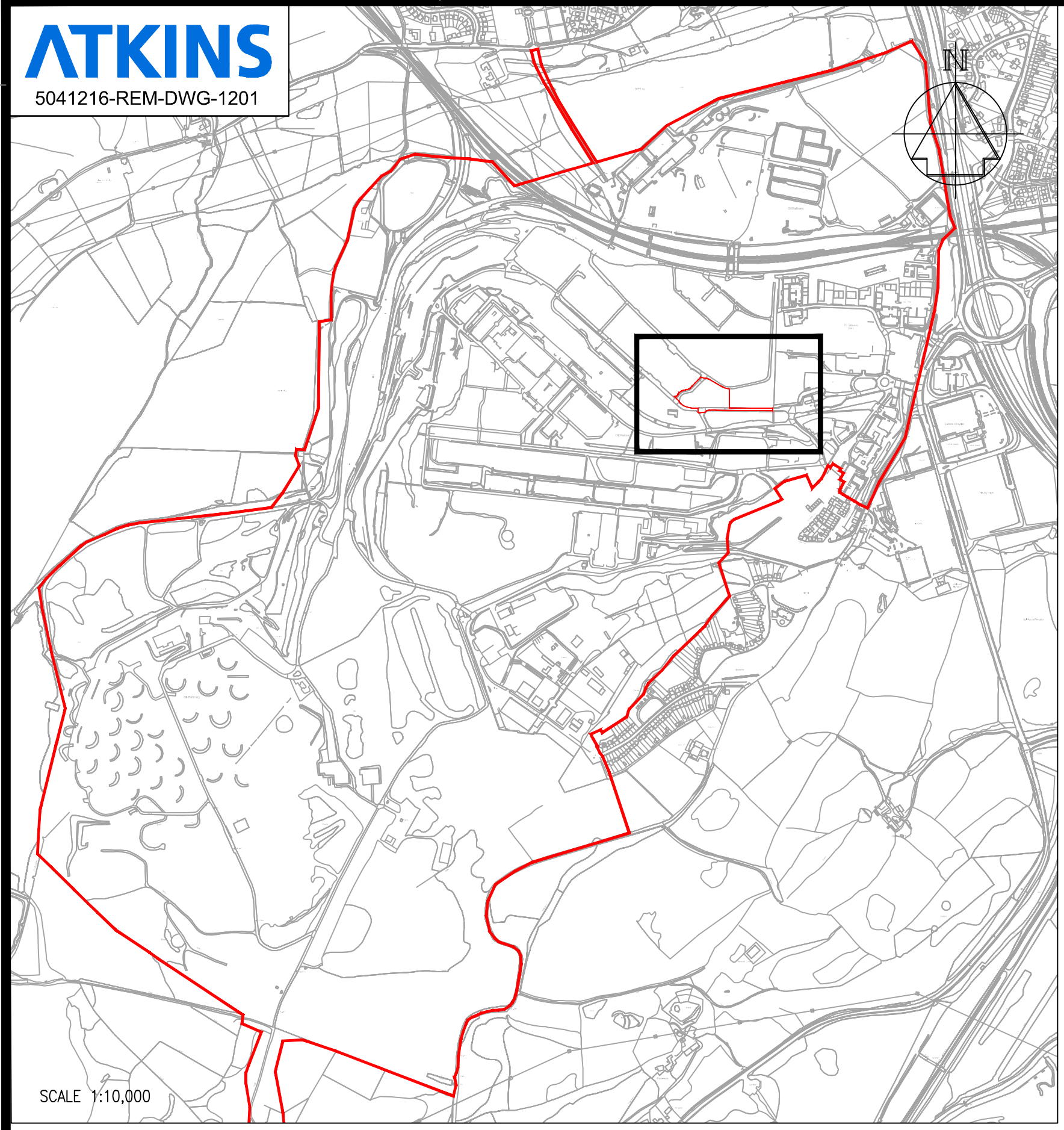




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ATKINS
5041216-REM-DWG-1201

SCALE 1:10,000



KEY:
— PROPOSED PHASE BOUNDARY (MONITOR PHASE 20)

NOTE:
LOCATION OF PROPOSED PHASE BASED ON ATKINS DRAWING
5041216-ENG-DWG-1156

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REVISIONS	Drawn By	Checked By	Date
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PURPOSE OF ISSUE	Rev.	Authorised for issue	Date
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Atkins Limited
Birmingham Office
The Axis, 10 Holiday Street
Birmingham
West Midlands B1 1TF
Tel 0121 483 5000 ©
Fax 0121 483 5252
THIS DRAWING IS NOT TO BE SCALED

CLIENT
ST.MODWEN

PROJECT
COED DARCY

DRAWING TITLE
PROPOSED PHASE BOUNDARY
(MONITOR PHASE 20)

Scales	DRAWN MJ	CHECKED ML	CO-ORD CHECK ML
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	DATE 02/05/12	DATE 02/05/12	DATE 04/04/12
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0	SHEET A1	PLOT DATE
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DRAWING NO	REV
5041216-REM-DWG-1201	-

APPENDIX A

PHOTOGRAPHS



Plate 1 Looking south across the study area.



Plate 2 Looking northeast across the study area towards the former refinery entrance.



Plate 3 Looking west across the study area



Plate 4 Looking east along an existing road which borders the study area to the south

APPENDIX B

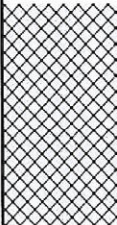
EXPLORATORY HOLE LOGS

Site: Coed Darcy Urban Village Client: St. Modwen Developments Ltd Project No: CATP-1			Start Date: 24/03/2011 End Date: 24/03/2011		Site Level (mAOD): 46.826 Easting: 271652.40 Northing: 195858.20	
Trial Pit Length (m): - Logged By: A Mann			Trial Pit Width (m): - Checked By:		Excavation Method: Machine Excavation Plant: Volvo 210 Excavator Shoring/Support: None	
Samples & Tests			Strata Details			
Depth (m)	Type	PID (ppm)	Thk	Legend	Depth	Description
0.30	ES		0.20		0.20	MADE GROUND, Brown slightly gravelly SAND. Medium to coarse gravel of sandstone and brick (0,0).
			0.20		0.40	
0.70	ES		0.40		0.80	MADE GROUND, light brown slightly gravelly SAND. Coarse gravel of brick and sandstone (0,0).
1.30	ES		1.00		1.80	MADE GROUND, Brown clayey gravelly SAND. Coarse gravel of brick, sandstone and quartz. Occasional boulders of concrete, brickwork. Occasional plastic (0,0).
						MADE GROUND. Locally stained grey sandy gravelly CLAY. Coarse gravel of sandstone and brick. Occasional cobbles and boulders of brick and concrete. Occasional wood, metal and solidified bitumen (2,1).
						End of Trial Pit at 1.80 m
General Notes: 1. All linear dimensions are in metres unless otherwise stated 2. All relative density/shear strength descriptions are based only on field observations and available in-situ test data.						
Groundwater Observations: No groundwater encountered			Stability: Trial Pit was stable.		General Remarks: Pit terminated at 1.8m on pipework.	

Site: Coed Darcy Urban Village			Start Date: 24/03/2011		Site Level (mAOD): 47.374	
Client: St. Modwen Developments Ltd			End Date: 24/03/2011		Easting: 271604.70	
Project No: CATP-1			Northing: 195860.30			
Trial Pit Length (m): -			Trial Pit Width (m): -		Excavation Method: Machine Excavation	
Logged By: A Mann			Checked By:		Plant: Volvo 210 Excavator	
					Shoring/Support: None	
Samples & Tests			Strata Details			
Depth (m)	Type	PID (ppm)	Thk	Legend	Depth	Description
0.40	ES		0.50		0.50	MADE GROUND. Coarse light brown gravelly SAND. Medium to coarse gravel of sandstone and brick. Rare brickwork (0,0).
0.80	ES		0.20		0.70	MADE GROUND, light brown slightly gravelly SAND. Coarse gravel of brick and sandstone (0,0).
1.50	ES		1.55			MADE GROUND as above but stained black, frequent pipework, brickwork and rubber hosing (4,2).
			0.05		2.25	Weathered SANDSTONE.
					2.30	End of Trial Pit at 2.30 m
General Notes: 1. All linear dimensions are in metres unless otherwise stated 2. All relative density/shear strength descriptions are based only on field observations and available in-situ test data.						
Groundwater Observations: Slight water ingress at 2.3m			Stability: Trial Pit was stable.		General Remarks: Pit terminated on bedrock	

Site: Coed Darcy Urban Village			Start Date: 24/03/2011		Site Level (mAOD): 47.014	
Client: St. Modwen Developments Ltd			End Date: 24/03/2011		Easting: 271580.80	
Project No: CATP-1					Northing: 195862.80	
Trial Pit Length (m): -			Trial Pit Width (m): -		Excavation Method: Machine Excavation	
Logged By: A Mann			Checked By:		Plant: Volvo 210 Excavator	
					Shoring/Support: None	
Samples & Tests			Strata Details			
Depth (m)	Type	PID (ppm)	Thk	Legend	Depth	Description
0.20	ES		0.30		0.30	MADE GROUND, light brown slightly gravelly SAND. Coarse gravel of brick and sandstone (0,0).
0.80	ES		1.40			MADE GROUND, Brown slightly clayey gravelly SAND. Coarse gravel of sandstone. Occasional whole brick and occasional clay pockets (0,0).
1.80	ES		0.35 0.05			MADE GROUND, Dark brown slightly clayey gravelly SAND, coarse gravel of sandstone and brick occasional wood (1,1).
					2.05 2.10	Weathered SANDSTONE. End of Trial Pit at 2.10 m
General Notes: 1. All linear dimensions are in metres unless otherwise stated 2. All relative density/shear strength descriptions are based only on field observations and available in-situ test data.						
Groundwater Observations: Slight water ingress at 2.1m			Stability: Trial Pit was stable.		General Remarks: Pit terminated on bedrock	

Site: Coed Darcy Urban Village			Start Date: 29/03/2011		Site Level (mAOD): 44.662	
Client: St. Modwen Developments Ltd			End Date: 29/03/2011		Easting: 271678.60	
Project No: CATP-1					Northing: 195868.10	
Trial Pit Length (m): -			Trial Pit Width (m): -		Excavation Method: Machine Excavation	
Logged By: A Mann			Checked By:		Plant: Volvo 210 Excavator	
					Shoring/Support: None	
Samples & Tests			Strata Details			
Depth (m)	Type	PID (ppm)	Thk	Legend	Depth	Description
0.30	ES	120.00	0.10		0.10	MADE GROUND. Brown gravelly SAND. Coarse gravel of brick and sandstone (0,0).
			0.30		0.40	
			0.10		0.50	Brown gravelly SAND. Coarse gravel of Weathered sandstone (0,0).
						Weathered SANDSTONE. End of Trial Pit at 0.50 m
General Notes: 1. All linear dimensions are in metres unless otherwise stated 2. All relative density/shear strength descriptions are based only on field observations and available in-situ test data.						
Groundwater Observations: No groundwater encountered			Stability: Trial Pit was stable.		General Remarks: Pit terminated on bedrock	

BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: WSMW077 (PIT)		PAGE 1 of 1	
	NUMBER	TYPE					DRILLING DATES: 03/12/03		DRILLING METHODS : JCB	
							DRILLER : JCB-Viv		BOREHOLE DIAMETER : -	
							LOGGED BY : EM		SCREEN TYPE & DIAM: -	
							CHECKED BY : SG		SCREEN SLOT SIZE: -	
							DESCRIPTION	COMMENTS	S,V	
	WSMW077 - 0.5m. (S,L,2xP)		*3.8		0.0		Soft, brown, silt with abundant rootletets. (MADE GROUND)	Damp. NVO	0,0	
							Soft, dark brown, fine sandy silt with frequent fine to coarse gravels, subangular cobbles and boulders. Occasional tabular boulders. (MADE GROUND)	Damp. NVO	0,0	
							Soft to firm, brown, silty clay with occasional fine to coarse gravels, subangular cobbles and boulders. (MADE GROUND)	Damp. NVO	0,0	
							Trial pit terminated at 0.9m due to refusal on concrete.			
					0.5					
					1.0					
					1.5					
					2.0					
					2.5					
					3.0					
					3.5					
					4.0					
					4.5					
					5.0					

LOCATION / NOTES: NVO = No visual or olfactory evidence of contamination S,V = Contamination Observations S - Odour score (0-5) V - Visual score (0-5)		LEGEND  Disturbed Sample  Undisturbed Sample  Headspace Analysis  Down Borehole Analysis  Groundwater Table  Perched Water Table		BOREHOLE LOG Job Title: BP Llandarcy Whole Site Investigation Location: BP Llandarcy Refinery Client: BP/WDA 			
				App'd:	Date: December 2003		
				Drawn : EM	Ref:		
				Scale: As Scale	Job No: 39991-044		
				Drg. Size: A4	BOREHOLE LOG		

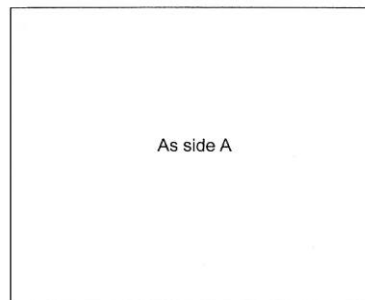
BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: WSMW065 (PIT)		PAGE 1 of 1	
	NUMBER	TYPE					DRILLING DATES: 26/11/03		DRILLING METHODS: JCB	
							DRILLER: JCB-Will		BOREHOLE DIAMETER: -	
							LOGGED BY: EM		SCREEN TYPE & DIAM: -	
							CHECKED BY: SG		SCREEN SLOT SIZE: -	
DESCRIPTION		COMMENTS	S,V							
	WSMW065 - 0.3m. (P)	*246	0.0	Loose, light brown, fine to medium sand with silt and clay. Frequent fine to coarse gravels. (MADE GROUND)	Damp. NVO	0,0				
	WSMW065 - 0.5m. (S,L)		0.5	Loose, black, fine to coarse sand comprising ash (MADE GROUND)	Damp. NVO	0,0				
	WSMW065 - 1.0m. (S,L)	*344	1.0	Firm, light grey to light brown, fine sandy SILT with occasional fine to coarse gravel. Occasional subangular cobbles.	Damp to dry. Strong hydrocarbon odour and staining	4,3				
	DUPLICATE (S,L)		1.5	With frequent subangular cobbles	With occasional black hydrocarbon staining from 1.0m.					
		*246	1.8	Trial pit terminated at 1.8m due to refusal.	Damp to dry. Strong hydrocarbon odour and moderate staining	4,3				
LOCATION / NOTES:		LEGEND		BOREHOLE LOG						
NVO = No visual or olfactory evidence of contamination S,V = Contamination Observations S - Odour score (0-5) V - Visual score (0-5)		 Disturbed Sample  Undisturbed Sample  Headspace Analysis  Down Borehole Analysis  Groundwater Table  Perched Water Table		Job Title: BP Llandarcy Whole Site Investigation Location: BP Llandarcy Refinery Client: BP/WDA 						
				App'd: _____ Date: December 2003 Drawn: EM Ref: _____ Scale: As Scale Job No: 39991-044 Drg. Size: A4 BOREHOLE LOG						

TRIAL PIT NUMBER: MSTP165
GROUND ELEVATION: -
DATE OF EXCAVATION: 04/6/98
WATER LEVEL: DRY
LOGGED BY: RF
APPROVED BY:

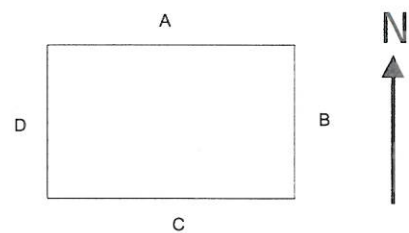
SIDE ELEVATIONS

SIDE D	SIDE A	SIDE B
	1	
0.3m 0.4m	2	
	3	
1.00m 1.25m	4 *	

SIDE C



PLAN



0 1 2m
Vertical Scale

Key:

- * Soil Sample location
- WA Water Sample
- HS Headspace Analysis
- Water Ingress

STRATA DESCRIPTIONS	COMMENTS	SAMPLES
1. Strong, brown, loose clay (MADE GROUND) 2. Black, coarse grained, tarry material 3. Orange/brown, firm CLAY 4. Dark green CLAY - darker with depth, oily Trial pit terminated on refusal at 1.25 mbgl due to sandstone bedrock	a. Strong hydrocarbon odour	<u>PID RESULTS</u> 0.5m - 3.5 ppm 1.0m - 1.5 ppm 1.25m - 15.8 ppm <u>SOIL SAMPLES</u> MSTP165-1.25m

Job Title: SOIL & GROUNDWATER INVESTIGATION

Location: LLANDARCY REFINERY

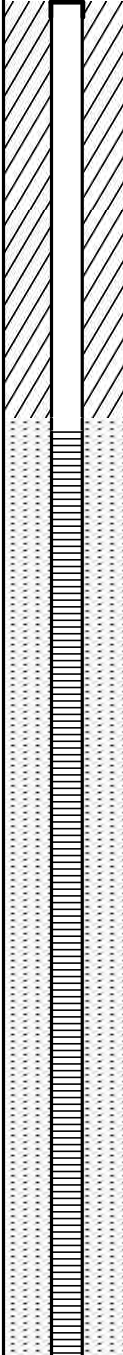
Client: BP LLANDARCY

Job No: 39991-001-401

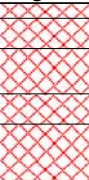
DRAFT



DAMES & MOORE

BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: WSMW077		PAGE 1 of 2	
	NUMBER	TYPE					DRILLING DATES: 12/1/2004		DRILLING METHODS : Beretta	
							DRILLER : APEX - Rhymal		BOREHOLE DIAMETER : 100-115mm	
							LOGGED BY : HM		SCREEN TYPE & DIAM: 50mm HDPE	
							CHECKED BY : SG		SCREEN SLOT SIZE: 1mm	
					0.0		DESCRIPTION		COMMENTS	S,V
							See trial pit log for details.		ODEX and casing	
					0.5		Concrete hardstanding. (MADE GROUND)			
					1.5		Probable rockhead, grey fine to medium SANDSTONE.			
					2.5		Medium strong, light and dark grey with orange stripes, weathered fine to medium sandstone.		Rock coring for 1.5m	
					2.0					
					2.5					
					3.0					
					3.5					
					4.0				Rotary air flush from 4.0m	
					4.5				Appears dry	
					5.0					

<u>LOCATION / NOTES:</u>		<u>LEGEND</u>		<u>BOREHOLE LOG</u>	
NVO = No visual or olfactory evidence of contamination S,V = Contamination Observations S - Odour score (0-5) V - Visual score (0-5)		 Disturbed Sample  Undisturbed Sample  Headspace Analysis  Down Borehole Analysis  Groundwater Table  Perched Water Table		Job Title: BP Llandarcy Whole Site Investigation Location: BP Llandarcy Refinery Client: BP/WDA	
				App'd:	Date: February 2004
				Drawn : CM	Ref:
				Scale: As scale	Job No: 39991-044-785
				Drg. Size: A4	BOREHOLE LOG

Site: Coed Darcy Urban Village Client: St. Modwen Development Ltd Project No: ADP238			Start Date: 06/03/2012 End Date: 06/03/2012		Site Level (mAOD):- Easting: 271494.00 Northing:195862.00	
Trial Pit Length (m):- Logged By: M Timmins			Trial Pit Width (m): - Checked By:		Excavation Method: Plant: Volvo 210 Excavator Shoring/Support: None	
Samples & Tests			Strata Details			
Depth (m)	Type	PID (ppm)	Thk	Legend	Depth	Description
0.20	ES		0.10		0.10	MADE GROUND. Brown slightly sandy gravelly SILT. Gravel is medium to coarse of rounded sandstone (0,0).
			0.20		0.30	
0.90	ES		0.30		0.60	MADE GROUND: Brown slightly sandy gravelly SILT. Gravel is fine to medium, subangular to subrounded or sandstone and mudstone. Some cobbles of red brick (0,0)
1.15	ES		0.20		0.80	
			0.40		1.20	MADE GROUND: Black coarse grained SAND sized ash.
						MADE GROUND: Brown slightly sandy gravelly SILT. Gravel is fine to medium, subangular to subrounded or sandstone and mudstone. Some cobbles of red brick (0,0) 0.70m ... weak concrete in south wall of the pit with some plastic.
						MADE GROUND: Light grey/brown slightly silty, sandy, gravelly CLAY. Gravel is fine to coarse subangular to subrounded of concrete, brick and sandstone. Some staining and hydrocarbon odour (2,1) End of Trial Pit at 1.20 m
General Notes: 1. All linear dimensions are in metres unless otherwise stated 2. All relative density/shear strength descriptions are based only on field observations and available in-situ test data.						
Groundwater Observations: Trial pit remained dry throughout			Stability: Trial pit collapsed		General Remarks: Pit terminated at 1.2m on bedrock. Two 'U' shaped cable runs 40mm x 60mm x70mm reinforced with rebar located between 0.1m and 0.3m.	

Site: Coed Darcy Urban Village			Start Date: 06/03/2012		Site Level (mAOD):-	
Client: St. Modwen Development Ltd			End Date: 06/03/2012		Easting: 271521.00	
Project No: ADP238					Northing:195860.00	
Trial Pit Length (m):-			Trial Pit Width (m): -		Excavation Method:	
Logged By: M Timmins			Checked By:		Plant: Volvo 210 Excavator	
					Shoring/Support: None	
Samples & Tests			Strata Details			
Depth (m)	Type	PID (ppm)	Thk	Legend	Depth	Description
0.60	ES		1.40			MADE GROUND: Brown slightly clayey, slightly gravelly fine to medium grained SAND. Gravel is fine to coarse angular to subrounded of quartzite and sandstone. Some tabular cobbles of sandstone (0,0).
1.20	ES		0.55		1.40	MADE GROUND: Grey/black coarse SAND and GRAVEL. Gravel is fine to coarse subangular to subrounded of concrete and clinker. Clinker is dark red/black in colour (0,0).
					1.95	End of Trial Pit at 1.95 m
General Notes: 1. All linear dimensions are in metres unless otherwise stated 2. All relative density/shear strength descriptions are based only on field observations and available in-situ test data.						
Groundwater Observations: Trial pit remained dry throughout			Stability: Trial pit stable		General Remarks: Pit terminated at 1.95m on bedrock	

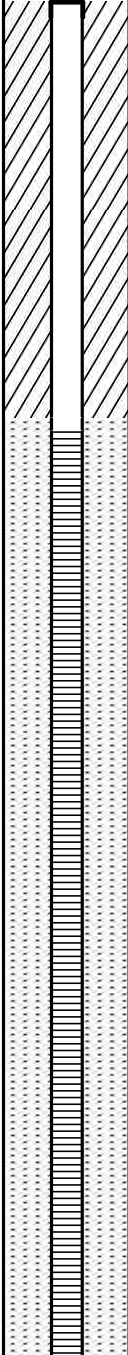
Site: Coed Darcy Urban Village Client: St. Modwen Development Ltd Project No: ADP238				Start Date: 06/03/2012 End Date: 06/03/2012		Site Level (mAOD):- Easting: 271538.00 Northing:195871.00	
Trial Pit Length (m):- Logged By: M Timmins				Trial Pit Width (m): - Checked By:		Excavation Method: Plant: Volvo 210 Excavator Shoring/Support: None	
Samples & Tests				Strata Details			
Depth (m)	Type	PID (ppm)	Thk	Legend	Depth	Description	
0.10	ES		0.15		0.15	Brown to grey/green slightly silty, slightly sandy, gravelly CLAY. Gravel is fine to course subangular to subrounded of sandstone (0,0) End of Trial Pit at 0.15 m	
General Notes: 1. All linear dimensions are in metres unless otherwise stated 2. All relative density/shear strength descriptions are based only on field observations and available in-situ test data.							
Groundwater Observations: Trial pit remained dry throughout			Stability: Trial pit stable			General Remarks: Pit terminated at 0.15m on bedrock	

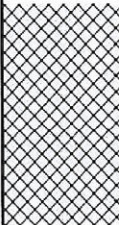
Site: Coed Darcy Urban Village Client: St. Modwen Development Ltd Project No: ADP238			Start Date: 06/03/2012 End Date: 06/03/2012		Site Level (mAOD):- Easting: 271530.00 Northing:195889.00	
Trial Pit Length (m):- Logged By: M Timmins			Trial Pit Width (m): - Checked By:		Excavation Method: Plant: Volvo 210 Excavator Shoring/Support: None	
Samples & Tests			Strata Details			
Depth (m)	Type	PID (ppm)	Thk	Legend	Depth	Description
0.60	ES		0.20		0.20	MADE GROUND: Red/brown to grey slightly clayey sandy fine to coarse, subangular to subrounded GRAVEL of sandstone, brick and hardcore (0,0).
			0.20		0.40	
			0.15		0.55	
			0.35		0.90	
1.40	ES		0.50		0.90	MADE GROUND: Light brown/cream slightly clayey, slightly sandy fine to coarse subrounded GRAVEL of sandstone and quartzite (0,0).
			0.30		1.40	
2.20	ES		0.55		1.70	MADE GROUND: Black slightly clayey medium to coarse SAND sized ash (0,0).
			0.45		2.25	
					2.70	
						Light grey/brown gravelly CLAY. Gravel is fine to medium sub-angular to sub-rounded of sandstone and mudstone. Occasional subrounded cobbles of sandstone and quartzite (0,1)
						Light orange/brown sandy cobbly fine to coarse subangular GRAVEL of sandstone, quartzite and brick. Cobbles are of angular to subrounded of quartzite and sandstone (0,0).
						Black/grey/brown slightly clayey, sandy SILT with many rootlets. Moderate hydrocarbon smell (2,3). (RELICT TOPSOIL)
						Light grey slightly clayey, sandy, fine to coarse GRAVEL of sandstone with frequent tabular cobbles of sandstone (0,0) (Highly weathered Sandstone).
						Light grey slightly clayey, slightly silty gravelly COBBLES of fine to coarse subangular sandstone. Gravel is fine to coarse subangular SANDSTONE. Very strong hydrocarbon odour. Some free product on groundwater at base of strata (5/4).
End of Trial Pit at 2.70 m						
General Notes: 1. All linear dimensions are in metres unless otherwise stated 2. All relative density/shear strength descriptions are based only on field observations and available in-situ test data.						
Groundwater Observations: Some groundwater seepage at the base of the excavation with yellow/brown free product on the surface.			Stability: Trial pit stable		General Remarks: Pit terminated at 2.7m on bedrock	

Site: Coed Darcy Urban Village Client: St. Modwen Development Ltd Project No: ADP238			Start Date: 06/03/2012 End Date: -		Site Level (mAOD):- Easting: 271517.00 Northing:195894.00	
Trial Pit Length (m):- Logged By: M Timmins			Trial Pit Width (m): - Checked By:		Excavation Method: Plant: , Shoring/Support: ,	
Samples & Tests			Strata Details			
Depth (m)	Type	PID (ppm)	Thk	Legend	Depth	Description
1.30	ES		0.25		0.25	MADE GROUND: Brown to grey coarse subangular to subrounded GRAVEL of ballast, sandstone and quartzite (0,0).
			0.10		0.35	
1.90	ES		1.05		1.40	MADE GROUND: Grey/brown gravelly fine to coarse SAND and sand sized ash. Gravel comprises fine to medium subangular pieces of red brick and clay pipe (0,0).
			0.60		2.00	Grey/brown slightly sandy gravelly CLAY. Gravel is fine subrounded quartzite. Occasional wood fragments and many rootlets throughout. Slight hydrocarbon odour and staining (1,1). Light grey/brown clayey sandy fine to coarse of subangular to subrounded GRAVEL of sandstone. Strong hydrocarbon odour and some staining (1,3) (Weathered Sandstone Bedrock) End of Trial Pit at 2.00 m
General Notes: 1. All linear dimensions are in metres unless otherwise stated 2. All relative density/shear strength descriptions are based only on field observations and available in-situ test data.						
Groundwater Observations: ,			Stability: ,		General Remarks: Pit terminated at 2.0m on bedrock. Pipe moved 2m to the southwest due to a 8	

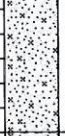
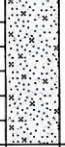
Site: Coed Darcy Urban Village Client: St. Modwen Development Ltd Project No: ADP238				Start Date: 06/03/2012 End Date: 06/03/2012		Site Level (mAOD):- Easting: 271467.00 Northing:195860.00	
Trial Pit Length (m):- Logged By: A Mann				Trial Pit Width (m):- Checked By:		Excavation Method: Plant: Volvo 210 Excavator Shoring/Support: None	
Samples & Tests				Strata Details			
Depth (m)	Type	PID (ppm)	Thk	Legend	Depth	Description	
0.50	ES		0.50		0.50	MADE GROUND: Brown slightly clayey gravelly SAND. Gravel is coarse subangular to subrounded of brick and ballast. Occasional whole bricks with frequent cobbles of concrete. Curb stone at 0.3m (0,0). End of Trial Pit at 0.50 m	
0.80	ES						
1.20	ES						
General Notes: 1. All linear dimensions are in metres unless otherwise stated 2. All relative density/shear strength descriptions are based only on field observations and available in-situ test data.							
Groundwater Observations: Trial pit remained dry throughout			Stability: Trial pit stable			General Remarks: Pit terminated at 0.5m on a reinforced concrete slab	

Site: Coed Darcy Urban Village Client: St. Modwen Development Ltd Project No: ADP238			Start Date: 06/03/2012 End Date: 06/03/2012		Site Level (mAOD):- Easting: 271477.00 Northing:195870.00	
Trial Pit Length (m):- Logged By: A Mann			Trial Pit Width (m): - Checked By:		Excavation Method: Plant: Volvo 210 Excavator Shoring/Support: None	
Samples & Tests			Strata Details			
Depth (m)	Type	PID (ppm)	Thk	Legend	Depth	Description
			0.10		0.10	MADE GROUND. Brown sandy medium to coarse subangular to subrounded GRAVEL of mudstone (0,0)
			0.20		0.30	
			0.90			
			0.40		1.20	(REWORKED NATURAL) Orange brown slightly sandy gravelly CLAY. Coarse gravel of sandstone. Stained grey(3,3) from 0.6m to 1.2m on southern face.
					1.60	
						Firm Grey (2,2) sandy gravelly CLAY. Gravel is coarse subangular sandstone
						End of Trial Pit at 1.60 m
General Notes: 1. All linear dimensions are in metres unless otherwise stated 2. All relative density/shear strength descriptions are based only on field observations and available in-situ test data.						
Groundwater Observations: Trial pit remained dry throughout			Stability: Trial pit stable		General Remarks: Pit terminated at 1.6m on bedrock	

BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: WSMW077		PAGE 1 of 2	
	NUMBER	TYPE					DRILLING DATES: 12/1/2004		DRILLING METHODS : Beretta	
							DRILLER : APEX - Rhymal		BOREHOLE DIAMETER : 100-115mm	
							LOGGED BY : HM		SCREEN TYPE & DIAM: 50mm HDPE	
							CHECKED BY : SG		SCREEN SLOT SIZE: 1mm	
							DESCRIPTION	COMMENTS	S,V	
 Rock core 2.5-4.0m TCR = 70% SCR = 30% RQD = 5% FI = 60%							See trial pit log for details.	ODEX and casing		
							Concrete hardstanding. (MADE GROUND)			
							Probable rockhead, grey fine to medium SANDSTONE.			
							Medium strong, light and dark grey with orange stripes, weathered fine to medium sandstone.	Rock coring for 1.5m		
								Rotary air flush from 4.0m		
		Appears dry								

BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: WSMW077 (PIT)		PAGE 1 of 1	
	NUMBER	TYPE					DRILLING DATES: 03/12/03		DRILLING METHODS : JCB	
							DRILLER : JCB-Viv		BOREHOLE DIAMETER : -	
							LOGGED BY : EM		SCREEN TYPE & DIAM: -	
							CHECKED BY : SG		SCREEN SLOT SIZE: -	
							DESCRIPTION	COMMENTS	S,V	
					0.0		Soft, brown, silt with abundant rootlets. (MADE GROUND)	Damp. NVO	0,0	
	WSMW077 - 0.5m. (S,L,2xP)		*3.8		0.5		Soft, dark brown, fine sandy silt with frequent fine to coarse gravels, subangular cobbles and boulders. Occasional tabular boulders. (MADE GROUND)	Damp. NVO	0,0	
	WSMW077 - 0.8m. (S,L)		*3.5		1.0		Soft to firm, brown, silty clay with occasional fine to coarse gravels, subangular cobbles and boulders. (MADE GROUND)	Damp. NVO	0,0	
					1.5		Trial pit terminated at 0.9m due to refusal on concrete.			
					2.0					
					2.5					
					3.0					
					3.5					
					4.0					
					4.5					
					5.0					

LOCATION / NOTES:	LEGEND	BOREHOLE LOG	
NVO = No visual or olfactory evidence of contamination S,V = Contamination Observations S - Odour score (0-5) V - Visual score (0-5)	 Disturbed Sample  Undisturbed Sample  Headspace Analysis  Down Borehole Analysis  Groundwater Table  Perched Water Table	Job Title: BP Llandarcy Whole Site Investigation Location: BP Llandarcy Refinery Client: BP/WDA 	
		App'd:	Date: December 2003
		Drawn : EM	Ref:
		Scale: As Scale	Job No: 39991-044
		Drg. Size: A4	BOREHOLE LOG

BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: WSMW065 (PIT)		PAGE 1 of 1	
	NUMBER	TYPE					DRILLING DATES: 26/11/03		DRILLING METHODS: JCB	
							DRILLER: JCB-Will		BOREHOLE DIAMETER: -	
							LOGGED BY: EM		SCREEN TYPE & DIAM: -	
							CHECKED BY: SG		SCREEN SLOT SIZE: -	
							DESCRIPTION	COMMENTS	S,V	
	WSMW065 - 0.3m. (P)		*246		0.0		Loose, light brown, fine to medium sand with silt and clay. Frequent fine to coarse gravels. (MADE GROUND)	Damp. NVO	0,0	
	WSMW065 - 0.5m. (S,L)				0.5			Loose, black, fine to coarse sand comprising ash (MADE GROUND)	Damp. NVO	0,0
	WSMW065 - 1.0m. (S,L)		*344		1.0			Firm, light grey to light brown, fine sandy SILT with occasional fine to coarse gravel. Occasional subangular cobbles.	Damp to dry. Strong hydrocarbon odour and staining	4,3
	DUPLICATE (S,L)				1.5			With frequent subangular cobbles	With occasional black hydrocarbon staining from 1.0m.	
			*246		2.0	Trial pit terminated at 1.8m due to refusal.		Damp to dry. Strong hydrocarbon odour and moderate staining	4,3	
				2.5						
				3.0						
				3.5						
				4.0						
				4.5						
				5.0						

LOCATION / NOTES:

NVO = No visual or olfactory evidence of contamination

S,V = Contamination Observations

S - Odour score (0-5)

V - Visual score (0-5)

LEGEND

-  Disturbed Sample
-  Undisturbed Sample
-  Headspace Analysis
-  Down Borehole Analysis
-  Groundwater Table
-  Perched Water Table

BOREHOLE LOG

Job Title: BP Llandarcy Whole Site Investigation

Location: BP Llandarcy Refinery

Client: BP/WDA



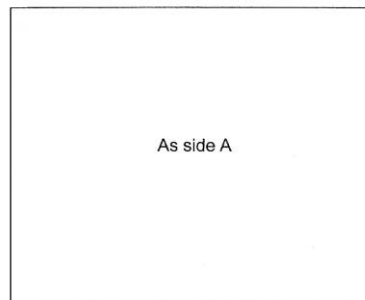
App'd:	Date: December 2003
Drawn: EM	Ref:
Scale: As Scale	Job No: 39991-044
Drg. Size: A4	BOREHOLE LOG

TRIAL PIT NUMBER: MSTP165
GROUND ELEVATION: -
DATE OF EXCAVATION: 04/6/98
WATER LEVEL: DRY
LOGGED BY: RF
APPROVED BY:

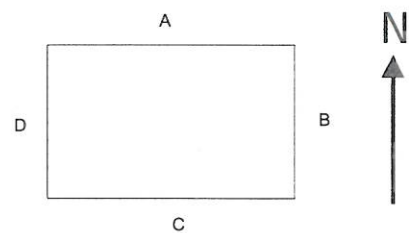
SIDE ELEVATIONS

SIDE D	SIDE A	SIDE B
	1	
0.3m 0.4m	2	
	3	
1.00m 1.25m	4 *	

SIDE C



PLAN



0 1 2m
Vertical Scale

Key:

- * Soil Sample location
- WA Water Sample
- HS Headspace Analysis
- Water Ingress

STRATA DESCRIPTIONS	COMMENTS	SAMPLES
1. Strong, brown, loose clay (MADE GROUND) 2. Black, coarse grained, tarry material 3. Orange/brown, firm CLAY 4. Dark green CLAY - darker with depth, oily Trial pit terminated on refusal at 1.25 mbgl due to sandstone bedrock	a. Strong hydrocarbon odour	<u>PID RESULTS</u> 0.5m - 3.5 ppm 1.0m - 1.5 ppm 1.25m - 15.8 ppm <u>SOIL SAMPLES</u> MSTP165-1.25m

Job Title: SOIL & GROUNDWATER INVESTIGATION

Location: LLANDARCY REFINERY

Client: BP LLANDARCY

Job No: 39991-001-401

DRAFT



DAMES & MOORE

APPENDIX C

ADOPTED THRESHOLDS / SAMPLE SCREENING RESULTS

Lowest of the Remedial Target Criterion/Risk Based Screening Level for Commercial land use, Shallow Soil

Contaminant	Minimum RBSL/ RTC 1% (mg/kg)	Minimum of RBSL/ RTC 3% (mg/kg)
Arsenic	500	500
Chromium	365	365
Cadmium	243	243
Mercury (inorganic)	480	480
Nickel	1990	1990
Selenium	8000	8000
Lead	750	750
Vanadium	7590	7590
Copper	115000	115000
Zinc	918000	918000
Benzo(a)pyrene	24.7	24.8
Benzene	5	5
Toluene	1160	1160
Ethylbenzene	122000	122000
Xylene	121000	121000
TPH aromatic C7-C8	1840	1840
TPH aromatic C8-C10	913	913
TPH aromatic C10-C12	26515	26515
TPH aromatic C12-C16	64875	64875
TPH aliphatic C6-C8	≤1.00E+06	≤1.00E+06
TPH aliphatic C8-C10	158890	158890
TPH aliphatic C10-C12	163360	163360
TPH aliphatic C12-C16	169032	169032
TPH aromatic C16-C21	28500	28500
TPH aromatic C21-C35	28500	28500
TPH aliphatic C16-C21	≤1.00E+06	≤1.00E+06
TPH aliphatic C21-C35	≤1.00E+06	≤1.00E+06
Total TPH (Phase 1)	81413	81413
Total TPH (Process Area)	44344	44344
Total TPH (North Tank Farm)	25875	25875
Total TPH (South Tank Farm)	37230	37230
1,2-Dichloroethane	0.401	2
1,1,1-Trichloroethane	443	3140
Tetrachloroethene	103	788
Trichloroethene	7.48	54.9
Vinyl chloride	0.045	0.174
Dichloromethane	158	734
Cis-1,2-Dichloroethene	8.7	53
Trans-1,2 Dichloroethene	13.8	87.7
Chromium III	221000	221000
Acenaphthene	109000 a	106000
Anthracene	539000	545000
Benzo(a)anthracene	222	242
Benzo(b)fluoranthene	246	247
Benzo(g,h,i)perylene	2490	2500
Benzo(k)fluoranthene	2470	2480
Chrysene	24100	24500
Dibenz(a,h)anthracene	24.6	24.9
Fluoranthene	72500	72700
Fluorene	68400	72200
Indeno(1,2,3-cd)pyrene	245	247
Pyrene	54300	54500
Phenol	686	1720
Mercury, methyl	418 a	411
Mercury, elemental	4.3	12.9
Naphthalene	15800 a	29300 a
TPH aliphatic C5-C6	≤1.00E+06	≤1.00E+06
1,1,1,2-Tetrachloroethane	71.4	559
1,1,2,2-Tetrachloroethane	178	1180
Carbon tetrachloride	1.97	14.7
Chlorobenzene (mono)	688 a	2730 a
TPH aromatic C5-C7	17.8	99.8

Notes
a) based on a value produced from following the approach outlined in SR4 for substances at saturation
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. It is assumed that no visible free product is present within the top 1.0m of soil. The presence of free product should be assessed in accordance with information in the S106
4. In the S106 only one value was presented for 1,2-dichloroethene of 273 mg/kg
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. The values for metals may not be protective of phytotoxic effects
7. Benzo(a)pyrene RBSL to be compared against sum of 16 US EPA Priority List PAHs using Toxicity Equivalence approach
8. No RTC was produced for total TPH as this will be considered further at validation stage
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-000476
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 by Atkins
13. Values for phenol are calculated to be protective of dermal effects in line with the approach used by the Environment Agency to derive the commercial phenol SGV

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

Contaminant	Minimum RBSL/ RTC 1% (mg/kg)	Minimum of RBSL/ RTC 3% (mg/kg)
Benzo(a)pyrene	>sat	>sat
Benzene	5	5
Toluene	389	389
Ethylbenzene	>sat	>sat
Xylene	>sat	>sat
TPH aromatic C7-C8	617	617
TPH aromatic C8-C10	547	547
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 aliphatic C16-C21	None	None
TPH aliphatic C21-C35	None	None
TPH aromatic C16-C21	None	None
TPH aromatic C21-C35	None	None
Total TPH (Phase 1)	81956	81956
Total TPH (Process Area)	35014	35014
Total TPH (North Tank Farm)	13974	13974
Total TPH (South Tank Farm)	34797	34797
1,2-Dichloroethane	0.65	0.65
1,1,1-Trichloroethane	3250	3250
Tetrachloroethene	368	368
Trichloroethene	28	28
Vinyl chloride	0.154	0.214
Dichloromethane	665	665
Cis-1,2-Dichloroethene	35.1	67
Trans-1,2 Dichloroethene	53.4	91
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(a,h)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
1,1,1,2-Tetrachloroethane	278	768
1,1,2,2-Tetrachloroethane	718	1720
Carbon tetrachloride	7.34	19
Chlorobenzene (mono)	>sat	>sat
TPH aliphatic C5-C6	>sat	>sat
TPH aromatic C5-C7	71	152

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
- "None" indicates theoretical RBSL greater than solubility limit
- In the S106 only one value was presented for 1,2-dichloroethene of 91 mg/kg
- '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
- No RTC was produced for total TPH as this will be considered further at validation stage
- 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-000476
- The potential presence of free product should be assessed in accordance with information in the S106
- TPH aromatic C5-C7 is considered to comprise benzene only by Atkins
- Values for phenol are calculated to be protective of dermal effects in line with the approach used by the Environment Agency to derive the commercial phenol SGV

Contaminant	Lowest of RTC and RBSL
Benzo(a)pyrene	>sat
Benzene	6
Toluene	229
Ethylbenzene	506
Total xylene	607
TPH aromatic C7-C8	97
TPH aromatic C8-C10	>sat
TPH aromatic C10-C12	>sat
TPH aromatic C12-C16	>sat
TPH aromatic C16-C21	none
TPH aromatic C21-C35	none
TPH aliphatic C6-C8	>sat
TPH aliphatic C8-C10	>sat
TPH aliphatic C10-C12	>sat
TPH aliphatic C12-C16	>sat
TPH aliphatic C16-C21	none
TPH aliphatic C21-C35	none
1,2-Dichloroethane	0.82
1,1,1-Trichloroethane	989
Tetrachloroethene	115
Trichloroethene	13
Vinyl chloride	0.3
Dichloromethane	624
Cis-1,2 Dichloroethene	68
Trans-1,2 Dichloroethene	68
Acenaphthene	>sat
Anthracene	>sat
Benzo(a)anthracene	>sat
Benzo(b)fluoranthene	>sat
Benzo(g,h,i)perylene	>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	>sat
Mercury (methyl)	>sat
Mercury (elemental)	>sat
TPH aliphatic C5-C6	>sat
1,1,1,2-Tetrachloroethane	133
1,1,2,2-Tetrachloroethane	879
Carbon tetrachloride	2.87
Chlorobenzene (mono)	>sat
Naphthalene	>sat
TPH aromatic C5-C7	11.5

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. "None" indicates theoretical RBSL greater than solubility limit.

4. In the S106, only one value was presented for 1,2-Dichloroethene of 68 mg/l.

5. 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.

6. TPH >C16 are not considered to be volatile according to TPHCWG. Consequently the inhalation of vapour pathways have not been considered.

7. The potential presence of free product should be assessed in accordance with information in the S106.

8. Additivity for TPHs and PAHs to be undertaken in line with guidance in Atkins report 5041216-REM-RPT-000476.

9. TPH aromatic C5-C7 is considered to comprise benzene only by Atkins.

APPENDIX D

LAB CERTIFICATES

Temporary Collection Chamber RTC Screening Commercial End Use																							
				pH Units	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Selenium	Vanadium	Zinc	Magnesium	GRO >C5-C12	Methyl tertiary butyl ether (MTBE)	Benzene	Toluene	Ethylbenzene	m,p-Xylene	o-Xylene	m,p,o-Xylene
Sample Location	Depth	Sample Date	Asbestos Containing Material Screen		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
CATP001	0.30-	24/03/2011	No ACM Detected	8.42	14.7	0.69	9.06	73.7	46.3	<0.14	45.8	<1	13.3	123	942	<44	<5	<10	2.17	3.26	<6	<3	<10
CATP001	0.70-	24/03/2011	No ACM Detected	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CATP001	1.30-	24/03/2011	-	7.76	18.4	1.26	22.2	87.1	108	<0.14	29.3	<1	26.3	369	15600	6670	<5	<10	<2	<3	<6	<3	<10
CATP002	0.80-	24/03/2011	No ACM Detected	8.1	28.3	1.3	19.2	119	178	1.89	30.1	<1	24.5	806	3390	100	<5	<10	36.6	<3	<6	<3	<10
CATP002	1.50-	24/03/2011	-	7.51	33.4	0.873	22.1	159	123	1.04	44.3	<1	36.3	256	2230	76200	<5	35.1	<2	<3	<6	<3	<10
CATP003	0.20-	24/03/2011	No ACM Detected	8.33	6.95	0.235	74.4	25	21.7	<0.14	7.21	2.36	144	70.5	1920	<44	<5	<10	2.09	4.18	<6	<3	<10
CATP003	0.80-	24/03/2011	No ACM Detected	8.29	23.9	0.684	12.6	125	158	0.53	20.2	<1	19	369	2300	<44	<5	<10	2.22	3.33	<6	<3	<10
CATP050	0.30-	29/03/2011	No ACM Detected	7.87	23.1	1.04	16.8	57.1	48.7	<0.14	26.2	<1	23.6	140	2410	156	<5	<10	2.28	10.3	<6	<3	<10
WSMW065	0.3	27/10/2003			36	4.5	12	150	98	0.84	46	1	47	180									
WSMW065	0.5	27/10/2003															<100	<100	<100	<100	<100	<100	<100
WSMW065	1	27/10/2003															<100	<100	<100	<100	<100	<100	<100
WSMW077	0.5	27/10/2003	No ACM Detected		41	0.58	15	90	18	0	22	1.1	22	91			<100	<100	<100	<100	<100	<100	<100
WSMW077	0.8	27/10/2003															<100	<100	<100	<100	<100	<100	<100
MSTP185	1.25	01/07/1998																					
FTS1	0.20-	08/03/2012		8.12	15.9	1.11	17.3	127	55.4	0.37	37.7	<1	21.2	174		332	<5	<10	3.45	<3	<6	<3	<9
FTS1	1.15-	08/03/2012		6.41	8.28	0.933	15.3	13.9	10.9	<0.14	23.2	1.26	17	60.9		9080	<5	<10	<2	<3	<6	<3	<9
FTS2	1.80-	08/03/2012		8.11	27.6	2.01	118	176	78.4	1.27	53.9	4.53	114	214		56.6	<5	<10	<2	<3	<6	<3	<9
FTS3	0.10-	08/03/2012		7.5	131	4.9	19.3	367	71.9	<0.14	24.1	1.28	26.1	312		<44	<5	<10	<2	<3	<6	<3	<9
FTS4	0.60-	08/03/2012		6.31	64	1.67	18.5	203	64.6	<0.14	14.7	1.84	27	212		51100	<5	<10	26.7	<3	<6	<3	<9
FTS4	2.20-	08/03/2012		6.15	5.38	0.444	19.2	5.49	9.13	<0.14	21	<1	13.1	43.5		4E+05	<100	<200	<40	<60	<120	<60	<9
FTS5	1.90-	08/03/2012		6.51	8.06	0.59	14.5	11.5	13	<0.14	26.8	1.2	13.8	59.7		1E+05	<100	<200	<40	<60	<120	<60	<9
FTS6	0.80-	08/03/2012		6.32	13.6	0.804	15.9	31.3	18.6	<0.14	22.4	1.32	17.5	78.7		1E+06	<100	<200	<40	<60	<120	<60	<9
					5.38	0.235	9.06	5.49	9.13	0	7.21	1	13.1	43.5	942	56.6	0	35.1	2.09	3.26	0	0	0
					131	4.9	118	367	178	1.89	53.9	4.53	144	806	15600	1E+06	0	35.1	36.6	10.3	0	0	0
					17	17	17	17	17	7	17	9	17	17	7	11	19	19	19	19	19	19	19
					500	243	365	1E+05	750	480	1990	8000	7590	9E+05				5000	1E+06	1.2E+08	1.2E+08	1.2E+08	1E+08
					500	243	365	1E+05	750	480	1990	8000	7590	9E+05				5000	1E+06	1.2E+08	1.2E+08	1.2E+08	1E+08

Temporary Collection Chamber RTC Scr																					
			Aliphatics >C5-C6	Aliphatics >C6-C8	Aliphatics >C8-C10	Aliphatics >C10-C12	Aliphatics >C12-C16	Aliphatics >C16-C21	Aliphatics >C21-C35	Aliphatics >C35-C44	Total Aliphatics >C12-C44	Aromatics >EC7-EC8	Aromatics >EC5-EC7	Aromatics >EC8-EC10	Aromatics >EC10-EC12	Aromatics >EC12-EC16	Aromatics >EC16-EC21	Aromatics >EC21-EC35	Aromatics >EC35-EC44	Aromatics >EC40-EC44	Total Aromatics >EC12-EC44
Sample Location	Depth	Sample Date	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
CATP001	0.30-	24/03/2011	<10	<10	<10	<10	5070	3320	26500	5680	40600	<10	<10	<10	<10	4090	5120	18100	15500	7460	42800
CATP001	0.70-	24/03/2011	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CATP001	1.30-	24/03/2011	36.9	283	1300	2510	81700	75100	324000	141000	622000	<10	<10	866	1670	54400	26000	291000	238000	107000	609000
CATP002	0.80-	24/03/2011	<10	<10	<10	17.7	27500	72800	527000	37200	665000	36.6	<10	14.2	11.8	36500	10800	310000	61100	24800	419000
CATP002	1.50-	24/03/2011	545	10200	21400	17900	1030000	378000	5410000	180000	7000000	<10	35.1	14300	11900	343000	421000	2640000	254000	84600	3660000
CATP003	0.20-	24/03/2011	<10	<10	<10	<10	3250	1830	11700	2210	19000	<10	<10	<10	<10	4480	3880	11000	8710	3610	28000
CATP003	0.80-	24/03/2011	<10	<10	<10	<10	6230	10300	69000	12600	98200	<10	<10	<10	<10	7190	4720	49500	32000	15400	93400
CATP050	0.30-	29/03/2011	<10	21.7	30.8	36.5	5360	3270	18000	6030	32700	<10	<10	34.2	25.1	7710	5820	28300	17900	7160	59700
WSMW065	0.3	27/10/2003		<100	75000	240000	290000	38000	38000				<100	22000	41000	95000	54000	<100			
WSMW065	0.5	27/10/2003		30000	460000	800000	650000	62000	62000				<100	<100	170000	350000	53000	<100			
WSMW065	1	27/10/2003		<100	<100	<100	<100	<100	139000				<100	<100	<100	<100	29000	<100			
WSMW077	0.5	27/10/2003																			
WSMW077	0.8	27/10/2003																			
MSTP185	1.25	01/07/1998																			
FTS1	0.20-	08/03/2012	35.7	93.2	51.8	64.4	8810	22400	84700	59900	176000	<10	<10	36.8	43.7	19800	19500	55200	21800	7920	116000
FTS1	1.15-	08/03/2012	<10	185	1910	3420	40900	29800	21800	2150	94700	<10	<10	1270	2280	13300	10500	9000	2380	797	35200
FTS2	1.80-	08/03/2012	<10	<10	14.2	<10	11200	17600	148000	75000	252000	<10	<10	13	<10	7930	14100	119000	95700	40600	237000
FTS3	0.10-	08/03/2012	<10	10.9	<10	<10	3150	6220	13700	504	23600	<10	<10	<10	<10	13600	4020	9150	3190	1020	30000
FTS4	0.60-	08/03/2012	1670	7080	11000	14400	61900	40500	35900	2380	141000	26.7	<10	7320	9610	39000	19700	28800	6640	1950	94200
FTS4	2.20-	08/03/2012	297	9280	64100	175000	162000	118000	82500	12700	375000	<200	<200	42700	117000	59000	46300	40600	9980	3530	156000
FTS5	1.90-	08/03/2012	<200	3390	26400	51100	76500	54900	32400	4840	169000	<200	<200	17600	34000	28300	24300	17900	3100	<100	73600
FTS6	0.80-	08/03/2012	618	45600	328000	393000	468000	186000	105000	21800	782000	<200	<200	219000	262000	186000	119000	126000	34900	12300	466000
			35.7	10.9	14.2	17.7	3150	1830	11700	504	19000	26.7	35.1	13	11.8	4090	3880	9000	2380	797	28000
			1670	45600	460000	800000	1030000	378000	5410000	180000	7000000	36.6	35.1	219000	262000	350000	421000	2640000	254000	107000	3660000
			15	18	18	18	18	18	18	15	15	15	18	18	18	18	18	18	15	14	15
			1E+09	1E+09	1.6E+08	1.63E+08	1.7E+08	28500000	28500000			2E+06	17800	913000	26515000	64875000	28500000	28500000			
			1E+09	1E+09	1.6E+08	#####	1.7E+08	28500000	28500000			2E+06	99800	#####	26515000	64875000	28500000	28500000			

Temporary Collection Chamber RTC Scr							
			Total Aliphatics & Aromatics >C5-C44	Total Aliphatics >C5-35	Total Aromatics >C5-35	Total Aliphatics & Aromatics >C5-35	Phenol
Sample Location	Depth	Sample Date	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
CATP001	0.30-	24/03/2011	83400	34900	27300	62300	<100
CATP001	0.70-	24/03/2011	-	-	-	-	-
CATP001	1.30-	24/03/2011	1240000	485000	373000	858000	<100
CATP002	0.80-	24/03/2011	1080000	627000	358000	985000	<100
CATP002	1.50-	24/03/2011	10700000	6870000	3430000	10300000	187
CATP003	0.20-	24/03/2011	47100	16800	19300	36100	<100
CATP003	0.80-	24/03/2011	192000	85500	61400	147000	<100
CATP050	0.30-	29/03/2011	92600	26800	41900	68600	<100
WSMW065	0.3	27/10/2003		643000	212000	855000	
WSMW065	0.5	27/10/2003		2002000	573000	2575000	
WSMW065	1	27/10/2003		139000	29000	168000	
WSMW077	0.5	27/10/2003					
WSMW077	0.8	27/10/2003					
MSTP185	1.25	01/07/1998					
FTS1	0.20-	08/03/2012	292000	116000	94500	211000	
FTS1	1.15-	08/03/2012	139000	98000	36400	134000	
FTS2	1.80-	08/03/2012	489000	177000	141000	318000	
FTS3	0.10-	08/03/2012	53600	23100	26800	49900	
FTS4	0.60-	08/03/2012	286000	173000	104000	277000	
FTS4	2.20-	08/03/2012	939000	611000	305000	916000	
FTS5	1.90-	08/03/2012	375000	245000	122000	367000	
FTS6	0.80-	08/03/2012	2500000	1530000	912000	2440000	
			47100	16800	19300	36100	187
			10700000	6870000	3430000	10300000	187
			15	18	18	18	1



Atkins Global Ltd
Project Jonah site office
Llan Coed House
Suite 24
Coed Darcy
Llandarcy
SA10 6HJ

Attention: Selina Bamforth

CERTIFICATE OF ANALYSIS

Date: 16 March 2012
Customer: H_ATKINS_LDC
Sample Delivery Group (SDG): 120308-5
Your Reference: Weekly Samples
Location: Coed Darcy Urban Village
Report No: 174597

We received 20 samples on Thursday March 08, 2012 and 15 of these samples were scheduled for analysis which was completed on Friday March 16, 2012. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

All chemical testing (unless subcontracted) is performed at ALcontrol Hawarden Laboratories.

Approved By:

Sonia McWhan

Operations Manager





SDG:	120308-5	Location:	Coed Darcy Urban Village	Order Number:	CD0227
Job:	H_ATKINS_LDC-105	Customer:	Atkins Global Ltd	Report Number:	174597
Client Reference:	Weekly Samples	Attention:	Selina Bamforth	Superseded Report:	

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
5288937	36 '			
5288940	DC1			
5288941	DC2			
5288938	DIRE WT IN			
5288939	DIRE WT OUT			
5288922	FTS1		0.20	
5288923	FTS1		0.90	
5288924	FTS1		1.15	
5288925	FTS2		0.60	
5288926	FTS2		1.80	
5288927	FTS3		0.10	
5288928	FTS4		0.60	
5288929	FTS4		1.40	
5288930	FTS4		2.20	
5288931	FTS5		1.30	
5288932	FTS5		1.90	
5288933	FTS6		0.80	
5288934	FTS6		1.20	
5288935	NSR IN			
5288936	NSR OUT			

Only received samples which have had analysis scheduled will be shown on the following pages.



SDG: 120308-5
Job: H_ATKINS_LDC-105
Client Reference: Weekly Samples

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

Order Number: CD0227
Report Number: 174597
Superseded Report:

LIQUID**Results Legend**

Test



No Determination Possible

Lab Sample No(s)**Customer Sample Reference****AGS Reference****Depth (m)****Container**

			5288937	5288941	5288940	5288936	5288935	5288938	5288939
			36'	DC2	DC1	NSR OUT	NSR IN	DIRE WT OUT	DIRE WT IN
			Vial (ALE297)	11 plastic (ALE221)	11 green glass bottle	Vial (ALE297)	11 plastic (ALE221)	11 green glass bottle	Vial (ALE297)
Ammoniacal Nitrogen	All	NDPs: 0 Tests: 5							
			X	X	X	X	X	X	X
Anions by Kone (w)	All	NDPs: 0 Tests: 5							
			X	X	X	X	X	X	X
BOD True Total	All	NDPs: 0 Tests: 3							
			X	X					
COD Unfiltered	All	NDPs: 0 Tests: 3							
			X	X					
Conductivity (at 20 deg.C)	All	NDPs: 0 Tests: 5							
			X	X	X	X	X	X	X
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 5							
			X	X	X	X	X	X	X
EPH CWG (Aliphatic) Aqueous GC (W)	All	NDPs: 0 Tests: 5							
			X	X	X	X	X	X	X
EPH CWG (Aromatic) Aqueous GC (W)	All	NDPs: 0 Tests: 5							
			X	X	X	X	X	X	X
GRO by GC-FID (W)	All	NDPs: 0 Tests: 5							
				X	X	X	X	X	X
Suspended Solids	All	NDPs: 0 Tests: 5							
			X	X	X	X	X	X	X
SVOC MS (W) - Aqueous	All	NDPs: 0 Tests: 7							
			X	X	X	X	X	X	X
TPH CWG (W)	All	NDPs: 0 Tests: 5							
			X	X	X	X	X	X	X
VOC MS (W)	All	NDPs: 0 Tests: 7							
			X	X	X	X	X	X	X



CERTIFICATE OF ANALYSIS

SDG: 120308-5
Job: H_ATKINS_LDC-105
Client Reference: Weekly Samples

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

Order Number: CD0227
Report Number: 174597
Superseded Report:

SOLID Results Legend X Test N No Determination Possible	Lab Sample No(s)		5288922	5288924	5288926	5288927	5288928	5288930	5288932	5288933
	Customer Sample Reference		FTS1	FTS1	FTS2	FTS3	FTS4	FTS4	FTS5	FTS6
	AGS Reference									
	Depth (m)		0.20	1.15	1.80	0.10	0.60	2.20	1.90	0.80
	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	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	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	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
EPH CWG (Aliphatic) GC (S)	All	NDPs: 0 Tests: 8	X	X	X	X	X	X	X	X
EPH CWG (Aromatic) GC (S)	All	NDPs: 0 Tests: 8	X	X	X	X	X	X	X	X
GRO by GC-FID (S)	All	NDPs: 0 Tests: 8		X	X	X	X	X	X	X
Metals by iCap-OES (Soil)	Arsenic	NDPs: 0 Tests: 8	X	X	X	X	X	X	X	X
	Cadmium	NDPs: 0 Tests: 8	X	X	X	X	X	X	X	X
	Chromium	NDPs: 0 Tests: 8	X	X	X	X	X	X	X	X
	Copper	NDPs: 0 Tests: 8	X	X	X	X	X	X	X	X
	Lead	NDPs: 0 Tests: 8	X	X	X	X	X	X	X	X
	Mercury	NDPs: 0 Tests: 8	X	X	X	X	X	X	X	X
	Nickel	NDPs: 0 Tests: 8	X	X	X	X	X	X	X	X
	Selenium	NDPs: 0 Tests: 8	X	X	X	X	X	X	X	X
	Vanadium	NDPs: 0 Tests: 8	X	X	X	X	X	X	X	X
	Zinc	NDPs: 0 Tests: 8	X	X	X	X	X	X	X	X
PAH by GCMS	All	NDPs: 0 Tests: 8	X	X	X	X	X	X	X	X
pH	All	NDPs: 0 Tests: 8	X	X	X	X	X	X	X	X



CERTIFICATE OF ANALYSIS

SDG: 120308-5
Job: H_ATKINS_LDC-105
Client Reference: Weekly Samples

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

Order Number: CD0227
Report Number: 174597
Superseded Report:

SOLID**Results Legend**

Test

No Determination
Possible**Lab Sample No(s)****Customer
Sample Reference****AGS Reference****Depth (m)****Container**

Sample description

TPH CWG GC (S)

All

All

NDPs: 0
Tests: 8NDPs: 0
Tests: 8

5288922

5288924

5288926

5288927

5288928

5288930

5288932

5288933

FTS1

FTS1

FTS2

FTS3

FTS4

FTS4

FTS5

FTS6

0.20

1.15

1.80

0.10

0.60

2.20

1.90

0.80

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
60g VOC (ALE215)
400g Tub (ALE214)
250g Amber Jar (AL

X

X

X

X

X

X

X

X

X

X

X

X

X

X

X

X



SDG:	120308-5	Location:	Coed Darcy Urban Village	Order Number:	CD0227
Job:	H_ATKINS_LDC-105	Customer:	Atkins Global Ltd	Report Number:	174597
Client Reference:	Weekly Samples	Attention:	Selina Bamforth	Superseded Report:	

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
5288922	FTS1	0.20	Dark Brown	Loamy Sand	0.063 - 0.1 mm	Stones	None
5288924	FTS1	1.15	Dark Brown	Sandy Clay Loam	0.063 - 0.1 mm	Stones	None
5288926	FTS2	1.80	Dark Brown	Sand	0.1 - 2 mm	Stones	None
5288927	FTS3	0.10	Dark Brown	Loamy Sand	0.063 - 0.1 mm	Vegetation	Stones
5288928	FTS4	0.60	Dark Brown	Clay Loam	0.063 - 0.1 mm	None	None
5288930	FTS4	2.20	Grey	Loamy Sand	0.063 - 0.1 mm	Oil/Petroleum	Stones
5288932	FTS5	1.90	Dark Brown	Sandy Silt Loam	0.063 - 0.1 mm	Oil/Petroleum	Stones
5288933	FTS6	0.80	Black	Silty Clay Loam	<0.063 mm	Oil/Petroleum	Stones

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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Report Number: 174597
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Order Number: CD0227
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Report Number: 174597
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CERTIFICATE OF ANALYSIS

SDG: 120308-5
Job: H_ATKINS_LDC-105
Client Reference: Weekly Samples

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

Order Number: CD0227
Report Number: 174597
Superseded Report:

SVOC MS (W) - Aqueous

Results Legend			Customer Sample R	36 '	DC1	DC2	DIRE WT IN	DIRE WT OUT	NSR IN
#	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	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)
1,2,4-Trichlorobenzene (aq)	<1 µg/l	TM176	08/03/2012 120308-5 5288937	08/03/2012 120308-5 5288940	08/03/2012 120308-5 5288941	08/03/2012 120308-5 5288938	08/03/2012 120308-5 5288939	08/03/2012 120308-5 5288935	
1,2-Dichlorobenzene (aq)	<1 µg/l	TM176	<1	<1	<1	<1	<1	<1	
1,3-Dichlorobenzene (aq)	<1 µg/l	TM176	<1	<1	<1	<1	<1	<1	
1,4-Dichlorobenzene (aq)	<1 µg/l	TM176	<1	<1	<1	<1	<1	<1	
2,4,5-Trichlorophenol (aq)	<1 µg/l	TM176	<1	<1	<1	<1	<1	<1	
2,4,6-Trichlorophenol (aq)	<1 µg/l	TM176	<1	<1	<1	<1	<1	<1	
2,4-Dichlorophenol (aq)	<1 µg/l	TM176	<1	<1	<1	<1	<1	<1	
2,4-Dimethylphenol (aq)	<1 µg/l	TM176	<1	<1	<1	<1	<1	<1	
2,4-Dinitrotoluene (aq)	<1 µg/l	TM176	<1	<1	<1	<1	<1	<1	
2,6-Dinitrotoluene (aq)	<1 µg/l	TM176	<1	<1	<1	<1	<1	<1	
2-Chloronaphthalene (aq)	<1 µg/l	TM176	<1	<1	<1	<1	<1	<1	
2-Chlorophenol (aq)	<1 µg/l	TM176	<1	<1	<1	<1	<1	<1	
2-Methylnaphthalene (aq)	<1 µg/l	TM176	<1	<1	<1	<1	<1	<1	
2-Methylphenol (aq)	<1 µg/l	TM176	<1	<1	<1	<1	<1	<1	
2-Nitroaniline (aq)	<1 µg/l	TM176	<1	<1	<1	<1	<1	<1	
2-Nitrophenol (aq)	<1 µg/l	TM176	<1	<1	<1	<1	<1	<1	
3-Nitroaniline (aq)	<1 µg/l	TM176	<1	<1	<1	<1	<1	<1	
4-Bromophenylphenylether (aq)	<1 µg/l	TM176	<1	<1	<1	<1	<1	<1	
4-Chloro-3-methylphenol (aq)	<1 µg/l	TM176	<1	<1	<1	<1	<1	<1	
4-Chloroaniline (aq)	<1 µg/l	TM176	<1	<1	<1	<1	<1	<1	
4-Chlorophenylphenylether (aq)	<1 µg/l	TM176	<1	<1	<1	<1	<1	<1	
4-Methylphenol (aq)	<1 µg/l	TM176	<1	<1	<1	<1	<1	<1	
4-Nitrophenol (aq)	<1 µg/l	TM176	<1	<1	<1	<1	<1	<1	
4-Nitroaniline (aq)	<1 µg/l	TM176	<1	<1	<1	<1	<1	<1	
Azobenzene (aq)	<1 µg/l	TM176	<1	<1	<1	<1	<1	<1	
Acenaphthylene (aq)	<1 µg/l	TM176	<1	<1	<1	<1	<1	<1	
Acenaphthene (aq)	<1 µg/l	TM176	<1	<1	<1	<1	<1	<1	
Anthracene (aq)	<1 µg/l	TM176	<1	<1	<1	<1	<1	<1	
bis(2-Chloroethyl)ether (aq)	<1 µg/l	TM176	<1	<1	<1	<1	<1	<1	
bis(2-Chloroethoxy)methan e (aq)	<1 µg/l	TM176	<1	<1	<1	<1	<1	<1	
bis(2-Ethylhexyl) phthalate (aq)	<2 µg/l	TM176	<2	<2	<2	<3	<5	<2	
Benzo(a)anthracene (aq)	<1 µg/l	TM176	<1	<1	<1	<1	<1	<1	
Butylbenzyl phthalate (aq)	<1 µg/l	TM176	<1	<1	<1	<1	<1	<1	
Benzo(b)fluoranthene (aq)	<1 µg/l	TM176	<1	<1	<1	<1	<1	<1	
Benzo(k)fluoranthene (aq)	<1 µg/l	TM176	<1	<1	<1	<1	<1	<1	

Order Number: CD0227
Report Number: 174597
Superseded Report:

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CERTIFICATE OF ANALYSIS

SDG:	120308-5	Location:	Coed Darcy Urban Village	Order Number:	CD0227
Job:	H_ATKINS_LDC-105	Customer:	Atkins Global Ltd	Report Number:	174597
Client Reference:	Weekly Samples	Attention:	Selina Bamforth	Superseded Report:	

SVOC MS (W) - Aqueous

Results Legend		Customer Sample R	NSR OUT				
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Date Received SDG Ref Lab Sample No.(s) AGS Reference	Water(GW/SW) -				
M	mCERTS accredited.						
S	Deviating sample.						
aq	Aqueous / settled sample.						
diss.filt	Dissolved / filtered sample.						
tot.unfilt	Total / unfiltered sample.						
*	Subcontracted test.			08/03/2012			
**	% 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			120308-5			
(F)	Trigger breach confirmed			5288936			
Component	LOD/Units	Method					
1,2,4-Trichlorobenzene (aq)	<1 µg/l	TM176	<1				
1,2-Dichlorobenzene (aq)	<1 µg/l	TM176	<1				
1,3-Dichlorobenzene (aq)	<1 µg/l	TM176	<1				
1,4-Dichlorobenzene (aq)	<1 µg/l	TM176	<1				
2,4,5-Trichlorophenol (aq)	<1 µg/l	TM176	<1				
2,4,6-Trichlorophenol (aq)	<1 µg/l	TM176	<1				
2,4-Dichlorophenol (aq)	<1 µg/l	TM176	<1				
2,4-Dimethylphenol (aq)	<1 µg/l	TM176	<1				
2,4-Dinitrotoluene (aq)	<1 µg/l	TM176	<1				
2,6-Dinitrotoluene (aq)	<1 µg/l	TM176	<1				
2-Chloronaphthalene (aq)	<1 µg/l	TM176	<1				
2-Chlorophenol (aq)	<1 µg/l	TM176	<1				
2-Methylnaphthalene (aq)	<1 µg/l	TM176	<1				
2-Methylphenol (aq)	<1 µg/l	TM176	<1				
2-Nitroaniline (aq)	<1 µg/l	TM176	<1				
2-Nitrophenol (aq)	<1 µg/l	TM176	<1				
3-Nitroaniline (aq)	<1 µg/l	TM176	<1				
4-Bromophenylphenylether (aq)	<1 µg/l	TM176	<1				
4-Chloro-3-methylphenol (aq)	<1 µg/l	TM176	<1				
4-Chloroaniline (aq)	<1 µg/l	TM176	<1				
4-Chlorophenylphenylether (aq)	<1 µg/l	TM176	<1				
4-Methylphenol (aq)	<1 µg/l	TM176	<1				
4-Nitrophenol (aq)	<1 µg/l	TM176	<1				
4-Nitroaniline (aq)	<1 µg/l	TM176	<1				
Azobenzene (aq)	<1 µg/l	TM176	<1				
Acenaphthylene (aq)	<1 µg/l	TM176	<1				
Acenaphthene (aq)	<1 µg/l	TM176	<1				
Anthracene (aq)	<1 µg/l	TM176	<1				
bis(2-Chloroethyl)ether (aq)	<1 µg/l	TM176	<1				
bis(2-Chloroethoxy)methan e (aq)	<1 µg/l	TM176	<1				
bis(2-Ethylhexyl) phthalate (aq)	<2 µg/l	TM176	<2				
Benzo(a)anthracene (aq)	<1 µg/l	TM176	<1				
Butylbenzyl phthalate (aq)	<1 µg/l	TM176	<1				
Benzo(b)fluoranthene (aq)	<1 µg/l	TM176	<1				
Benzo(k)fluoranthene (aq)	<1 µg/l	TM176	<1				

Order Number: CD0227
Report Number: 174597
Superseded Report:

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CERTIFICATE OF ANALYSIS

SDG: 120308-5
Job: H_ATKINS_LDC-105
Client Reference: Weekly Samples

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

Order Number: CD0227
Report Number: 174597
Superseded Report:

TPH CWG (S)

Results Legend			Customer Sample R		FTS1	FTS1	FTS2	FTS3	FTS4	FTS4
#	ISO17025 accredited.		Depth (m) Sample Type Date Sampled Date Received SDG Ref Lab Sample No.(s) AGS Reference		0.20	1.15	1.80	0.10	0.60	2.20
M	mCERTS accredited.				Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid
S	Deviating sample.				-	-	-	-	-	-
aq	Aqueous / settled sample.				08/03/2012	08/03/2012	08/03/2012	08/03/2012	08/03/2012	08/03/2012
diss.filt	Dissolved / filtered sample.				120308-5	120308-5	120308-5	120308-5	120308-5	120308-5
tot.unfilt	Total / unfiltered sample.				5288922	5288924	5288926	5288927	5288928	5288930
*	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			49	112	80	61	124	126
GRO >C5-C12	<44 µg/kg	TM089			332	9080	56.6	<44	51100	408000
Methyl tertiary butyl ether (MTBE)	<5 µg/kg	TM089			<5	<5	<5	<5	<5	<100
Benzene	<10 µg/kg	TM089			<10	<10	<10	<10	<10	<200
Toluene	<2 µg/kg	TM089			3.45	<2	<2	<2	26.7	<40
Ethylbenzene	<3 µg/kg	TM089			<3	<3	<3	<3	<3	<60
m,p-Xylene	<6 µg/kg	TM089			<6	<6	<6	<6	<6	<120
o-Xylene	<3 µg/kg	TM089			<3	<3	<3	<3	<3	<60
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	26.7	<24
Aliphatics >C5-C6	<10 µg/kg	TM089			35.7	<10	<10	<10	1670	297
Aliphatics >C6-C8	<10 µg/kg	TM089			93.2	185	<10	10.9	7080	9280
Aliphatics >C8-C10	<10 µg/kg	TM089			51.8	1910	14.2	<10	11000	64100
Aliphatics >C10-C12	<10 µg/kg	TM089			64.4	3420	<10	<10	14400	175000
Aliphatics >C12-C16	<100 µg/kg	TM173			8810	40900	11200	3150	61900	162000
Aliphatics >C16-C21	<100 µg/kg	TM173			22400	29800	17600	6220	40500	118000
Aliphatics >C21-C35	<100 µg/kg	TM173			84700	21800	148000	13700	35900	82500
Aliphatics >C35-C44	<100 µg/kg	TM173			59900	2150	75000	504	2380	12700
Total Aliphatics >C12-C44	<100 µg/kg	TM173			176000	94700	252000	23600	141000	375000
Aromatics >EC5-EC7	<10 µg/kg	TM089			<10	<10	<10	<10	<10	<200
Aromatics >EC7-EC8	<10 µg/kg	TM089			<10	<10	<10	<10	26.7	<200
Aromatics >EC8-EC10	<10 µg/kg	TM089			36.8	1270	13	<10	7320	42700
Aromatics >EC10-EC12	<10 µg/kg	TM089			43.7	2280	<10	<10	9610	117000
Aromatics >EC12-EC16	<100 µg/kg	TM173			19800	13300	7930	13600	39000	59000
Aromatics >EC16-EC21	<100 µg/kg	TM173			19500	10500	14100	4020	19700	46300
Aromatics >EC21-EC35	<100 µg/kg	TM173			55200	9000	119000	9150	28800	40600
Aromatics >EC35-EC44	<100 µg/kg	TM173			21800	2380	95700	3190	6640	9980
Aromatics >EC40-EC44	<100 µg/kg	TM173			7920	797	40600	1020	1950	3530
Total Aromatics >EC12-EC44	<100 µg/kg	TM173			116000	35200	237000	30000	94200	156000
Total Aliphatics & Aromatics >C5-C44	<100 µg/kg	TM173			292000	139000	489000	53600	286000	939000
Total Aliphatics >C5-35	<100 µg/kg	TM173			116000	98000	177000	23100	173000	611000
Total Aromatics >C5-35	<100 µg/kg	TM173			94500	36400	141000	26800	104000	305000
Total Aliphatics & Aromatics >C5-35	<100 µg/kg	TM173			211000	134000	318000	49900	277000	916000



CERTIFICATE OF ANALYSIS

SDG: 120308-5
Job: H_ATKINS_LDC-105
Client Reference: Weekly Samples

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

Order Number: CD0227
Report Number: 174597
Superseded Report:

TPH CWG (S)

Results Legend		Customer Sample R	FTS5		FTS6				
#	ISO17025 accredited.		1.90	0.80					
M	mCERTS accredited.		Soil/Solid	Soil/Solid					
S	Deviating sample.								
aq	Aqueous / settled sample.								
diss.filt	Dissolved / filtered sample.		08/03/2012	08/03/2012					
tot.unfilt	Total / unfiltered sample.		120308-5	120308-5					
*	Subcontracted test.		5288932	5288933					
**	% 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	122	110					
GRO >C5-C12	<44 µg/kg	TM089	133000	1250000					
Methyl tertiary butyl ether (MTBE)	<5 µg/kg	TM089	<100 #	<100 #					
Benzene	<10 µg/kg	TM089	<200 M	<200 M					
Toluene	<2 µg/kg	TM089	<40 M	<40 M					
Ethylbenzene	<3 µg/kg	TM089	<60 M	<60 M					
m,p-Xylene	<6 µg/kg	TM089	<120 M	<120 M					
o-Xylene	<3 µg/kg	TM089	<60 M	<60 M					
sum of detected mpo xylene by GC	<9 µg/kg	TM089	<9	<9					
sum of detected BTEX by GC	<24 µg/kg	TM089	<24	<24					
Aliphatics >C5-C6	<10 µg/kg	TM089	<200	618					
Aliphatics >C6-C8	<10 µg/kg	TM089	3390	45600					
Aliphatics >C8-C10	<10 µg/kg	TM089	26400	328000					
Aliphatics >C10-C12	<10 µg/kg	TM089	51100	393000					
Aliphatics >C12-C16	<100 µg/kg	TM173	76500	468000					
Aliphatics >C16-C21	<100 µg/kg	TM173	54900	186000					
Aliphatics >C21-C35	<100 µg/kg	TM173	32400	105000					
Aliphatics >C35-C44	<100 µg/kg	TM173	4840	21800					
Total Aliphatics >C12-C44	<100 µg/kg	TM173	169000	782000					
Aromatics >EC5-EC7	<10 µg/kg	TM089	<200	<200					
Aromatics >EC7-EC8	<10 µg/kg	TM089	<200	<200					
Aromatics >EC8-EC10	<10 µg/kg	TM089	17600	219000					
Aromatics >EC10-EC12	<10 µg/kg	TM089	34000	262000					
Aromatics >EC12-EC16	<100 µg/kg	TM173	28300	186000					
Aromatics >EC16-EC21	<100 µg/kg	TM173	24300	119000					
Aromatics >EC21-EC35	<100 µg/kg	TM173	17900	126000					
Aromatics >EC35-EC44	<100 µg/kg	TM173	3100	34900					
Aromatics >EC40-EC44	<100 µg/kg	TM173	<100	12300					
Total Aromatics >EC12-EC44	<100 µg/kg	TM173	73600	466000					
Total Aliphatics & Aromatics >C5-C44	<100 µg/kg	TM173	375000	2500000					
Total Aliphatics >C5-35	<100 µg/kg	TM173	245000	1530000					
Total Aromatics >C5-35	<100 µg/kg	TM173	122000	912000					
Total Aliphatics & Aromatics >C5-35	<100 µg/kg	TM173	367000	2440000					

Order Number: CD0227
Report Number: 174597
Superseded Report:

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CERTIFICATE OF ANALYSIS

SDG: 120308-5
Job: H_ATKINS_LDC-105
Client Reference: Weekly Samples

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

Order Number: CD0227
Report Number: 174597
Superseded Report:

VOC MS (W)

Results Legend			Customer Sample R		36'	DC1	DC2	DIRE WT IN	DIRE WT OUT	NSR IN
#	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			Water(GW/SW)	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)
Dibromofluoromethane**	%	TM208			119	121	115	120	119	117
Toluene-d8**	%	TM208			102	101	99.4	99.7	99	99.8
4-Bromofluorobenzene**	%	TM208			98.9	91.8	99.1	97.4	97.1	95.6
Dichlorodifluoromethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Chloromethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Vinyl chloride	<1 µg/l	TM208			<1	<1	<1	3.02	3.82	<1
Bromomethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Chloroethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Trichlorofluoromethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
1,1-Dichloroethene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Carbon disulphide	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Dichloromethane	<3 µg/l	TM208			<3	<3	<3	44.4	144	<3
Methyl tertiary butyl ether (MTBE)	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
1,1-Dichloroethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
2,2-Dichloropropane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Bromochloromethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Chloroform	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
1,1,1-Trichloroethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
1,1-Dichloropropene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Carbontetrachloride	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	<1 µg/l	TM208			<1	<1	<1	113	295	<1
Benzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Trichloroethene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
1,2-Dichloropropane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Dibromomethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Bromodichloromethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
cis-1,3-Dichloropropene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Toluene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
trans-1,3-Dichloropropene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
1,1,2-Trichloroethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
1,3-Dichloropropane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Tetrachloroethene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Dibromochloromethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1



CERTIFICATE OF ANALYSIS

SDG: 120308-5
Job: H_ATKINS_LDC-105
Client Reference: Weekly Samples

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

Order Number: CD0227
Report Number: 174597
Superseded Report:

VOC MS (W)

Results Legend			Customer Sample R		36'	DC1	DC2	DIRE WT IN	DIRE WT OUT	NSR IN
#	ISO17025 accredited.		Depth (m) Sample Type Date Sampled Date Received SDG Ref Lab Sample No.(s) AGS Reference		Water(GW/SW)	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)
M	mCERTS accredited.				08/03/2012	08/03/2012	08/03/2012	08/03/2012	08/03/2012	08/03/2012
S	Deviating sample.				120308-5	120308-5	120308-5	120308-5	120308-5	120308-5
aq	Aqueous / settled sample.				5288937	5288940	5288941	5288938	5288939	5288935
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	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
					#	#	#	#	#	#
Chlorobenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
					#	#	#	#	#	#
1,1,1,2-Tetrachloroethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
					#	#	#	#	#	#
Ethylbenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
					#	#	#	#	#	#
m,p-Xylene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
					#	#	#	#	#	#
o-Xylene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
					#	#	#	#	#	#
Styrene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
					#	#	#	#	#	#
Bromoform	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
					#	#	#	#	#	#
Isopropylbenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
					#	#	#	#	#	#
1,1,2,2-Tetrachloroethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
					#	#	#	#	#	#
Bromobenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
					#	#	#	#	#	#
Propylbenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
					#	#	#	#	#	#
2-Chlorotoluene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
					#	#	#	#	#	#
1,3,5-Trimethylbenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
					#	#	#	#	#	#
4-Chlorotoluene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
					#	#	#	#	#	#
tert-Butylbenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
					#	#	#	#	#	#
1,2,4-Trimethylbenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
					#	#	#	#	#	#
sec-Butylbenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
					#	#	#	#	#	#
4-iso-Propyltoluene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
					#	#	#	#	#	#
1,3-Dichlorobenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
					#	#	#	#	#	#
1,4-Dichlorobenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
					#	#	#	#	#	#
n-Butylbenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
					#	#	#	#	#	#
1,2-Dichlorobenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
					#	#	#	#	#	#
Hexachlorobutadiene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
					#	#	#	#	#	#
tert-Amyl methyl ether (TAME)	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
					#	#	#	#	#	#
Naphthalene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
					#	#	#	#	#	#
1,2,3-Trichlorobenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
					#	#	#	#	#	#
1,3,5-Trichlorobenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1



CERTIFICATE OF ANALYSIS

SDG: 120308-5
Job: H_ATKINS_LDC-105
Client Reference: Weekly Samples

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

Order Number: CD0227
Report Number: 174597
Superseded Report:

VOC MS (W)

Results Legend		Customer Sample R	NSR OUT				
#	ISO17025 accredited.						
M	mCERTS accredited.	Depth (m) Sample Type Date Sampled Date Received SDG Ref Lab Sample No.(s) AGS Reference	Water(GW/SW) - 08/03/2012 120308-5 5288936				
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**	%	TM208	117				
Toluene-d8**	%	TM208	101				
4-Bromofluorobenzene**	%	TM208	97.6				
Dichlorodifluoromethane	<1 µg/l	TM208	<1	#			
Chloromethane	<1 µg/l	TM208	<1	#			
Vinyl chloride	<1 µg/l	TM208	<1	#			
Bromomethane	<1 µg/l	TM208	<1	#			
Chloroethane	<1 µg/l	TM208	<1	#			
Trichlorofluoromethane	<1 µg/l	TM208	<1	#			
1,1-Dichloroethene	<1 µg/l	TM208	<1	#			
Carbon disulphide	<1 µg/l	TM208	<1	#			
Dichloromethane	<3 µg/l	TM208	<3	#			
Methyl tertiary butyl ether (MTBE)	<1 µg/l	TM208	<1	#			
trans-1,2-Dichloroethene	<1 µg/l	TM208	<1	#			
1,1-Dichloroethane	<1 µg/l	TM208	<1	#			
cis-1,2-Dichloroethene	<1 µg/l	TM208	<1	#			
2,2-Dichloropropane	<1 µg/l	TM208	<1	#			
Bromochloromethane	<1 µg/l	TM208	<1	#			
Chloroform	<1 µg/l	TM208	<1	#			
1,1,1-Trichloroethane	<1 µg/l	TM208	<1	#			
1,1-Dichloropropene	<1 µg/l	TM208	<1	#			
Carbontetrachloride	<1 µg/l	TM208	<1	#			
1,2-Dichloroethane	<1 µg/l	TM208	<1	#			
Benzene	<1 µg/l	TM208	<1	#			
Trichloroethene	<1 µg/l	TM208	<1	#			
1,2-Dichloropropane	<1 µg/l	TM208	<1	#			
Dibromomethane	<1 µg/l	TM208	<1	#			
Bromodichloromethane	<1 µg/l	TM208	<1	#			
cis-1,3-Dichloropropene	<1 µg/l	TM208	<1	#			
Toluene	<1 µg/l	TM208	<1	#			
trans-1,3-Dichloropropene	<1 µg/l	TM208	<1	#			
1,1,2-Trichloroethane	<1 µg/l	TM208	<1	#			
1,3-Dichloropropane	<1 µg/l	TM208	<1	#			
Tetrachloroethene	<1 µg/l	TM208	<1	#			
Dibromochloromethane	<1 µg/l	TM208	<1	#			



CERTIFICATE OF ANALYSIS

SDG: 120308-5
Job: H_ATKINS_LDC-105
Client Reference: Weekly Samples

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

Order Number: CD0227
Report Number: 174597
Superseded Report:

VOC MS (W)

Results Legend			Customer Sample R	NSR OUT				
#	ISO17025 accredited.							
M	mCERTS accredited.		Depth (m) Sample Type Date Sampled Date Received SDG Ref Lab Sample No.(s) AGS Reference	Water(GW/SW) - 08/03/2012 120308-5 5288936				
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	<1 µg/l	TM208		<1	#			
Chlorobenzene	<1 µg/l	TM208		<1	#			
1,1,1,2-Tetrachloroethane	<1 µg/l	TM208		<1	#			
Ethylbenzene	<1 µg/l	TM208		<1	#			
m,p-Xylene	<1 µg/l	TM208		<1	#			
o-Xylene	<1 µg/l	TM208		<1	#			
Styrene	<1 µg/l	TM208		<1	#			
Bromoform	<1 µg/l	TM208		<1	#			
Isopropylbenzene	<1 µg/l	TM208		<1	#			
1,1,2,2-Tetrachloroethane	<1 µg/l	TM208		<1				
1,2,3-Trichloropropane	<1 µg/l	TM208		<1	#			
Bromobenzene	<1 µg/l	TM208		<1	#			
Propylbenzene	<1 µg/l	TM208		<1	#			
2-Chlorotoluene	<1 µg/l	TM208		<1	#			
1,3,5-Trimethylbenzene	<1 µg/l	TM208		<1	#			
4-Chlorotoluene	<1 µg/l	TM208		<1	#			
tert-Butylbenzene	<1 µg/l	TM208		<1	#			
1,2,4-Trimethylbenzene	<1 µg/l	TM208		<1	#			
sec-Butylbenzene	<1 µg/l	TM208		<1	#			
4-iso-Propyltoluene	<1 µg/l	TM208		<1	#			
1,3-Dichlorobenzene	<1 µg/l	TM208		<1	#			
1,4-Dichlorobenzene	<1 µg/l	TM208		<1	#			
n-Butylbenzene	<1 µg/l	TM208		<1	#			
1,2-Dichlorobenzene	<1 µg/l	TM208		<1				
1,2-Dibromo-3-chloropropene	<1 µg/l	TM208		<1				
1,2,4-Trichlorobenzene	<1 µg/l	TM208		<1	#			
Hexachlorobutadiene	<1 µg/l	TM208		<1	#			
tert-Amyl methyl ether (TAME)	<1 µg/l	TM208		<1	#			
Naphthalene	<1 µg/l	TM208		<1	#			
1,2,3-Trichlorobenzene	<1 µg/l	TM208		<1	#			
1,3,5-Trichlorobenzene	<1 µg/l	TM208		<1				



SDG:	120308-5	Location:	Coed Darcy Urban Village	Order Number:	CD0227
Job:	H_ATKINS_LDC-105	Customer:	Atkins Global Ltd	Report Number:	174597
Client Reference:	Weekly Samples	Attention:	Selina Bamforth	Superseded Report:	

Notification of Deviating Samples

Sample Number	Customer Sample Ref.	Depth (m)	Matrix	Test Name	Component Name	Comment
5289190	NSR IN		LIQUID	Anions by Kone (w)	Nitrate as NO3	Sample holding time exceeded
5289190	NSR IN		LIQUID	Anions by Kone (w)	Nitrite as NO2	Sample holding time exceeded
5289201	NSR OUT		LIQUID	Anions by Kone (w)	Nitrate as NO3	Sample holding time exceeded
5289201	NSR OUT		LIQUID	Anions by Kone (w)	Nitrite as NO2	Sample holding time exceeded
5289212	36 '		LIQUID	Anions by Kone (w)	Nitrate as NO3	Sample holding time exceeded
5289212	36 '		LIQUID	Anions by Kone (w)	Nitrite as NO2	Sample holding time exceeded
5289348	DC1		LIQUID	Anions by Kone (w)	Nitrate as NO3	Sample holding time exceeded
5289348	DC1		LIQUID	Anions by Kone (w)	Nitrite as NO2	Sample holding time exceeded
5289370	DC2		LIQUID	Anions by Kone (w)	Nitrate as NO3	Sample holding time exceeded
5289370	DC2		LIQUID	Anions by Kone (w)	Nitrite as NO2	Sample holding time exceeded

Note : Test results may be compromised



CERTIFICATE OF ANALYSIS

SDG: 120308-5
Job: H_ATKINS_LDC-105
Client Reference: Weekly Samples

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

Order Number: CD0227
Report Number: 174597
Superseded Report:

Table of Results - Appendix

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		
TM022	Method 2540D, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part120 1981;BS EN 872	Determination of total suspended solids in waters		
TM045	MEWAM BOD5 2nd Ed.HMSO 1988 / Method 5210B, AWWA/APHA, 20th Ed., 1999; SCA Blue Book 130	Determination of BOD5 (ATU) Filtered by Oxygen Meter on liquids		
TM061	Method for the Determination of EPH,Massachusetts Dept.of EP, 1998	Determination of Extractable Petroleum Hydrocarbons by GC-FID (C10-C40)		
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) and BTEX (MTBE) compounds by Headspace GC-FID (C4-C12)		
TM099	BS 2690: Part 7:1968 / BS 6068: Part2.11:1984	Determination of Ammonium in Water Samples using the Kone Analyser		
TM107	ISO 6060-1989	Determination of Chemical Oxygen Demand using COD Dr Lange Kit		
TM120	Method 2510B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part 9:1970	Determination of Electrical Conductivity using a Conductivity Meter		
TM133	BS 1377: Part 3 1990;BS 6068-2.5	Determination of pH in Soil and Water using the GLpH pH Meter		
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS		
TM173	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	Determination of Speciated Extractable Petroleum Hydrocarbons in Soils by GC-FID		
TM174	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	Determination of Speciated Extractable Petroleum Hydrocarbons in Waters by GC-FID		
TM176	EPA 8270D Semi-Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)	Determination of SVOCs in Water by GCMS		
TM181	US EPA Method 6010B	Determination of Routine Metals in Soil by iCap 6500 Duo ICP-OES		
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers		
TM208	Modified: US EPA Method 8260b & 624	Determination of Volatile Organic Compounds by Headspace / GC-MS in Waters		
TM218	Microwave extraction – EPA method 3546	Microwave extraction - EPA method 3546		
TM245	By GC-FID	Determination of GRO by Headspace in waters		

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



CERTIFICATE OF ANALYSIS

Validated

SDG:	120308-5	Location:	Coed Darcy Urban Village	Order Number:	CD0227
Job:	H_ATKINS_LDC-105	Customer:	Atkins Global Ltd	Report Number:	174597
Client Reference:	Weekly Samples	Attention:	Selina Bamforth	Superseded Report:	

Test Completion Dates

Lab Sample No(s)	5288937	5288940	5288941	5288938	5288939	5288922	5288924	5288926	5288927	5288928
Customer Sample Ref.	36'	DC1	DC2	DIRE WT IN	DIRE WT OUT	FTS1	FTS1	FTS2	FTS3	FTS4
AGS Ref.										
Depth						0.20	1.15	1.80	0.10	0.60
Type	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID	SOLID	SOLID	SOLID	SOLID	SOLID
Ammoniacal Nitrogen	10-Mar-2012	10-Mar-2012	10-Mar-2012							
Anions by Kone (w)	15-Mar-2012	15-Mar-2012	15-Mar-2012							
BOD True Total	14-Mar-2012									
COD Unfiltered	10-Mar-2012									
Conductivity (at 20 deg.C)	09-Mar-2012	11-Mar-2012	11-Mar-2012							
Dissolved Metals by ICP-MS	12-Mar-2012	12-Mar-2012	12-Mar-2012							
EPH CWG (Aliphatic) Aqueous GC (W)	15-Mar-2012	14-Mar-2012	14-Mar-2012							
EPH CWG (Aliphatic) GC (S)						14-Mar-2012	14-Mar-2012	13-Mar-2012	14-Mar-2012	14-Mar-2012
EPH CWG (Aromatic) Aqueous GC (W)	15-Mar-2012	14-Mar-2012	14-Mar-2012							
EPH CWG (Aromatic) GC (S)						14-Mar-2012	14-Mar-2012	13-Mar-2012	14-Mar-2012	14-Mar-2012
GRO by GC-FID (S)						13-Mar-2012	13-Mar-2012	13-Mar-2012	14-Mar-2012	13-Mar-2012
GRO by GC-FID (W)	09-Mar-2012	09-Mar-2012	09-Mar-2012							
Metals by iCap-OES (Soil)						14-Mar-2012	14-Mar-2012	14-Mar-2012	14-Mar-2012	14-Mar-2012
PAH by GCMS						12-Mar-2012	12-Mar-2012	12-Mar-2012	12-Mar-2012	12-Mar-2012
pH						14-Mar-2012	13-Mar-2012	13-Mar-2012	13-Mar-2012	14-Mar-2012
Sample description						09-Mar-2012	09-Mar-2012	09-Mar-2012	09-Mar-2012	09-Mar-2012
Suspended Solids	13-Mar-2012	13-Mar-2012	13-Mar-2012							
SVOC MS (W) - Aqueous	14-Mar-2012	14-Mar-2012	14-Mar-2012	16-Mar-2012	16-Mar-2012					
TPH CWG (W)	15-Mar-2012	14-Mar-2012	14-Mar-2012							
TPH CWG GC (S)						14-Mar-2012	14-Mar-2012	13-Mar-2012	14-Mar-2012	14-Mar-2012
VOC MS (W)	11-Mar-2012	11-Mar-2012	11-Mar-2012	11-Mar-2012	11-Mar-2012					

Lab Sample No(s)	5288930	5288932	5288933	5288935	5288936
Customer Sample Ref.	FTS4	FTS5	FTS6	NSR IN	NSR OUT
AGS Ref.					
Depth	2.20	1.90	0.80		
Type	SOLID	SOLID	SOLID	LIQUID	LIQUID
Ammoniacal Nitrogen				10-Mar-2012	10-Mar-2012
Anions by Kone (w)				15-Mar-2012	15-Mar-2012
BOD True Total				14-Mar-2012	14-Mar-2012
COD Unfiltered				10-Mar-2012	10-Mar-2012
Conductivity (at 20 deg.C)				09-Mar-2012	11-Mar-2012
Dissolved Metals by ICP-MS				12-Mar-2012	12-Mar-2012
EPH CWG (Aliphatic) Aqueous GC (W)				15-Mar-2012	15-Mar-2012
EPH CWG (Aliphatic) GC (S)	14-Mar-2012	13-Mar-2012	13-Mar-2012		
EPH CWG (Aromatic) Aqueous GC (W)				15-Mar-2012	15-Mar-2012
EPH CWG (Aromatic) GC (S)	14-Mar-2012	13-Mar-2012	13-Mar-2012		
GRO by GC-FID (S)	14-Mar-2012	14-Mar-2012	14-Mar-2012		
GRO by GC-FID (W)				09-Mar-2012	09-Mar-2012
Metals by iCap-OES (Soil)	14-Mar-2012	14-Mar-2012	14-Mar-2012		
PAH by GCMS	12-Mar-2012	12-Mar-2012	12-Mar-2012		
pH	14-Mar-2012	13-Mar-2012	13-Mar-2012		
Sample description	09-Mar-2012	09-Mar-2012	09-Mar-2012		
Suspended Solids				13-Mar-2012	13-Mar-2012
SVOC MS (W) - Aqueous				14-Mar-2012	14-Mar-2012
TPH CWG (W)				15-Mar-2012	15-Mar-2012
TPH CWG GC (S)	14-Mar-2012	14-Mar-2012	14-Mar-2012		
VOC MS (W)				11-Mar-2012	11-Mar-2012



CERTIFICATE OF ANALYSIS

SDG:	120308-5	Location:	Coed Darcy Urban Village	Order Number:	CD0227
Job:	H_ATKINS_LDC-105	Customer:	Atkins Global Ltd	Report Number:	174597
Client Reference:	Weekly Samples	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).

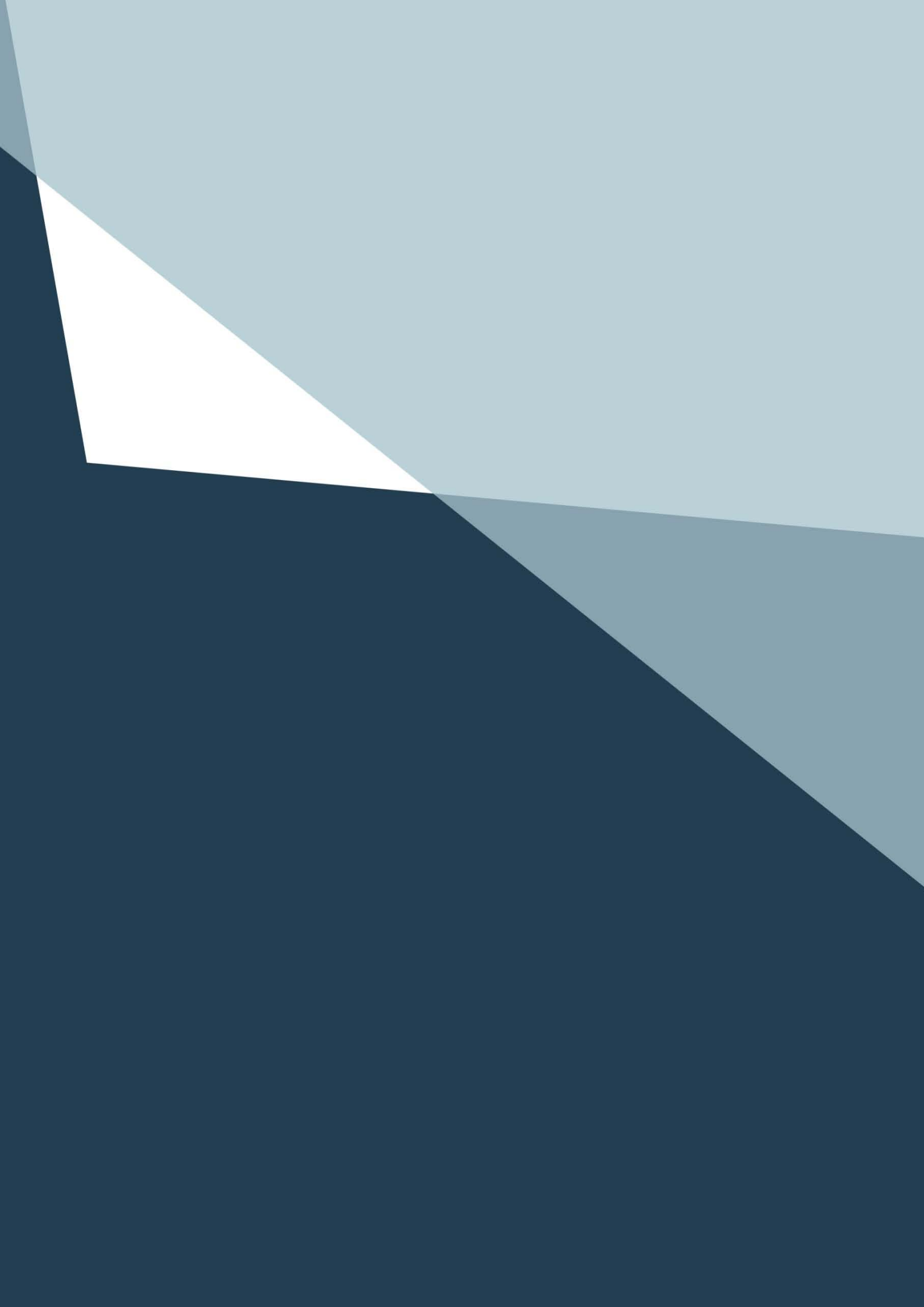
The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using Alcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based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



Stodwen Developments Ltd

Coedarcy

Validation Report

ersimmonhase A Cordon Sanitaire

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Coed Darcy

Validation Report Persimmon Phase 1A_Cordon Sanitaire (Monitor Phase 22)

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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

* "garden surface, pavement level, floor level or equivalent within buildings" as defined within the S106 Deed of Planning Obligation

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.

The purpose of this report is to provide a summary of information with regard to an area of recent remediation and validation works within the former refinery. This area has been referred to in previous reports (refer to Section 2.1) as the proposed 'cordon sanitaire' for the initial phase of residential housing at the site, to be constructed by Persimmon. This document supercedes a previous version of this report, issued to the Monitor in September 2012.

In the short term, this area may be utilised for temporary parking for the proposed housing. In the longer term, this area is shown for redevelopment as a 'mixed end use'. On the basis of the information currently available, it is believed that this is likely to comprise a multi storey commercial/office property with car parking at the rear.

For the purpose of Monitor sign off, the area of these works is proposed as Monitor Phase 22, as shown on Drawing 5041216-DWG-300SD-1280

This report will present the following:

- A summary of background information relating to Monitor Phase 22;
- A summary of reclamation and remedial works undertaken.
- Confirmation of the compliance of the recent works with the requirements of the S106.

It is anticipated that this document will form a submission under **Planning Condition** 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.

This document supplements previous reports by Atkins relating to this area.

2. The Site

2.1 General

Detailed information on the historical development of this area has been previously reported in the following Atkins reports:

- 5041216/PLOTS/RPT/735 'Persimmon Phase 1A (Monitor Phase 3), Validation Report (March 2012).
- 5041216/REM/RPT/576 'Geoenvironmental Assessment and Outline Remediation Strategy, Phase 3 Residential Area (May 2011)
- 5041216/REM/RPT/431 'Geoenvironmental Assessment Report, Former Laboratory (Technical Building and Canteen Area), March 2011.

The area of the proposed cordon sanitaire occupies a rectangular piece of land immediately to the north of an area of proposed housing, to be constructed by Persimmon (refer to Drawing 5041216-DWG-300SD-1280. Remedial works across the area of the proposed housing (Monitor Phase 3) were completed in March 2012, details of which are provided in Atkins report 5041216/PLOTS/RPT/735.

The northern boundary of Monitor Phase 22 is defined by an existing site haul road. The existing road is no longer in use and all hard surfacing has been removed. Details of ground conditions, remediation and the validation of this former road has been incorporated into the reporting for the area of a proposed temporary foul drainage collection chamber to the north (Atkins report 5041216/REM/RPT/819, Monitor Phase 20).

Reference to historical maps and existing reports (Atkins Report 5041216/REM/RT/576) indicate the 'Process Pool Depot' to have lain within the eastern end of this area. It is understood that this building was *"a mess room for general labourers to be located prior to being designated with works tasks"*.

A small number of tanks are also believed to have been present within the western end of Monitor Phase 22, based upon the presence of circular concrete bases evident prior to the clearance of this area (refer to Photograph 1 in Appendix A).

2.2 Recorded Ground Conditions

Details of historical and more recent ground investigation across this area have been previously provided in reports relating to the former canteen and initial phase of residential housing 'Persimmon Phase 1A' (refer to Section 2.1).

Discussion of the most recent investigation across this area is presented in Atkins report 5041216/PLOTS/RPT/735. These works were undertaken in October 2011, on completion of the clearance of the former weighbridge and hardstanding associated with the former road. The findings of this investigation indicated granular Made Ground to depths of between 0.1m and 1.15mbgl beneath ground level. Natural cohesive soils were identified locally, overlying sandstone bedrock at depths of ground level to 1.15m bgl.

Evidence of hydrocarbon contamination was recorded locally, up to a maximum of Class 4 (heavy staining and a strong hydrocarbon odour in ambient air).

The locations of previous investigation within Monitor Phase 22 (PAN) are shown on Atkins Drawing 1081. Copies of relevant exploratory hole logs are presented in Appendix B.

Due to the potential for remaining below ground structures, it was recommended that existing soils within this area were 'turned over' and replaced. Further investigation of this area was then recommended in order to 'validate' this area in terms of the S106 (Atkins report 5041216/PLOTS/RT/735).

3. S106 Requirements

Based on the proposed end use of Monitor Phase 22 (refer to section 1.1), this area is considered to be representative of a **commercial end use** scenario as defined within the S106. A summary of the adopted thresholds relating to an area of proposed commercial end use are presented in Appendix C.

Schedule 8, Para 6 indicates the following remediation redevelopment requirements for an area of proposed commercial use.

- *All oil saturated soils and soil containing free product other than minor sheens shall be removed to a minimum depth of 2.00m FFL or 0.50m below the likely lowest seasonal groundwater elevation following development of the intended Urban Village, whichever is the deeper. This depth is to be established by consideration of all available groundwater level monitoring data.*
- *All soils must meet the RBSL for TPH to at least 1m below FFL.*
- *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.*
- *Where there is a risk of the migration in the ground of hazardous gas or contaminated liquid into remediated areas, the Developer shall take all appropriate measures to prevent this occurring. Such measures could include the installation of interception trenches and management of discharge from those. The Developer shall monitor whatever measures are put in place after their installation to continue to demonstrate their effectiveness.*
- *Where necessary, seeps, sheens and iron rich discharges from the bedrock must be controlled such that there is no visible discharge at surface and little or no odour. Acceptable methodologies for remediation may include, but are not limited to the use of land drainage via interceptors.*

It should be noted that the requirements of the S106 relate to a 'commercial end use where groundwater is in soil' and that they are 'intended to refer to commercial end use in areas where there is sufficient soils material overlying the bedrock to commonly contain perched groundwater'.

Based upon the identified ground conditions and the presence of sandstone bedrock at shallow depth such requirements are likely to be over conservative when applied to the proposed remediation of Monitor Phase 22.

Post remediation development requirements, as also required by the S106, are discussed in Section 6.

4. Remedial and plot preparatory works

4.1 Scope of Works

In line with the requirements of the S106, relating to a proposed commercial end use (see Section 3), the scope of the required remedial works across Monitor Phase 22 was deemed to comprised the following:

- *The removal of identified free product and oil saturated soils (VO=5)*
- *Turnover of existing soils and the removal of any existing concrete and relict services encountered.*
- *Reprofiling of the final surface to achieve a stable, free draining surface.*

4.2 Works Undertaken

Clearance and remedial works across Monitor Phase 22 have been undertaken in a number of phases in conjunction with the remediation of an area of proposed housing to the south. In summary the scope of works across this area has generally comprised:

- *Removal of existing weighbridge, surface hardstanding and existing drainage from beneath former site road – undertaken as part of the Monitor Phase 3 remedial works (September to October 2011)*
- *Turnover and reprofiling of outstanding areas of Monitor Phase 22, including the removal of below ground structures, remnant drainage runs and identified hydrocarbon impacted materials (May to June 2012)*
- *Validation investigation- trial pitting (June 2012)*
- *Localised breakout of shallow bedrock in associated with 'benching' prior to the construction of a proposed embankment (March 2013).*

Pre remediation levels across Monitor Phase 22 are shown on drawing 5041216/300SD/DWG/1260.

The extent of the area proposed for sign off as Monitor Phase 22 is shown on Drawing 5041216/300SD/DWG/1262.

Due to the absence of specific 'post remediation' development levels, fill materials used during the remedial and plot preparatory works across Monitor Phase 22 comprised suitable excavated soils (see below). No additional fill materials were required as part of these works.

Recovery of Free Product and Excavation of Hydrocarbon impacted soils

The locations of existing monitoring wells within Monitor Phase 22 are shown on Drawing 5041216/300SD/DWG/1262.

No product was recorded during monitoring at MSTP295, which was destroyed as part of the clearance works across the eastern part of Monitor Phase 22 and lay within shallow natural soils (0.75 to 1.75m bgl).

Product recovery was undertaken from MSMW143 during April and early May 2012 as part of the ongoing assessment of Monitor Phase 22.

A total of 2.0 litres of product was recovered, with subsequent monitoring rounds (July-August 2012) indicating remaining thicknesses of between 5-10mm of product in the well. MSMW143 is installed within the underlying sandstone bedrock, at depths of between 2.5m and 12m bgl. Recorded groundwater levels at this location are suggested as lying between 2.9m and 3.2m bgl.

Based on the removal of remaining sources of hydrocarbon contamination, both within Monitor Phase 22 and upslope, the presence of residual hydrocarbon within this sandstone at this depth (>3m bgl) was not considered to represent a widespread or significant source of on-going

contamination. Due to the presence of sandstone bedrock at 1m bgl, it was not viable to undertake significant investigations at this location to the depth of the recorded product. It is noted that no evidence of staining and/or seepages has been noted during recent deep (2.5-4.0m bgl) excavations for service installation into the sandstone bedrock immediately to the north of Monitor Phase 22 (refer to Photographs 5 and 6 in Appendix A). The base of these excavations lie below the level of the recorded product in MSMW143 and were extended along the majority of the northern boundary of Monitor Phase 22.

In line with the investigation in October 2011, approximately 25m³ of heavily stained materials (VO=>4) were encountered within the western end of Monitor Phase 22, within the vicinity of PAN002. Due to their shallow depth and the uncertainty relating to final development levels across this area, these materials were excavated and taken elsewhere within the refinery for treatment.

The remainder of existing soils encountered across this area were considered to be suitable for retention within an area of proposed commercial end use. Suitable materials encountered as part of the clearance and turnover works were reused and replaced within Monitor Phase 22.

Final 'as built' levels on completion of the works are shown on Drawing 5041216/300SD/DWG/1262. An isopachyte drawing showing the depth of turnover down to sandstone bedrock is attached for information.

5. Validation / Verification

5.1 Requirements of the S106

Monitor Sign off requires demonstration of the compliance of an area for proposed development with the requirements of the S106. In line with the proposed end of of this area (refer to section 1) the S106 requirements for a commercial end use have been adopted for the purpose of the following assessment.

The S106 (Schedule 8, Part 3, Paragraph 8) sets out the following requirements for validation testing within a proposed commercial area as part of the ongoing redevelopment of the refinery.

Table Minimum Validation Testing Frequencies for a Commercial Area

Testing for the Validation Suite at the following frequency	Soils Commercial at all depths
Imported quarried material	1 per 1000m ³ ex situ, composite of 5 regular sub-samples.
Imported soil from verified Greenfield site	1 per 500m ³ ex situ, composite of 5 regular sub-samples.
Imported soil from characterised brownfield site ¹ .	1 per 100m ³ ex situ, composite of 5 regular sub-samples.
0.5m-1m below FFL in-situ	Regular grid of 1 per 400m ² , sample over 0.5m depth.
>1m below FFL in-situ.	Regular grid of 1 per 400m ² , sample over 0.5m depth..
Stockpiled excavated site materials for re-use.	1 per 400m ³ ex situ, composite of 5 sub-samples.
Face of remedial excavations <1m deep.	1 per 15m ² , minimum of 1 per face, worst case VO sample.
Face of remedial excavations >1m deep.	1 per 15m ² , minimum of 1 per face, worst case VO sample.
Along redundant service excavations.	1 per 20m of trench, worst case VO sample.
Soil treated ex situ and homogenised.	1 per 500m ³ ex situ, 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

Monitor Phase 22 occupies an area of approximately 0.45ha (4520m²), as shown on drawing 5041216-DWG-300SD-1280

Fill Materials

In order to enable the removal of remaining 'hard' materials and relict infrastructure, in situ soils beneath Monitor Phase 22 have been excavated down to the underlying sandstone bedrock. Selected photographs taken during the works and subsequent backfill operations are presented in Appendix A.

In line with the phasing of works across this area, as defined in Section 4.2, trial pitting of this area was also undertaken in two phases.

An initial series of trial pits (PAN) was undertaken in October 2011 after the removal of surface hardstanding from across this area, as part of the assessment and clearance of Persimmon Phase 1A (Section 5.2 of Atkins report 5041216/PLOTS/RPT/735). The result of this investigation (refer to summary table in Appendix D) suggested existing soils within this area to be suitable for retention within a proposed commercial area.

A further validation exercise (CSP) was then undertaken in May 2012, on completion of additional turnover works in June 2012 in order to update the findings of ground investigation for comparison with the requirements of the S106. Due to the presence of an existing steep embankment, the locations of the later (CSP) validation pits were restricted along the southern boundary of Monitor Phase 22. The locations of relevant validation trial pits across this area are shown on drawing 5041216-300SD-DWG-1243. Copies of exploratory hole logs are presented in Appendix B.

The most recent validation pitting across Monitor Phase 22 (May 2012) indicates fill materials beneath Monitor Phase 22 to comprise gravelly sands and clays, overlying sandstone bedrock at depths of up to 1.3m depth (CSP009). Localised visual/olfactory evidence of hydrocarbon staining (up to a maximum Class of VO=1) was seen in CSP001 and CSP005. These soils are considered suitable for retention within this area.

A summary of the results of chemical analysis from across Monitor Phase 22 is presented as Table D1 in Appendix D. These indicate no exceedences of the adopted thresholds for retention at shallow (<1m) depth within a proposed commercial area (refer to Appendix C).

Due to the absence of any quantitative analysis for asbestos, further sampling was carried out across Monitor Phase 22 in January 2013. The results of this analysis indicates concentrations up to 0.0014% and below the permitted threshold of 300ppm stated in the S106. The locations of additional sample locations are presented on Drawing 5041216/DWG/300SD/1243. Copies of all laboratory certificates are presented in Appendix D.

6. Post Remediation Development requirements

Based on the proposed Masterplan, it is understood that the area of Monitor Phase 22 is proposed for a commercial end use in the final development. Detailed information relating to final development layouts and development levels for this area are not known at the time of writing.

In the short term, it is understood that this area may be used for temporary parking associated with the construction of an adjacent housing development by Persimmon.

The result of validation pitting and subsequent chemical analysis on in situ soils from across Monitor Phase 22 infers no concentrations in excess of the permitted thresholds for a commercial end use as proposed.

In the longer term, the following additional design requirements also relate to the proposed redevelopment of this area (Schedules 9 and 10 of the S106).

Preventative Measures (Schedule 9)

- *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 CDL does not object to validate the integrity of the membrane and the adequacy of the venting system installed in each such structure.*
- *The use of appropriate construction methodologies and materials to ensure that contact with residual Pre-Transfer Date Contamination does not cause the decay or degradation of construction materials or the exposure of humans to contamination, including but not limited to contamination of drinking water by penetration of water supply pipes or other penetration of buried structures and services by contaminants.*

Placement of Clean Cover (Schedule 10)

- *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 hardsurfaced 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.*

7. Conclusion

Based upon the execution of reclamation, remedial and re-profiling works across Monitor Phase 22, this area is considered to have achieved the requirements of the S106 for Coed Darcy.

A E I A

Selected hotographs



Photograph 1: Historical tank bases within Monitor Phase 22



Photograph 2: Clearance works across Monitor Phase 22



Photograph 3: Turnover of existing soils



Photograph 4: Monitor Phase 22_Post Remediation



Photographs 5 and 6: Deep excavations for service installation into sandstone bedrock immediately to the north of Monitor Phase 22

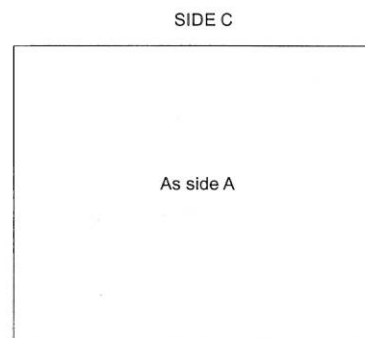
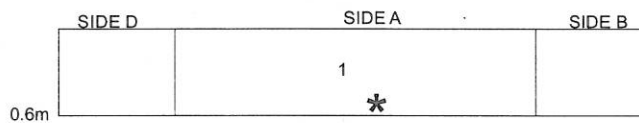


A E I B

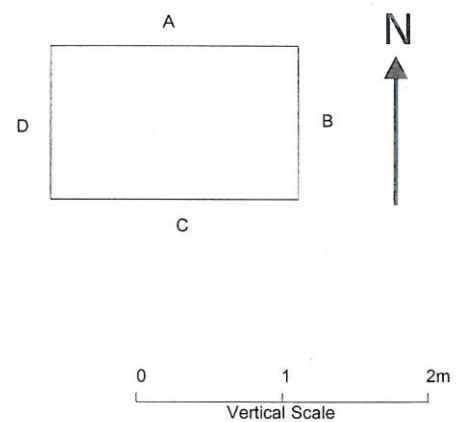
E ploratory hole logs

TRIAL PIT NUMBER: MSTP154
 GROUND ELEVATION: -
 DATE OF EXCAVATION: 19/6/98
 WATER LEVEL: DRY
 LOGGED BY: RC
 APPROVED BY:

SIDE ELEVATIONS



PLAN



Key:

- * Soil Sample location
- WA Water Sample
- HS Headspace Analysis
- ⇒ Water Ingress

STRATA DESCRIPTIONS	COMMENTS	SAMPLES
1. Orange/brown, firm CLAY with topsoil Trial pit terminated on refusal at 0.6 mbgl due to sandstone bedrock or boulders	a. No hydrocarbon odour or staining evident b. Window sampled due to access restrictions	<u>PID RESULTS</u> 0.0m - 0 ppm 0.5m - 0.3 ppm <u>SOIL SAMPLES</u> MSTP154-0.5m

Job Title:	SOIL & GROUNDWATER INVESTIGATION	
Location:	LLANDARCY REFINERY	
Client:	BP LLANDARCY	
Job No:	39991-001-401	DRAFT
 DAMES & MOORE		

BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: MSTP295		PAGE 1 of 1	
	NUMBER	TYPE					START DATE: 24/2/99		DRILLING METHOD: Window Sampling	
							FINISH DATE: 24/2/99		BOREHOLE DIAMETER: 100 mm	
							DRILLER: GEOTECHNICAL		SCREEN TYPE & DIAMETER: UPVC50 mm	
							LOGGED BY: SG APPR'D BY:		SCREEN SLOT SIZE: 1 mm	
						DESCRIPTION	COMMENTS			
						0	Soft brown SILT with rootlets.	0		
						0.5	Medium dense brown very silty gravelly SAND.	0.5		
						1.0	Predominately gravelly horizons at 0.7m and 1.0m.	1.0		
						1.5	Firm orange brown sandy CLAY with sandstone cobbles at 1.5m.	1.5		
						1.7	Borehole terminated at 1.7 mbgl on refusal	1.7		
						2.0		2.0		
						2.5		2.5		
						3.0		3.0		
						3.5		3.5		
						4.0		4.0		
						4.5		4.5		
						5.0		5.0		

LOCATION / NOTES:

1. All measurements in m below ground level (mbgl)

LEGEND

- Disturbed Sample
- Undisturbed Sample
- Headspace Analysis
- Down Borehole Analysis
- Groundwater Table
- Perched Water Table

BOREHOLE LOG

Job Title **SOIL & GROUNDWATER INVESTIGATION**

Location **LLANDARCY REFINERY**

Client **BP LLANDARCY LTD**

App'd **DRAFT**

Ref. **CR/DS/BIR/LON**

Date **APRIL 99**

Job No. **39991-004-401**

DAMES & MOORE

Project Name
Phase22

Project No.
CSP

Co-ords: 271626E - 195825N
Level: -

Date
23/05/2012

Location: Coed Darcy

Dimensions:

Scale
1:25

Client: St Modwen

Depth
0.70m

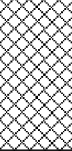
Logged By
Alex Mann

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
0.20	ES		0.70			MADE GROUND: Brown clayey gravelly SAND. Occasional staining at base (1,1). Coarse gravel of brick and sandstone SANDSTONE BEDROCK Trialpit Complete at 0.70 m
0.50	ES					

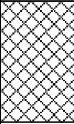
Remarks:	Pit terminated on bedrock
----------	---------------------------

Groundwater: No groundwater encountered



WS Atkins (Telford) Ltd							Trialpit No CSP002 Sheet 1 of 1	
Project Name Phase22			Project No. CSP		Co-ords: 271626E - 195839N Level: -		Date 23/05/2012	
Location: Coed Darcy					Dimensions: -		Scale 1:25	
Client: St Modwen					Depth 0.50m		Logged By Alex Mann	
Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description		
Depth (m)	Type	Results						
0.30	ES		0.50			MADE GROUND: Brown clayey gravelly SAND. Coarse gravel of brick and sandstone (0,0)		
						SANDSTONE BEDROCK		
						Trialpit Complete at 0.50 m		
						1		
						2		
						3		
						4		
Remarks: Pit terminated on bedrock								
Groundwater: No groundwater encountered								

WS Atkins (Telford) Ltd						Trialpit No CSP003 Sheet 1 of 1			
Project Name Phase22			Project No. CSP		Co-ords: 271602E - 195821N Level: -		Date 23/05/2012		
Location: Coed Darcy					Dimensions: -		Scale 1:25		
Client: St Modwen					Depth 1.30m		Logged By Alex Mann		
Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description			
Depth (m)	Type	Results							
0.50	ES					MADE GROUND: Brown clayey gravelly SAND. Coarse gravel of brick and sandstone (0,0)			
1.00	ES								
			1.20			SANDSTONE BEDROCK			
			1.30			Trialpit Complete at 1.30 m			
Remarks:			Pit terminated on bedrock						
Groundwater:			No groundwater encountered						

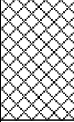
WS Atkins (Telford) Ltd							Trialpit No CSP004 Sheet 1 of 1	
Project Name Phase22			Project No. CSP		Co-ords: 271583E - 195835N Level: -		Date 23/05/2012	
Location: Coed Darcy					Dimensions: -		Scale 1:25	
Client: St Modwen					Depth 0.40m		Logged By Alex Mann	
Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description		
Depth (m)	Type	Results						
0.20	ES		0.40			MADE GROUND: Brown clayey gravelly SAND. Coarse gravel of brick and sandstone (0,0)		
						SANDSTONE BEDROCK		
						Trialpit Complete at 0.40 m		
						1		
						2		
						3		
						4		
Remarks: Pit terminated on bedrock								
Groundwater: No groundwater encountered								

WS Atkins (Telford) Ltd						Trialpit No CSP005 Sheet 1 of 1	
Project Name Phase22			Project No. CSP		Co-ords: 271571E - 195817N Level: -		Date 23/05/2012
Location: Coed Darcy					Dimensions: -		Scale 1:25
Client: St Modwen					Depth 1.10m		Logged By Alex Mann
Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
Depth (m)	Type	Results					
0.40	ES					MADE GROUND: Brown occasionally stained grey (1,2) clayey gravelly SAND. Coarse gravel of brick and sandstone (0,0)	
1.00	ES		1.10			SANDSTONE BEDROCK	
						Trialpit Complete at 1.10 m	
						1	
						2	
						3	
						4	
Remarks: Pit terminated on bedrock							
Groundwater: No groundwater encountered							



WS Atkins (Telford) Ltd						Trialpit No CSP006 Sheet 1 of 1		
Project Name Phase22			Project No. CSP		Co-ords: 271555E - 195836N Level: -		Date 23/05/2012	
Location: Coed Darcy					Dimensions: -		Scale 1:25	
Client: St Modwen					Depth 0.60m		Logged By Alex Mann	
Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description		
Depth (m)	Type	Results						
0.40	ES		0.60			MADE GROUND: Light brown sandy gravelly CLAY. Coarse gravel of sandstone and brick (0,0)		
						SANDSTONE BEDROCK		
						Trialpit Complete at 0.60 m		
						1		
						2		
						3		
						4		
Remarks: Pit terminated on bedrock								
Groundwater: No groundwater encountered								



WS Atkins (Telford) Ltd						Trialpit No CSP007 Sheet 1 of 1		
Project Name Phase22			Project No. CSP		Co-ords: 271544E - 195825N Level: -		Date 23/05/2012	
Location: Coed Darcy					Dimensions: -		Scale 1:25	
Client: St Modwen					Depth 0.40m		Logged By Alex Mann	
Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description		
Depth (m)	Type	Results						
0.20	ES		0.40			MADE GROUND: Orange brown clayey gravelly SAND. Coarse gravel of sandstone and brick (0,0)		
						SANDSTONE BEDROCK		
						Trialpit Complete at 0.40 m		
						1		
						2		
						3		
						4		
Remarks: Pit terminated on bedrock								
Groundwater: No groundwater encountered								



WS Atkins (Telford) Ltd						Trialpit No CSP008 Sheet 1 of 1	
Project Name Phase22			Project No. CSP		Co-ords: 271537E - 195823N Level: -		Date 23/05/2012
Location: Coed Darcy					Dimensions: -		Scale 1:25
Client: St Modwen					Depth 0.70m		Logged By Alex Mann
Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
Depth (m)	Type	Results					
0.40	ES		0.70			MADE GROUND: Brown clayey gravelly SAND. Coarse gravel of brick and sandstone (0,0)	
						SANDSTONE BEDROCK	
						Trialpit Complete at 0.70 m	
						1	
						2	
						3	
						4	
Remarks: Pit terminated on bedrock							
Groundwater: No groundwater encountered							

Project Name
Phase22

Project No.
CSP

Co-ords: 271522E - 195837N
Level: -

Date
23/05/2012

Location: Coed Darcy

Dimensions:

Scale

1:25

Client: St Modwen

Depth
1.40m

Logged By
Alex Mann

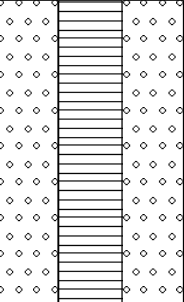
Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
0.50	ES					MADE GROUND: Brown clayey gravelly SAND. Coarse gravel of brick and sandstone (0,0)
1.00	ES					
			1.30			SANDSTONE BEDROCK
			1.40			Trialpit Complete at 1.40 m

Remarks:	Pit terminated on bedrock
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Groundwater: No groundwater encountered



BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: MSMW143D		PAGE 1 of 2			
	NUMBER	TYPE					START DATE: 1.4/99		DRILLING METHOD: ROTARY AIR FLUSH			
							FINISH DATE: 1/4/99		BOREHOLE DIAMETER: 115mm			
							DRILLER: R2		SCREEN TYPE & DIAMETER: 50 mm ID UPVC			
							LOGGED BY: SG APPR'D BY:		SCREEN SLOT SIZE: 0.5 mm			
						DESCRIPTION		COMMENTS				
						Loose brown silty CLAY with minor gravel		No odour		0		
								Slight hydrocarbon odour		1.0		
										2.0		
										3.0		
										4.0		
										5.0		
										6.0		
										7.0		
										8.0		
										9.0		
										10		
LOCATION / NOTES: 1. All measurements in m below ground level (mbgl) 2. Rotary from surface						LEGEND Disturbed Sample Undisturbed Sample Headspace Analysis Down Borehole Analysis Groundwater Table Perched Water Table		BOREHOLE LOG Job Title SOIL & GROUNDWATER INVESTIGATION Location LLANDARCY REFINERY Client BP LLANDARCY LTD App'd DRAFT Ref. CR/MC/BRS Date MAY 99 Job No. 39991-004-401				
											DAMES & MOORE GROUP	

BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: MSMW143D		PAGE 2 of 2	
	NUMBER	TYPE					START DATE: 1.4/99		DRILLING METHOD: ROTARY AIR FLUSH	
							FINISH DATE: 1/4/99		BOREHOLE DIAMETER: 115mm	
							DRILLER: R2		SCREEN TYPE & DIAMETER: 50 mm ID UPVC	
							LOGGED BY: SG APPR'D BY:		SCREEN SLOT SIZE: 1 mm	
						DESCRIPTION		COMMENTS		
					10	Consolidated light blue-grey SANDSTONE (BEDROCK)		No odour	10	
					12	Borehole terminated at 12.0 mbgl			12	
					11				11	
					12				12	
					13				13	
					14				14	
					15				15	
					16				16	
					17				17	
					18				18	
					19				19	
					20				20	

LOCATION / NOTES: 1. All measurements in m below ground level (mbgl)		LEGEND  Disturbed Sample  Undisturbed Sample  Headspace Analysis  Down Borehole Analysis  Groundwater Table  Perched Water Table	BOREHOLE LOG Job Title SOIL & GROUNDWATER INVESTIGATION Location LLANDARCY REFINERY Client BP LLANDARCY LTD App'd DRAFT Ref. CR/MC/BRS Date MAY 99 Job No. 39991-004-401		 DAMES & MOORE GROUP
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WS Atkins (Telford) Ltd						Trialpit No PAN016 Sheet 1 of 1	
Project Name P1AN			Project No. P1AN		Co-ords: 271586E - 195812N Level: -		Date 21/11/2011
Location: Coed Darcy Urban Village					Dimensions: - Depth 0.50m		Scale 1:25
Client: St. Modwen Development Ltd							Logged By Alex Mann

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
0.30	ES		0.10			MADE GROUND: Brown sandy GRAVEL. Coarse gravel of mudstone and brick (0,0)
			0.20			MADE GROUND: Red brown sandy GRAVEL. Coarse gravel of brick (0,0)
						MADE GROUND: Black / grey (4,3) gravelly sandy CLAY. Coarse gravel of sandstone
			0.50			Sandstone Bedrock
						Trialpit Complete at 0.50 m

Remarks:	Pit terminated at 0.5m in bedrock
Groundwater:	No groundwater encountered

WS Atkins (Telford) Ltd						Trialpit No PAN017 Sheet 1 of 1	
Project Name P1AN			Project No. P1AN		Co-ords: 271617E - 195814N Level: -		Date 21/11/2011
Location: Coed Darcy Urban Village					Dimensions: -		Scale 1:25
Client: St. Modwen Development Ltd					Depth 1.00m		Logged By Alex Mann
Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
Depth (m)	Type	Results					
0.50	ES		1.00			MADE GROUND: Brown sandy gravel. Stained black (4,3) at base	
0.90	ES					Sandstone Bedrock Trialpit Complete at 1.00 m	
Remarks: Pit terminated at 1.0m on bedrock							
Groundwater: No groundwater encountered							



WS Atkins (Telford) Ltd						Trialpit No PAN018 Sheet 1 of 1	
Project Name P1AN			Project No. P1AN		Co-ords: 271625E - 195815N Level: -		Date 21/11/2011
Location: Coed Darcy Urban Village					Dimensions: -		Scale 1:25
Client: St. Modwen Development Ltd					Depth 0.80m		Logged By Alex Mann

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
0.50	ES		0.10			MADE GROUND: Brown sandy GRAVEL. Coarse gravel of mudstone and brick (0,0)
						Brown slightly sandy gravelly CLAY. Coarse gravel of sandstone (0,0)
			0.80			Sandstone Bedrock Trialpit Complete at 0.80 m

Remarks: Pit terminated at 0.8m on bedrock	
Groundwater: No groundwater encountered	

WS Atkins (Telford) Ltd						Trialpit No PAN001 Sheet 1 of 1	
Project Name P1AN			Project No. P1AN		Co-ords: 271512E - 195835N Level: -		Date 18/10/2011
Location: Coed Darcy Urban Village					Dimensions: -		Scale 1:25
Client: St. Modwen Development Ltd					Depth 1.20m		Logged By Alex Mann
Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
Depth (m)	Type	Results					
0.40	ES					MADE GROUND: Light/dark brown clayey gravelly SAND. Coarse gravel of brick and sandstone (0,0)	
0.90	ES						
			1.15 1.20			Sandstone Bedrock	
						Trialpit Complete at 1.20 m	
Remarks: Pit terminated at 1.2m on bedrock							
Groundwater: No groundwater encountered							

WS Atkins (Telford) Ltd						Trialpit No PAN002 Sheet 1 of 1	
Project Name P1AN			Project No. P1AN		Co-ords: 271529E - 195811N Level: -		Date 18/10/2011
Location: Coed Darcy Urban Village					Dimensions: - Depth 0.50m		Scale 1:25 Logged By Alex Mann
Client: St. Modwen Development Ltd							
Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
Depth (m)	Type	Results					
0.50	ES		0.50		 MADE GROUND: Stained black (4,4) clayey sandy gravels of mudstone and concrete. Excavated as part of a drainage channel clearance		
						Trialpit Complete at 0.50 m	
Remarks: Pit terminated after obstruction removal							
Groundwater: No groundwater encountered							

WS Atkins (Telford) Ltd				Trialpit No PAN004 Sheet 1 of 1	
Project Name P1AN		Project No. P1AN		Co-ords: 271535E - 195841N Level: -	
Location: Coed Darcy Urban Village				Dimensions: - Depth 1.00m	
Client: St. Modwen Development Ltd				Scale 1:25 Logged By Alex Mann	

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
0.30	ES		0.05			MADE GROUND: Light/dark brown clayey gravelly SAND. Coarse gravel of brick and sandstone (0,0)
						MADE GROUND: Orange brown very sandy gravelly CLAY (reworked natural). Coarse gravel of rounded sandstone
0.90	ES		0.80			As above stained grey (2,2)
			0.95			Sandstone Bedrock
			1.00			Trialpit Complete at 1.00 m 1 2 3 4

Remarks: Pit terminated at 1.0m on bedrock	
Groundwater: No groundwater encountered	

WS Atkins (Telford) Ltd						Trialpit No PAN005 Sheet 1 of 1	
Project Name P1AN			Project No. P1AN		Co-ords: 271548E - 195826N Level: -		Date 18/10/2011
Location: Coed Darcy Urban Village					Dimensions: -		Scale 1:25
Client: St. Modwen Development Ltd					Depth 0.20m		Logged By Alex Mann
Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
Depth (m)	Type	Results					
0.10	ES		0.15 0.20			MADE GROUND: Brown sandy gravelly CLAY. Coarse gravel of brick and sandstone (0,0) Sandstone Bedrock	
						Trialpit Complete at 0.20 m	
						1	
						2	
						3	
						4	
Remarks: Pit terminated at 0.2m on bedrock							
Groundwater: No groundwater encountered							

WS Atkins (Telford) Ltd						Trialpit No PAN007 Sheet 1 of 1	
Project Name P1AN			Project No. P1AN		Co-ords: 271569E - 195841N Level: -		Date 18/10/2011
Location: Coed Darcy Urban Village					Dimensions: -		Scale 1:25
Client: St. Modwen Development Ltd					Depth 0.50m		Logged By Alex Mann
Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
Depth (m)	Type	Results					
0.20	ES					MADE GROUND: Brown/dark brown sandy gravelly CLAY. Coarse gravel of concrete, brick and sandstone. Occasional whole brick (0,0)	
			0.45 0.50			Sandstone Bedrock	
						Trialpit Complete at 0.50 m	
Remarks: Pit terminated at 0.5m on bedrock							
Groundwater: No groundwater encountered							

WS Atkins (Telford) Ltd						Trialpit No PAN008 Sheet 1 of 1	
Project Name P1AN			Project No. P1AN		Co-ords: 271587E - 195824N Level: -		Date 18/10/2011
Location: Coed Darcy Urban Village					Dimensions: -		Scale 1:25
Client: St. Modwen Development Ltd					Depth 1.00m		Logged By Alex Mann

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
Depth (m)	Type	Results					
						MADE GROUND: Brown clayey gravelly SAND. Coarse gravel of brick and frequent concrete	
			0.80				
			1.00			Concrete	
						Trialpit Complete at 1.00 m	1
							2
							3
							4

Remarks:	Pit terminated at 1.0m in concrete
Groundwater:	No groundwater encountered

