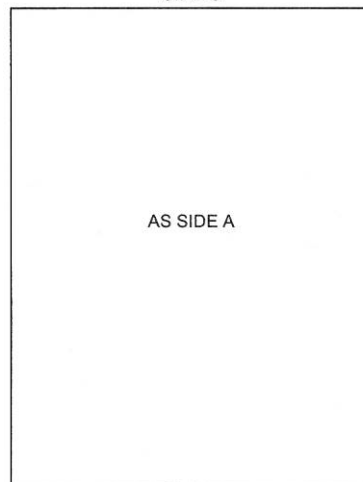


TRIAL PIT NUMBER: MSTP272
GROUND ELEVATION: -
DATE OF EXCAVATION: 25/02/99
WATER LEVEL: 1.3m
LOGGED BY: DB/JC
APPROVED BY:

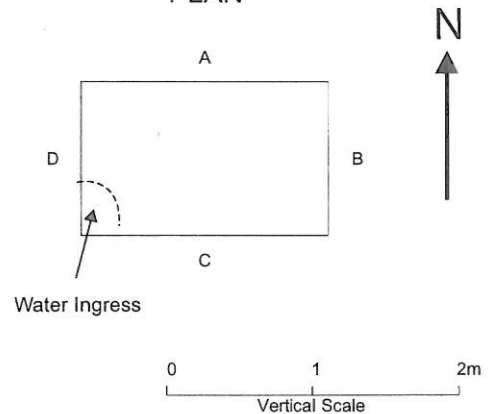
SIDE ELEVATIONS



SIDE C



PLAN



Key:

BGL Below Ground Level
● Sample location
SO Soil Sample
WA Water Sample
* Headspace Analysis
(ND = Not Detected)
→ Water Ingress

STRATA DESCRIPTIONS	COMMENTS	SAMPLES
1. Loose medium brown clayey SILT with frequent rootlets and some gravel and frequent brick rubble in places on side 'D'.		<u>PID Results</u> 0.1m - 0 ppm 1.3m - 250 ppm 2.0m - 450 ppm 3.0m - 489 ppm 3.5m - 1123 ppm
2. Loose grey-brown clayey sandy SILT with frequent sub-angular cobbles and gravel	2 Damp Hydrocarbon odour	
3. Loose grey clayey silt with some sand and frequent gravel and cobbles and some boulders	3 Damp Moderate hydrocarbon odour	<u>Soil Samples</u> MSTP272 - 3.5m
Trial Pit terminated at 3.5 mbgl on collapse		

Job Title: SOIL AND GROUNDWATER INVESTIGATION

Location: BP LLANDARCY REFINERY

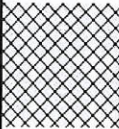
Client: BP LLANDARCY LTD

Job No: 39991-004-401

DRAFT



DAMES & MOORE

BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: WSTP162 - Hand Auger		PAGE 1 of 1	
	NUMBER	TYPE					DRILLING DATES: 03/12/2003		DRILLING METHODS : Hand Auger	
							DRILLER : SS		BOREHOLE DIAMETER : -	
							LOGGED BY : SS		SCREEN TYPE & DIAM: -	
							CHECKED BY : SG		SCREEN SLOT SIZE: -	
	WSTP162 - 0.4m (S,L)		*<0.1		0.0		DESCRIPTION		COMMENTS	S,V
							Loose, golden brown, slightly fine sandy silt with trace gravel. (MADE GROUND)		Damp. NVO	0,0
					0.5		Hand Auger terminated at 0.5m on refusal			
					1.0					
					1.5					
					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 : SS	Ref:
		Scale: As scale	Job No: 39991-044-785
		Drg. Size: A4	BOREHOLE LOG

Appendix C – Historical Laboratory Analysis

VOCS BTEX

Contamination analysis results

[illegible]

Asbestos

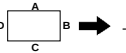
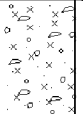
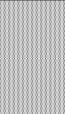
Location	Depth	Zone	Asbestos	Type
WSMW011	0.2 D		N	
WSTP018	0.4 D		N	
WSTP085	0.4 D		Y	White
WSMW045	0.5 D		N	
WSTP016	0.5 D		N	
WSTP146	0.5 D		N	
WSTP269	0.5 D		N	
WSMW145(PI	0.5 D		N	
WSMW010	0.6 D		N	
WSTP270	0.7 D		N	

VOCS BTEX

Contamination analysis results

[illegible]

Appendix D – Recent Logs

Logged A/W Checked AP	Start 20/01/2015 End 20/01/2015	Equipment, Methods and Remarks Komatsu PC210 Machine excavated trial pit from GL to 0.4m Terminated on bedrock.	Dimensions and Orientation Width 1.50 m Length 3.00 m 	Ground Level - Coordinates - National Grid - Chainage -		
Samples and Tests			Strata			
Depth	Type & No.	Date Records	Description	Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
		*	1 Orange gravelly SILT with low cobble content. Gravel is subangular to subrounded, fine to coarse of sandstone. Cobbles are subangular to subrounded occasionally tabular of sandstone. (VO = 0,0) EXPLORATORY HOLE ENDS AT 0.40 m 0.40 m Grey weathered bedrock.	(0.40) 0.40		
Depth	Type & No.	Records Date				
Groundwater Entries No. Struck Post Strike Behaviour (m) None observed (see Key Sheet)			Depth Related Remarks * From to (m) 0.00 No Samples Obtained.	Stability Stable Shoring None Weather Sunny		
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. Scale 1:25 (c) ESG www.esg.co.uk 426.4805/03/2015 14:36:27 			Project Coed Darcy Sitewide Trial Pitting Project No. H4039-14 Carried out for St Modwen Developments Limited	Trial Pit TPE2365 Sheet 1 of 1		

Logged NK Checked AP		Start 21/01/2015 End 21/01/2015		Equipment, Methods and Remarks Komatsu PC210 Machine excavated trial pit from GL to 2.2m Terminated on bedrock.		Dimensions and Orientation Width 1.00 m Length 2.50 m A B C D B →		Ground Level Coordinates National Grid Chainage	
Samples and Tests				Strata					
Depth	Type & No.	Date Records	Description			Depth, Level/ (Thickness)	Legend	Backfill/ Instruments	
0.50	ES 1		1 Soft orangish brown slightly sandy gravelly SILT with medium cobble content. Sand is fine. Gravel is subangular to subrounded, fine to coarse of sandstone. Cobbles are subangular to subrounded of sandstone. Occasional rootlets. (VO = 0,0)			0.40			
1.50	ES 2		2 Bluish grey mottled black slightly silty gravelly fine to coarse SAND with medium cobble content. Gravel is subangular to subrounded, fine to coarse of sandstone. Cobbles are subangular to subrounded of sandstone. (VO = 3,3)			(1.80)			
			EXPLORATORY HOLE ENDS AT 2.20 m			2.20			
Depth	Type & No.	Records Date							
Groundwater Entries No. Struck Post Strike Behaviour (m) 2 1.00 Heavy seepage all sides.			Depth Related Remarks * From to (m)			Stability Stable Shoring None Weather Cloudy			
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. Scale 1:25 (c) ESG www.esg.co.uk 426.4805/03/2015 14:36:52 			Project Coed Darcy Sitewide Trial Pitting Project No. H4039-14 Carried out for St Modwen Developments Limited			Trial Pit TPE2402 Sheet 1 of 1			

Trial Pit Log



Logged AW Checked AP		Start 22/01/2015 End 22/01/2015	Equipment, Methods and Remarks Komatsu PC210 Machine excavated trial pit from GL to 2.0m Terminated on bedrock.	Dimensions and Orientation Width 1.50 m Length 3.00 m A B C D		Ground Level Coordinates National Grid Chainage		- - -
Samples and Tests			Strata					
Depth	Type & No.	Date Records	Description			Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
0.50	ES 1		1 Orange slightly gravelly SILT with low cobble content. Gravel is subangular to subrounded, fine to coarse of sandstone. Cobbles are subangular to subrounded of sandstone. (VO = 0,0) 0.00-0.50 m Occasional roots and rootlets.			(1.30)		
1.50	ES 2		2 Grey frequently stained black sandy slightly clayey subangular to subrounded, fine to coarse GRAVEL of sandstone with low cobble content. Sand is fine to coarse. Cobbles are subangular to subrounded of sandstone. (VO = 4,3)			1.30 (0.70)		
			EXPLORATORY HOLE ENDS AT 2.00 m 2.00 m Grey weathered bedrock.			2.00		
Depth	Type & No.	Records Date						
Groundwater Entries No. Struck Post Strike Behaviour (m) None observed (see Key Sheet)			Depth Related Remarks * From to (m)			Stability Stable Shoring None Weather Cloudy		
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. Scale 1:25 (c) ESG www.esg.co.uk 426.4805/03/2015 10:20:00			Project Coed Darcy Sitewide Trial Pitting Project No. H4039-14 Carried out for St Modwen Developments Limited			Trial Pit TPE2446 Sheet 1 of 1		

[illegible]

Trial Pit Log

Logged NK Checked AP	Start 21/01/2015 End 21/01/2015	Equipment, Methods and Remarks Komatsu PC210 Machine excavated trial pit from GL to 2.1m Terminated on bedrock.	Dimensions and Orientation Width 1.00 m Length 2.50 m 	Ground Level - Coordinates - National Grid - Chainage -		
Samples and Tests		Strata				
Depth	Type & No.	Date Records	Description	Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
0.50	ES 1		1 Very soft orangish brown slightly gravelly SILT with medium cobble content. Gravel is subangular to subrounded, fine to coarse of sandstone. Cobbles are subangular to subrounded of sandstone. Occasional rootlets. (VO = 0,0)	0.30		
			2 Very soft grey mottled black slightly sandy gravelly SILT with medium cobble content. Sand is fine to medium. Gravel is subangular to subrounded, fine to coarse of sandstone. Cobbles are subangular to subrounded of sandstone. (VO = 3,3)	(0.80)		
1.50	ES 2		3 Grey mottled black slightly silty gravelly fine to coarse SAND with medium cobble content. Gravel is subangular to subrounded, fine to coarse of sandstone. Cobbles are subangular to subrounded of sandstone. (VO = 3,3)	1.10		
				(1.00)		
			EXPLORATORY HOLE ENDS AT 2.10 m 2.10 m Bedrock	2.10		
Depth	Type & No.	Records Date				
Groundwater Entries No. Struck Post Strike Behaviour (m) None observed (see Key Sheet)			Depth Related Remarks * From to (m)	Stability Stable Shoring None Weather Sunny		
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. Scale 1:25 (c) ESG www.esg.co.uk 426.4805/03/2015 14:37:18			Project Coed Darcy Sitewide Trial Pitting Project No. H4039-14 Carried out for St Modwen Developments Limited	Trial Pit TPE2448 Sheet 1 of 1		

Trial Pit Log



Logged NK Checked AP		Start 21/01/2015 End 21/01/2015	Equipment, Methods and Remarks Komatsu PC210 Machine excavated trial pit from GL to 0.2m Terminated on concrete.		Dimensions and Orientation Width 1.00 m Length 2.00 m A B C D →		Ground Level - Coordinates - National Grid - Chainage -	
Samples and Tests			Strata					
Depth	Type & No.	Date Records	Description			Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
		*	1 (MADE GROUND) Soft dark brown sandy gravelly SILT with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded, fine to coarse of sandstone, concrete and brick. Cobbles are subangular to subrounded of sandstone, brick, concrete and metal. Frequent rootlets. (VO = 0,0) 0.20 m Concrete. EXPLORATORY HOLE ENDS AT 0.20 m			0.20		
Depth	Type & No.	Records Date						
Groundwater Entries No. Struck Post Strike Behaviour (m) None observed (see Key Sheet)			Depth Related Remarks * From to (m) 0.00 0.20 No samples obtained.			Stability Stable Shoring None Weather Sunny		
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. Scale 1:25 (c) ESG www.esg.co.uk 426.4805/03/2015 14:37:23			Project Coed Darcy Sitewide Trial Pitting Project No. H4039-14 Carried out for St Modwen Developments Limited			Trial Pit TPE2449 Sheet 1 of 1		

[illegible]

Trial Pit Log

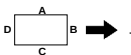
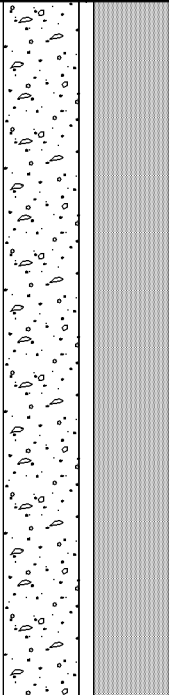


Logged NK Checked AP		Start 21/01/2015 End 21/01/2015	Equipment, Methods and Remarks Komatsu PC210 Machine excavated trial pit from GL to 2.7m Terminated on bedrock.	Dimensions and Orientation Width 1.00 m Length 2.50 m A B C D		Ground Level Coordinates National Grid Chainage	
Samples and Tests			Strata				
Depth	Type & No.	Date Records	Description		Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
0.50	ES 1		1 Light brown slightly silty gravelly fine to coarse SAND with medium cobble content. Gravel is subangular to subrounded, fine to coarse of sandstone. Cobbles are subangular to subrounded of sandstone. Rare rootlets. (VO = 0,0)		(1.00)		
1.50	ES 2		2 Bluish grey slightly silty gravelly fine to coarse SAND with medium cobble content. Gravel is subangular to subrounded, fine to coarse of sandstone. Cobbles are subangular to subrounded of sandstone. (VO = 3,3)		1.00 (1.70)		
2.50	ES 3						
			EXPLORATORY HOLE ENDS AT 2.70 m		2.70		
			2.70 m Bedrock				
Depth	Type & No.	Records Date					
Groundwater Entries No. Struck Post Strike Behaviour (m)			Depth Related Remarks * From to (m)		Stability Stable Shoring None Weather Sunny		
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. (c) ESG www.esg.co.uk 426.4805/03/2015 14:37:26			Project Coed Darcy Sitewide Trial Pitting Project No. H4039-14 Carried out for St Modwen Developments Limited		Trial Pit TPE2534 Sheet 1 of 1		

[illegible]

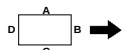
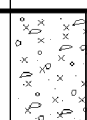
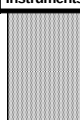
Logged NK Checked AP		Start 22/01/2015 End 22/01/2015		Equipment, Methods and Remarks Komatsu PC210 Machine excavated trial pit from GL to 2.4m Terminated on bedrock.		Dimensions and Orientation Width 1.00 m Length 2.50 m A B C D ➔ -		Ground Level Coordinates National Grid Chainage			- - -
Samples and Tests			Strata								
Depth	Type & No.	Date Records	Description					Depth, Level/ (Thickness)	Legend	Backfill/ Instruments	
0.50	ES 1		1 Soft orangish brown slightly sandy gravelly SILT with low cobble content. Sand is fine. Gravel is subangular to subrounded, fine to coarse of sandstone. Cobbles are subangular to subrounded of sandstone. Occasional rootlets. (VO = 0,0)					0.30			
1.50	ES 2		2 Firm grey mottled black sandy gravelly SILT with medium cobble content. Sand is fine to medium. Gravel is subangular to subrounded, fine to coarse of sandstone. Cobbles are subangular to subrounded of sandstone. Cobbles are subangular to subrounded of sandstone. (VO = 3,3)					(1.40)			
			3 Grey gravelly fine to medium SAND with medium cobble content. Gravel is subangular to subrounded, fine to coarse of sandstone. Cobbles are subangular to subrounded of sandstone. Cobbles are subangular to subrounded of sandstone. (VO = 3,3)					1.70 (0.70)			
			EXPLORATORY HOLE ENDS AT 2.40 m					2.40			
								</			

Trial Pit Log

Logged NK Checked AP	Start 22/01/2015 End 22/01/2015	Equipment, Methods and Remarks Komatsu PC210 Machine excavated trial pit from GL to 2.3m Terminated on bedrock.	Dimensions and Orientation Width 1.00 m Length 2.50 m 		Ground Level Coordinates National Grid Chainage
Samples and Tests			Strata		
Depth	Type & No.	Date Records	Description	Depth, Level / Thickness	Legend Backfill / Instruments
0.50	ES 1		1 Grey mottled black slightly silty gravelly fine to medium SAND with medium cobble content. Gravel is subangular to subrounded, fine to coarse of sandstone. Cobbles are subangular to subrounded of sandstone. Rare rootlets. (VO = 3,3)	(2.30)	
1.50	ES 2				
			EXPLORARY HOLE ENDS AT 2.30 m	2.30	
Depth	Type & No.	Records Date			
Groundwater Entries No. Struck Post Strike Behaviour (m) None observed (see Key Sheet)			Depth Related Remarks * From to (m)	Stability Stable Shoring None Weather Cloudy	
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. Scale 1:25 (c) ESG www.esg.co.uk 426.4805\03\2015 10:20:34 			Project Coed Darcy Sitewide Trial Pitting Project No. H4039-14 Carried out for St Modwen Developments Limited	Trial Pit TPE2537 Sheet 1 of 1	

Trial Pit Log

Logged AW Checked AP		Start 22/01/2015 End 22/01/2015	Equipment, Methods and Remarks Komatsu PC210 Machine excavated trial pit from GL to 1.7m Terminated on bedrock.	Dimensions and Orientation Width 1.50 m Length 3.00 m 	Ground Level - Coordinates - National Grid - Chainage -	
Samples and Tests			Strata	Depth, Level/ (Thickness) Legend Backfill/ Instruments		
Depth	Type & No.	Date Records	Description	Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
0.50	ES 1		1 Orange slightly gravelly slightly sandy SILT with low cobble content. Gravel is subangular to subrounded, fine to coarse of sandstone. Sand is fine. Cobbles are subangular to subrounded of sandstone. (VO = 0,0)	(1.10)		
1.50	ES 2		2 Bluish grey gravelly clayey, fine to coarse SAND with low cobble content. Gravel is subangular to subrounded, fine to coarse of sandstone. Cobbles are subangular to subrounded occasionally tabular of sandstone. (VO = 4,3)	1.10 (0.60)		
			EXPLORATORY HOLE ENDS AT 1.70 m 1.70 m Grey weathered bedrock.	1.70		
Depth	Type & No.	Records Date				
Groundwater Entries No. Struck Post Strike Behaviour (m) None observed (see Key Sheet)			Depth Related Remarks * From to (m)	Stability Stable Shoring None Weather Cloudy		
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. Scale 1:25 (c) ESG www.esg.co.uk 426.4805/03/2015 10:20:38			Project Coed Darcy Sitewide Trial Pitting Project No. H4039-14 Carried out for St Modwen Developments Limited	Trial Pit TPE2538 Sheet 1 of 1		

Logged NK Checked AP	Start 22/01/2015 End 22/01/2015	Equipment, Methods and Remarks Komatsu PC210 Machine excavated trial pit from GL to 0.4m Terminated on bedrock.	Dimensions and Orientation Width 1.00 m Length 2.00 m 	Ground Level Coordinates National Grid Chainage		
Samples and Tests			Strata			
Depth	Type & No.	Date Records	Description	Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
		*	1 Firm dark brown sandy gravelly SILT with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded, fine to coarse of sandstone. Cobbles are subangular to subrounded of sandstone. Occasional rootlets. (VO = 0,0) EXPLORATORY HOLE ENDS AT 0.40 m	(0.40) 0.40		
Depth	Type & No.	Records Date				
Groundwater Entries No. Struck Post Strike Behaviour (m) None observed (see Key Sheet)			Depth Related Remarks * From to (m) 0.00 0.40 No Samples Obtained.	Stability Stable Shoring None Weather Cloudy		
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. Scale 1:25 (c) ESG www.esg.co.uk 426.4805/03/2015 10.21.25 			Project Coed Darcy Sitewide Trial Pitting Project No. H4039-14 Carried out for St Modwen Developments Limited	Trial Pit TPE2620 Sheet 1 of 1		

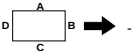
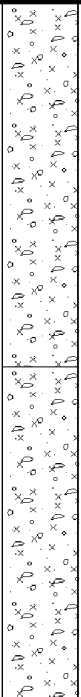
Logged AW Checked AP	Start 21/01/2015 End 21/01/2015	Equipment, Methods and Remarks Komatsu PC210 Machine excavated trial pit from GL to 1.3m Terminated on bedrock.	Dimensions and Orientation Width 1.50 m Length 3.00 m A B C D ➔		Ground Level Coordinates National Grid Chainage	
Samples and Tests			Strata			
Depth	Type & No.	Date Records	Description	Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
0.50	ES 1		1 (MADE GROUND) Brown gravelly slightly sandy SILT with medium cobble content. Gravel is subangular to subrounded, fine to coarse of sandstone and brick. Sand is fine to coarse. Cobbles are subangular to subrounded of sandstone and brick. Occasional roots and rootlets. (VO = 0,0) 2 Bluish grey sandy clayey subangular to subrounded, fine to coarse GRAVEL of sandstone with low cobble content. Sand is fine to coarse. Cobbles are subangular to subrounded occasionally tabular of sandstone. (VO = 4,3)	0.30 <		

Trial Pit Log

Logged AW Checked AP		Start 22/01/2015 End 22/01/2015	Equipment, Methods and Remarks Komatsu PC210 Machine excavated trial pit from GL to 1.8m Terminated on bedrock.	Dimensions and Orientation Width 1.50 m Length 3.00 m 	Ground Level - Coordinates - National Grid - Chainage -	
Samples and Tests			Strata	Depth, Level/ (Thickness) Legend Backfill/ Instruments		
Depth	Type & No.	Date Records	Description	Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
0.50	ES 1		1 Orange slightly gravelly slightly sandy SILT with low cobble content. Gravel is subangular to subrounded, fine to coarse of sandstone. Sand is fine. Cobbles are subangular to subrounded of sandstone. (VO = 0,0)	0.00-0.50 m Occasional roots and rootlets.	(1.30)	
1.50	ES 2		2 Bluish grey sandy slightly clayey subangular to subrounded, fine to coarse GRAVEL of sandstone with low cobble content. Sand is fine to coarse. Cobbles are subangular to subrounded occasionally tabular of sandstone. (VO = 4,3)		1.30 (0.50)	
			EXPLORATORY HOLE ENDS AT 1.80 m 1.80 m Grey weathered bedrock.		1.80	
Depth	Type & No.	Records Date				
Groundwater Entries No. Struck Post Strike Behaviour (m) None observed (see Key Sheet)			Depth Related Remarks * From to (m)	Stability Stable Shoring None Weather Cloudy		
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. Scale 1:25 (c) ESG www.esg.co.uk 426.4805/03/2015 10:21:28			Project Coed Darcy Sitewide Trial Pitting Project No. H4039-14 Carried out for St Modwen Developments Limited	Trial Pit TPE2622 Sheet 1 of 1		

Trial Pit Log



Logged NK Checked AP		Start 22/01/2015 End 22/01/2015	Equipment, Methods and Remarks Komatsu PC210 Machine excavated trial pit from GL to 2.3m Terminated on bedrock.	Dimensions and Orientation Width 1.00 m Length 2.50 m 		Ground Level Coordinates National Grid Chainage		- - -
Samples and Tests			Strata					
Depth	Type & No.	Date Records	Description			Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
0.50	ES 1		1 Soft brown mottled orangish brown sandy gravelly SILT with medium cobble content. Sand is fine to medium. Gravel is subangular to subrounded, fine to coarse of sandstone. Cobbles are subangular to subrounded of sandstone. Occasional rootlets. (VO = 1,0)			(1.20)		
1.50	ES 2		2 Very soft grey mottled black and brown gravelly SILT with medium cobble content. Gravel is subangular to subrounded, fine to coarse of sandstone. Cobbles are subangular to subrounded of sandstone. (VO = 3,3)			1.20 (1.10)		
			EXPLORATORY HOLE ENDS AT 2.30 m			2.30		
			2.30 m Bedrock					
Depth	Type & No.	Records Date						
Groundwater Entries No. Struck Post Strike Behaviour (m) None observed (see Key Sheet)			Depth Related Remarks * From to (m)			Stability Stable Shoring None Weather Cloudy		
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. Scale 1:25			Project Coed Darcy Site-wide Trial Pitting Project No. H4039-14 Carried out for St Modwen Developments Limited			Trial Pit TPE2623 Sheet 1 of 1		



Trial Pit Log



Logged NK Checked AP		Start 21/01/2015 End 21/01/2015	Equipment, Methods and Remarks Komatsu PC210 Machine excavated trial pit from GL to 0.1m Terminated on concrete.		Dimensions and Orientation Width 1.00 m Length 2.00 m A B C D B →		Ground Level - Coordinates - National Grid - Chainage -	
Samples and Tests			Strata					
Depth	Type & No.	Date Records	Description			Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
		*	1 Very soft light brown mottled black slightly sandy gravelly SILT with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded, fine to coarse of sandstone. Cobbles are subangular to subrounded of sandstone. Frequent rootlets. (VO = 2,2) 0.10 m Concrete. EXPLORATORY HOLE ENDS AT 0.10 m			0.10		
Depth	Type & No.	Records Date						
Groundwater Entries No. Struck Post Strike Behaviour (m) None observed (see Key Sheet)			Depth Related Remarks * From to (m) 0.00 0.10 No samples obtained.			Stability Stable Shoring None Weather Cloudy		
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. Scale 1:25 (c) ESG www.esg.co.uk 426.4805/03/2015 14:37:37			Project Coed Darcy Sitewide Trial Pitting Project No. H4039-14 Carried out for St Modwen Developments Limited			Trial Pit TPE2624 Sheet 1 of 1		

Trial Pit Log



Logged AW Checked AP		Start 21/01/2015 End 21/01/2015	Equipment, Methods and Remarks Komatsu PC210 Machine excavated trial pit from GL to 0.4m Terminated due to concrete and red brick base.		Dimensions and Orientation Width 1.50 m Length 3.00 m A B C D ➔		Ground Level - Coordinates - National Grid - Chainage -	
Samples and Tests			Strata					
Depth	Type & No.	Date Records	Description			Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
		*	1 (MADE GROUND) Orangish brown gravelly slightly sandy SILT with low cobble content. Gravel is subangular to subrounded, fine to coarse of sandstone, brick and concrete. Sand is fine. Cobbles are subangular to subrounded of sandstone and brick. Moderate roots and rootlets. (VO = 0,0) EXPLORATORY HOLE ENDS AT 0.40 m			(0.40) 0.40		
Depth	Type & No.	Records Date						
Groundwater Entries No. Struck Post Strike Behaviour (m) None observed (see Key Sheet)			Depth Related Remarks * From to (m) 0.00 0.40 No Samples Obtained.			Stability Stable Shoring None Weather Sunny		
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. Scale 1:25 (c) ESG www.esg.co.uk 426.4805/03/2015 10:21:58 AGS			Project Coed Darcy Sitewide Trial Pitting Project No. H4039-14 Carried out for St Modwen Developments Limited			Trial Pit TPE2674 Sheet 1 of 1		

Trial Pit Log

Logged AW Checked AP		Start 21/01/2015 End 21/01/2015	Equipment, Methods and Remarks Komatsu PC210 Machine excavated trial pit from GL to 3.1m Terminated on bedrock.	Dimensions and Orientation Width 1.50 m Length 3.00 m 	Ground Level - Coordinates - National Grid - Chainage -	
Samples and Tests			Strata	Depth, Level/ (Thickness) Legend Backfill/ Instruments		
Depth	Type & No.	Date Records	Description	Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
0.50	ES 1		1 (MADE GROUND) Orangish brown gravelly sandy SILT with medium cobble content. Gravel is subangular to subrounded, fine to coarse of sandstone and occasional brick. Sand is fine. Cobbles are subangular to subrounded of sandstone and brick. Occasional roots and rootlets. (VO = 0,0)	(0.60)		
1.50	ES 2		2 Soft greyish brown moderately stained black gravelly slightly sandy CLAY with low cobble content. Gravel is subangular to subrounded of sandstone. Sand is fine. Cobbles are subangular to subrounded of sandstone. (VO = 4,4)	0.60 (1.50)		
2.50	ES 3		3 Grey gravelly slightly clayey, fine to coarse SAND with low cobble content. Gravel is subangular to subrounded, fine to coarse of sandstone. Cobbles are subangular to subrounded of sandstone. (VO = 3,3)	2.10 (1.00)		
			EXPLORATORY HOLE ENDS AT 3.10 m	3.10		
			3.10 m Grey weathered bedrock.			
Depth	Type & No.	Records Date				
Groundwater Entries No. Struck Post Strike Behaviour (m) None observed (see Key Sheet)			Depth Related Remarks * From to (m)	Stability Stable Shoring None Weather Sunny		
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. Scale 1:25 (c) ESG www.esg.co.uk 426.4805/03/2015 10:22:03			Project Coed Darcy Sitewide Trial Pitting Project No. H4039-14 Carried out for St Modwen Developments Limited	Trial Pit TPE2675 Sheet 1 of 1		

Trial Pit Log

Logged AW Checked AP		Start 21/01/2015 End 21/01/2015	Equipment, Methods and Remarks Komatsu PC210 Machine excavated trial pit from GL to 5.0m Terminated on bedrock.	Dimensions and Orientation Width 1.50 m Length 3.00 m 	Ground Level - Coordinates - National Grid - Chainage -	
Samples and Tests			Strata			
Depth	Type & No.	Date Records	Description	Depth, Level (Thickness)	Legend	Backfill/ Instruments
0.50	ES 1		1 Orange gravelly slightly sandy SILT with low cobble content. Gravel is subangular to subrounded, fine to coarse of sandstone. Sand is fine to coarse. Cobbles are subangular to subrounded of sandstone. Occasional roots and rootlets. (VO = 0,0)	(0.70)		
1.50	ES 2		2 Soft to firm bluish grey occasionally stained black gravelly sandy CLAY with low cobble content. Gravel is subangular to subrounded, fine to coarse of sandstone. Sand is fine. Cobbles are subangular to subrounded occasionally tabular of sandstone. (VO = 4,3)	0.70		
2.50	ES 3					
3.50	ES 4			(4.30)		
4.50	ES 5					
Depth	Type & No.	Records Date	EXPLORATORY HOLE ENDS AT 5.00 m			
Groundwater Entries No. Struck Post Strike Behaviour (m) None observed (see Key Sheet)			Depth Related Remarks * From to (m)		Stability Stable Shoring None Weather Sunny	
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. Scale 1:25			Project Coed Darcy Sitewide Trial Pitting Project No. H4039-14 Carried out for St Modwen Developments Limited		Trial Pit TPE2677 Sheet 1 of 1	

Trial Pit Log



Logged NK Checked AP		Start 22/01/2015 End 22/01/2015	Equipment, Methods and Remarks Komatsu PC210 Machine excavated trial pit from GL to 4.3m Terminated on bedrock.	Dimensions and Orientation Width 1.00 m Length 2.50 m A B C D		Ground Level Coordinates National Grid Chainage	
Samples and Tests			Strata				
Depth	Type & No.	Date Records	Description	Depth, Level/ (Thickness)	Legend	Backfill/ Instruments	
0.50	ES 1		1 Orangish brown silty gravelly fine to coarse SAND with medium cobble content. Gravel is subangular to subrounded, fine to coarse of sandstone. Cobbles are subangular to subrounded of sandstone. Rare rootlets. (VO = 0,0)	(1.20)			
1.50	ES 2		2 Soft grey mottled black very sandy gravelly SILT with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded, fine to coarse of sandstone. Cobbles are subangular to subrounded of sandstone. (VO = 3,3)	1.20			
2.50	ES 3						
3.50	ES 4			(3.10)			
			EXPLORATORY HOLE ENDS AT 4.30 m	4.30			
			4.30 m Bedrock				
Depth	Type & No.	Records Date					
Groundwater Entries No. Struck Post Strike Behaviour (m) 1 2.00 Heavy seepage from C side.			Depth Related Remarks * From to (m)		Stability Unstable Shoring None Weather Cloudy		
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. (c) ESG www.esg.co.uk 426.4805/03/2015 10:22:10 AGS			Project Coed Darcy Site-wide Trial Pitting Project No. H4039-14 Carried out for St Modwen Developments Limited		Trial Pit TPE2678 Sheet 1 of 1		

Trial Pit Log

Logged AW Checked AP		Start 21/01/2015 End 21/01/2015	Equipment, Methods and Remarks Komatsu PC210 Machine excavated trial pit from GL to 1.5m Terminated on bedrock.	Dimensions and Orientation Width 1.50 m Length 3.00 m 	Ground Level - Coordinates - National Grid - Chainage -	
Samples and Tests			Strata			
Depth	Type & No.	Date Records	Description	Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
0.50	ES 1		1 Brown gravelly slightly sandy SILT with low cobble content. Gravel is subangular to subrounded, fine to coarse of sandstone. Sand is fine to coarse. Cobbles are subangular to subrounded of sandstone. (VO = 0,0)	(0.60)		
			2 Orange slightly gravelly SILT with low cobble content. Gravel is subangular to subrounded, fine to coarse of sandstone. Cobbles are subrounded of sandstone. (VO = 0,0)	(0.90)		
1.50	ES 2		EXPLORATORY HOLE ENDS AT 1.50 m 1.50 m Weathered bedrock (contaminated and stained black) (VO = 4,4).	1.50		
Depth	Type & No.	Records Date				
Groundwater Entries No. Struck Post Strike Behaviour (m) None observed (see Key Sheet)			Depth Related Remarks * From to (m)	Stability Stable Shoring None Weather Sunny		
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. Scale 1:25 (c) ESG www.esg.co.uk 426.4805/03/2015 10:22:34			Project Coed Darcy Sitewide Trial Pitting Project No. H4039-14 Carried out for St Modwen Developments Limited	Trial Pit TPE2723 Sheet 1 of 1		

Logged AW Checked AP	Start 21/01/2015 End 21/01/2015	Equipment, Methods and Remarks Komatsu PC210 Machine excavated trial pit from GL to 1.4m Terminated on bedrock.	Dimensions and Orientation Width 1.50 m Length 3.00 m A B C D E F G		Ground Level Coordinates National Grid Chainage	
Samples and Tests			Strata			
Depth	Type & No.	Date Records	Description	Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
1.00	ES 1		1 (MADE GROUND) Brown gravelly slightly silty, fine to coarse SAND with medium cobble content. Gravel is subangular to subrounded, fine to coarse of sandstone and brick. Cobbles are subangular to subrounded of sandstone and brick. Moderate roots and rootlets. (VO = 0,0) 2 Grey frequently stained black gravelly clayey, fine to coarse SAND with low cobble content. Gravel is subangular to subrounded, fine to coarse of sandstone. Cobbles are subangular to subrounded of sandstone. (VO = 4,5)	(0.40) 0.40 (1.00)		
			EXPLORATORY HOLE ENDS AT 1.40 m	1.40		

Logged AW Checked AP	Start 21/01/2015 End 21/01/2015	Equipment, Methods and Remarks Komatsu PC210 Machine excavated trial pit from GL to 2.1m Terminated on grey concrete.	Dimensions and Orientation Width 1.50 m Length 3.00 m A B C D B →	Ground Level Coordinates National Grid Chainage	- - -	
Samples and Tests			Strata			
Depth	Type & No.	Date Records	Description	Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
0.50	ES 1		1 Firm to stiff orangish brown gravelly slightly sandy CLAY with medium cobble content. Gravel is subangular to subrounded, fine to coarse of sandstone. Sand is fine to coarse. Cobbles are subangular to subrounded of sandstone. (VO = 0,0)	(2.10)		
1.50	ES 2					
			EXPLORATORY HOLE ENDS AT 2.10 m	2.10		
			2.10 m Grey concrete.			
Depth	Type & No.	Records Date				
Groundwater Entries No. Struck Post Strike Behaviour (m) None observed (see Key Sheet)			Depth Related Remarks * From to (m)			Stability Stable Shoring None Weather Sunny
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. Scale 1:25 (c) ESG www.esg.co.uk 426.4805/03/2015 10:23:10 			Project Coed Darcy Sitewide Trial Pitting Project No. H4039-14 Carried out for St Modwen Developments Limited			Trial Pit TPE2828 Sheet 1 of 1

Trial Pit Log



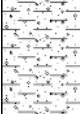
Logged AJ Checked AP		Start 26/01/2015 End 26/01/2015	Equipment, Methods and Remarks Komatsu PC210 Machine excavated trial pit from GL to 2.2m Terminated on bedrock.	Dimensions and Orientation Width 1.60 m Length 3.50 m 		Ground Level Coordinates National Grid Chainage	
Samples and Tests			Strata				
Depth	Type & No.	Date Records	Description	Depth, Level (Thickness)	Legend	Backfill/ Instruments	
0.50	ES 1		1 Soft orangish brown slightly gravelly CLAY. Gravel is subangular to subrounded, fine to coarse of sandstone. (VO = 0,0)	(1.20)			
1.50	ES 2		2 Brown sandy slightly clayey subangular to subrounded, fine to coarse GRAVEL of sandstone with medium cobble content. Cobbles are subangular to subrounded of sandstone. (VO = 0,0)	1.20 (1.00)			
2.20	ES 3		EXPLORATORY HOLE ENDS AT 2.20 m 2.20 m Bedrock	2.20			
Depth	Type & No.	Records Date					
Groundwater Entries No. Struck Post Strike Behaviour (m) None observed (see Key Sheet)			Depth Related Remarks * From to (m)			Stability Stable Shoring None Weather Dry	
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. Scale 1:25 (c) ESG www.esg.co.uk 426.4805/03/2015 10:23:16			Project Coed Darcy Sitewide Trial Pitting Project No. H4039-14 Carried out for St Modwen Developments Limited			Trial Pit TPE2913 Sheet 1 of 1	

Trial Pit Log



Logged NK Checked AP		Start 22/01/2015 End 22/01/2015	Equipment, Methods and Remarks Komatsu PC210 Machine excavated trial pit from GL to 0.1m Terminated on bedrock.	Dimensions and Orientation Width 1.00 m Length 1.50 m 		Ground Level - Coordinates - National Grid - Chainage -	
Samples and Tests			Strata				
Depth	Type & No.	Date Records	Description		Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
		*	1 Soft orangish brown sandy gravelly SILT with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded, fine to coarse of sandstone. Cobbles are subangular to subrounded of sandstone. (VO = 0,0) 0.10 m Bedrock. EXPLORATORY HOLE ENDS AT 0.10 m		0.10		
Depth	Type & No.	Records Date					
Groundwater Entries No. Struck Post Strike Behaviour (m) None observed (see Key Sheet)			Depth Related Remarks * From to (m) 0.00 0.10 No Samples Obtained.			Stability Stable Shoring None Weather Cloudy	
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. Scale 1:25 (c) ESG www.esg.co.uk 426.4805/03/2015 10:23:19			Project Coed Darcy Sitewide Trial Pitting Project No. H4039-14 Carried out for St Modwen Developments Limited			Trial Pit TPE2914 Sheet 1 of 1	

ATKINS				Trial Pit Log				Trialpit No ZDHP 001			
				Sheet 1 of 1							
Project Name: Coed Darcy POS Signoff				Project No. 5122307_POS		Co-ords: - Level: mAOS		Date 09/04/2015			
Location: Coed Darcy POS				Dimensions (m):		m		Scale 1:25			
Client: St Modwen				Depth 0.60				Logged AEM			
Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	Visual Criteria	Olfactory Criteria		
	Depth	Type	Results								
	0.50	ES		0.40 0.60			Brown gravelly sandy CLAY (Topsoil)	0	0	1	
							Stiff grey sandy CLAY	0	0		2
						End of pit at 0.60 m					
										4	
										5	
Remarks: Pit terminated at 0.6m										AGS	
Stability:											
GroundWater											
Remarks:											

				Trial Pit Log				Trialpit No POS 022	
Project Name: Coed Darcy POS Signoff				Project No. 5122307_POS		Co-ords: - Level: mAOS		Sheet 1 of 1 Date 21/04/2015	
Location: Coed Darcy POS						Dimensions (m):		Scale 1:25	
Client: St Modwen						Depth 3.60		Logged AEM	
Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	Visual Criteria	Olfactory Criteria
	Depth	Type	Results						
	0.50	ES		0.10			Woodchip	0	0
				0.40			MADE GROUND. Grey brown sandy gravelly CLAY. Coarse gravel of sandstone and brick	0	0
	1.50	ES					Orange brown clayey gravelly SAND with occasional grey bands. Frequent gravel and angular cobbles of sandstone	0	0
	3.50	ES		3.20			Stiff grey sandy gravelly CLAY. Coarse gravel of sandstone	0	0
						3.60		End of pit at 3.60 m	

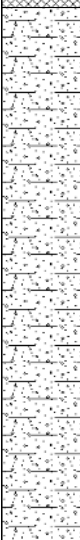
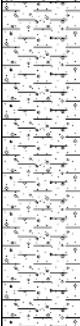
Remarks: Pit terminated at 3.6 due to collapse

Stability:

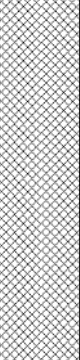
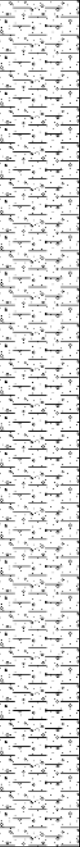
GroundWater

Remarks:

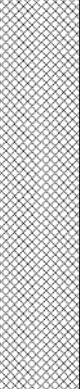
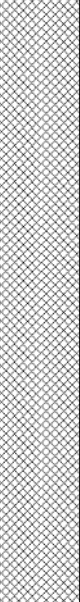


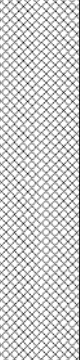
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Project Name: Coed Darcy POS Signoff				Project No. 5122307_POS		Co-ords: - Level: mAOS		Date 21/04/2015	
Location: Coed Darcy POS						Dimensions (m): m		Scale 1:25	
Client: St Modwen						Depth 3.30		Logged AEM	
Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	Visual Criteria	Olfactory Criteria
	Depth	Type	Results						
	0.50	ES		0.10			Woodchip	0	0
				0.40			Black ashy GRAVEL of clinker ash and slag	0	0
	1.50	ES		2.20			Brown clayey gravelly SAND. Coarse gravel of sandstone	0	0
	2.50	ES		3.30			Light brown occasionally mottled grey sandy gravelly CLAY. Coarse gravel of sandstone. Occasional coal flecks	0	0
						End of pit at 3.30 m			
Remarks: Pit terminated due to collapse									
Stability: GroundWater Remarks:									

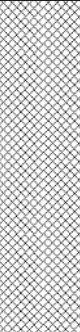
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Project Name: Coed Darcy POS Signoff				Project No. 5122307_POS		Co-ords: - Level: mAOS		Date 21/04/2015	
Location: Coed Darcy POS				Dimensions (m):		Scale 1:25			
Client: St Modwen				Depth 4.20		Logged AEM			

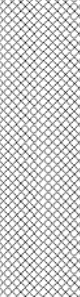
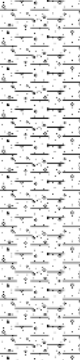
Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	Visual Criteria	Olfactory Criteria	
	Depth	Type	Results							
	0.50	ES					MADE GROUND. Brown fibrous gravelly SAND with frequent pockets of black ash and woodchip	0	0	1
	1.50	ES		1.20 1.40			MADE GROUND. Soft brown sandy CLAY	0	0	
	2.50	ES					Firm brown sandy gravelly CLAY. Occasionally stained grey. Coarse gravel of sandstone	2	2	2 3
	3.50	ES								4
				4.20			End of pit at 4.20 m			5

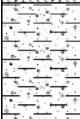
Remarks: Pit terminated due to collapse								
Stability: GroundWater								
Remarks:								

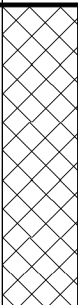
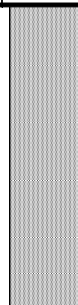
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Project Name: Coed Darcy POS Signoff				Project No. 5122307_POS		Co-ords: - Level: mAOS		Sheet 1 of 1 Date 21/04/2015	
Location: Coed Darcy POS				Dimensions (m):		Scale 1:25			
Client: St Modwen				Depth 3.30		Logged AEM			
Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	Visual Criteria	Olfactory Criteria
	Depth	Type	Results						
	0.50	ES		1.30			MADE GROUND. Brown fibrous gravelly SAND with frequent pockets of black ash and woodchip	2	2
	1.50	ES					MADE GROUND. Light brown clayey gravelly SAND with frequent clay pockets. Gravel of A-R sandstone		
	2.50	ES		3.30				0	0
End of pit at 3.30 m									
Remarks: Pit terminated due to collapse									
Stability: GroundWater Remarks:									

				Trial Pit Log				Trialpit No POS 031 Sheet 1 of 1	
Project Name: Coed Darcy POS Signoff				Project No. 5122307_POS		Co-ords: - Level: mAOS		Date 21/04/2015	
Location: Coed Darcy POS						Dimensions (m):		Scale 1:25	
Client: St Modwen						Depth 1.50		Logged AEM	
Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	Visual Criteria	Olfactory Criteria
	Depth	Type	Results						
	0.50	ES		1.20 1.40 1.50			MADE GROUND. Brown clayey gravelly SAND. Coarse gravel of frequent sandstone cobbles	0	0
							Recovered as weathered sandstone GRAVEL	0	0
							Sandstone bedrock	0	0
						End of pit at 1.50 m			
Remarks: Pit terminated on bedrock Stability: GroundWater Remarks: 									

				Trial Pit Log				Trialpit No POS 032 Sheet 1 of 1	
Project Name: Coed Darcy POS Signoff				Project No. 5122307_POS		Co-ords: - Level: mAOS		Date 21/04/2015	
Location: Coed Darcy POS						Dimensions (m):		Scale 1:25	
Client: St Modwen						Depth 1.90		Logged AEM	
Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	Visual Criteria	Olfactory Criteria
	Depth	Type	Results						
	0.50	ES		0.30			MADE GROUND. Brown sandy gravelly CLAY. Frequent rootlets	0	0
							MADE GROUND. Brown clayey gravelly SAND. Coarse gravel of frequent sandstone cobbles	0	0
							Recovered as weathered sandstone GRAVEL. Occasional Free product globules noted on the the gravel	5	1
				1.90		End of pit at 1.90 m			
Remarks: Pit terminated on bedrock									
Stability: GroundWater Remarks:									

				Trial Pit Log				Trialpit No POS 033	
Project Name: Coed Darcy POS Signoff				Project No. 5122307_POS		Co-ords: - Level: mAOS		Sheet 1 of 1 Date 21/04/2015	
Location: Coed Darcy POS						Dimensions (m):		Scale 1:25	
Client: St Modwen						Depth 2.20		Logged AEM	
Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	Visual Criteria	Olfactory Criteria
	Depth	Type	Results						
	0.50	ES		1.00			MADE GROUND. Black ashy GRAVEL with strong HC odour	4	4
	1.50	ES					Light brown mottled grey sandy gravelly CLAY. Coarse gravel of sandstone. Strong sweet sickly hydrocarbon odours	1	3
				2.20			End of pit at 2.20 m		
Remarks: Pit terminated due to overwhelming odours									
Stability: GroundWater Remarks:									

				Trial Pit Log				Trialpit No POS 034 Sheet 1 of 1	
Project Name: Coed Darcy POS Signoff				Project No. 5122307_POS		Co-ords: - Level: mAOS		Date 21/04/2015	
Location: Coed Darcy POS						Dimensions (m):		Scale 1:25	
Client: St Modwen						Depth 2.40		Logged AEM	
Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	Visual Criteria	Olfactory Criteria
	Depth	Type	Results						
	0.50	ES		0.20			Brown gravelly sandy CLAY (Topsoil)	0	0
				0.60			Yellow brown mottled grey sandy gravelly CLAY. Medium gravels of sandstone	1	1
	1.60	ES		2.40			Brown stained grey clayey sl gravelly SAND. Coarse gravel of sandstone. Very strong sweet sickly hydrocarbon odours	2	4
						End of pit at 2.40 m			
Remarks: Pit terminated due to overwhelming odours									
Stability: GroundWater Remarks:									

Logged NK Checked AP		Start 26/01/2015 End 26/01/2015	Equipment, Methods and Remarks Komatsu PC210 Machine excavated trial pit from GL to 1.0m Terminated on bedrock.	Dimensions and Orientation Width 1.00 m Length 2.00 m A B C D B →		Ground Level Coordinates National Grid Chainage		
Samples and Tests			Strata					
Depth	Type & No.	Date Records	Description			Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
0.50	ES 1		1 (MADE GROUND) Dark brown slightly silty gravelly fine to medium SAND with medium cobble content. Gravel is subangular to subrounded, fine to coarse of sandstone, concrete and brick. Cobbles are subangular to subrounded of sandstone, concrete and brick. Occasional rootlets. (VO = 0,0)			(1.00)		
			EXPLORATORY HOLE ENDS AT 1.00 m 1.00 m Bedrock.			1.00		
Depth	Type & No.	Records Date						
Groundwater Entries No. Struck Post Strike Behaviour (m) None observed (see Key Sheet)			Depth Related Remarks * From to (m)			Stability Stable Shoring None Weather Sunny		
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. Scale 1:25 (c) ESG www.esg.co.uk 426.4809/03/2015 10:15:16			Project Coed Darcy Sitewide Trial Pitting Project No. H4039-14 Carried out for St Modwen Developments Limited			Trial Pit TPE2911 Sheet 1 of 1		

Trial Pit Log



Logged NK Checked AP		Start 26/01/2015 End 26/01/2015	Equipment, Methods and Remarks Komatsu PC210 Machine excavated trial pit from GL to 1.1m Terminated on bedrock.	Dimensions and Orientation Width 1.00 m Length 2.00 m A B C D	Ground Level - Coordinates - National Grid - Chainage -
Samples and Tests			Strata		
Depth	Type & No.	Date Records	Description	Depth, Level/ (Thickness)	Legend Backfill/ Instruments
0.50	ES 1		1 (MADE GROUND) Dark brown slightly silty gravelly fine to coarse SAND with medium cobble content. Gravel is subangular to subrounded, fine to coarse of sandstone, brick and concrete. Cobbles are subangular to subrounded of sandstone, brick and concrete. Frequent rootlets. (VO = 0,0)	(1.10)	
			EXPLORATORY HOLE ENDS AT 1.10 m	1.10	
			1.10 m Bedrock		
Depth	Type & No.	Records Date			
Groundwater Entries No. Struck Post Strike Behaviour (m) None observed (see Key Sheet)			Depth Related Remarks * From to (m)	Stability Stable Shoring None Weather Sunny	
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. Scale 1:25			Project Coed Darcy Sitewide Trial Pitting Project No. H4039-14 Carried out for St Modwen Developments Limited	Trial Pit TPE2910 Sheet 1 of 1	



[illegible]

Trial Pit Log

Logged NK Checked AP	Start 26/01/2015 End 26/01/2015	Equipment, Methods and Remarks Komatsu PC210 Machine excavated trial pit from GL to 3.2m Terminate on bedrock.	Dimensions and Orientation Width 1.00 m Length 3.00 m 	Ground Level - Coordinates - National Grid - Chainage -		
Samples and Tests		Strata				
Depth	Type & No.	Date Records	Description	Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
0.50	ES 1		1 (MADE GROUND) Dark brown gravelly fine to coarse SAND with medium cobble content. Gravel is subangular to subrounded, fine to coarse of sandstone, brick and concrete. Cobbles are subangular to subrounded of sandstone, brick and concrete. Frequent rootlets. (VO = 0,0)	(1.10)		
1.50	ES 2		2 (MADE GROUND) Light brown gravelly fine to medium SAND with medium cobble content. Gravel is subangular to subrounded, fine to coarse of sandstone. Cobbles are subangular to subrounded of sandstone. (VO = 1,1)	1.10 (1.20)		
2.50	ES 3		3 Soft bluish grey sandy gravelly SILT with medium cobble content. Sand is fine to medium. Gravel is subangular to subrounded, fine to coarse of sandstone. Cobbles are subangular to subrounded of sandstone. (VO = 3,3)	2.30 (0.90)		
			EXPLORATORY HOLE ENDS AT 3.20 m 3.20 m Bedrock	3.20		
Depth	Type & No.	Records Date				
Groundwater Entries No. Struck Post Strike Behaviour (m) None observed (see Key Sheet)			Depth Related Remarks * From to (m)		Stability Stable Shoring None Weather Sunny	
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. Scale 1:25 (c) ESG www.esg.co.uk 426.4809/03/2015 10:15:04			Project Coed Darcy Sitewide Trial Pitting Project No. H4039-14 Carried out for St Modwen Developments Limited		Trial Pit TPE2908 Sheet 1 of 1	

Trial Pit Log



Logged AJ Checked AP		Start 26/01/2015 End 26/01/2015	Equipment, Methods and Remarks Komatsu PC210 Machine excavated trial pit from GL to 3.2m Terminated on bedrock.	Dimensions and Orientation Width 1.60 m Length 3.50 m A B C D	Ground Level Coordinates National Grid Chainage	- - -
Samples and Tests			Strata			
Depth	Type & No.	Date Records	Description	Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
0.50	ES 1		1 Soft red slightly gravelly CLAY with low cobble content. Gravel is subangular to subrounded, fine to coarse of sandstone. Cobbles are subangular to subrounded of sandstone. (VO = 0,0)	(1.00)		
1.50	ES 2		2 Soft dark grey slightly gravelly CLAY. Gravel is subangular to subrounded, fine to coarse of sandstone. (VO = 1,1)	(1.20)		
2.50	ES 3		3 Soft brown sandy slightly gravelly CLAY with medium cobble content. Gravel is subangular to subrounded, fine to coarse of sandstone. Cobbles are subangular to subrounded, fine to coarse of sandstone. (VO = 1,1)	(1.00)		
3.20	ES 4		EXPLORATORY HOLE ENDS AT 3.20 m	3.20		
			3.20 m bedrock			
Depth	Type & No.	Records Date				
Groundwater Entries No. Struck Post Strike Behaviour (m) 1 1.00 Slight seepage.			Depth Related Remarks * From to (m)	Stability Stable Shoring None Weather Sun		
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. Scale 1:25			Project Coed Darcy Sitewide Trial Pitting Project No. H4039-14 Carried out for St Modwen Developments Limited	Trial Pit TPE2832 Sheet 1 of 1		



Logged NK Checked AP	Start 26/01/2015 End 26/01/2015	Equipment, Methods and Remarks Komatsu PC210 Machine excavated trial pit from GL to 1.6m Terminated on bedrock.	Dimensions and Orientation Width 1.00 m Length 2.00 m A B C D	Ground Level Coordinates National Grid Chainage	- - -	
Samples and Tests			Strata			
Depth	Type & No.	Date Records	Description	Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
0.50	ES 1		1 (MADE GROUND) Stiff yellowish brown slightly sandy gravelly CLAY with medium cobble content. Sand is fine to medium. Gravel is subangular to subrounded, fine to coarse of sandstone. Cobbles are subangular to subrounded of sandstone, brick and concrete. Rare rootlets. (VO = 0,0)	(1.10)		
1.50	ES 2		2 (MADE GROUND) Brown mottled light brown slightly silty gravelly SAND with medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded, fine to coarse of sandstone, brick and clinker. Cobbles are subangular to subrounded of sandstone, brick and concrete. (VO = 0,0)	1.10 (0.50)		
			1.60 m Bedrock. - EXPLORATORY HOLE ENDS AT 1.60 m	1.60		
Depth	Type & No.	Records Date				
Groundwater Entries No. Struck Post Strike Behaviour (m) None observed (see Key Sheet)			Depth Related Remarks * From to (m)		Stability Stable Shoring None Weather Cloudy	
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. Scale 1:25 (c) ESG www.esg.co.uk 426.4809/03/2015 10:14:45 ESG			Project Coed Darcy Sitewide Trial Pitting Project No. H4039-14 Carried out for St Modwen Developments Limited		Trial Pit TPE2831 Sheet 1 of 1	

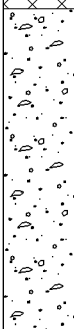
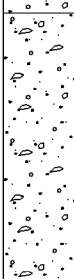
Trial Pit Log

Logged NK Checked AP		Start 26/01/2015 End 26/01/2015	Equipment, Methods and Remarks Komatsu PC210 Machine excavated trial pit from GL to 1.7m Terminated on bedrock.	Dimensions and Orientation Width 1.00 m Length 2.00 m 	Ground Level - Coordinates - National Grid - Chainage -	
Samples and Tests			Strata	Depth, Level/ (Thickness) Legend Backfill/ Instruments		
Depth	Type & No.	Date Records	Description	Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
0.50	ES 1		1 (MADE GROUND) Firm yellowish brown slightly sandy gravelly CLAY with medium cobble content. Sand is fine to medium. Gravel is subangular to subrounded, fine to coarse of sandstone and concrete. Cobbles are subangular to subrounded of sandstone, brick, clinker and concrete. Occasional rootlets. (VO = 1,0)	(1.00)		
1.50	ES 2		2 (MADE GROUND) Dark brown gravelly fine to coarse SAND with medium cobble content. Gravel is subangular to subrounded, fine to coarse of sandstone, brick and clinker. Cobbles are subangular to subrounded of sandstone and brick. (VO = 0,0)	(0.70)		
			EXPLORATORY HOLE ENDS AT 1.70 m 1.70 m Bedrock	1.70		
Depth	Type & No.	Records Date				
Groundwater Entries No. Struck Post Strike Behaviour (m) None observed (see Key Sheet)			Depth Related Remarks * From to (m)	Stability Stable Shoring None Weather Cloudy		
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. Scale 1:25 (c) ESG www.esg.co.uk 426.4809/03/2015 10:14:42			Project Coed Darcy Sitewide Trial Pitting Project No. H4039-14 Carried out for St Modwen Developments Limited	Trial Pit TPE2830 Sheet 1 of 1		

Trial Pit Log



Logged NK Checked AP		Start 26/01/2015 End 26/01/2015	Equipment, Methods and Remarks Komatsu PC210 Machine excavated trial pit from GL to 3.0m Terminated on concrete block.	Dimensions and Orientation Width 1.00 m Length 2.00 m A B C D		Ground Level Coordinates National Grid Chainage		- - -
Samples and Tests			Strata					
Depth	Type & No.	Date Records	Description			Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
0.50	ES 1		1 (MADE GROUND) Stiff yellowish brown slightly sandy gravelly CLAY with high cobble content. Sand is fine to coarse. Gravel is subangular to subrounded, fine to coarse of sandstone, brick and concrete. Cobbles are subangular to subrounded of sandstone, brick and concrete. Occasional rootlets. (VO = 1,0)			(3.00)		
1.50	ES 2							
2.50	ES 3							
			EXPLORATORY HOLE ENDS AT 3.00 m			3.00		
			Concrete block.					
Depth	Type & No.	Records Date						
Groundwater Entries No. Struck Post Strike Behaviour (m) None observed (see Key Sheet)			Depth Related Remarks * From to (m)			Stability Stable Shoring None Weather Cloudy		
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. (c) ESG www.esg.co.uk 426.4809/03/2015 10:14:39			Project Coed Darcy Sitewide Trial Pitting Project No. H4039-14 Carried out for St Modwen Developments Limited			Trial Pit TPE2829 Sheet 1 of 1		

Logged NK Checked AP	Start 19/01/2015 End 19/01/2015	Equipment, Methods and Remarks Komatsu PC210 Machine excavated trial pit from GL to 2.3m Terminated on bedrock.	Dimensions and Orientation Width 1.00 m Length 2.50 m A B C →	Ground Level Coordinates National Grid Chainage	- - -	
Samples and Tests			Strata			
Depth	Type & No.	Date Records	Description	Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
0.50	ES 1		1 (MADE GROUND) Reddish brown gravelly fine to coarse SAND. Gravel is subangular to subrounded, fine to coarse of sandstone and brick. (VO = 0,0)	0.30		
			2 Yellowish brown gravelly fine to medium SAND with medium cobble content. Gravel is subangular to subrounded, fine to coarse of sandstone. Cobbles are subangular to subrounded of sandstone. (VO = 0,0)	(1.10)		
1.50	ES 2		3 Grey mottled black gravelly fine to medium SAND with medium cobble content. Gravel is subangular to subrounded, fine to coarse of sandstone. Cobbles are subangular to subrounded of sandstone. (VO = 2,1)	1.40 (0.90)		
			EXPLORATORY HOLE ENDS AT 2.30 m	2.30		
Depth	Type & No.	Records Date				
Groundwater Entries No. Struck Post Strike Behaviour (m)			Depth Related Remarks * From to (m)	Stability Stable Shoring None Weather Cloudy		
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. Scale 1:25 (c) ESG www.esg.co.uk 426.4806/03/2015 13:34:21 			Project Coed Darcy Sitewide Trial Pitting Project No. H4039-14 Carried out for St Modwen Developments Limited	Trial Pit TPE2997 Sheet 1 of 1		

Trial Pit Log

[illegible]

Logged NK Checked AP	Start 26/01/2015 End 26/01/2015	Equipment, Methods and Remarks Komatsu PC210 Machine excavated trial pit from GL to 2.1m Terminated on bedrock.	Dimensions and Orientation Width 1.00 m Length 2.00 m A B C D B → -	Ground Level - Coordinates - National Grid - Chainage -		
Samples and Tests			Strata			
Depth	Type & No.	Date Records	Description	Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
0.50	ES 1		1 (MADE GROUND) Dark brown very gravelly fine to coarse SAND with high cobble content. Gravel is subangular to subrounded, fine to coarse of sandstone and brick. Cobbles are subangular to subrounded mostly tabular of sandstone and concrete. (VO = 0,0)	0.40		
1.50	ES 2		2 Soft orangish brown mottled yellowish brown slightly sandy gravelly SILT with medium cobble content. Sand is fine to medium. Gravel is subangular to subrounded, fine to coarse of sandstone. Cobbles are subangular to subrounded of sandstone. (VO = 0,0)	1.70		
			EXPLORATORY HOLE ENDS AT 2.10 m	2.10		

Appendix E – Recent Laboratory Analysis

Contamination analysis results

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		Determinand	Arsenic as As, dry weight	Cadmium as Cd, dry weight	Chromium as Cr, dry weight	Copper as Cu, dry weight	Lead as Pb, dry weight	Mercury as Hg, weight	Nickel as Ni, dry weight	Selenium as Se, dry weight	Vanadium as V, dry weight	Zinc as Zn, dry weight	VPH >C5 - C6, aliphatic	VPH >C6 - C8, aliphatic	VPH >C8 - C10, aliphatic	EPH >C10 - C12, aliphatic	EPH >C12 - C16, aliphatic	EPH >C16 - C21, aliphatic	EPH >C21 - C35, aliphatic	EPH >C16 - C35, aliphatic	VPH >C7 - C8, aromatic	VPH >C8 - C10, aromatic	EPH >C10 - C12, aromatic	EPH >C12 - C16, aromatic	EPH >C16 - C21, aromatic	EPH >C21 - C35, aromatic	Petroleum Hydrocarbo ns	
Sample No	ZONE	Depth	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
TPE2996	D	0.00-0.50	54.10	0.74	12.80	246.00	298.00	<0.14	25.00	<1	17.80	663.00	<40	0.14	0.19	0.17	7.29	18.50	233.00	<40	<40	0.129	0.109	0.865	3.58	42.9		
TPE2997	D	0.00-0.50	7.65	<0.02	11.50	16.70	11.20	<0.14	20.90	<1	12.30	60.50	<0.04	<0.04	<0.04	<0.04	<0.1	<0.1	<10	<10	<10	<10	<0.1	<0.1	<0.1	<0.1		
TPE2996	D	0.00-1.50	70.80	0.35	16.70	293.00	284.00	<0.14	32.20	<1	19.80	812.00	0.02	0.09	0.10	0.15	4.69	16.50	231.00	<10	<10	0.0148	0.0338	<0.1	<0.1	<0.1		
TPE2997	D	0.00-1.50	9.38	<0.02	10.50	19.80	11.10	<0.14	19.20	<1	12.90	56.40	<40	0.08	0.21	0.06	<100	<100	<100	<10	<10	<10	<10	<0.1	<0.1	<0.1		
TPE2402	D	0.50-	8.82	0.53	14.20	<14	19.60	<1.4	25.30	<10	17.30	123.00	2.02	69.30	69.70	61.8	2550	2420	725	<10	<10	<10	<10	<0.1	<0.1	<0.1		
TPE2446	D	0.50-	11.70	<0.02	13.10	51.40	17.60	<0.14	18.20	<1	18.40	69.30	<40	<40	<40	<40	2.94	17.7	105	<40	<40	<40	<100	<100	<100	<100		
TPE2447	D	0.50-	30.20	<0.02	16.80	67.30	350.00	<0.14	27.30	<1	22.80	116.00	<40	0.30	0.49	0.252	7.85	43.7	182	<40	<40	<40	23.5	55.8	410	14.2	2.22	
TPE2448	D	0.50-	8.49	<0.02	14.70	17.60	13.80	<0.14	25.40	<1	19.40	83.30	<200	<200	<200	<200	1240	1370	601	<40	<40	<40	14.9	44.1	<100	3.03	<100	
TPE2533	D	0.50-	12.60	0.41	13.40	23.60	27.20	<0.14	32.80	<1	14.10	92.10	<40	<40	0.05	<40	<100	11.4	59.8	0.139	<40	31.5	39.3	23.5	2.38	<100		
TPE2534	D	0.50-	12.90	<0.02	12.00	17.90	22.30	<0.14	21.90	<1	16.80	80.40	<40	<40	0.11	0.0807	17.2	51.6	33	<40	<40	<40	12.7	28.4	21.6	1.56	<100	
TPE2535	D	0.50-	11.10	<0.02	13.00	17.80	15.00	<0.14	22.80	<1	16.80	116.00	<40	<40	<40	<40	3.38	8.46	2.55	<40	<40	<40	0.116	0.0557	<100	<100	5.77	
TPE2536	D	0.50-	9.56	0.70	13.10	18.20	18.30	<0.14	23.30	<1	15.40	109.00	0.47	11.50	49.90	40	172	61.2	27.2	<40	<40	<40	<40	<100	<100	9.03		
TPE2537	D	0.50-	14.30	<0.02	11.90	14.90	14.70	<0.14	22.50	<1	17.60	86.70	0.06	10.90	68.90	70.5	2020	1600	296	<40	<40	<40	0.206	0.057	<100	0.624	7.12	
TPE2538	D	0.50-	10.60	0.80	12.70	44.60	14.10	<0.14	13.90	<1	18.90	110.00	0.07	0.08	0.06	<40	4.58	49.1	119	<40	<40	<40	<40	<100	<100	3.74		
TPE2622	D	0.50-	49.30	0.80	15.60	142.00	26.20	<0.14	17.10	<1	22.00	116.00	<40	<40	<40	<40	2.1	8.39	5.93	<40	<40	0.0459	<40	0.316	1.1	10.5		
TPE2623	D	0.50-	51.60	0.43	14.10	58.10	34.60	<0.14	19.30	<1	20.90	152.00	<40	0.06	0.20	0.288	84.8	211	297	<40	<40	0.0429	0.051	0.23	1.74	16.9		
TPE2678	D	0.50-	14.70	1.00	13.50	33.70	58.50	<0.14	23.00	<1	15.40	104.00	<40	0.06	0.11	0.109	1.07	6.97	14.9	<40	<40	0.0506	<40	<100	<100	11.6		
TPE2723	D	0.50-	70.60	0.77	18.80	180.00	166.00	<0.14	37.20	<1	27.90	260.00	0.05	0.28	0.52	0.207	3.87	11.4	40.4	<40	<40	<40	<40	0.234	0.606	5.99		
TPE2828	D	0.50-	14.80	0.24	18.40	25.50	38.70	<0.14	20.70	<1	24.40	160.00	<40	0.10	0.11	0.0666	1.63	3.76	13.9	<40	<40	<40	<40	0.775	1.54	10.5		
TPE2829	D	0.50-	12.00	0.50	13.00	16.20	23.40	<0.14	15.50	<1	17.10	225.00	<40	<40	<40	<40	<100	0.814	7.43	<40	<40	<40	<40	0.637	3.01	33.4		
TPE2830	D	0.50-	14.80	0.41	17.10	18.20	26.30	<0.14	18.70	<1	22.90	187.00	<40	<40	0.05	0.0464	5.04	6.34	8.66	<40	<40	<40	<40	<100	<100	5.27		
TPE2831	D	0.50-	16.80	1.01	18.20	26.00	43.10	<0.14	18.30	<1	24.30	197.00	<40	<40	0.05	<40	<100	<100	6.75	<40	<40	0.152	0.0762	0.549	0.442	10.9		
TPE2832	D	0.50-	15.20	0.09	18.80	20.80	74.40	<0.14	18.60	<1	27.20	173.00	<40	<40	<40	<40	<100	<100	12.8	<40	<40	<40	<40	<100	0.717	20.4		
TPE2908	D	0.50-	26.30	1.97	138.00	145.00	185.00	2.60	40.40	<1	19.30	904.00	<40	0.08	0.10	<40	1.64	9.02	78.10	<40	<40	<40	<40	0.514	1.64	16.2		
TPE2909	D	0.50-	11.10	0.22	12.80	26.10	33.20	<0.14	23.70	<1	13.60	125.00	<40	<40	<40	<40	0.19	0.36	3.36	<40	<40	<40	<40	0.392	1.83	10.3		
TPE2910	D	0.50-	57.40	1.22	18.80	196.00	436.00	<0.14	33.30	<1	21.50	484.00	<40	<40	<40	<40	3.03	20.70	53.30	<40	<40	<40	<40	0.918	2.5	14.3		
TPE2911	D	0.50-	30.00	0.70	26.80	69.20	1180.00	<0.14	31.70	<1	20.10	329.00	<40	0.05	0.07	0.04	24.50	78.60	221.00	<40	<40	<40	<40	0.651	2.54	14.7		
TPE2912	D	0.50-	20.00	<0.02	15.70	56.90	35.50	<0.14	21.20	<1	19.20	84.00	<40	<40	<40	<40	<100	<100	2.49	<40	<40	0.0455	<40	<100	<100	5.69		
TPE2913	D	0.50-	7.94	<0.02	14.00	30.30	13.20	<0.14	11.40	1.32	21.40	52.00	<40	<40	<40	<40	<100	<100	2.90	<40	<40	0.0593	<40	0.491	1.38	3.74		
TPE2827	D	1.00-	9.65	<0.02	12.40	17.00	15.80	<0.14	22.00	<1	18.00	69.90	165.00	893.00	898.00	516	217	75	43.1	<40	<40	<40	0.0418	1.82	5.28	31.3		
ZDHP 001	D	0.5	27.30	1.95	9.38	70.10	37.30	<0.14	10.60	<1	18.20	144.00	<40	<40	<40	<40	<100	<100	<40	<40	<40	<40	<40	<100	<100	6.02		
ZDHP 002	D	0.5	20.90	0.78	7.35	18.80	16.30	<0.14	5.34	<1	19.00	51.10	<40	<40	<40	<40	<100	<100	<40	<40	<40	<40	<40	<100	<100	12.0		
ZDHP 003	D	0.5	19.70	0.72	4.94	59.70	31.00	<0.14	2.43	<1	10.50	19.40	<40	<40	<40	<40	<100	<100	<40	<40	<40	<40	<40	<100	<100	12.4		
POS 21	D	0.50-0.50	21.10	0.78	15.00	278.00	75.80	0.27	42.10	<1	32.70	143.00	<40	0.05	0.07	0.199	42.9	159	362	<40	<40	0.0517	0.133	2.31	21.7	190		
POS 22	D	0.50-0.50	17.20	0.68	13.10	38.60	25.90	<0.14	26.40	<1	17.00	102.00	<40	0.17	0.56	1.43	78.3	145	127	<40	<40	0.376	0.954	7.8	41.8	66.1		
POS 25	D	0.50-0.50	21.10	0.54	10.40	28.90	16.80	<0.14	23.90	<1	13.80	87.40	<40	<40	<40	<40	<100	<100	<100	<40	<40	<40	<40	<100	<100	<100		
POS 27	D	0.50-0.50	40.30	0.71	15.10	72.50	75.50	7.43	30.50	<1	28.10	135.00	<40	<40	0.13	0.564	145	355	826	<40	<40	0.0972	0.376	26.7	189	986		
POS 29	D	0.50-0.50	92.10	2.86	28.70	439.00	1000.00	1.92	51.20	<1	43.50	2280.00	<40	0.08	0.12	0.315	29.6	67.9	171	<40	<40	0.0888	0.21	4.53	33.5	182		
POS 31	D	0.50-0.50	10.80	0.63	12.30	13.00	30.20	<0.14	28.10	<1	14.60	87.30	<40	<40	<40	<40	1.82	28	50.7	<40	<40	<40	<40	0.376	8.33	39.8		
POS 32	D	0.50-0.50	12.30	0.68	13.80	64.50	17.50	<0.14	30.60	<1	18.60	93.70	<40	<40	0.05	0.23	0.925	41.8	62.8	66.3	<40	<40	0.158	0.616	9.74	46.1	82.5	
POS 33	D	0.50-0.50	17.60	0.69	6.23	27.80	16.90	<0.14	17.00	<1	22.30	65.50	-	-	-	-	2040	3590	3900	-	-	-	-	605	1740	2910		
POS 34	D	0.50-0.50	7.70	0.26	14.30	24.90	13.40	<0.14	7.03	<1	22.00	35.40	<10	<10	<10	<10	<100	<100	<100	<10	<10	<10	<10	<100	<100	<100		
1% SOM Shallow PARKS			64	2.6	78	143	337	1	75	3	351	478	294000	294000	5740	5700	5800	-	159000	159000	26.2	21300	2230	2330	2330	1450	1450	-
3% SOM Shallow PARKS			64	2.6	78	143	337	1	75	3	351	478	294000	294000	5740	5830	5860	-	159000	159000	27.5	21300	2310	2340	2350	1450	1450	-

VOCS BTEX

Contamination analysis results

			1.2 DCE	Benzene	Toluene	Etylbenzene	m&p Xylene	O Xylene	Xylene total
		Determinand	1.2 DCE	Benzene	Toluene	Etylbenzene	m&p Xylene	O Xylene	Xylene total
Sample	Zone	Depth	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
TPE2997	D	0.00-0.50		<10	<2	<3	<6	<3	<9
TPE2996	D	0.00-1.50		<10	<2	<3	<6	<3	<9
TPE2997	D	0.00-1.50		<10	<2	<3	<6	<3	<9
TPE2402	D	0.50-		<10	<2	<3	<6	<3	<9
TPE2446	D	0.50-		<10	<2	<3	<6	<3	<9
TPE2447	D	0.50-		<40	<8	<12	<24	<12	<9
TPE2448	D	0.50-		<40	<8	<12	<24	<12	<9
TPE2533	D	0.50-		<40	<8	<12	<24	<12	<9
TPE2534	D	0.50-		139.00	<8	<12	<24	<12	<9
TPE2535	D	0.50-		<40	<8	<12	<24	<12	<9
TPE2536	D	0.50-		<40	<8	<12	31.30	<12	31.3
TPE2537	D	0.50-		<40	<8	<12	<24	<12	<36
TPE2538	D	0.50-		<40	<8	16	86.6	<12	86.6
TPE2622	D	0.50-		<40	<8	<12	<24	<12	<9
TPE2623	D	0.50-		<40	<8	<12	<24	<12	<9
TPE2678	D	0.50-		<40	<8	<12	<24	<12	<36
TPE2723	D	0.50-		<40	<8	<12	<24	<12	<9
TPE2828	D	0.50-		<40	<8	<12	<24	<12	<36
TPE2829	D	0.50-		<40	<8	<12	<24	<12	<9
TPE2830	D	0.50-		<40	<8	<12	<24	<12	<9
TPE2831	D	0.50-		<40	<8	<12	<24	<12	<9
TPE2832	D	0.50-		<40	<8	<12	48.4	<12	48.4
TPE2908	D	0.50-		<40	<8	<12	<24	<12	<36
TPE2909	D	0.50-		<40	<8	<12	<24	<12	<9
TPE2910	D	0.50-		<40	<8	<12	<24	<12	<9
TPE2911	D	0.50-		<40	<8	<12	<24	<12	<9
TPE2912	D	0.50-		<40	9.04	<12	<24	<12	<9
TPE2913	D	0.50-		<40	15.2	<12	<24	<12	<9
TPE2827	D	1.00-		<40	25.3	<12	30.8	<12	30.8
TPE2996	D	0.00-0.50		<40	<8	<12	<24	<12	<9
ZDHP 001	D	0.5		<40	<8	<12	<24	<12	<9
ZDHP 002	D	0.5		<40	<8	<12	<24	<12	<9
ZDHP 003	D	0.5		<40	<8	<12	<24	<12	<9
POS 21	D	0.50-0.50		<40	12.3	<12	<24	<12	<9
POS 22	D	0.50-0.50		<40	<8	<12	<24	<12	<9
POS 25	D	0.50-0.50		<40	<8	<12	<24	<12	<9
POS 27	D	0.50-0.50		<40	<8	<12	<24	<12	<9
POS 29	D	0.50-0.50		<40	<8	<12	<24	<12	<9
POS 31	D	0.50-0.50		<40	<8	<12	<24	<12	<9
POS 32	D	0.50-0.50		<40	<8	<12	<24	<12	<9
POS 33	D	0.50-0.50		-	-	-	-	-	-
POS 34	D	0.50-0.50		<10	<2	<3	<6	<3	<9
	Shallow parks 1%		4500	13000	8110000	4740000	-	-	7940000
	Shallow parks 3%		4500	13000	8110000	4740000	-	-	7940000

Asbestos

Location	Zone	Depth	Asbestos	Type
TPE2996	D	0.00-1.50	-	-
TPE2997	D	0.00-1.50	-	-
TPE2402	D	0.50-	0	-
TPE2446	D	0.50-	0	-
TPE2447	D	0.50-	0	-
TPE2448	D	0.50-	0	-
TPE2533	D	0.50-	0	-
TPE2534	D	0.50-	Loose fibres in soil	-
TPE2535	D	0.50-	0	-
TPE2536	D	0.50-	0	-
TPE2537	D	0.50-	0	-
TPE2538	D	0.50-	0	-
TPE2622	D	0.50-	0	-
TPE2623	D	0.50-	0	-
TPE2678	D	0.50-	0	-
TPE2723	D	0.50-	Loose fibres in soil	<0.001
TPE2828	D	0.50-	0	-
TPE2829	D	0.50-	0	-
TPE2830	D	0.50-	Loose fibres in soil	-
TPE2831	D	0.50-	Loose fibres in soil	<0.001
TPE2832	D	0.50-	0	-
TPE2908	D	0.50-	Loose fibres in soil	0.177
TPE2909	D	0.50-	Loose fibres in soil	<0.001
TPE2910	D	0.50-	Loose fibres in soil	<0.001
TPE2911	D	0.50-	Soil containing ACM	0.0095
TPE2912	D	0.50-	0	-
TPE2913	D	0.50-	0	-
TPE2827	D	1.00-	0	-
TPE2996	D	0.00-0.50	0	-
TPE2997	D	0.00-0.50	0	-
TPE 2908 R	D	0.5	Detected	0.0102
POS 21	D	0.50-0.50	Detected	0.0097
POS 22	D	0.50-0.50	Not Detected	
POS 25	D	0.50-0.50	Not Detected	
POS 27	D	0.50-0.50	Detected	0.0186
POS 29	D	0.50-0.50	Not Detected	
POS 31	D	0.50-0.50	Not Detected	
POS 32	D	0.50-0.50	Not Detected	
POS 33	D	0.50-0.50	Detected	<0.001
POS 34	D	0.50-0.50	Not Detected	

Contamination analysis results

		Determinand	Arsenic as As, dry weight	Cadmium as Cd, dry weight	Chromium as Cr, dry weight	Copper as Cu, dry weight	Lead as Pb, dry weight	Mercury as Hg, dry weight	Nickel as Ni, dry weight	Selenium as Se, dry weight	Vanadium as V, dry weight	Zinc as Zn, dry weight	VPH >C5 - C6, aliphatic	VPH >C6 - C8, aliphatic	VPH >C8 - C10, aliphatic	EPH >C10 - C12, aliphatic	EPH >C12 - C16, aliphatic	EPH >C16 - C21, aliphatic	EPH >C21 - C35, aliphatic	EPH >C16 - C35, aliphatic	VPH >C5 - C7, aromatic	VPH >C7 - C8, aromatic	VPH >C8 - C10, aromatic	EPH >C10 - C12, aromatic	EPH >C12 - C16, aromatic	EPH >C16 - C21, aromatic	EPH >C21 - C35, aromatic	Petroleum Hydrocarbons	
		Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Sample No	ZONE	Depth																											
TPE2402	D	1.50-	8.20	<0.02	10.00	13.00	9.95	<0.14	18.80	<1	12.00	60.10	0.93	21.00	19.20	31.9	278	278	75.7		<40	<40	0.44	0.06	<100	<100	<100		
TPE2446	D	1.50-	8.15	1.04	12.70	13.00	10.70	<0.14	29.00	<1	14.50	102.00	<40	0.51	2.56	3.76	39.3	12	17.8		<40	<40	<40	<40	0.33	1.18	3.72		
TPE2447	D	1.50-	11.80	<0.02	12.10	14.10	21.70	<0.14	24.60	<1	15.00	70.30	0.12	3.05	8.21	20.2	542	542	131		<40	<40	0.27	2.30	0.81	9.28	83.50		
TPE2448	D	1.50-	10.40	<0.02	11.70	9.81	11.00	<0.14	22.60	<1	13.20	63.70	7.84	83.00	190.00	382	1120	820	264		<40	<40	0.15	0.09	<100	<100	17.30		
TPE2534	D	1.50-	11.00	<0.2	14.60	<14	11.70	<1.4	27.10	<10	20.40	68.60	0.11	1.60	25.90	39.6	341	337	84.3		<40	<40	0.06	0.05	<100	<100	<100		
TPE2535	D	1.50-	9.23	<0.02	11.80	11.60	11.10	<0.14	24.00	<1	13.60	61.70	0.17	4.92	18.70	17.8	135	38.1	9.46		<40	<40	<40	<40	<100	<100	1.88		
TPE2536	D	1.50-	8.36	0.13	11.50	12.30	11.70	<0.14	21.60	<1	13.30	56.30	24.40	117.00	99.90	97.7	368	128	43.2		<40	<40	<40	<40	0.34	4.61	61.80		
TPE2537	D	1.50-	7.93	0.23	14.40	17.60	15.40	<0.14	25.20	<1	16.70	70.10	0.32	25.20	388.00	311	1440	1090	216		<40	<40	<40	<40	<100	<100	3.70		
TPE2538	D	1.50-	7.77	1.58	16.50	17.40	14.20	<0.14	26.30	<1	18.00	131.00	1.18	13.50	29.50	32.5	204	284	237		<40	<40	<40	<40	<100	<100	<100		
TPE2622	D	1.50-	10.60	0.32	16.70	16.50	14.40	<0.14	41.90	<1	19.30	78.90	0.13	9.33	139.00	207	286	104	6.36		<40	<40	0.07	0.12	5.80	34.60	237.00		
TPE2623	D	1.50-	53.10	0.59	20.00	47.50	15.80	<0.14	18.20	1.18	27.10	81.40	4.27	108.00	224.00	190	532	145	128		<40	<40	3.33	27.90	0.39	15.10	141.00		
TPE2678	D	1.50-	92.90	0.51	14.80	122.00	<0.14	<0.14	23.10	<1	21.10	113.00	6.53	109.00	597.00	642	1200	622	411		0.04	<40	14.90	7.59	0.23	<100	3.61		
TPE2723	D	1.50-	14.20	0.50	16.10	36.40	22.10	<0.14	20.00	<1	21.40	96.60	<40	<40	<40	<40	<100	<100	4.18		<40	<40	<40	<40	<100	<100	5.85		
TPE2828	D	1.50-	16.40	0.28	33.40	25.10	47.40	<0.14	24.40	<1	32.80	166.00	0.05	0.32	0.26	0.111	<100	0.98	13.4		<40	<40	<40	<40	<100	0.24	3.69		
TPE2829	D	1.50-	12.20	0.37	15.90	15.80	25.50	<0.14	15.70	<1	20.50	150.00	<40	<40	<40	<40	<100	8.47	19.4		<40	<40	<40	<40	0.53	0.37	2.10		
TPE2830	D	1.50-	42.80	2.50	37.60	129.00	12000.00	<0.14	41.80	<1	38.80	633.00	1.00	10.40	1.30	0.199	48.3	366	2120		<40	<40	<40	<40	<100	1.83	7.03		
TPE2831	D	1.50-	19.10	0.30	19.80	56.10	247.00	<0.14	35.50	<1	18.70	143.00	<40	0.21	0.11	<40	2.55	26.7	115		<40	<40	0.04	0.47	5.39	1.62	<100		
TPE2832	D	1.50-	186.00	0.11	18.20	127.00	343.00	<0.14	15.20	<1	25.00	109.00	0.04	0.15	0.12	0.0682	2.95	22.8	148		<40	<40	12.90	45.10	96.20	10.70	1.84		
TPE2908	D	1.50-	16.90	0.49	14.80	45.20	60.60	<0.14	22.50	<1	15.20	271.00	0.05	30.30	54.10	5.45	1.04	9.51	42.30		<40	<40	<40	<40	<100	<100	<100		
TPE2912	D	1.50-	12.30	<0.02	10.80	88.50	25.70	<0.14	17.70	<1	12.90	152.00	<40	<40	<40	<40	<100	<100	2.37		<40	<40	<40	<40	0.11	<100	0.67		
TPE2913	D	1.50-	11.00	<0.02	11.10	11.80	12.10	<0.14	20.00	<1	12.90	61.50	<40	<40	<40	<40	<100	<100	<100		<40	<40	<40	<40	<100	<100	1.49		
TPE2913	D	2.20-	9.21	0.11	14.30	18.80	61.30	<0.14	4.43	1.68	7.63	151.00	<40	<40	<40	<40	1.51	6.27	32.70		<40	<40	<40	<40	<100	<100	0.80		
TPE2534	D	2.50-	10.30	<0.02	11.70	10.20	9.49	<0.14	25.00	<1	12.50	58.80	0.15	3.28	31.80	63.1	310	208	49.4		<40	<40	<40	<40	<100	<100	<100		
TPE2678	D	2.50-	8.15	0.93	13.10	14.20	11.70	<0.14	23.20	<1	13.20	83.70	3.68	28.60	160.00	278	366	103	40.4		<40	<40	<40	<40	<100	<100	<100		
TPE2829	D	2.50-	18.40	0.43	21.20	21.60	26.20	<0.14	26.40	<1	25.60	282.00	<40	<40	<40	<40	<100	1.95	13.3		<40	<40	<40	<40	<100	<100	<100		
TPE2832	D	2.50-	23.70	0.31	21.20	49.90	121.00	<0.14	19.90	<1	28.10	137.00	<40	<40	<40	<40	1.46	12.9	62.7		<40	<40	<40	<40	<100	<100	0.42		
TPE2908	D	2.50-	9.60	0.19	14.40	18.70	18.10	<0.14	22.90	<1	14.10	101.00	<200	174.00	339.00	42.60	<100	1.51	10.90		<40	<40	<40	<40	<100	<100	<100		
TPE2832	D	3.20-	8.52	0.32	12.60	12.50	15.30	<0.14	22.70	<1	14.60	79.60	<40	0.05	0.32	0.79	53.60	17.20	30.80		<40	<40	<40	<40	<100	<100	<100		
TPE2678	D	3.50-	9.31	0.91	12.50	14.30	28.20	<0.14	21.90	<1	15.60	65.40	14.10	94.90	206.00	283	170	66.6	16.2		<40	<40	<40	<40	<100	<100	<100		
POS 21	D	1.50-1.50	13.40	0.56	13.90	2240.00	29.70	<0.14	28.00	<1	17.30	90.20	<40	<40	<40	<40	0.459	1.88	12.5		<40	<40	<40	<40	<100	<100	1.13	12.70	
POS 21	D	2.50-2.50	19.90	0.53	13.80	36.50	30.80	<0.14	22.10	<1	17.30	79.00	<40	<40	<40	<40	0.387	1.21	2.07		<40	<40	<40	<40	<100	0.42	3.26		
POS 21	D	3.50-3.50	8.32	0.31	12.30	13.80	11.60	<0.14	25.20	<1	13.30	60.60	<40	<40	<40	<40	<100	<100	<100		<40	<40	<40	<40	<100	<100	0.78		
POS 22	D	1.50-1.50	26.00	0.51	13.70	50.00	27.70	<0.14	22.80	<1	18.80	94.10	<40	0.14	0.37	0.728	41.7	106	129		<40	<40	0.25	0.49	2.19	20.50	70.60		
POS 22	D	2.50-2.50	12.90	0.51	13.40	24.80	14.00	<0.14	26.80	<1	16.30	76.60	<40	0.10	0.159	<100	<100	2.58	<100		<40	<40	0.07	0.11	<100	<100	1.48		
POS 22	D	3.50-3.50	19.90	0.70	12.70	45.00	21.30	<0.14	18.40	<1	16.30	89.80	<40	<40	<40	<40	<100	<100	<100		<40	<40	<40	<40	<100	<100	1.57		
POS 25	D	1.50-1.50	30.50	0.69	14.80	57.30	27.20	<0.14	18.80	<1	20.50	102.00	<40	<40	<40	<40	0.523	0.792	2.41		<40	<40	<40	<40	<100	<100	6.93		
POS 25	D	2.50-2.50	10.10	0.29	12.50	15.50	13.00	<0.14	20.90	<1	14.90	55.40	<40	<40	<40	<40	<100	<100	<100		<40	<40	<40	<40	<100	<100	1.11		
POS 27	D	1.50-1.50	19.40	0.76	14.70	43.50	101.00	<0.14	27.60	<1	20.90	126.00	<40	0.05	0.23	0.758	228	500	804		<40	<40	0.17	0.51	32.30	194.00	735.00		
POS 27	D	2.50-2.50	16.50	0.75	15.00	30.60	43.50	<0.14	26.60	<1	21.40	106.00	<40	0.08	0.74	2.71	46.1	122	248		<40	<40	0.49	1.81	6.82	50.60	242.00		
POS 27	D	3.50-3.50	21.10	0.57	15.30	33.90	16.00	<0.14	24.90	<1	19.40	84.10	<40	0.11	1.00	1.94	<100	<100	<100		<40	<40	0.69	1.29	0.23	0.45	1.61		
POS 29	D	1.50-1.50	8.76	0.46	10.70	12.30	10.90	<0.14	22.60	<1	12.90	71.30	<40	<40	<40	<40	0.282	0.71	11.3		<40	<40	<40	<40	<100	<100	2.02		
POS 29	D	2.50-2.50	16.90	0.58	13.80	28.90	21.80	<0.14	23.60	<1	16.80	93.40	<40	<40	<40	<40	7.26	26	38.6		<40	<40	<40	<40	1.02	10.60	39.30		
POS 33	D	1.50-1.50	11.90	0.18	16.50	9.76	7.90	<0.14	11.50	<1	30.90	33.60	<40	0.08	1.00	2.41	<100	<100	<100		<40	<40	0.66	1.61	2.29	2.65	3.52		
POS 34	D	1.60-1.60	10.30	0.33	11.20	15.40	12.10	<0.14	22.00	<1	13.50																		

Contamination analysis results

			Determinand	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)Anthracene	Chrysene	Benzo(b)Fluoranthene	Benzo(k)fluoranthene	Benzo(e)Pyrene	Indeno(123-cd)Pyrene	Dibenzo(ah)Anthracene	Benzo(ghi)Perylene	Total (of 16) PAHs	Phenol
Sample	Zone	Depth	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
TPE2402	D	1.50-	0.254	<12	<8	0.358	0.762	0.174	<17	0.0634	<14	0.0409	0.0315	<14	<15	<18	<23	<24			
TPE2446	D	1.50-	0.0244	<12	0.0117	0.0359	0.0429	0.0266	<17	0.0195	0.0211	<15	0.0117	<14	<15	<18	<23	<24			
TPE2447	D	1.50-	0.127	<12	0.136	0.463	0.828	0.18	0.0311	0.068	<14	<10	0.0208	<14	<15	<18	<23	<24			
TPE2448	D	1.50-	0.488	0.0412	0.576	1.51	3.02	0.927	0.066	0.147	<14	0.0125	0.0232	<14	<15	<18	<23	<24			
TPE2534	D	1.50-	0.0689	<12	0.0576	0.32	0.278	0.0986	0.0217	0.0375	<14	0.0211	0.0189	<14	<15	<18	<23	<24			
TPE2535	D	1.50-	0.051	<12	0.063	0.08	0.157	0.0599	<17	<15	<14	0.0165	<15	<14	<15	<18	<23	<24			
TPE2536	D	1.50-	0.513	0.02	0.12	0.14	0.25	0.05	0.02	0.03	0.02	0.02	0.02	<14	<15	<18	<23	<24			
TPE2537	D	1.50-	0.29	<12	0.27	1.23	1.37	0.30	0.04	0.06	<14	0.04	0.05	<14	<15	<18	<23	<24			
TPE2538	D	1.50-	0.12	<12	0.03	0.24	0.35	0.08	<17	0.03	<14	0.03	0.02	<14	<15	<18	<23	<24			
TPE2622	D	1.50-	0.174	<12	0.211	0.4	0.507	0.223	<17	0.0209	<14	0.0255	0.026	<14	<15	<18	<23	<24			
TPE2623	D	1.50-	0.0801	<12	0.0372	0.0559	0.129	0.0224	0.109	0.0958	0.0271	0.0319	0.0226	<14	<15	<18	<23	<24			
TPE2678	D	1.50-	4.59	<12	<8	0.53	0.77	0.17	0.23	0.28	0.11	0.17	0.18	<14	0.08	0.06	<23	0.09			
TPE2723	D	1.50-	<9	<12	<8	<10	0.03	<16	<17	<15	<14	0.02	0.02	<14	<15	<18	<23	<24			
TPE2828	D	1.50-	0.0175	0.03	0.03	0.03	0.37	0.06	0.90	0.69	0.42	0.57	0.77	0.25	0.44	0.31	0.11	0.38			
TPE2829	D	1.50-	0.0176	0.0302	0.0331	0.0301	0.238	0.0673	0.574	0.448	0.314	0.331	0.453	0.207	0.335	0.194	0.0831	0.232			
TPE2830	D	1.50-	0.126	<120	<80	<100	1.12	<160	1.35	1.28	0.798	0.696	1.94	0.632	1.29	0.969	0.334	1.77			
TPE2831	D	1.50-	0.035	<10	<8	<10	0.183	0.0204	0.325	0.233	0.203	0.248	0.51	0.171	0.25	0.232	0.0806	0.341			
TPE2832	D	1.50-	0.14	<12	0.03	0.02	0.38	0.02	0.571	0.419	0.267	0.429	0.816	0.208	0.364	0.296	0.103	0.329			
TPE2908	D	1.50-	0.0659	<12	<8	<10	0.0787	<16	0.0602	0.0546	0.0296	0.0398	0.0713	0.0179	0.0341	0.0299	<23	0.0427			
TPE2912	D	1.50-	0.0162	<12	<8	<10	0.0507	<16	0.0206	0.0169	<14	0.0313	0.0365	<14	<15	<18	<23	<24			
TPE2913	D	1.50-	<9	<12	<8	<10	0.132	<16	<17	<15	<14	0.0589	0.041	<14	<15	<18	<23	<24			
TPE2913	D	2.20-	0.0315	<12	0.02	0.02	0.14	0.04	0.30	0.25	0.29	0.28	0.50	0.18	0.31	0.20	0.08	0.24			
TPE2534	D	2.50-	0.105	<12	0.0659	0.205	0.308	0.0699	<17	0.0216	<14	0.0289	0.033	<14	<15	<18	<23	<24			
TPE2678	D	2.50-	3.34	<12	0.10	0.16	0.24	0.05	0.02	0.03	<14	0.02	0.02	<14	<15	<18	<23	<24			
TPE2829	D	2.50-	<9	<12	<8	<10	0.0564	<16	0.125	0.104	0.102	0.0734	0.122	0.0479	0.0803	0.0516	<23	0.0664			
TPE2832	D	2.50-	<9	<12	<8	<10	0.0958	0.0284	0.213	0.152	0.147	0.113	0.181	0.0613	0.116	0.0638	<23	0.0698			
TPE2908	D	2.50-	0.0698	<12	<8	<10	0.101	<16	0.0536	0.0442	0.04	0.06	0.06	0.02	0.03	<18	<23	<24			
TPE2832	D	3.20-	0.03	<12	<8	<10	0.02	<16	<17	<15	<14	<10	0.0203	<14	<15	<18	<23	<24			
TPE2678	D	3.50-	2.02	<12	0.03	0.12	0.22	0.04	<17	0.02	0.03	0.03	0.03	<14	<15	<18	<23	<24			
POS 21	D	1.50-1.50	0.02	<12	<8	<10	0.12	<16	0.04	0.03	<14	0.03	0.05	<14	<15	<18	<23	<24			
POS 21	D	2.50-2.50	0.01	<12	<8	<10	0.14	<16	0.02	<15	<14	0.04	0.03	<14	<15	<18	<23	<24			
POS 21	D	3.50-3.50	<9	<12	<8	<10	0.05	<16	<17	<15	<14	<10	<15	<14	<15	<18	<23	<24			
POS 22	D	1.50-1.50	0.02	<12	<8	0.02	0.19	0.05	0.08	0.10	0.03	0.04	0.09	0.02	0.04	0.03	<23	0.04			
POS 22	D	2.50-2.50	<9	<12	<8	<10	0.12	<16	<17	<15	<14	0.03	0.04	<14	<15	<18	<23	<24			
POS 22	D	3.50-3.50	0.01	<12	<8	<10	0.10	<16	<17	<15	<14	0.04	0.02	<14	<15	<18	<23	<24			
POS 25	D	1.50-1.50	<9	<12	<8	<10	0.07	<16	<17	<15	<14	0.01	<15	<14	<15	<18	<23	<24			
POS 25	D	2.50-2.50	<9	<12	<8	<10	0.05	<16	<17	<15	<14	<10	<15	<14	<15	<18	<23	<24			
POS 27	D	1.50-1.50	1.11	0.95	0.15	0.37	1.17	0.66	2.29	5.94	2.27	3.11	3.27	1.08	5.97	2.98	0.94	5.50			
POS 27	D	2.50-2.50	0.33	0.24	0.02	0.08	0.43	0.20	0.82	1.93	0.74	0.80	0.82	0.31	1.26	0.60	0.19	1.24			
POS 27	D	3.50-3.50	0.01	<12	<8	<10	0.12	<16	<17	<15	<14	0.06	0.04	<14	<15	<18	<23	<24			
POS 29	D	1.50-1.50	<9	<12	<8	<10	0.06	<16	<17	<15	<14	0.01	0.02	<14	<15	<18	<23	<24			
POS 29	D	2.50-2.50	0.02	<12	<8	<10	0.08	<16	0.03	0.03	<14	0.01	0.03	<14	<15	<18	<23	<24			
POS 33	D	1.50-1.50	0.07	<12	<8	<10	<15	<16	<17	<15	<14	<10	<15	<14	<15	<18	<23	<24			
POS 34	D	1.60-1.60	0.08	<12	<8	<10	0.04	<16	<17	<15	0.02	0.01	<15	<14	<15	<18	<23	<24			
														</							

VOCS BTEX

Contamination analysis results

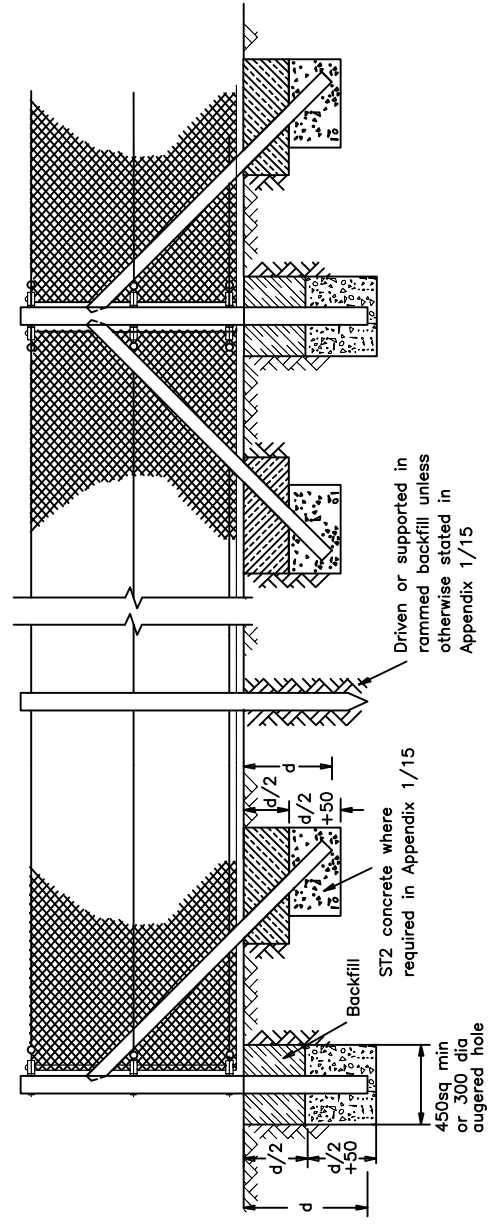
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Asbestos

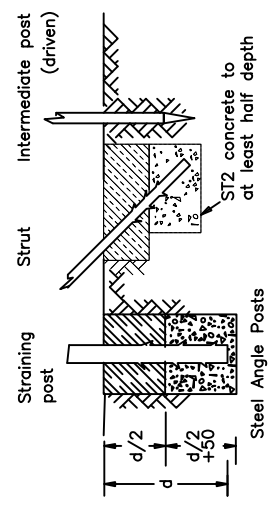
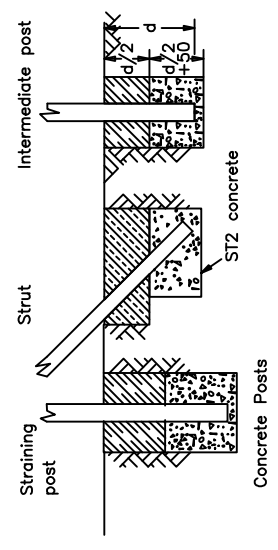
Location	Zone	Depth	Asbestos	Type	
TPE2402	D	1.50-	-	-	
TPE2446	D	1.50-	-	-	
TPE2447	D	1.50-	-	-	
TPE2448	D	1.50-	-	-	
TPE2534	D	1.50-	-	-	
TPE2535	D	1.50-	-	-	
TPE2536	D	1.50-	-	-	
TPE2537	D	1.50-	-	-	
TPE2538	D	1.50-	-	-	
TPE2622	D	1.50-	-	-	
TPE2623	D	1.50-	-	-	
TPE2678	D	1.50-	-	-	
TPE2723	D	1.50-	-	-	
TPE2828	D	1.50-	-	-	
TPE2829	D	1.50-	-	-	
TPE2830	D	1.50-	-	-	
TPE2831	D	1.50-	-	-	
TPE2832	D	1.50-	-	-	
TPE2908	D	1.50-	-	-	
TPE2912	D	1.50-	-	-	
TPE2913	D	1.50-	-	-	
TPE2913	D	2.20-	-	-	
TPE2534	D	2.50-	-	-	
TPE2678	D	2.50-	-	-	
TPE2829	D	2.50-	-	-	
TPE2832	D	2.50-	-	-	
TPE2908	D	2.50-	-	-	
TPE2832	D	3.20-	-	-	
TPE2678	D	3.50-	-	-	
POS 21	D	1.50-1.50			
POS 21	D	2.50-2.50			
POS 21	D	3.50-3.50			
POS 22	D	1.50-1.50			
POS 22	D	2.50-2.50			
POS 22	D	3.50-3.50			
POS 25	D	1.50-1.50			
POS 25	D	2.50-2.50			
POS 27	D	1.50-1.50			
POS 27	D	2.50-2.50			
POS 27	D	3.50-3.50			
POS 29	D	1.50-1.50			
POS 29	D	2.50-2.50			
POS 33	D	1.50-1.50			
POS 34	D	1.60-1.60			

Appendix F – Typical Fencing Details

NOTE: TYPICAL FENCING DETAIL ONLY< ALL PROPOSED FENCING IS SUBJECT TO
PRIOR AGREEMENT WITH THE LOCAL PLANNING AUTHORITY



DETAIL FOR TIMBER POSTS



VARIATIONS FOR POSTS OF MATERIALS OTHER THAN TIMBER

NOTES

1. B.S.1722 Part 1 applies unless otherwise stated.
2. Dimensions of foundation, type and size of posts, struts and mesh, etc. shall be taken from B.S.1722 Part 1 appropriate to the height and with any other requirement described in Appendix 1/15 and on the Drawings.
3. Plastic coating when required in Appendix 1/15 shall comply with Specification Clauses 2604 and 2605.
4. Plastic coating material shall not be acceptable where serious damage has occurred to the coating before or during erection. Minor defects must be sprayed with an approved plastic paint within 24 hours of erection.
5. All timber shall comply with Specification Clause 304 unless otherwise stated in Appendix 1/15.
6. Where a fence forms a boundary between the highway and private property the wire shall be fixed to the highway side unless otherwise stated in Appendix 1/15.
7. Timber posts and struts may be supported in rammed backfill unless otherwise stated in Appendix 1/15.
8. ALL DIMENSIONS ARE IN MILLIMETRES.

HIGHWAY CONSTRUCTION DETAILS		FENCES, STILES & GATES		ACCOMMODATION WORKS CHAIN LINK FENCES		Drawing No.
						H11
D	MAY 04					
C	MAR 98					
B	AUG 93					
A	DEC 91					
Issue		Date				

Appendix G – Separator Removal Works



1) Zone D Separator viewing towards RAP 9B and South Bay to the west.



2) The southern edge of Zone D Separator.



3) Exposing the side of the separator



4) Exposing the side of the separator



5) Recovery manhole exhibiting product and wax in the chamber



6) Recovery manhole exhibiting product and wax in the chamber



7) Recovery of product from the outer excavation



8) Photo looking in to the separator chamber. Free product on grey basal silts.



9) Backfill of the excavation around the separator following product removal



10) Commencement of breaking the top off the separator.



11) Inside the separator



12) Inside the separator



13) Recovery of basal silts and water with product on.



14) Backfilling of the separator following the removal of material and oily water.



15) Backfilling of the separator following the removal of material and oily water.

Appendix E. Upper Tank Farm (Zone E)

Technical Note 1388

Subject:	Coed Darcy – Open Space Zone E (Upper Tank Farm)		
Reference:	5041216-REM-TN-1388	Revision:	A
Author:	Alex Mann	Checker:	Matthew Timmins
Issued to:	Rhys Mander (AECOM)	Reviewer:	Michelle Lee
Date:	October 2015	Authoriser:	Mike Poland

1. Introduction

This Technical Note relates to the assessment and validation of an area of open space known as the ‘Upper Tank Farm’, which forms one part of Monitor Phase 39 (refer to Atkins Drawing 5041216-REM-DWG-1661 P4) within the former Llandarcy Oil Refinery, Neath. Based on the current Masterplan, this area is shown to remain as Open Space (woodland) within the final development.

For ease of reference, the ‘Upper Tank Farm’ is referred to as ‘Zone E’ to correspond with the areas set out in the overarching Monitor Phase 39 report (5041216-REM-RPT-1340 Rev A).

2. The Site

Zone E is an irregular shaped parcel of land covering 13.59ha (hectares) and forms part of existing green space proposed to be enhanced to form a landscaping belt that will bisect the future development on the former refinery. The extent of the area under consideration is shown on Atkins Drawing 5041216-REM-DWG-1791 P2.

Existing vegetation within this area comprises gravelly disturbed ground, dense semi mature and mature woodland, very overgrown scrub (buddleja and bramble) and gorse. The topography in Zone E varies but is broadly governed by the upper terrace of the former refinery which is located to the north of the site. Levels generally fall towards the south (Llandarcy Bog/Contractors Yard) and south west (proposed residential areas on the former southern tank farm). The highest point of the site is approximately 80 metres above ordnance datum (mAOD) along part of the northern boundary to approximately 30m AOD along part of the southern boundary. Selected photographs are attached for reference (Appendix A).

Zone E is bound to the north and west by proposed residential phases of the wider Coed Darcy site, to the east by the Contractors Yard/Llandarcy Bog and to the south by proposed open space Zone F. Zone E also surrounds a proposed residential area known as Monitor Phase 51 which is located roughly in the centre of the site and is roughly oblong in shape.

The final design for this area has not yet been defined but is anticipated to remain as an area of proposed woodland with some open parkland adjacent to Llandarcy Bog. Strategic proposals for these woodland and heathland areas, within the final development, are discussed in Atkins report 5041216-ECO-RPT-486.

3. Site History

Construction of Llandarcy Oil refinery commenced in 1917 but was temporarily suspended during the war due to the lack of men and resources. Construction started again in 1919 with production beginning in 1921. The refinery was officially opened in 1922.

The purpose of the refinery was to produce motor spirit, kerosene, gas fuel oil, fuel residue and lubricating oil and wax from imported crude oil. Between the wars, the oil industry developed rapidly. By 1939, the refinery had little of the original plant in operation.

In the mid 1980's a number of rationalisations occurred with the closure of the refinery being formally announced in 1997.

Based on the desk study for the former refinery (URS Report BRRP0001), historical activities within Zone E included part of refinery based process areas in the north with storage tanks dominating the remainder of the site to the south and west.

Thirteen tanks are recorded to have been historically located either partially (5no.) or wholly (8no.) within Zone E. All but one tank (CF2), located in the northern most point of Zone E, are indicated to have had associated bunding. The tanks are recorded to be pre-war tankage that were used to store '*Benzene and Kerosene*' (B Series) and '*Diesel/DERV and Gas Oil*' (400 and 800 series). The site boundary does not include, but wraps around, five bunded tanks of which three are noted to have stored '*Crude*' (C Tanks) and the remainder, '*Diesel/DERV and Gas Oil*' (400 and 800 series).

Two flare stacks and their associated stays are indicated to have been located in the northern part of the phase adjacent to the track which services the butane and propane storage area to the north of Zone E. Adjacent to these flarestacks, and just off site to the north, lies the former Cooling Water Towers. In recent times, a series of reprofiling works in this area has reduced the height of ground level by up to 8m locally.

The northern boundary of Zone E crosses the former No. 4 CDU (Crude Distillation Unit) and No.5 VDU (Vacuum Distillation Unit) as well as Substation No.14a. Just south of the substation lies the former Prot. Services Training Area and part of Llandarcy Bog which has remained unchanged to the present day.

The location of known historical refinery activities within Zone E is shown on Drawing 5041216-REM-DWG-1824 P2.

4. Site Walkover

Atkins undertook a site walkover of Zone E in February 2015 to assess the potential for any proposed ground investigation and to also look for any obvious visual indicators of contamination or possible sources of contamination. A selection of photographs, taken during the walkover, are presented as Appendix A and the corresponding location drawing is shown as 5041216-REM-DWG-1791 P2.

During the walkover, approximately 20 percent of the site area within Zone E was not accessible for ground investigation due to boggy ground, dense vegetation, very steep topography and access issues in to the contractors yard and along tank farm road. The remainder of Zone E comprises mainly sloping topography comprising overgrown scrub and gravelly disturbed ground.

Details of all constraints to any proposed investigation within Zone E are highlighted on drawing 5041216-REM-DWG-1799 P2. A number of concrete and brick structures were present but no obvious evidence of gross contamination was noted within this area during the walkover.

5. Historical Ground Investigation

Historical ground investigation data for Zone E (URS Report FR1287) suggests a total of 60 exploratory holes from 59 exploratory hole locations (1 locations with dual installation) within this area, as shown on drawing 5041216-REM-DWG-1808 P2. Copies of available exploratory hole logs for these locations are collated in Appendix B.

A review of the available logs indicate Made Ground was present overlying natural soils in 38 locations which is consistent with the historical uses of these locations (tank bases, bunds and infrastructure). The Made Ground generally comprises soft to firm clays and loose gravels/sands of ash, clinker, concrete, and brick fragments. Made Ground ranged in thickness from 0.1m in MSTP125 to 5.8m in MSMW200.

Underlying the Made Ground (where present), the near surface soils comprised varying sequences of silts, clays, peat, sands and gravels which extended, where proven, to depths between 1.8m (MSTP117) and 9.2m bgl (MSMW56d and MSMW56s).

Bedrock is reported in fifteen locations where the base of near surface soils was proven, however, gravelly horizons were encountered at a number of locations above the bedrock which may be considered to represent weathered bedrock. The bedrock comprised both sandstone and mudstone.

A review of the available logs indicates that strong to very strong hydrocarbon odours were encountered with localised product intercepted in four locations as oily sheens at depths from 0.2m (MSTP068) to 1.5m bgl (MSTP075).

A summary of the results of historical laboratory analysis on seven samples from Zone E (47 shallow and 44 deep) is presented in Appendix C. These indicate the following exceedances of the adopted thresholds for retention at shallow depth within in area of Public Open Space.

- Arsenic – 4 no. up to a maximum of 340 mg/kg from WSMW151 @ 0.6m bgl (64 mg/kg)
- Cadmium – 6 no. up to a maximum of 9.50 mg/kg from WSMW151 @ 0.6m bgl (2.6 mg/kg)
- Copper – 4 no. up to a maximum of 2400 mg/kg from WSMW151 @ 0.6m bgl (143 mg/kg)
- Lead – 1 no. with a concentration of 1900 mg/kg from WSMW151 @ 0.6m bgl (337 mg/kg)
- Mercury – 1 no. with a concentration of 1.3 mg/kg from WSMW151 @ 0.6m bgl (1 mg/kg)
- Nickel– 2 no. up to a maximum of 88 mg/kg from MSTP117 @ 0.5m bgl (75 mg/kg)
- Selenium– 1 no. with a concentration of 3.6mg/kg from MSTP033 @ 0.8m bgl (3 mg/kg)
- Zinc – 1no. with a concentration of 3700 mg/kg from WSMW151 @ 0.6m bgl (478 mg/kg)
- Aromatic C16-C21 – 3 no. up to a maximum of 2600 mg/kg from WSTP112 @ 0.45m bgl (1450 mg/kg)
- Benzo(a)Anthracene – 1 no. with a concentration of 22.3 mg/kg from MSTP133 @ 0.5m bgl (20.8 mg/kg)
- Benzo(b)Fluoranthene – 1 no. with a concentration of 22.1 mg/kg from TFTP060 @ 0.5m bgl (21.3 mg/kg)
- Benzo(a)Pyrene – 4 no. up to a maximum of 14.8 mg/kg from WSTP118 @ 0.5m bgl (0.9 mg/kg)
- Dibenzo(ah)Anthracene – 2 no. up to a maximum of 29 mg/kg from TFTP060 @ 0.5m bgl (2.16 mg/kg)

Reference to historic borehole monitoring in URS Report FR1287 indicates that groundwater levels are recorded to lie at approximate depths of between 0.53 m bgl (WSMW088) to 18.94m bgl (MSMW186). Product was noted to have been recorded in two wells (MSMW200 and MSMW187) with a maximum thickness of 0.212m. Subsequent monitoring rounds undertaken by URS (FR1287) recorded intermittent presence of product in these holes.

6. S106 Remediation Redevelopment Requirements

The existing S106 (Dewey and LeBoeuf, GNP/NJR/13773-2) does not provide specific details for remediation requirements for areas of proposed Open Space, but states the following:

The Developer shall remediate areas of Property which will not be developed for residential or commercial end-uses based on those areas falling into one of the following three broad categories of land-use:

Well managed parks and public gardens;

More lightly managed areas where public access is encouraged;

Areas to which access is discouraged but occasional access and/or trespassing is possible.

Assuming the retention of existing topography and planting within the final development, it is considered that Zone E falls within the latter category where public access will be generally restricted.

In line with the absence of specific details relating to remediation requirements for proposed areas of open space, the S106 states the following with regard to the scope of remedial and/or mitigation works in these areas:

The degree of protection that will need to be afforded to people will be largely dependent upon how the access to these areas is encouraged/discouraged and managed. For guidance only, access may be discouraged by physical barriers such as fencing, or vegetation or actively managed by the provision of

walkways along which controlled access is encouraged. The topography of the site may encourage children to use bikes, potentially causing rutting of the ground surface and exposing soils at depth. Detailed designs in this regard will be prepared by the Developer approved by CDL and agree with the Environmental Authorities to (i) protect human health considering the reasonably anticipatable use of the land (ii) achieve the relevant RBSLs (recreational RBSLs being provided in Table 1 above) to an appropriate depth and (iii) include an appropriate scheme of validation testing.

The Risk Based Screening Levels (RBSLs), listed in the S106 for the site, have been combined with Atkins derived Risk Target Concentrations (RTCs) for an open space end use, to assess chemical results in these areas. Details of the adopted thresholds are shown/presented in Appendix I of the overarching Monitor Phase 39 Report, Site wide open space validation, 5041216-REM-RPT-1340.

The general validation sampling frequency agreed with the monitor for Zone E (Table 1) is based upon the absence of significant historic refinery activities across much of this area.

Table 1 –Agreed Validation Frequency

Sampling Strategy	Exploratory Hole	Frequency
Areas of Historical Process Operations and Storage*	Trial Pits/Hand Dug Pits	1 per 400m ²
Areas of little or no development*	Hand Dug Pits	1 per 2500m ²

**only where safe access and egress is possible*

7. Recent Ground Investigations

With the aim of supplementing and updating the limited historical investigation within Zone E, a total of 219 machine excavated trial pits excavated pits were undertaken by Atkins between April 2014 and April 2015. In line with the site walkover and the presence of dense semi mature/mature woodland and proximity to open water bodies in of Zone E, trial pits were only excavated where safe access and egress was possible as shown on drawing 5041216-REM-DWG-1824 P2. Copies of all relevant exploratory holes logs are presented in Appendix D.

Ground conditions encountered during the recent ground investigations were similar to that found in previous investigations and generally confirm Zone E to be underlain predominantly by Made Ground and natural soils (silts, sands and gravels) overlying sandstone bedrock (where encountered).

Made Ground, comprising reworked natural soils containing ash, clinker, brick, concrete, cement etc., was identified in 137 locations. The locations were located in, or immediately adjacent to, former tank bases, storage tank bunding, infrastructure or the substations in the north of the phase as shown on Drawing 5041216-REM-DWG-1824 P2.

The depth to sandstone bedrock, where encountered, in Zone E, was found to vary between 0.4m bgl (POS133) and 5m depth (POS66).

The maximum recorded VO class noted during recent investigation was an olfactory class 5 in Made Ground (IP0435). The pipe noted within this log has been removed as part of the reclamation works. Generally, however, soils encountered in Zone E were between VO classes of 0-2.

A total of 656 environmental samples (240 shallow and 416 deep) were taken from in situ soils within these exploratory holes during the Atkins investigation. The results of the chemical analysis relating to the recent investigation in Zone E are presented in Appendix E. These indicate the following exceedances of the adopted thresholds for retention at shallow depth within in area of Public Open Space.

The depth of relevant samples beneath the current surface is given in brackets for reference.

- Arsenic – 13 no. up to a maximum of 173 mg/kg from IP141 @ 0.5m bgl (64 mg/kg)
- Cadmium – 2 no. up to a maximum of 10.8 mg/kg from POS123 @ 0.1m bgl (2.6 mg/kg)
- Chromium – 3 no. up to a maximum of 112 mg/kg from TPE154 @ 0.2m bgl (78 mg/kg)

- Copper – 12 no. up to a maximum of 2730 mg/kg from TP6100 @ 0.9m bgl (143 mg/kg)
- Lead – 12 no. up to a maximum of 3200 mg/kg from TPE154 @ 0.2m bgl (337 mg/kg)
- Mercury – 6 no. up to a maximum of 17.60 mg/kg from TP6063 @ 0.3m bgl (1 mg/kg)
- Nickel– 1 no. with a concentration of 91.9 mg/kg from TPE154 @ 0.2m bgl (75 mg/kg)
- Zinc – 7 no. up to a maximum of 2290 mg/kg from POS123 @ 0.5m bgl (478 mg/kg)
- Aromatic C21-C35 – 1 no. with a concentration of 2480 mg/kg from IP142 @ 0.5m bgl (1450 mg/kg)
- Benzo (a) Pyrene – 23 no. with a concentration of 1.19 mg/kg from TPE228 @ 0.2m bgl (0.9 mg/kg)

Marginal exceedances

- Selenium– 1 no. with a concentration of 3.82mg/kg from IP3 @ 0.5m bgl (3 mg/kg)
- Benzo (a) Anthracene – 1 no. with a concentration of 22.2 mg/kg from TPE228 @ 0.2m bgl (20.8 mg/kg)
- Benzo (B) Fluoranthene – 1 no. with a concentration of 21.7 mg/kg from TPE228 @ 0.2m bgl (21.3 mg/kg)
- Dibenzo(ah)Anthracene – 1 no. with a concentration of 2.55 mg/kg from TPE228 @ 0.2m bgl (2.16 mg/kg)

Due to the marginal exceedances of four determinands from two locations, considering the proposed end use where access is to be restricted then risk of exposure is deemed to be low.

Asbestos was detected in twenty of the samples tested from across Zone E and were subsequently scheduled for quantitative assessment. Two samples exceeded the asbestos RBSL threshold (0.02%) for retention in the top metre below finished floor level in an open space end use.

TPE229 at 0.2m bgl had a concentration of 0.0378% and POS118 at 0.3m bgl recorded an asbestos concentration of 0.036%.

8. Validation

Based on the presence or absence of historical operations, Tables 2 and 3 detail the validation frequencies using the corresponding samples/exploratory holes from each area as discussed in section 6.

Table 2 –Exploratory Hole Validation Frequency

Sampling Strategy	Agreed Frequency	Area within Zone E	Number of Exploratory Holes	Validation Frequency
Areas of Historical Process Operations and Storage	1 per 400m ²	41,500m ²	91	1 per 456m ²
Areas of little or no development	1 per 2500m ²	93,800m ²	128	1 per 733m ²

Table 3 –Sampling Validation Frequency

Sampling Strategy	Area within Zone E	Number of Samples	Validation Frequency
Areas of Historical Process Operations and Storage	41,500m ²	201	1 per 206m ²
Areas of little or no development	93,800m ²	455	1 per 206m ²

The validation frequency for the area with no previous refinery history is below the agreed value. In line with restricted access, however, the validation frequency for the area with previous refinery history exceeds the agreed value. As previously indicated (section 4), access to much of Zone E was found to be restricted by the presence of dense semi mature/mature woodland and steep topography, thus the extent of the area available for further investigation was limited. The total extent of restricted access for the area with previous refinery

history equates to approximately 7,650m². When subtracted from the total area (41,500m²) for this historical use, the validation frequency is below agreed values at 1 exploratory hole per 372m².

A comparison of the results of recent laboratory analysis with the permitted thresholds for Parks and Open Spaces, indicate exceedances of the adopted thresholds for a number of inorganic and organic determinands as listed in Section 7.

9. Conceptual Site Model (CSM)

Zone E lies in the central eastern part of the former Llandarcy refinery and comprises rough gravelled ground, dense semi mature and mature woodland, very overgrown scrub (buddleja and bramble) and gorse dominating the remaining areas. The site lies downslope of the main refinery on the upper terrace and in turn, lies upslope of the contractors yard, Llandarcy Bog and the wider southern tank farm.

Based upon historical maps, historical refinery operations within Zone E appear restricted to storage tanks (kerosene, diesel/gas oil, benzene and crude), substations and a section of the No. 4 CDU and No.5 VDU (refer to Drawing 5041216-REM-DWG-1824 P2).

Historical ground investigation (refer to section 5) confirms the presence of natural soils underlying this zone with the presence of localised Made Ground associated with former historical uses. Recent ground investigation recorded elevated concentrations of inorganic metals/metalloids (arsenic, cadmium, chromium, copper, mercury, lead, nickel, selenium and zinc), polycyclic aromatic hydrocarbons (benzo (a) anthracene, benzo (B) fluoranthene, benzo(a)pyrene and dibenzo(ah)anthracene), two TPH fractions (Aromatic C21-C35) and the presence of asbestos fibres within the near surface soils (section 7).

Key exposure pathways to the anticipated receptors, based on an ongoing Public Open Space end use, include:

- Dermal contact with contaminants in soil, soil-derived dust and entrained surface water run-off from any areas where soil (and contaminants) is exposed at the surface or in perched water/ groundwater if excavation takes place;
- Ingestion of contaminants in soil, soil-derived dust and entrained surface water run-off from any areas where soil (and contaminants) is exposed at the surface or in perched water/ groundwater if excavation takes place;
- Inhalation of contaminants in soil-derived dust from any areas where soil (and contaminants) is exposed at the surface or excavation takes place;
- Migration and inhalation of outdoor and indoor vapours
- Migration of contaminants and permeation into plastic drinking water pipes.
- Passive and active uptake through roots of contaminants in migrating perched water/ groundwater and leaf contact with contaminants in windblown, soil-derived dust.

Detailed proposals relating to the final design for this area are not yet defined although it is envisaged that the majority of this area will need to be fenced or restrictive planting installed and will therefore fall within 'Areas to which access is discouraged but occasional access and/or trespassing is possible', as defined in the S106..

Due to the absence of topsoil/subsoil across parts of this area, it is proposed that a minimum thickness of at least 300mm of clean soils, is placed across open areas to ensure a sufficient growing medium for future planting. Where exceedances of the target criteria were recorded (section 7), it is proposed to install clean cover systems to a nominal thickness of 600mm. The placement of suitable shallow soils will help to minimise the potential risks to final users of Zone E with the inorganic and asbestos exceedances highlighted in section 7. The existing woodland within Zone E is extremely dense with significantly overgrown brambles which hinder access to much of the site. In addition, in line with steep topography, it is assumed that future access to Zone E will need to be restricted to formal, surfaced pathways defined by fencing.

The risk to receptors in the short term is deemed to be mitigated by the presence of 24hour security, secure site perimeter fencing and the wet and marshy ground associated with Crymlyn Bog SSSI. However, to mitigate the risk to long term receptors, the proposed fencing works, designated footways, clean cover and new planting

is likely to significantly reduce the frequency of receptors entering the site. The works proposed to protect long term receptors will be required upon the development of Zone E and are detailed on drawing 5041216-ATK-REM-DWG-2018. The above CSM and envisaged low frequency of use, suggests the reduced sampling frequency is sufficient for this assessment and the remaining risk to present and future receptors is considered low.

10. Conclusion

Atkins Limited has been commissioned by St. Modwen Developments Ltd to provide a summary of information relating to an area of proposed Open Space known as Zone E of Monitor Phase 39.

Planning condition 41 of the Outline Planning Permission for the redevelopment of the former refinery states that:

No works shall commence on each development area until a scheme detailing the temporary means of enclosure for each development phase as agreed under Condition 9 of this consent (including details of the means to prevent unauthorised access to a service track or restricted access point) together with full details of temporary protective fencing to safeguard trees, hedgerows and habitat and ecological areas of importance giving full consideration to measures which will allow or restrict wildlife access to areas have been submitted to and approved in writing by the Local Planning Authority. The submitted details shall have due regard for the Environmental Management Plan and include the specifications of the fencing; details of signage stating that the fencing should not be removed; together with plans showing the location of the fencing and the extent of the areas to be protected. The approved details shall be fully implemented on site and shall be retained as such for the duration of the works within these areas.

Within the current site, unauthorised access to this area is restricted by ongoing security at the site perimeter. Ongoing reclamation works to remove remnant structures within this zone is subject to an engineers watching brief to ensure compliance with the S106 requirements.

Subject to fencing of existing structures within this area and the placement of suitable soils, Zone E is considered suitable for ongoing and proposed use as Open Space (Woodland) in line with the requirements of the S106.

Drawings

5041216-REM-DWG-1661 (P4)

5041216-REM-DWG-1791 P2

5041216-REM-DWG-1799 P2

5041216-REM-DWG-1808 P2

5041216-REM-DWG-1824 P2

5041216-REM-DWG-1925 P2

5041216-ATK-REM-DWG-2018