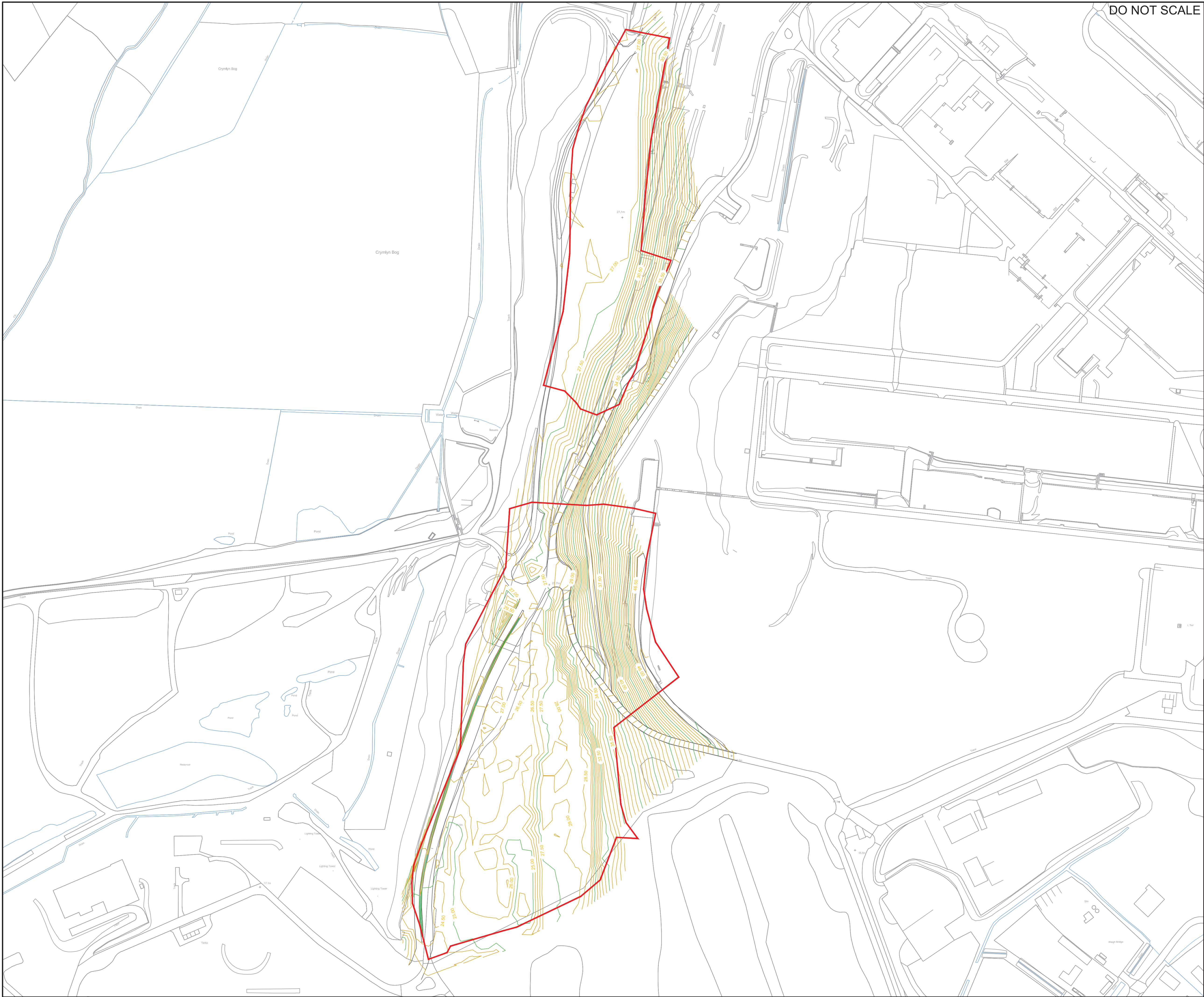


100
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Millimetres



DO NOT SCALE

- KEY:
- PHASE BOUNDARY
 - MAJOR CONTOURS
 - MINOR CONTOURS

Rev.	Date	Description		By	Chk'd	App'd
Drawing Status					Suitability	
FOR INFORMATION					S2	
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Coed Darcy Monitor Phase 58 RRWCC

**Prepared for:
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**Prepared by:
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1. INTRODUCTION

1.1 Scope

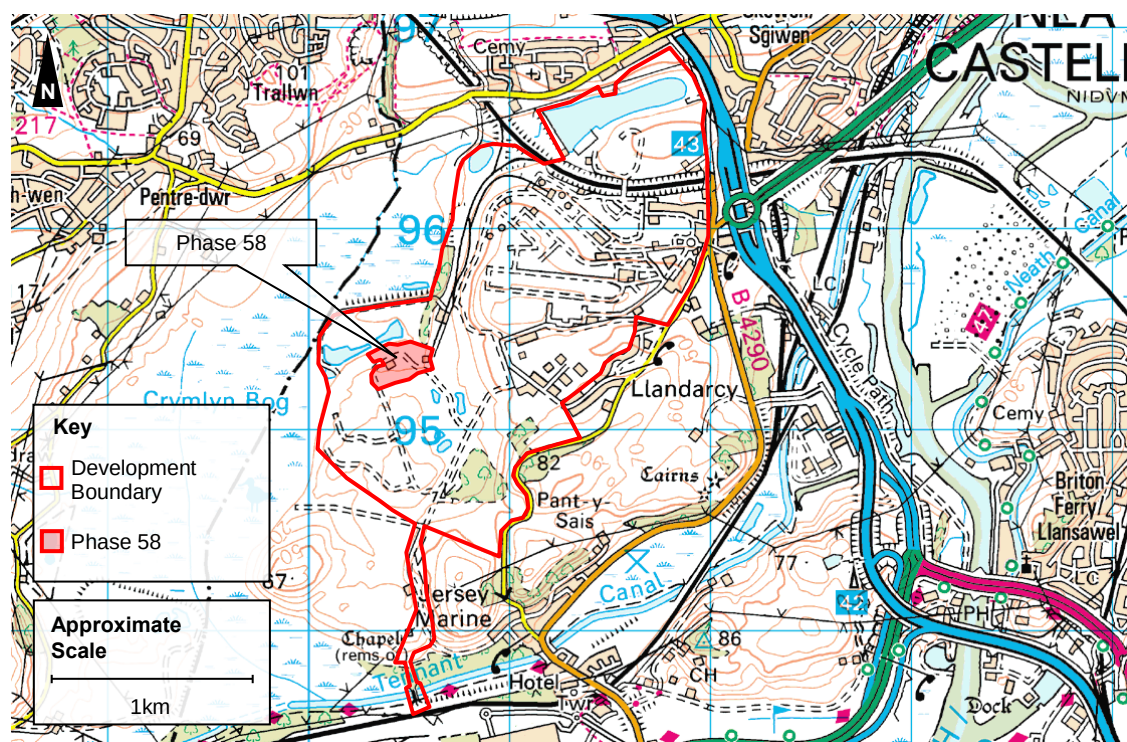
This Redevelopment Remediation Works Completion Certificate (RRWCC) has been prepared with reference to the following agreements:

- Section 106 Agreement dated 8 February 2008 between Neath Port Talbot Borough Council (NPTCBC), St Modwen Developments Limited (SMD), St Modwen Properties Plc (SMP), BP Oil Llandarcy Refinery Limited (BPLR) and Coed Darcy Limited (CDL); and
- Remediation and Maintenance Agreement dated 23 May 2008 (RMA) between SMD, SMP and CDL.

Unless advised otherwise, definitions used in this RRWCC can be found in the Section 106 Agreement and/or the RMA.

This RRWCC has been prepared for Phase 58 in response to the receipt of a written request from SMD pursuant to clause 4.3 of the RMA. The phase boundary and intended use on which this RRWCC is based were notified to the Monitor by letter, a copy of which is provided in **Appendix A**.

The intended use for Phase 58 has been declared as commercial. The phase boundary for Phase 58 is the land edged red on drawing 5041216-REM-DWG-1892, a copy of which is provided in **Appendix A**. The approximate location of Phase 58 in relation to the Development Boundary is shown in **Figure 1** below. Phase 58 covers an area of approximately 50,600m².



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Figure 1 – Location plan

A development layout is yet to be confirmed for Phase 58, however an outline layout is shown on the current masterplan drawing reference 1332/400/MP/SK/TERT Revision H, a copy of which is also provided in **Appendix A**.

With reference to the masterplan drawing it should be noted that Phase 58 is situated within an area of proposed residential development, whereas it has been declared as a commercial phase. However, with reference to the Monitor's Deed of Appointment, the Monitor is obliged to certify the phase against the intended use that is declared by the developer, irrespective of what is shown on the masterplan. It must be noted that further remediation works may be required if the phase is to be redeveloped for residential use in the future.

In accordance with the requirements of the Monitor's Deed of Appointment, this RRWCC shall:

- Describe the remedial action which in the Monitor's professional opinion has been carried out for the purposes of completing the redevelopment remediation works in relation to Phase 58; and
- Certify whether or not in the Monitor's professional opinion the redevelopment remediation works have been satisfactorily completed for Phase 58 in accordance with the purpose, objectives and requirements of Schedule 8 of the Section 106 Agreement, having regard to the intended use.

A copy of Schedule 8 of the Section 106 Agreement is provided in **Appendix B**.

1.2 Background

1.2.1 Objectives of the Redevelopment Remediation Works

Part One of Schedule 8 of the Section 106 Agreement outlines the purpose and objectives of the redevelopment remediation works as follows:

- The purpose and objectives of the redevelopment remediation works are the carrying out of all such remedial action over and above that actually carried out as part of the RAP Works that is necessary in order to make each part of the property suitable for its intended use. A part of the property will only be suitable for its intended use if and when the Phase Works Completion Date (PWCD) is declared in respect of that part of the property.
- This objective will be deemed to be met for the purposes of the Section 106 Agreement and the RMA on the date specified in a notice from CDL declaring the PWCD for the phase. The PWCD will be declared once CDL is satisfied that the remediation necessary for the specified intended use for the phase has been completed.

Part Two of Schedule 8 of the Section 106 Agreement places a number of obligations on SMD as the Developer. The main obligations pertinent to this phase are as follows:

- The Developer shall carry out or procure the carrying out of all Remedial Action necessary in order to achieve the purpose and objective as outlined in Part 1 of Schedule 8 of the Section 106 Agreement. The design and specification of any remediation shall take account of the principles and objectives and the design assumptions for the RAP Works and shall not prejudice the achievement and future sustainability of these principles and objectives.
- In order to determine the need for Remedial Action in the first place it is necessary to undertake an appropriate site assessment. This assessment needs to take account of the site history, potential and/or actual measured extent of contamination and the associated implied risk. Only by developing a thorough understanding of both potential and actual contamination will it be possible to confirm that all necessary Remedial Action likely to have been completed. This obligation should be satisfied through completion of an appropriate desk study and intrusive investigation.

- The Risk Based Screening Levels (RBSLs) set out in Tables 1 and 2 [in Schedule 8 of the Section 106 Agreement] and the aesthetic criteria, remediation quality and scope (including the depth below Final Finished Level (FFL) to which quality standards are achieved), as the same may be varied in accordance with this Schedule 8, shall be achieved for each part of the property at the minimum validation frequencies set out in Clause 8 of Part 3 (as applicable depending upon whether such part of the property is intended for use as residential, commercial or recreational land) as a minimum base level standard.

It should be noted that SMD has procured the services of Atkins Ltd. to assist in discharging the above obligations.

Tables 1, 2, 3 and 4 from Schedule 8 of the Section 106 Agreement are reproduced below for reference.

Table 1 Summary of Soil RBSLs

<i>Contaminant</i>	<i>Land-Use Specific Soil RBSL Surface to 1m below FFL (mg/kg)¹</i>			<i>Land-Use Specific RBSL Soil below 1m depth (mg/kg)</i>		
	<i>Residential</i>	<i>Commercial</i>	<i>Recreational</i>	<i>Residential</i>	<i>Commercial</i>	<i>Recreational</i>
<u>METALS & METALLOIDS</u>						
Arsenic	64	500	64	-	-	-
Cadmium	2.6	1400	2.6	-	-	-
Chromium	130	5000	200	-	-	-
Mercury	1	480	1	-	-	-
Nickel	50	5000	75	-	-	-
Selenium	3	8000	3	-	-	-
Lead	337	750	337	-	-	-
Vanadium	416	16000	640	-	-	-
Copper	200	-	200	-	-	-
Zinc	478	-	478	-	-	-
<u>ORGANIC SPECIES</u>						
Benzene	0.12	5	13	0.4	5	48
Benzo(a)pyrene ²	0.9	29	0.9	none	none	none
Toluene	36	1160	8110	52	389	none
Ethylbenzene	41	122000	4740	140	none	none
Xylenes	32	121000	7940	58	none	none

Contaminant	Land-Use Specific Soil RBSL Surface to 1m below FFL (mg/kg)¹			Land-Use Specific RBSL Soil below 1m depth (mg/kg)		
	Residential	Commercial	Recreational	Residential	Commercial	Recreational
1,2-Dichloroethane	0.04	2	4.5	0.1	0.65	6
Dichloromethane	5	1650	241	84	665	6220
Tetrachloroethene	11	1050	641	34	368	1780
Trichloroethene	1	84	193	2	28	269
Vinyl Chloride	0.01	4	0.7	0.04	1.6	16
1,2 Dichloroethene	4	273	632	7	91	881
1,1,1-Trichloroethane	154	577000	27900	160	3250	none
TPH Aromatic EC>C7-C8	125	1840	21337	146	617	none
TPH Aromatic EC>C8-C10	94	913	4025	257	547	none
TPH Aromatic EC>C10-C12	118	26515	4589	1394	none	none
TPH Aromatic EC>C12-C16	131	64875	4799	none	none	none
TPH Aromatic EC>C16-C21	82	51449	3639	none	none	none
TPH Aromatic EC>C21-C35	1130	51449	3639	none	none	none
TPH Aliphatic EC>C6-C8	8335	8517587	606191	none	none	none
TPH Aliphatic EC>C8-C10	112	158890	12075	158	none	none
TPH Aliphatic EC>C10-C12	3204	163360	12094	none	none	none
TPH Aliphatic EC>C12-C16	4513	169032	12117	none	none	none
TPH Aliphatic EC>C16-C21	94174	3429944	242573	none	none	none
TPH Aliphatic EC>C21-C35	94820	3429944	242573	none	none	none
Total TPH (Phase 1) ³	1717	81413	9061	9182	81956	None
Total TPH (Process Area) ³	2601	44344	10830	4098	35014	None
Total TPH (North Tank Farm) ³	1104	25875	9419	3802	13974	None
Total TPH (South Tank Farm) ²	1015	37230	6349	2792	34797	None
<u>ASBESTOS</u>						
Sum of all Types of ACM	200	300	200	200 ⁴	-	-

Notes

- “-” value not applicable to scenario
- “none” RBSL value exceeds soil saturation limits and free phase assessment appropriate
- 1 Lower value of human health RBSL or Soil Code value if higher than background LCL value (applicable to metals & metalloids only)
- 2 Benzo(a)pyrene RBSL to be compared against sum of 16 US EPA Priority List PAHs using Toxicity Equivalence approach
- 3 ‘Total’ TPH RBSL derived for an area of development, based on individual RBSLs provided and available mass fraction TPH data in soil at time of derivation, using the inverse weighted average approach
- 4 Refer to Section 106 Agreement for specification of relevant depth ranges

Table 2 Summary of RBSLs for Groundwater

<i>Contaminant</i>	<i>Land-Use Specific RBSL (mg/l)</i>		
	<i>Residential</i>	<i>Commercial</i>	<i>Recreational</i>
TPH Aliphatic EC>C6-C8	none	none	none
TPH Aliphatic EC>C8-C10	none	none	none
TPH Aliphatic EC>C10-C12	none	none	none
TPH Aliphatic EC>C12-C16	none	none	none
TPH Aliphatic EC>C16-C21	none	none	none
TPH Aliphatic EC>C21-C35	none	none	none
TPH Aromatic EC>C7-C8	20	97	none
TPH Aromatic EC>C8-C10	22	none	none
TPH Aromatic EC>C10-C12	none	none	none
TPH Aromatic EC>C12-C16	none	none	none
TPH Aromatic EC>C16-C21	none	none	none
TPH Aromatic EC>C21-C35	none	none	none
Benzene	0.7	6	198
Benzo(a)pyrene	none	none	none
Toluene	47	229	none
Ethylbenzene	102	506	none
Xylenes	43	607	none

Contaminant	Land-Use Specific RBSL (mg/l)		
	Residential	Commercial	Recreational
1,2-Dichloroethane	0.2	0.82	45
Dichloromethane	150	624	none
Tetrachloroethene	22	115	none
Trichloroethene	2.6	13	813
Vinyl Chloride	0.06	0.3	18
1,2-Dichloroethene	15	68	none
1,1,1-Trichloroethane	193	989	none

Notes

“none” theoretical RBSL greater than solubility limit

Table 3 Scale of Aesthetic Criteria

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

Notes

Visible suspect ACM refers to Asbestos Containing Material visible to the naked eye which a reasonable and prudent person used to managing asbestos may suspect to be asbestos containing.

Table 4 Minimum Validation Testing Frequencies

Testing for the Validation Suite at the following frequency:	Shallow Soils (Residential <1m FFL)	Deeper Soils (Residential >1m below FFL)	Soils (Commercial all relevant depths)
Imported quarried material	1 per 500m ³ ex situ, composite of 5 regular sub-samples	1 per 1000m ³ ex situ, composite of 5 regular sub-samples	1 per 1000m ³ ex situ, composite of 5 regular sub-samples

Testing for the Validation Suite at the following frequency:	Shallow Soils (Residential <1m FFL)	Deeper Soils (Residential >1m below FFL)	Soils (Commercial all relevant depths)
Imported soil from verified greenfield site	1 per 250m ³ ex situ, composite of 5 regular sub-samples	1 per 500m ³ ex situ, composite of 5 regular sub-samples	1 per 500m ³ ex situ, composite of 5 regular sub-samples
Imported soil from characterised brownfield site ¹	1 per 25m ³ ex situ, composite of 5 sub-samples	1 per 50m ³ ex situ, composite of 5 sub-samples	1 per 100m ³ ex situ, composite of 5 sub-samples
0.5-1m below FFL in-situ	Regular grid of 1 per 50m ² , sample over 0.5m depth	n/a	Regular grid of 1 per 400m ² , sample over 0.5m depth
>1m below FFL in-situ	n/a	Regular grid of 1 per 100m ² , sample over 1m depth	Regular grid of 1 per 400m ² , sample over 0.5m depth
Stockpiled excavated site materials for re-use	1 per 50m ³ ex situ, composite of 5 sub-samples	1 per 100m ³ ex situ, composite of 5 sub-samples	1 per 400m ³ ex situ, composite of 5 sub-samples
Face of remedial excavations <1m deep	1 per 10m, minimum of 1 per face, worst case VO sample	n/a	1 per 15m, minimum of 1 per face, worst case VO sample
Face of remedial excavations >1m deep	n/a	1 per 10m ² , minimum of 1 per face, worst case VO sample	1 per 15m ² , minimum of 1 per face, worst case VO sample
Along redundant service excavations	1 per 20m of trench, worst case VO sample	1 per 20m of trench, worst case VO sample	1 per 20m of trench, worst case VO sample
Soil treated ex-situ and homogenised	1 per 200m ³ , composite of 5 regular sub-samples	1 per 200m ³ , composite of 5 regular sub-samples	1 per 500m ³ , composite of 5 regular sub-samples

Notes

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

“VO” Visual/olfactory (i.e. aesthetic) observation

1.2.2 Remediation Action Plan (RAP) Works

In addition to the requirements of the redevelopment remediation works, the Developer must also complete a series of statutory remedial works which are referred to as the RAP Works. The requirements for the RAP Works are outlined in Schedule 7 of the Section 106 Agreement.

It is intended that this report, which is the RRWCC, will be complemented by a RAP Works Completion Statement (RAPWCS) in order to provide the information required by CDL to enable the PWCD to be declared.

Details of the scope of works and associated validation completed to satisfy the RAP requirements pertinent to this phase are reported separately in RAPWCS ref. 49310747/BRRP00132/Cert 58a.

1.3 Information Sources

A summary of the information sources that the Monitor has been provided with in relation to Phase 58 is provided below in **Table 5**. Unless otherwise stated, the Monitor has relied solely on these information sources as the basis for issuing this RRWCC. Upon a review of the information sources, in the Monitor's reasonable professional opinion, such information and the manner in which it was obtained appears sufficiently up to date, reliable and robust to justify such reliance. No verification of the data has been completed by the Monitor unless noted in the following sections.

Electronic copies of the information sources are provided in **Appendix C**.

Table 5 Information Sources

<i>Ref.</i>	<i>Document Reference</i>	<i>Format</i>	<i>Title</i>	<i>Author</i>	<i>Date Received</i>
1	39991-044-785-FR1287	Report	Whole Site Investigation BP Llandarcy Refinery	URS	August 2005
2	44382742/BRRP0001	Report	BP Llandarcy Refinery Desk Study	URS	July 2007
3	5041216-OSW-RPT-0001385	Report	Validation Report Monitor Phase 58 Revision 1	Atkins	October 2015
4	5041216-OSW-TN-0001482	Technical Note	Phase 58 Response to Monitor RFI 0140	Atkins	October 2015
5	5041216-REM-TN-1550	Technical Note	Monitor Phase 58 – Bitumen Removal	Atkins	January 2016

1.4 Requests for Information (RFIs) Issued by the Monitor

The Monitor has raised one RFI in relation to Phase 58, as summarised in **Table 6** below. A copy of the RFI is provided in **Appendix D**. Copies of the responses received are included in the information sources provided in **Appendix C**.

Table 6 RFIs

<i>RFI Ref.</i>	<i>Title</i>	<i>Associated Atkins Document</i>	<i>Date Raised</i>	<i>Complete</i>	<i>Comments</i>
140	Review of Atkins' Validation Report for Monitor Phase 58	5041216-OSW-RPT-0001385 Validation Report Monitor Phase 58	April 2015	Yes	Response to RFI and updated validation report received

2. DESCRIPTION OF THE REMEDIAL ACTION

The following section provides a description of the remedial action that has been carried out for the purposes of completing the redevelopment remediation works in relation to Phase 58. This section of the report is structured as follows:

1. Site Assessment
2. Remediation Strategy
3. Redevelopment Remediation Works
4. Validation

2.1 Site Assessment

As discussed above, the Section 106 Agreement requires the Developer to undertake an appropriate site assessment which needs to take account of the site history, potential and/or actual measured extent of contamination and the associated implied risk. The Section 106 Agreement also states that only by developing a thorough understanding of both potential and actual contamination will it be possible to confirm that all necessary Remedial Action is likely to have been completed. This obligation should be satisfied through completion of an appropriate desk study and intrusive investigation.

2.1.1 Desk Study

From the information presented in Atkins' validation report (Information Source 3) it is evident that Atkins has reviewed the findings of previous site investigations and desk studies to develop an understanding of both potential and actual contamination within Phase 58. The following is of note.

Phase 58 lies within the south west part of the former Llandarcy Oil Refinery, at the northern extent of the southern tank farm. With reference to the historical maps presented in **Appendix E** it can be seen that a fuel oil blending area, fuel pump house, crude oil pump house, sludge and sediment tanks, four C-series tanks with associated infrastructure and a small electricity substation were previously located within Phase 58.

With regards geology, Atkins reports that the British Geological Survey Sheet for Swansea (Sheet 247) Drift Edition indicates that this part of the refinery is underlain by peat and Glacial Till (Diamicton) overlying Hughes Member Pennant Sandstone.

With regards hydrogeology, groundwater within Phase 58 is generally situated within both the drift and underlying bedrock and it is considered likely that groundwater flow is generally towards the north/northwest, towards the containment lagoons. The underlying sandstones are classified as a Secondary A Aquifer, which are defined by the Environment Agency as 'permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers'. The closest surface water body within the confines of the former Llandarcy Oil Refinery to Phase 58 are the containment lagoons, located directly to the north and northwest of Phase 58.

2.1.2 Intrusive Investigations

URS carried out a number of historical site investigations on behalf of the former refinery operator, as reported in URS' site investigation report FR1287 (Information Source 1). These investigations included 54 exploratory holes within Phase 58.

Based on the findings of the site investigations, URS designated a number of 'Special Process Areas' which represented areas of potentially increased contamination associated with historical activities or processes. Six Special Process Areas were designated within Phase 58.

Between June 2014 and April 2015 Atkins undertook a site investigation which included the excavation of a further 445 trial pits within Phase 58. This site investigation was carried out after the removal of historical structures within this area. Details of these site investigations are presented in Atkins' validation report (Information Source 3).

Logs from the trial pits and boreholes indicate ground conditions to be consistent with the reported geology discussed above. Generally the soils comprise made ground, underlain with glacial soils with occasional pockets of peat over sandstone bedrock. Bedrock was predominantly encountered as a weathered zone comprising tabular sandstone gravel, cobbles and boulders. Trial pits were terminated on bedrock at depths ranging from 0.4m below ground level (bgl) in the east to 4.4m bgl in the west.

Land contamination is reported to have been evident within the soils in the form of visible free product, staining and odours. Laboratory analysis identified benzene in excess of the adopted thresholds for a commercial end use in one sample and TPH aromatic C8-C10 in two samples. Visible ACM was recorded in trial pit IP1663. No other locations recorded visible ACM. A total of 465 samples underwent laboratory analysis for asbestos and suspected asbestos fibres were reported to have been encountered in 71 soil samples.

The site investigation confirmed that groundwater across Phase 58 was generally found to lie within both superficial deposits and the underlying zone of weathered bedrock. Atkins considers that the 'groundwater in soil' scenario, as defined in the Section 106 Agreement, is applicable to Phase 58.

2.2 Remediation Strategy

Schedule 8 of the Section 106 Agreement sets out the minimum remedial action required depending on the intended use and the groundwater regime. The intended use for Phase 58 has been declared as commercial and groundwater is primarily in soils, i.e. there is sufficient soil material over bedrock to contain perched groundwater such that the water table is normally first encountered in the soil or interpreted zone of weathered bedrock. Therefore the scenario for commercial end-use where groundwater is in soil, as defined in the Section 106 Agreement, has been applied. The following minimum requirements are considered necessary for Phase 58:

- The RBSLs and the aesthetic criteria, remediation quality and scope (including the depth below FFL to which quality standards are achieved) shall be achieved for each part of the property at the minimum validation frequencies set out in Clause 8 of Part 3 of the Section 106 Agreement (as applicable depending upon whether such part of the property is intended for use as residential, commercial or recreational land) as a minimum base level standard.
- All oil saturated soils and soil containing free product other than minor sheens shall be removed to a minimum depth of 2m below FFL or 0.5m below the likely lowest seasonal groundwater elevation following development of the intended Urban Village, whichever is the deeper.
- All soils must meet the RBSL for TPH to at least 1m below FFL.
- All soils must meet in bulk, considering both dispersed fibres and pieces of ACM, the RBSL for ACM to at least 1m below FFL and any visible ACM encountered during construction in the first 1m below FFL is to be removed.
- Where there is a risk of the migration in ground of hazardous gas or contaminated liquid into remediated areas, the Developer shall take all appropriate measures to prevent this occurring. Such measures could include the installation of interception trenches and management of discharge from those. The Developer shall monitor whatever measures are put in place after their installation to continue to demonstrate their effectiveness.

- Where necessary, seeps, sheens and iron rich discharges from the bedrock must be controlled such that there is no visible discharge at surface and little or no odour. Acceptable methodologies for remediation may include, but are not limited to the use of land drainage via interceptors.

Furthermore, Schedule 10 of the Section 106 Agreement sets out additional generic remedial requirements, the following of which are relevant to Phase 58:

- Irrespective of the intended use of each phase or part thereof, all existing buried services at the property shall be removed and the routes of those services shall be backfilled with material no more permeable than the general material in the vicinity. Where backfill to new underground services may become a pathway for residential pre-transfer date contamination, appropriate control measures such as land drainage or venting measures shall be installed so as to appropriately protect remediated and/or developed areas
- Wherever there is a risk that following construction of the Urban Village groundwater or organic phase liquid may contaminate soils within the top one metre below FFL such that any of the relevant RBSLs and/or aesthetic criteria specified in Schedule 8 may be exceeded, the Developer shall ensure that all necessary steps are taken to mitigate these risks. Suitable measures may include, but not be limited to, the installation of land drains and/or the raising of the site ground levels such that groundwater will not be able to influence shallow soil quality.
- To provide a minimum thickness of suitable garden soils in residential areas, soils for landscaping in public and commercial areas and sub-base for hardsurfaced areas, the Developer shall build up the final elevation after completion of the RAP and redevelopment remediation works with a minimum of 0.5m of quality controlled imported fill materials suitable for the use to which they are to be put and of better quality than all RBSLs for the relevant end-use and meeting aesthetic type 0 for residential use and type 1 or better for commercial use as specified in Schedule 8 of the Section 106 Agreement. For the avoidance of doubt, the minimum remediation standards set out above therefore assume that the first half metre below FFL will comprise such imported material in all circumstances of residential and commercial end-use.

Based on the above requirements and the data collected during the site investigations, Atkins proposed that further investigation and/or remediation works were required in locations where:

- oily sheens and free product was noted;
- RBSL exceedances were recorded within existing soils;
- elevated aesthetic scores were recorded;
- pipework was identified; and
- PCB testing within the vicinity of a former electricity substation.

The Monitor considered the above approach to be acceptable in accordance with the requirements of the Section 106 Agreement.

2.3 Redevelopment Remediation Works

The redevelopment remediation works that have been completed for Phase 58 are described in Atkins' validation report (Information Source 3) and can be summarised as follows:

- Further investigation of the electricity substation, with three additional trial pits. PCB concentrations were found to be below the laboratory method detection limit;

- Removal of approximately 300m³ material around trial pits IP1928 and IP1995 where RBSL exceedances were identified;
- Removal of pipework that had been identified in 33 trial pits; and
- Further investigation of identified free product and visual/olfactory scores of 5, with recovery of free product and removal of oil saturated soils where necessary.

The Monitor attended site and was generally satisfied that the above works were being carried out appropriately and that the requirements of the Section 106 Agreement were likely to be achieved.

It should be noted that the remediation works that have been carried out were focused on addressing areas of concern that were identified during the site investigation, rather than a more general turnover of soils as has been seen on a number of previous phases elsewhere on site. Whereas these previous phases involved a wider stripping of soils, allowing a more comprehensive inspection of the ground conditions and increased confidence over the presence of contamination, the trial pit based approach adopted on Phase 58 means there is an inherent risk that contamination may have been missed. Nevertheless, the testing frequencies specified in the Section 106 Agreement are relatively conservative, and furthermore the ground investigation was undertaken in line with the residential testing frequencies, rather than the commercial frequencies, which improves confidence and reduces the likelihood that contamination may have been missed. Furthermore the Section 106 Agreement does not specify the exact manner in which the works should be undertaken, so the Developer has not contravened the requirements of the Section 106 Agreement. The Monitor is therefore satisfied that the works have been undertaken appropriately.

2.4 Validation

With reference to the remediation requirements discussed in Section 2.2 of this report, the following sections aim to demonstrate whether or not the requirements of the Section 106 Agreement have been achieved.

It should be noted that in the absence of a detailed layout for the proposed development and confirmed FFLs, it has been assumed that the ground levels following the completion of the redevelopment remediation works represents FFL minus 1m. A topographical record of the ground levels upon which this certificate is based are shown on drawing 5041216-ATK-DR-C-REM-2120 Rev P1 a copy of which is provided in **Appendix F**.

2.4.1 Aesthetic Criteria and the Removal of Oil Saturated Soils

The Section 106 Agreement requires that for a commercial phase all oil saturated soils and soil containing free product other than minor sheens shall be removed to a minimum depth of 2m below FFL or 0.5m below the likely lowest seasonal groundwater elevation following development of the intended Urban Village, whichever is the deeper. This depth is to be established by consideration of all available groundwater level monitoring data.

From the information presented in Atkins' validation report it is evident that groundwater levels across Phase 58 are variable. During URS' historical site investigations water strikes were recorded in 35 exploratory holes at depths ranging from 0.3m to 12.5m bgl. During Atkins' more recent site investigations water strikes were recorded in 240 of the 445 trial pits at depths ranging from 0.1m to 5.0m bgl.

From the trial pit logs presented in Atkins' validation report, it appears that the majority of trial pits were terminated on bedrock at relatively shallow depth, otherwise the trial pits generally extended to the maximum reach of the excavator at around 5.2m bgl. Where groundwater was encountered it was usually within the weathered zone of the underlying bedrock.

Given that the majority of trial pits advanced beyond 2m below FFL (i.e. 1m bgl given that the existing ground levels represent FFL minus 1m) and bedrock was encountered, above which groundwater was generally encountered within the weathered zone, it would appear that the requirement to achieve a minimum depth of 2m below FFL or 0.5m below the likely lowest seasonal groundwater elevation, has been met and the Monitor is satisfied that the trial pits were excavated to a sufficient depth.

During the site investigation, soils were logged in accordance with the aesthetic criteria listed in **Table 3** of this report. Soils achieving an aesthetic classification of 5 (visible hydrocarbon product and/or overwhelming odour) were deemed to comprise oil saturated soils and/or soil containing free product and were therefore unsuitable for retention.

Atkins reports that following the completion of the redevelopment remediation works the highest visual/olfactory classification reported was 4 and the soils were therefore suitable for retention based on the specified aesthetic criteria. The Monitor is satisfied that the information presented in Atkins' validation report appear to confirm that oil saturated soils and soil containing free product have been removed from Phase 58.

In summary, the Monitor is satisfied that oil saturated soils and soil containing free product appear to have been removed from Phase 58 to a satisfactory depth below ground level.

Atkins also reports an area of waste bitumen barrels that was encountered during the excavation of trial pit IP1663. In addition, solidified bitumen was encountered in the adjacent trial pit IP1664. Suspected asbestos was also reported to be mixed with the soils and coated with bitumen.

Atkins reports that a remediation excavation was undertaken to excavate the bitumen waste and associated materials. The base and sides of the resultant excavation were validated on a visual/olfactory basis to confirm the absence of bitumen impacted soils. The excavated materials were temporarily placed on a lined and fenced area adjacent to trial pit IP1663. These materials have now been removed from Phase 58 as discussed in Atkins' technical note (Information Source 5).

2.4.2 Soil Chemical Quality and Testing Frequencies

The Section 106 Agreement requires that all soils must meet the RBSLs at the specified depths and in particular the RBSL for TPH to at least 1m below FFL. It should be noted that in addition to the RBSLs specified in the Section 106 Agreement, Atkins has also developed Remediation Target Concentrations (RTCs). These RTCs are intended to be health protective and it has been agreed with NPTCBC that where the RTCs are more conservative than the RBSLs, then the RTCs shall take precedence. A summary of the RBSLs and RTCs is presented in **Appendix G**.

With regards to the requirement to achieve the RBSL for TPH to at least 1m below FFL, given that the ground profile upon which this certificate is based represents FFL minus 1m, this requirement is not considered to be relevant to this phase and therefore only the RBSL/RTCs for deep commercial soils have been considered.

The Section 106 Agreement also requires that the soils must be tested in accordance with the specified minimum validation testing frequencies set out in **Table 4** in this report. With reference to that table, the following testing frequencies are considered to be relevant to Phase 58:

- In situ soils are to be tested on a regular grid at a minimum frequency of 1 per 400m², irrespective of the depth below FFL; and
- The faces of remedial excavations are to be tested at a minimum frequency of 1 per 15m², with a minimum of 1 sample per face.

Atkins reports that soil samples were collected from a total of 445 trial pits that were excavated across Phase 58, the area of which is approximately 50,600m². This equates to a testing frequency of 1 per 114m² which complies with the minimum testing frequency specified in the Section 106 Agreement of 1 per 400m².

It should be noted that the testing frequency that has been achieved significantly exceeds the minimum testing frequency for a commercial phase. This is because the site investigation was carried out in general accordance with the residential testing frequencies in order to fully delineate the extent of contamination present.

As discussed in section 2.3 of this report, approximately 300m³ of soils were removed from around trial pits IP1928 and IP1995 where RBSL/RTC exceedances had been identified. Soil samples were collected from the remediation excavations in order to demonstrate the acceptability of the remaining soils.

Atkins reports that two validation sample was taken from the base of the excavation combining both IP1928 and IP1995 to comply with the 1 per 400m² frequency and that six validation samples were taken from the excavation faces of to comply with the 1 per 15m² frequency.

Atkins also reports that further excavations were carried out across Phase 58 to investigate the presence of free product and visual/olfactory scores of 5 that had been observed during the site investigation. Atkins reports that free product was collected and oil saturated soils were removed where encountered. The volume of soils removed is not reported. As discussed in Section 2.4.1 above, waste bitumen barrels and bitumen impacted soils were also removed from IP1663 and IP1664.

Laboratory analysis of the validation samples and the soil samples collected from the original trial pits indicated that the soils achieved the necessary RBSL/RTCs for deep soils in a commercial phase and were therefore suitable for retention.

It should be noted that the remediation excavations have been left open, so there was no requirements to validate imported soils.

In summary, the Monitor is satisfied that the soils within Phase 58 meet the necessary chemical quality requirements as specified in the Section 106 Agreement. It should however be noted that if the development layout and proposed FFLs differ significantly from the assumed FFLs, or if the intended use should change, then further remediation works may be required.

2.4.3 Groundwater Quality

In addition to the RBSLs for soils, the Section 106 Agreement also specifies RBSLs for groundwater as detailed in **Table 2** in this report.

Atkins reports that groundwater samples were collected from two serviceable boreholes, MSMW031 and TFTP156 in January 2015. Laboratory analysis of the groundwater samples indicated the recorded concentrations to be below the RBSL/RTCs for both residential and commercial end use and no further action was considered necessary.

The Monitor is satisfied that the groundwater samples collected from Phase 58 indicate the groundwater to be generally acceptable in accordance with the requirements of the Section 106 Agreement.

2.4.4 Measures to Prevent Contamination Migration

The Section 106 Agreement states that where there is a risk of the migration in ground of hazardous gas or contaminated liquid into remediated areas, the Developer shall take all appropriate measures to prevent this occurring.

As discussed in Section 2.1.1 of this report, groundwater flow within Phase 58 is likely to be towards the north-northwest. Given the absence of free product and oil saturated soils within Phase 58, the recontamination of down gradient areas is considered unlikely. Therefore measures to prevent the migration of contamination are not considered necessary for Phase 58.

In summary the Monitor is satisfied that there is minimal risk of migration in ground of hazardous gas or contaminated liquid into or out of Phase 58 and therefore no measures are considered necessary to prevent the recontamination of soils.

2.4.5 Asbestos

The Section 106 Agreement requires that all soils must meet in bulk, considering both dispersed fibres and pieces of ACM, the RBSL for ACM to at least 1m below FFL and that any visible ACM encountered during construction in the first 1m below FFL must be removed.

Given that the ground profile upon which this certificate is based represents FFL minus 1m, it is not necessary for the soils to meet the specified requirements in relation to asbestos. Nevertheless, Atkins has assessed the soils, as follows.

Atkins reports that visible ACM was recorded in trial pit IP1663. This was associated with the bitumen barrels discussed above and the materials were subsequently removed. No other visible ACM was recorded during the site investigations or remediation works.

Atkins reports that a total of 465 soil samples received a routine asbestos screening and 71 samples returned positive results indicating the presence of suspected asbestos. Atkins reports that quantitative analysis was undertaken on 44 of these samples and concentrations of asbestos exceeded the RBSL/RTC for shallow commercial soils of 0.03% in five samples.

Despite this, given that there is no RBSL/RTC for asbestos at depths greater than 1m below FFL for commercial end use, the soils were considered suitable for retention.

In summary, the Monitor is satisfied that the soils within Phase 58 appear to meet the necessary requirements for asbestos in accordance with the Section 106 Agreement.

It should be noted however that whilst this certificate considers the requirements of the Section 106 Agreement in terms of the human health risks once the site has been developed, it does not consider the potential health and safety risks during construction. These risks will need to be given full consideration by any Contractor undertaking works in this area.

2.4.6 Seepages

The Section 106 Agreement states that where necessary, seeps, sheens and iron rich discharges from the bedrock must be controlled such that there is no visible discharge at surface and little or no odour.

Atkins reports that no seeps, sheens or iron staining that were considered to require control to prevent discharge at the surface were identified during the works. Furthermore, given the depth of groundwater in relation to the FFL, it is considered unlikely that any such seepages would discharge at surface.

The Monitor is therefore satisfied that no further control measures are required in relation to the management of seeps, sheens and iron rich discharges in accordance with the requirements of the Section 106 Agreement.

2.4.7 Removal of Buried Services

The Section 106 Agreement states that irrespective of the intended use, all existing buried services shall be removed.

Atkins reports that pipework was encountered in 33 locations during the site investigation and all pipework was removed. Atkins does not report the discovery of any other buried services within Phase 58.

The Monitor is satisfied that the buried services that were encountered during the site investigation appear to have been removed from Phase 58. However, given the nature of the site investigation it is considered possible that other buried services could have been missed and may still be present within Phase 58.

2.4.8 *Recontamination of Soils*

The Section 106 Agreement states that wherever there is a risk that following construction of the Urban Village groundwater or organic phase liquid may contaminate soils within the top 1m below FFL such that any of the relevant RBSLs and/or aesthetic criteria may be exceeded, then all necessary steps should be taken to mitigate these risks. This may involve the installation of land drains and/or the raising of the site ground levels.

Observations during the works indicate groundwater levels to be significantly below the FFL and therefore the risk of recontamination of the top 1m of soils is considered unlikely. As such, the Monitor is satisfied that the installation of land drains and/or the raising of the site ground levels is not necessary in relation to this phase.

2.4.9 *Fill to Achieve FFL*

The Section 106 Agreement requires that the build-up of the final elevation after completion of the redevelopment remediation works must comprise a minimum of 0.5m of quality controlled imported fill materials suitable for the use to which they are to be put and of better quality than all RBSLs for the relevant end-use and meeting aesthetic type 1 or better for commercial use.

Atkins' validation report (Information Source 3) states that the post-remediation ground levels upon which this certificate are based generally represent FFL minus 1m and therefore the top 1m of soils, including the top 0.5m of quality controlled imported fill materials, are yet to be placed. As such this requirement is yet to be met for this phase.

A topographical record of the ground levels upon which this certificate are based is shown on drawing 5041216-ATK-DR-C-REM-2120 Rev P1 a copy of which is provided in **Appendix F**.

It should be noted that if there is any significant change in the development proposals or the proposed FFLs then reconsideration of the information contained within this certificate may be necessary. Furthermore, any subsequent import of material and/or removal of material from the phase following certification will need to be controlled by the Local Planning Authority as the Monitor will have no formal on-going role to control subsequent works once this RRWCC has been issued.

3. *CERTIFICATION*

3.1 *Redevelopment Remediation Works*

The following section aims to confirm whether or not in the Monitor's professional opinion the redevelopment remediation works have been satisfactorily completed in accordance with the purpose, objectives and requirements of Schedule 8 of the Section 106 Agreement, having regard to the intended use. **Table 7** provides a list of the minimum remedial action required for a commercial phase where groundwater is in rock, as described in Section 2.2 of this report, and summarises whether or not each requirement has been achieved.

Table 7 Certificate Summary

Requirement	Status	Comments
The RBSLs and the aesthetic criteria, remediation quality and scope (including the depth below FFL to which quality standards are achieved) shall be achieved for each part of the property at the minimum validation frequencies set out in Clause 8 of Part 3 of the Section 106 Agreement (as applicable depending upon whether such part of the property is intended for use as residential, commercial or recreational land) as a minimum base level standard.	Complete	Refer to Section 2.4 of this report.
All oil saturated soils and soil containing free product other than minor sheens shall be removed from ground level down to the surface of bedrock.	Complete	Refer to Section 2.4.1 of this report.
All soils must meet the RBSL for TPH to at least 1m below FFL.	Not applicable	The top 1m of soils is yet to be placed. Refer to Section 2.4.2 of this report.
Where there is a risk of the migration in ground of hazardous gas or contaminated liquid into remediated areas, the Developer shall take all appropriate measures to prevent this occurring. Such measures could include the installation of interception trenches and management of discharge from those. The Developer shall monitor whatever measures are put in place after their installation to continue to demonstrate their effectiveness.	Complete	Refer to Section 2.4.4 of this report.
All soils must meet in bulk, considering both dispersed fibres and pieces of ACM, the RBSL for ACM to at least 1m below FFL and any visible ACM encountered during construction in the first 1m below FFL is to be removed.	Not applicable	The top 1m of soils is yet to be placed. Refer to Section 2.4.5 of this report.
Where necessary, seeps, sheens and iron rich discharges from the bedrock must be controlled such that there is no visible discharge at surface and little or no odour. Acceptable methodologies for remediation may include, but are not limited to the use of land drainage via interceptors.	Complete	Refer to Section 2.4.6 of this report.

Requirement	Status	Comments
Irrespective of the intended use of each phase or part thereof, all existing buried services at the property shall be removed and the routes of those services shall be backfilled with material no more permeable than the general material in the vicinity. Where backfill to new underground services may become a pathway for residential pre-transfer date contamination, appropriate control measures such as land drainage or venting measures shall be installed so as to appropriately protect remediated and/or developed areas.	Complete	Refer to Section 2.4.7 of this report.
Wherever there is a risk that following construction of the Urban Village groundwater or organic phase liquid may contaminate soils within the top one metre below FFL such that any of the relevant RBSLs and/or aesthetic criteria specified in Schedule 8 may be exceeded, the Developer shall ensure that all necessary steps are taken to mitigate these risks. Suitable measures may include, but not be limited to, the installation of land drains and/or the raising of the site ground levels such that groundwater will not be able to influence shallow soil quality.	Complete	Refer to Section 2.4.8 of this report.
To provide a minimum thickness of suitable garden soils in residential areas, soils for landscaping in public and commercial areas and sub-base for hardsurfaced areas, the Developer shall build up the final elevation after completion of the RAP and redevelopment remediation works with a minimum of 0.5m of quality controlled imported fill materials suitable for the use to which they are to be put and of better quality than all RBSLs for the relevant end-use and meeting aesthetic type 0 for residential use and type 1 or better for commercial use as specified in Schedule 8 of the Section 106 Agreement. For the avoidance of doubt, the minimum remediation standards set out above therefore assume that the first half metre below FFL will comprise such imported material in all circumstances of residential and commercial end-use.	Not applicable	The top 1m of soils is yet to be placed. Refer to Section 2.4.9 of this report.

3.2 Preventative Measures

In addition to preparing the RAPWCS and RRWCC, the Monitor is also obliged, if requested by CDL, to review any certificate or other documentation produced to CDL by or on behalf of the Developer purporting to confirm that Preventative Measures have been completed or are not required in relation to any phase or part thereof providing CDL in writing of its professional opinion as to:

- whether the author is suitably qualified to issue the certificate; and
- whether the certificate contains or reflects any manifest error, omission or bias, etc. and certifies that the land is fit for its purpose.

The Monitor has not received any such documentation or requests in relation to Phase 58.

3.2.1 Ground Gas

The Section 106 Agreement states that a proprietary and appropriate ground gas resistant membrane and appropriate venting system shall be installed in all structures that will be entered by people and any structure where there is a potential for gas accumulation if ground gas is present.

Atkins is yet to undertake a detailed ground gas assessment for Phase 58 but this will be necessary in order to specify appropriate gas and vapour protection measures. Such measures will need to be agreed with the relevant regulatory authorities prior to installation.

4. CONCLUSIONS

4.1 RRWCC

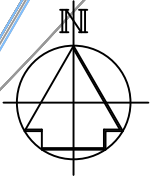
This RRWCC confirms that in the Monitor's professional opinion, and on the basis of the information provided within the information sources as well as observations made by the Monitor on site during the remediation works, the Monitor is satisfied that the Phase 58 redevelopment remediation works appear to have been completed in general accordance with the purpose, objectives and requirements of Schedule 8 of the Section 106 Agreement, having regard to the specified intended uses, and that the purpose, objectives and requirements of Schedule 8 of the Section 106 Agreement are likely to continue to be met for the foreseeable future without the need for further remedial action in relation to or affecting the area within the phase boundary.

It should be noted that Phase 58 is hereby certified as a commercial phase, which differs from the residential end-use shown on the current masterplan. If Phase 58 is developed as a residential phase then further redevelopment remediation works will be required. The scope of such works will need to be agreed with the Local Authority as the Monitor will have no formal on-going role to control subsequent works once this RRWCC has been issued.

4.2 PWCD

The PWCD will be declared once CDL is satisfied that the remediation necessary for the specified intended uses for the phase has been completed. This report, which is the RRWCC, will be complemented by a RAPWCS in order to provide the information required by CDL to enable the PWCD to be declared.

APPENDIX A DECLARATION OF PHASE BOUNDARY, INTENDED USE AND PROPOSED DEVELOPMENT LAYOUT



KEY



MONITOR BOUNDARY PHASE 58



SPECIAL PROCESS AREAS:

1. THE BARN WORKSHOP
2. SUBSTATION
3. BENZENE TANKFARM - DISSOLVED BENZENE
4. TPH TANKFARM PUMP RAFT
5. CRUDE PUMP HOUSE
6. PUMP RAFT

SITE LOCATION
SCALE 1:25,000

REVISIONS

Drawn By
Checked By
Date

PURPOSE OF ISSUE

Rev.
Authorised for issue
Date

Atkins Limited

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Telford TF3 3AZ

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Tel 0121 483 5000
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THIS DRAWING IS NOT TO BE SCALED

CLIENT

ST.MODWEN

PROJECT

COED DARCY

DRAWING TITLE

MONITOR BOUNDARY PHASE 58

SCALES

1:2500

DRAWN MJ

CHECKED MM

CO-ORD CHECK ML

DATE 11/05/15

DATE 11/05/15

DATE 11/05/15

DRAWING NO

5041216-REM-DWG-1892

REV

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ST. MODWEN DEVELOPMENTS LIMITED - a ST. MODWEN company

Registration England 892832

Park Point, 17 High Street, Longbridge, Birmingham, B31 2UQ

T: 0121 222 9400 **W:** www.stmodwen.co.uk

21st May 2015

Our ref:

Coed Darcy Limited
Dumfries House
Dumfries Place
Cardiff
CF10 3ZF

Dear Sirs

Coed Darcy
Monitor Phase 58
Request for Phase Works Completion Date

We hereby give our written request seeking the declaration of the Phase Works Completion Date for Monitor Phase 58 of Coed Darcy as required under Clause 4.6 of the Remediation Agreement made between Coed Darcy Limited, St. Modwen Developments Limited and St. Modwen Properties PLC dated 23rd May 2008.

The Phase 58 boundary is shown on the attached Drawing No. 5041216-REM-DWG-1892.

The “Intended Use” for Phase 58 is assumed as that of proposed commercial end use.

As required by the Remediation Agreement, we have copied this letter to the Monitor.

Yours faithfully

Neil Williams

For and on behalf of St. Modwen Developments Limited

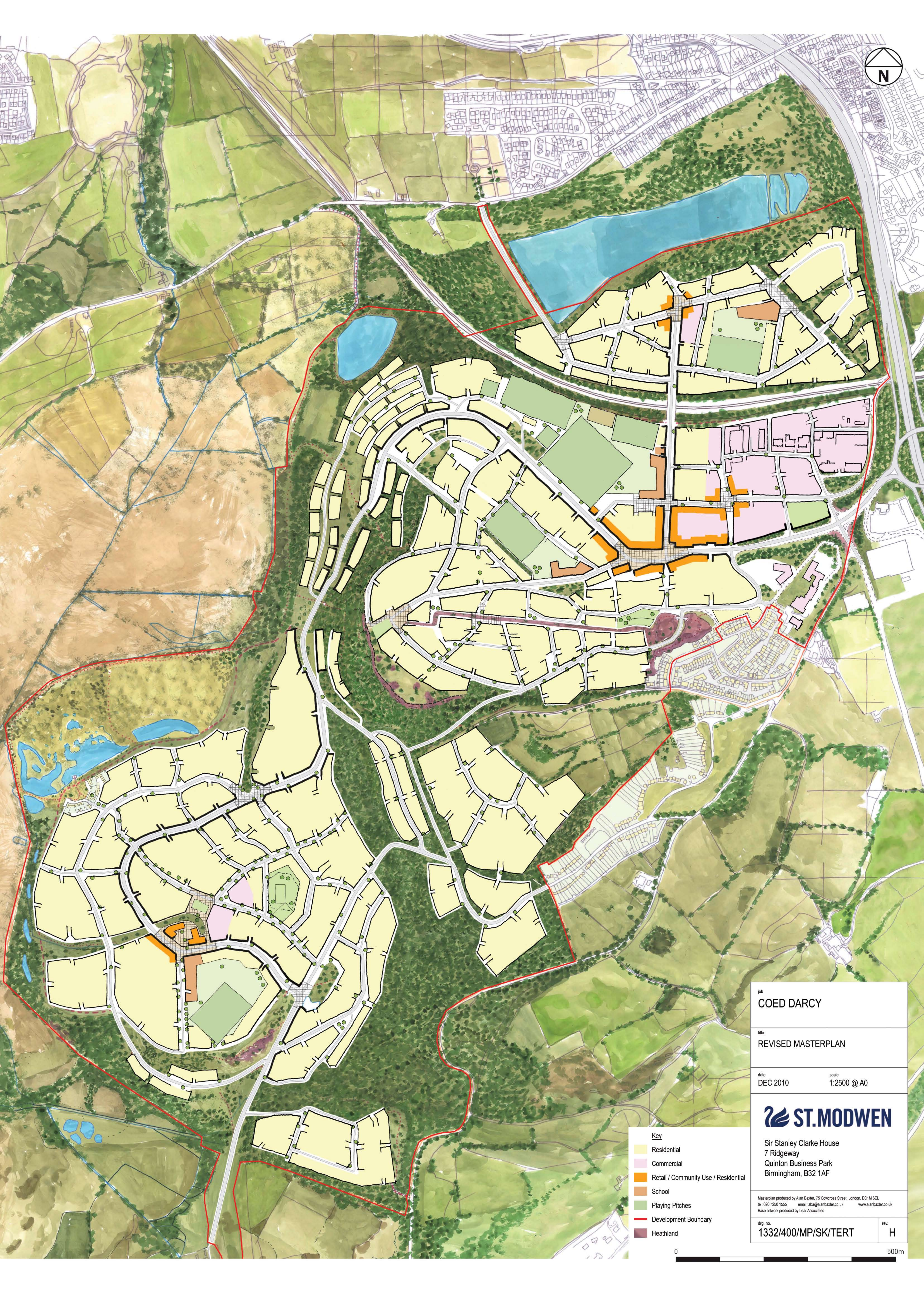
Cc Rhys Mander, Llancoed House, Coed Darcy, Neath, SA11 8AZ

St. Modwen Properties PLC

Head Office & Registered Office: Sir Stanley Clarke House, 7 Ridgeway, Quinton Business Park, Birmingham, B32 1AF

T: [0121] 222 9400 **W:** www.stmodwen.co.uk

Registration: England 349201



- Key**
- Residential
 - Commercial
 - Retail / Community Use / Residential
 - School
 - Playing Pitches
 - Development Boundary
 - Heathland

job COED DARCY	
title REVISED MASTERPLAN	
date DEC 2010	scale 1:2500 @ A0
 ST.MODWEN	
Sir Stanley Clarke House 7 Ridgeway Quinton Business Park Birmingham, B32 1AF	
Masterplan produced by Alan Baxter, 75 Cowcross Street, London, EC1M 6EL tel: 020 7250 1555 email: aba@alanbaxter.co.uk www.alanbaxter.co.uk Base artwork produced by Lear Associates	
drp. no. 1332/400/MP/SK/TERT	rev. H

0 500m

APPENDIX B SCHEDULE 8 OF THE SECTION 106 AGREEMENT

SCHEDULE 8

Redevelopment Remediation Works

Purpose, objectives and requirements of the Redevelopment Remediation Works

Part 1

1. Purpose and objectives of the Redevelopment Remediation Works

- 1.1 The purpose and objectives of the Redevelopment Remediation Works are the carrying out of all such Remedial Action over and above that actually carried out as part of the RAP Works that is necessary in order to make each part of the Property suitable within the meaning of paragraph 1.2 below for its Intended Use or such other use as may be determined from time to time.
- 1.2 A part of the Property will only be suitable for its Intended Use or such other use as may be determined from time to time if and when the Phase Works Completion Date is declared in respect of that part of the Property.

Part 2

2. Developer's obligations regarding Redevelopment Remediation Works

- 2.1 The Developer shall carry out or procure the carrying out of all Remedial Action necessary in order to achieve the purpose and objectives set out in Part 1 of this Schedule.
- 2.2 The design and specification of the Redevelopment Remediation Works shall take appropriate account of the principles and objectives (as set out in sub-paragraph 1.3 (including 1.3.1-1.3.5 thereof) of Schedule 7 hereto) and the design assumptions of the RAP Works and shall not prejudice the achievement and future sustainability of these principles and objectives of the RAP Works or the RAP Works themselves.
- 2.3 The Redevelopment Remediation Works may reduce the reliance on the RAP Works to achieve the principles and objectives of the RAP Works set out in sub-paragraph 1.3 (including 1.3.1-1.3.5 thereof) of Schedule 7 hereto but must not increase that reliance.
- 2.4 The RBSLs set out in Tables 1 and 2 below and the aesthetic criteria, remediation quality and scope (including the depth below Final Finished Level to which quality standards are achieved) as also set out in Part 3 below, as the same may be varied in accordance with this Schedule 8, shall be achieved for each part of the Property at the minimum validation frequencies set out in clause 8 of Part 3 (as applicable depending upon whether such part of the Property is intended for use as residential, commercial or recreational land) as a minimum base level standard.
- 2.5 Without prejudice to the requirement to achieve the RBSLs set out in Tables 1 and 2 as a minimum base level standard, the Developer shall ensure that all necessary remediation targets are developed and used to determine the extent and quality of remediation appropriate to the development design and purpose of the Urban Village and the Pre-Transfer Date Contamination.
- 2.6 The Developer shall promptly notify CDL and the Monitor if at any time it or any person acting on its behalf identifies a substance present at, in, on or under the

Property, or has reasonable cause to suspect such presence, for which no RBSL is specified in Tables 1 or 2 of Part 3 below in which case the following procedure shall apply:

- 2.6.1 As soon as reasonably practicable after serving a notice under paragraph 2.6 above, the Developer shall prepare proposals for soil and groundwater RBSLs for the substance identified that are consistent with the purpose and objectives of the Redevelopment Remediation Works as set out in Part 1 of this Schedule and the standards of prevailing Environmental Law and shall provide a copy of such proposals to CDL the Monitor and the Authority. Any such proposal shall contain a detailed statement of the health risk assessment and general methodology from which the proposed RBSLs have been derived.
 - 2.6.2 Not earlier than 10 Working Days after submitting its proposals to CDL the Monitor and the Authority in accordance with sub-paragraph 2.6.1 above, the Developer shall submit a written request to the appropriate Environmental Authorities, copied at the same time to CDL the Monitor and the Authority, for approval of the use of the proposed RBSLs. The Developer shall provide to the appropriate Environmental Authorities with its request copies of the health risk assessment and general methodology referred to in sub-paragraph 2.6.1 above and a copy of this Agreement clearly drawing attention to the purpose, objectives and requirements of the Redevelopment Remediation Works set out therein and the proposed changes thereto.
 - 2.6.3 Each of the Developer, CDL and the Monitor shall be free at any time to make such submissions to the appropriate Environmental Authorities in relation to the Developer's proposals as they see fit, provided such submissions are made in writing and copied to each other and the Authority at the same time.
 - 2.6.4 The Developer shall ensure that the Redevelopment Remediation Works achieve compliance with any RBSLs approved in writing by the appropriate Environmental Authorities pursuant to this paragraph 2.6, as if they were also set out in Tables 1 and 2 of Part 3 of this Schedule.
- 2.7 The Developer may at any time propose variations to the requirements of clauses 3 to 8 inclusive of this Schedule 8 below to the appropriate Environmental Authorities and to the Authority pursuant and to the extent required to comply with the Planning Permission to take account of changes of circumstances since the date of this Agreement, provided no variation shall be proposed that is in any way prejudicial to the achievement of the purpose and objectives of the Redevelopment Remediation Works as set out in Part 1 above and, in particular, the achievement of the RBSLs set out in Tables 1 and 2 above (as previously amended in accordance with paragraph 2.6 above if applicable) and provided further that
- 2.7.1 Any such proposals shall be submitted in writing to CDL the Monitor and the Authority at least 10 Working Days before they are submitted to any Environmental Authority;
 - 2.7.2 Any such proposal submitted to any Environmental Authority shall be copied to CDL the Monitor and the Authority at the same time;
 - 2.7.3 The Developer shall enclose a copy of this Agreement with any such proposal made to any Environmental Authority clearly drawing attention to the

purpose, objectives and requirements of the Redevelopment Remediation Works set out therein and the proposed changes thereto;

- 2.7.4 Each of the Developer, CDL and the Monitor shall be free to make such submissions to the appropriate Environmental Authorities in relation to the Developer's proposals as they see fit, provided such submissions are made in writing and copied to each other and the Authority at the same time.
 - 2.7.5 Subject to paragraph 2.7.6 no such proposed variation shall be implemented unless, it has been approved in writing by the appropriate Environmental Authorities in accordance with the requirements of this clause 2.7.
 - 2.7.6 If the Developer has only oral approval (or non objection) to a proposed variation from the relevant Environmental Authorities, no such proposed variation shall be implemented unless the Developer notifies the relevant Environmental Authorities in writing (copied at the same time to CDL the Monitor and the Authority) that it proposes to proceed with the implementation of the proposed variation to the Redevelopment Remediation Works 10 Business Days after the date of such notice and no written objections of any relevant Environmental Authority are received within such 10 Business Day period in respect of the same.
 - 2.7.7 Any reference in this Agreement to the Redevelopment Remediation Works shall be to the Redevelopment Remediation Works as varied in accordance with this paragraph 2.
- 2.8 The Developer shall, and shall procure that any person acting on its behalf in relation to any aspect of the Redevelopment Remediation Works required by this Schedule 8 shall, at all times comply with the requirements of Schedule 10 (General Remediation Requirements).

Part 3

Table 1 – Summary of Soil RBSLs

Contaminant	Land-Use Specific Soil RBSL Surface to 1m below FFL (mg/kg) ¹			Land-Use Specific RBSL Soil below 1m depth (mg/kg)		
	Residential	Commercial	Recreational	Residential	Commercial	Recreational
METALS & METALLOIDS						
Arsenic	64	500	64	-	-	-
Cadmium	2.6	1400	2.6	-	-	-
Chromium	130	5000	200	-	-	-
Mercury	1	480	1	-	-	-
Nickel	50	5000	75	-	-	-
Selenium	3	8000	3	-	-	-
Lead	337	750	337	-	-	-
Vanadium	416	16000	640	-	-	-
Copper	478	-	478	-	-	-
Zinc	200	-	200	-	-	-
ORGANIC SPECIES						
Benzene	0.12	5	13	0.4	5	48
Benzo(a)pyrene ²	0.9	29	0.9	none	none	none
Toluene	36	1160	8110	52	389	none
Ethylbenzene	41	122000	4740	140	none	none
Xylenes	32	121000	7940	58	none	none
1,2-Dichloroethane	0.04	2	4.5	0.1	0.65	6
Dichloromethane	5	1650	241	84	665	6220
Tetrachloroethene	11	1050	641	34	368	1780
Trichloroethene	1	84	193	2	28	269
Vinyl Chloride	0.01	4	0.7	0.04	1.6	16
1,2 Dichloroethene	4	273	632	7	91	881
1,1,1-Trichloroethane	154	577000	27900	160	3250	none
TPH Aromatic EC>C7-C8	125	1840	21337	146	617	none
TPH Aromatic EC>C8-C10	94	913	4025	257	547	none
TPH Aromatic EC>C10-C12	118	26515	4589	1394	none	none
TPH Aromatic EC>C12-C16	131	64875	4799	none	none	none
TPH Aromatic EC>C16-C21	82	51449	3639	none	none	none
TPH Aromatic EC>C21-C35	1130	51449	3639	none	none	none

TPH Aliphatic EC>C6-C8	8335	8517587	606191	none	none	none
TPH Aliphatic EC>C8-C10	112	158890	12075	158	none	none
TPH Aliphatic EC>C10-C12	3204	163360	12094	none	none	none
TPH Aliphatic EC>C12-C16	4513	169032	12117	none	none	none
TPH Aliphatic EC>C16-C21	94174	3429944	242573	none	none	none
TPH Aliphatic EC>C21-C35	94820	3429944	242573	none	none	none
Total TPH (Phase 1) ³	1717	81413	9061	9182	81956	none
Total TPH (Process Area) ³	2601	44344	10830	4098	35014	none
Total TPH (North Tank Farm) ³	1104	25875	9419	3802	13974	none
Total TPH (South Tank Farm) ²	1015	37230	6349	2792	34797	none
ASBESTOS						
Sum of all Types of ACM	200	300	200	200 ⁴	-	-

“-“ value not applicable to scenario

“none” RSBL value exceeds soil saturation limits and free phase assessment appropriate

¹ Lower value of human health RBSL or Soil Code value if higher than background LCL value (applicable to metals & metalloids only)

² Benzo(a)pyrene RBSL to be compared against sum of 16 US EPA Priority List PAHs using Toxicity Equivalence approach

³ ‘Total’ TPH RBSL derived for an area of development, based on individual RBSLs provided and available mass fraction TPH data in soil at time of derivation, using the inverse weighted average approach.

⁴ See text below for specification of relevant depth ranges

Table 2 – Summary of RBSLs for Groundwater

Contaminant	Land-Use Specific RBSL (mg/l)		
	Residential	Commercial	Recreational
TPH Aliphatic EC>C6-C8	none	none	none
TPH Aliphatic EC>C8-C10	none	none	none
TPH Aliphatic EC>C10-C12	none	none	none
TPH Aliphatic EC>C12-C16	none	none	none
TPH Aliphatic EC>C16-C21	none	none	none
TPH Aliphatic EC>C21-C35	none	none	none
TPH Aromatic EC>C7-C8	20	97	none
TPH Aromatic EC>C8-C10	22	none	none
TPH Aromatic EC>C10-C12	none	none	none
TPH Aromatic EC>C12-C16	none	none	none
TPH Aromatic EC>C16-C21	none	none	none
TPH Aromatic EC>C21-C35	none	none	none
Benzene	0.7	6	198
Benzo(a)pyrene	none	none	none
Toluene	47	229	none
Ethylbenzene	102	506	none
Xylenes	43	607	none
1,2-Dichloroethane	0.2	0.82	45
Dichloromethane	150	624	none
Tetrachloroethene	22	115	none
Trichloroethene	2.6	13	813
Vinyl Chloride	0.06	0.3	18
1,2-Dichloroethene	15	68	none
1,1,1-Trichloroethane	193	989	none

“none”= theoretical RBSL greater than solubility limit

3. Scale of aesthetic criteria

Table 3 – Scale of aesthetic criteria

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

3.1 Visible suspect ACM refers to asbestos containing material visible to the naked eye which a reasonable and prudent person used to managing asbestos may suspect to be asbestos containing.

3.2 All references in Table 1 above to depths to which minimum RBSLs are to be achieved are expressed below, relative to FFL following completion of construction of the intended Urban Village.

4. Residential End-Use where Groundwater is Primarily in Rock

4.1 This remediation scenario is intended to refer to residential end-use in areas where there is limited soil material over bedrock, little perched groundwater is present in that soil, and the water table is normally first encountered in bedrock. Areas of the Property with these characteristics include the more elevated parts of the former process area and of the southern tank farm. The minimum Remedial Action required in this scenario is as follows:

4.2 All oil saturated soil should be removed.

4.3 All soils must be remediated so as to meet the RBSLs for TPH, BTEX and PAHs at the relevant depth relative to FFL and the aesthetic criteria Class 2 or better at greater than 1m below FFL.

4.4 The aesthetic quality of soils shall be Class 1 or better for at least the first metre below FFL.

4.5 Soils where there is visible ash and clinker, or metal concentrations above RBSLs, are to be removed so that none is retained within the first metre below FFL in garden areas.

4.6 Where it is not practicable to address groundwater contamination within bedrock this must be controlled, e.g. where seeps, sheens and iron staining discharge from the bedrock. Acceptable methodologies for remediation may include, but are not limited to, the use of land drainage via interceptors. Control measures should result in no visible discharge at surface and little or no odour observable.

4.7 All soil potentially containing dispersed asbestos fibres or visible ACM must be removed or remediated to meet in bulk, considering both dispersed fibres and pieces

of ACM, the appropriate ACM RBSL, or to meet the requirements of relevant Environmental Authorities, whichever is the more conservative.

5. Residential End-Use where Groundwater is in soil

- 5.1 This remediation scenario is intended to refer to residential end-use in areas where there is sufficient soil material over bedrock to commonly contain perched groundwater such that the water table is normally first encountered in soil. Areas of the Property with these characteristics include the lower parts of the former process area and of the southern tank farm and the north site tank farm. The minimum Remedial Action required in this scenario is as follows.
- 5.2 All oil saturated soils and free product shall be removed.
- 5.3 Soils must be remediated so as to meet the RBSLs for TPH, BTEX and PAHs to a minimum depth of 0.5m below the likely seasonal minimum groundwater depth following development of the intended Urban Village. This depth is to be established by consideration of all available groundwater level monitoring data relevant for each area. All soil must meet aesthetic criteria Class 2 or better to the same depth.
- 5.4 All soil must meet aesthetic criteria Class 1 or better to at least 1m below FFL.
- 5.5 Soils where there is visible ash and clinker or metal concentrations above RBSLs to be replaced to at least 1m below FFL.
- 5.6 All soil potentially containing dispersed asbestos fibres or visible ACM must be removed or remediated to meet in bulk, considering both dispersed fibres and pieces of ACM, the appropriate ACM RBSL, or the requirements of relevant Environmental Authorities, whichever is the more conservative, to a minimum depth of 2m below FFL.
- 5.7 Where there is a risk of the migration in ground of hazardous gas or vapour or contaminated liquid into remediated areas, the Developer shall take all necessary measures appropriate to prevent this occurring, including monitoring whatever measures are put in place after their installation to continue to demonstrate their effectiveness. Such measures could include the installation of interception trenches and management of discharge from these.
- 5.8 Where necessary, seeps, sheens and iron rich discharges from the bedrock must be permanently controlled such that there is no visible discharge at surface and little or no odour detectable. Acceptable methodologies for remediation may include, but are not limited to the use of land drainage via interceptors.

6. Commercial End-Use where Groundwater is in soil

- 6.1 This remediation scenario is intended to refer to commercial end-use in areas where there is sufficient soil material over bedrock to commonly contain perched groundwater such that the water table is normally first encountered in soil. The area identified for commercial development in the Masterplan is the lower part of the former process area, which in general terms has these characteristics. Based on the Masterplan, no commercial developments are currently envisaged where groundwater is primarily encountered only in rock; in the event such development is proposed, Remedial Action consistent with the standards specified below would be required, adapted as necessary to local conditions.

- 6.2 All oil saturated soils and soil containing free product other than minor sheens shall be removed to a minimum depth of 2 m FFL or 0.5 m below the likely lowest seasonal groundwater elevation following development of the intended Urban Village, whichever is the deeper. This depth is to be established by consideration of all available groundwater level monitoring data.
- 6.3 All soils must meet the RBSL for TPH to at least 1m below FFL.
- 6.4 All soils must meet in bulk, considering both dispersed fibres and pieces of ACM”, the RBSL for ACM to at least 1m below FFL and any visible ACM encountered during construction in the first 1m below FFL is to be removed.
- 6.5 Where there is a risk of the migration in ground of hazardous gas or contaminated liquid into remediated areas, the Developer shall take all appropriate measures to prevent this occurring. Such measures could include the installation of interception trenches and management of discharge from those. The Developer shall monitor whatever measures are put in place after their installation to continue to demonstrate their effectiveness.
- 6.6 Where necessary, seeps, sheens and iron rich discharges from the bedrock must be controlled such that there is no visible discharge at surface and little or no odour. Acceptable methodologies for remediation may include, but are not limited to the use of land drainage via interceptors.

7. Public Open Space

- 7.1 The Developer shall remediate areas of the 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:
- 7.1.1 Well managed parks and public gardens;
- 7.1.2 More lightly managed areas where public access is encouraged;
- 7.1.3 Areas to which access is discouraged but occasional access and/or trespassing is possible.
- 7.2 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 agreed 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.

8. Validation

- 8.1 As a minimum validation of RBSL's will be required to include:
- 8.1.1 Determining the necessary extent of remedial excavations: this will be the responsibility of the Developer;

- 8.1.2 Quality assurance of imported materials, including testing of imported materials for contamination if it is intended to use reclaimed aggregates, top soil, etc: this will be the responsibility of the Developer, however, CDL may elect to validate such materials in-situ, once they are finally placed for construction;
- 8.1.3 Quality assurance of soils treated on the site for re-use: this will be the responsibility of the Developer, however, CDL will validate such materials in-situ, once they are finally placed for construction, and;
- 8.1.4 Quality assurance of soils for which no remedial works are identified: this will be the responsibility of the Developer, however, CDL will validate such materials.

8.2 As a minimum, sampling at the following frequencies should be undertaken.

Table 4 - Minimum Validation Testing Frequencies.

Testing for the Validation Suite at the following frequency:	Shallow Soils (Residential <1m FFL)	Deeper Soils (Residential >1m below FFL)	Soils (Commercial all relevant depths)
Imported quarried material	1 per 500m ³ ex situ, composite of 5 regular sub-samples	1 per 1000m ³ ex situ, composite of 5 regular sub-samples	1 per 1000m ³ ex situ, composite of 5 regular sub-samples
Imported soil from verified greenfield site	1 per 250m ³ ex situ, composite of 5 regular sub-samples	1 per 500m ³ ex situ, composite of 5 regular sub-samples	1 per 500m ³ ex situ, composite of 5 regular sub-samples
Imported soil from characterised brownfield site ¹	1 per 25m ³ ex situ, composite of 5 sub-samples	1 per 50m ³ ex situ, composite of 5 sub-samples	1 per 100m ³ ex situ, composite of 5 sub-samples
0.5-1m below FFL in-situ	Regular grid of 1 per 50m ² , sample over 0.5m depth	n/a	Regular grid of 1 per 400m ² , sample over 0.5m depth
>1m below FFL in-situ	n/a	Regular grid of 1 per 100m ² , sample over 1m depth	Regular grid of 1 per 400m ² , sample over 0.5m depth
Stockpiled excavated site materials for re-use	1 per 50m ³ ex situ, composite of 5 sub-samples	1 per 100m ³ ex situ, composite of 5 sub-samples	1 per 400m ³ ex situ, composite of 5 sub-samples
Face of remedial excavations <1m deep	1 per 10m, minimum of 1 per face, worst case VO sample	n/a	1 per 15m, minimum of 1 per face, worst case VO sample
Face of remedial excavations >1m deep	n/a	1 per 10m ² , minimum of 1 per face, worst case VO sample	1 per 15m ² , minimum of 1 per face, worst case VO sample
Along redundant service excavations	1 per 20m of trench, worst case VO sample	1 per 20m of trench, worst case VO sample	1 per 20m of trench, worst case VO sample
Soil treated ex-situ and homogenised	1 per 200m ³ , composite of 5 regular sub-samples	1 per 200m ³ , composite of 5 regular sub-samples	1 per 500m ³ , composite of 5 regular sub-samples

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

VO = visual / olfactory (ie aesthetic) observation

- 8.3 The quality of all material placed as fill and/or remaining in-situ post-construction of the Urban Village must as a minimum meet the relevant RBSLs and aesthetic standards at the frequencies set out above (in either case as the same may be amended in accordance with this Schedule).
- 8.4 In all circumstances, CDL and/or the Monitor may at its discretion take additional samples if it has reason to suspect that material may not meet the relevant RBSLs and

aesthetic standards (in either case as the same may be amended in accordance with this Schedule).

- 8.5 All validation samples obtained by CDL and/or the Monitor whether according to the above frequencies or on a discretionary basis must on analysis be of the same or better quality than the relevant RBSLs and meet or exceed the relevant aesthetic criteria (in either case as the same may be amended in accordance with this Schedule).

APPENDIX C INFORMATION SOURCES

APPENDIX D REQUESTS FOR INFORMATION (RFI)

Contract Name:	Coed Darcy Monitor	RFI No:
Contract Number:	GNP/NJR/13773-2	Date Raised: 25 June 2015
Subject:	Review of Atkins' Validation Report for Monitor Phase 58	
To:	Michelle Lee	Atkins
Cc:	Mike Poland	Atkins
From:	Rhys Mander	AECOM

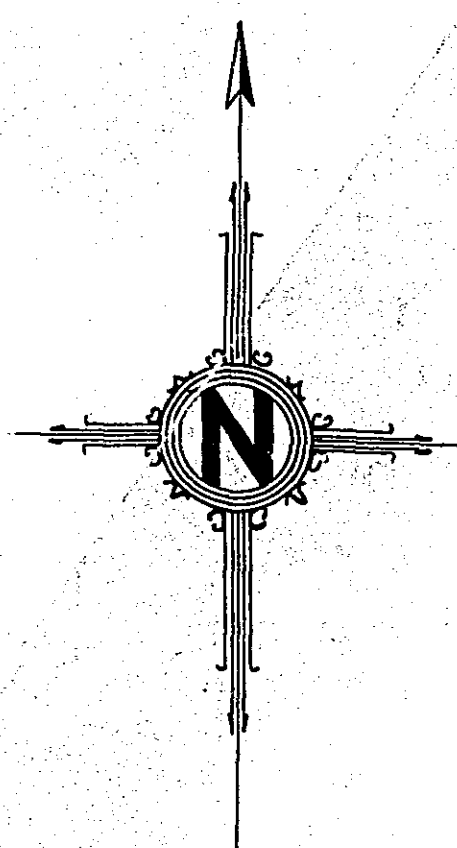
Comments

The following queries are raised in relation to Atkins' Validation Report for Monitor Phase 58 (report ref. 5041216-OSW-RPT-0001385):

- With reference to the phase boundary drawing it is noted that the phase boundary overlaps with the boundary for phase 2 - the Demonstration Village, which has already been certified.
- Section 1.1 - The report states that the intended use is commercial whereas the masterplan indicates that the phase shall comprise residential plots. Should the intended use change after the Monitor's RRWCC has been issued, then it should be noted that further validation and possibly further remediation works is likely to be required.
- Section 2.2 – A crude oil pump house is stated to be adjacent to the east of the phase but the historical map indicates that it was located to the north.
- Section 2.2 - Sludge and sediment tanks are stated as being adjacent to the south of the phase but are not marked on the historical map provided. Please clarify the location of these tanks?
- Section 2.4.2 - Surface water features (ditches/drains/ponds) are marked in the north east corner of the phase but are not discussed in the report. It is noted that there is a lack of trial pits in this area. Is this related to the presence of these features?
- Section 3.1.1 - 66 historical holes are stated to have been excavated by URS however this does not correspond with drawing: 5041216-REM-DWG-1894.
- Section 5.3 - Of the 461 trial pits, samples from only 391 were taken. It is assumed that this is due to the presence of free product, but please clarify.
- Section 5.4 - Paragraph 3 suggests that 57 trial pits contained free product however only 55 are marked on drawing 1896.
- Section 5.4 - Asbestos is said to have exceeded the RBSL for 5 samples however it has not been measured for every sample in which it was detected. Please clarify the rationale for deciding whether or not to submit samples for quantitative analysis.
- Section 5.4 – It is noted that the groundwater sample has been screened against the residential RBSLs, rather than commercial. Is one sample considered sufficient?
- Section 5.4 - Paragraph 6 states that Drawing 1896 shows the location of the presence of asbestos fibres but it does not appear to do so.
- No MCERTs have been provided.
- It is noted that further remediation works are required in order to satisfy the requirements of the Section 106 Agreement. It should be noted that the RRWCC will only be issued once these works have been completed and appropriately validated.
- The finalised validation report will need to include a topographical record of the ground profile pre-investigation, at the base of the remediation excavation and the finished ground profile.

Date: 25 June 2015

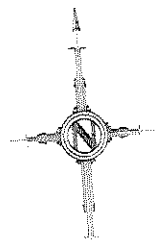
APPENDIX E HISTORICAL MAPS



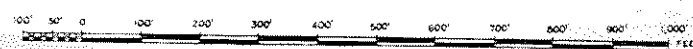
ISSUE 1
~~DELETED~~ - MEROX UNIT; POWER STN. NO. 2; SUMAP SEPARATORS A & B;
COOLING TOWERS A, B & C; WUB ON BLENDING DESPATCH PLANT;
BOTTLED GAS DESPATCH PLANT;
TANKS: 105, 106, 107, 110, 111, 113, 114, 115; 227 TO 233 INC;
301 TO 318 INC; 409 TO 412 INC. 415 TO 430 INC, 433, 434, 437, 438,
102, 108, 109, 200, 210;
~~ADDED~~ - WALS GAS STATION; VDU PREHEAT & COOLING TOWER;
WUB ON GAS ROAD LEADING GUNITEY; WHITE OIL & LPG
RPH LEADING GAFFELIS; TANK DMR. TANKS D3,D4,DG,D7,D10,
E9,E10; LORRY PARK.

ADDED - WALES GAS STATION; VDU PREHEAT & COOLING TOWER;
WHITE OIL SLACK WAX ROAD LOADING GANTTRY; WHITE OIL & LRG.
RAIL LOADING GANTEIES; TANK DMR1. TANKS D3,D4,D6,D7,D10,
E9,E10, LORRY PARK.

[illegible]



SCALE $\frac{3}{4}" = 100 \text{ FEET}$



3	20-NOV	19	DRAWING REVISED						
2	4-NOV	17	DRAWING REVISED						
153	DAT	18	AMENDMENT						
BP. REFINERY (LEANDARY) LTD				ORNG	TRA	2044	ON		
					TK	Q3	63	17	
					AW		PER		
UNIT	ESTATE								
SECTION	PLOT PLANS & LAYOUTS								
DESCRIPTION	LAYOUT OF TANK FARM								
DATE	20-NOV	19	DRAWING	REVISED					

***APPENDIX F TOPOGRAPHICAL
RECORD OF THE GROUND
LEVELS FOLLOWING THE
COMPLETION OF THE
REDEVELOPMENT
REMEDIATION WORKS***

APPENDIX G COMPARISON OF RBSL AND RTC THRESHOLDS

Contaminant	RTC (mg/l)
TPH aliphatic C10-C12	>sat
TPH aliphatic C12-C16	>sat
1,2-Dichloroethane	4.80E+00
1,1,1-Trichloroethane	>sat
Tetrachloroethene	>sat
Trichloroethene	2.85E+01
Vinyl chloride	3.38E-01
Dichloromethane	1.98E+03
Cis-1,2 Dichloroethene	7.40E+01
Trans-1,2 Dichloroethene	8.91E+01
1. Where the lower of the vapour or aqueous saturation limits has been exceeded by the RTC calculated, the hazard quotient is considered to be less than 1 and as such >sat has been presented 2. Xylene - the lowest RTC of the three isomers has been presented. Users must consider total exposure from all xylene isomers and not consider them in isolation 3. TPH aromatic C7-C8 is considered to comprise toluene only by Atkins 4. The potential presence of free product should be assessed in accordance with information in the S106 (Ref. 1).	

4. Comparison of RBSLs and RTC

As an objective of these works was to establish whether the RBSLs were health protective, the commercial RBSLs and RTC have been compared. This comparison is presented in the tables in this section of the report. As per the approach adopted for the residential and recreational RTC, within the tables within this section, the lower of the RBSL/RTC has been bolded. Therefore where the RBSL has been bolded, it is protective in comparison to the RTC:

- If the RBSL and the RTC are equal, the RBSL is bolded.
- If the RTC is lower than the RBSL, the RTC is bolded⁹.
- If the RBSL is lower than the RTC, the RBSL is bolded.

Where the RTC are greater than the RBSL or the RTC are equal to the RBSL, the values have been marked as final to illustrate that the RBSL is protective. Where the RTC are lower than the RBSL, further site specific modifications could be considered to establish whether the RTC is unnecessarily conservative and these have been marked as draft. Further site specific modifications have not been considered at the present stage.

The RBSL should be used in all cases, except where the RTC is bolded. In this event, the relevant RTC should therefore be adopted.

The background soil concentration and Soil Code have not been considered within the metals RTC presented and therefore the values presented for metals may not be protective of phytotoxic

⁹ In some cases there may be two RTC, where one RTC is higher than the RBSL and the other lower: one may be bolded and the other not and therefore they remain as draft.

effects. The soft landscaping areas should therefore be suitably designed at the remediation design stage, once such areas are defined.

4.1 Comparison of commercial RBSLs and RTC (shallow soil)

The commercial RBSLs and RTC for a shallow soil source are compared in Table 4.1 below.

Table 4.1 – Comparison of commercial RBSLs and RTC for shallow soil (0.65m below FFL)

Contaminant	S106 RBSL (mg/kg)	RTC 1% Sand (mg/kg)	RTC 3% Sandy loam (mg/kg)	Draft/Final
Arsenic	5.00E+02	6.35E+02	6.35E+02	final
Chromium	5.00E+03	3.65E+02	3.65E+02	draft
Cadmium	1.40E+03	2.43E+02	2.43E+02	draft
Mercury (inorganic)	4.80E+02	3.71E+03	3.71E+03	final
Nickel	5.00E+03	1.99E+03	1.99E+03	draft
Selenium	8.00E+03	1.30E+04	1.30E+04	final
Lead	7.50E+02	5.45E+03	5.45E+03	final
Vanadium	1.60E+04	7.59E+03	7.59E+03	draft
Copper	-	1.15E+05	1.15E+05	draft
Zinc	-	9.18E+05	9.18E+05	draft
Benzo(a)pyrene	2.90E+01	2.47E+01	2.48E+01	draft
Benzene	5.00E+00	1.78E+01	9.98E+01	final
Toluene	1.16E+03	4.18E+05 a	4.22E+05 a	final
Ethylbenzene	1.22E+05	1.83E+05 a	1.87E+05 a	final
Xylene	1.21E+05	2.93E+05 a	3.27E+05 a	final
TPH aromatic C7-C8	1.84E+03	4.18E+05 a	4.22E+05 a	final
TPH aromatic C8-C10	9.13E+02	6.21E+04 a	6.62E+04 a	final
TPH aromatic C10-C12	2.65E+04	6.83E+04 a	6.84E+04 a	final
TPH aromatic C12-C16	6.49E+04	6.84E+04 a	6.57E+04	final
TPH aliphatic C6-C8	>1.00E+06	≤1.00E+06 a	≤1.00E+06 a	draft
TPH aliphatic C8-C10	1.59E+05	1.69E+05 a	1.70E+05 a	final
TPH aliphatic C10-C12	1.63E+05	1.71E+05 a	1.71E+05 a	final
TPH aliphatic C12-C16	1.69E+05	1.71E+05 a	1.71E+05 a	final
TPH aromatic C16-C21	5.14E+04	2.85E+04	2.85E+04	draft
TPH aromatic C21-C35	5.14E+04	2.85E+04	2.85E+04	draft
TPH aliphatic C16-C21	>1.00E+06	≤1.00E+06	≤1.00E+06	draft
TPH aliphatic C21-C35	>1.00E+06			draft
Total TPH (Phase 1)	8.14E+04	Not calculated (see note 8)		
Total TPH (Process Area)	4.43E+04			
Total TPH (North Tank Farm)	2.59E+04			

Contaminant	S106 RBSL (mg/kg)	RTC 1% Sand (mg/kg)	RTC 3% Sandy loam (mg/kg)	Draft/Final
Total TPH (South Tank Farm)	3.72E+04			
1,2-Dichloroethane	2.00E+00	4.01E-01	2.15E+00	draft
1,1,1-Trichloroethane	5.77E+05	4.43E+02	3.14E+03	draft
Tetrachloroethene	1.05E+03	1.03E+02	7.88E+02	draft
Trichloroethene	8.40E+01	7.48E+00	5.49E+01	draft
Vinyl chloride	4.00E+00	4.50E-02	1.74E-01	draft
Dichloromethane	1.65E+03	1.58E+02	7.34E+02	draft
Cis-1,2-Dichloroethene	2.73E+02	8.70E+00	5.30E+01	draft
Trans-1,2 Dichloroethene		1.38E+01	8.77E+01	draft
Notes				
a) based on a value produced from following the approach outlined in SR4 for substances at saturation				
1. It is assumed that no visible free product is present within the top 1.0m of soil The presence of free product should be assessed in accordance with information in the S106 (Ref. 1).				
2. Xylene - the lowest RTC of the three isomers has been presented. Users must consider total exposure from all xylene isomers and not consider them in isolation				
3. TPH aromatic C7-C8 is considered to comprise toluene only by Atkins				
4. In the S106 (Ref. 1), only one value was presented for 1,2-dichloroethene of 273 mg/kg				
5. 'Total' TPH RBSL derived for an area of development, based on individual RBSL and available mass fraction TPH data in soil at time of derivation, using the inverse weighted average approach.				
6. Benzo(a)pyrene RBSL to be compared against sum of 16 US EPA Priority List PAHs using Toxicity Equivalence approach				
7. No RTC was produced for total TPH as this will be considered further at validation stage				
8. Asbestos has not been considered here as it is being considered in a separate report				
9. Additivity for TPHs and PAHs to be undertaken in line with guidance in this report				
10. In the S106 (Ref. 1), “-“ was presented for the RBSLs for copper and zinc for a commercial land use				
11. The values for metals may not be protective of phytotoxic effects				

4.2 Comparison of commercial RBSLs and RTC (deep soil)

The commercial RBSLs and RTC for a deep soil source are compared in Table 4.2 below.

Table 4.2 – Comparison of commercial RBSLs and RTC for deep soil (1m below FFL)

Contaminant	S106 RBSL (mg/kg)	RTC 1% Sandy loam (mg/kg)	RTC 3% Sandy loam (mg/kg)	Draft/final
Benzo(a)pyrene	None	>sat	>sat	final
Benzene	5.00E+00	7.10E+01	1.52E+02	final
Toluene	3.89E+02	>sat	>sat	final
Ethylbenzene	None	>sat	>sat	final
Xylene	None	>sat	>sat	final

Contaminant	S106 RBSL (mg/kg)	RTC 1% Sandy loam (mg/kg)	RTC 3% Sandy loam (mg/kg)	Draft/final
TPH aromatic C7-C8	6.17E+02	>sat	>sat	final
TPH aromatic C8-C10	5.47E+02	>sat	>sat	final
TPH aromatic C10-C12	None	>sat	>sat	final
TPH aromatic C12-C16	None	>sat	>sat	final
TPH aliphatic C6-C8	None	>sat	>sat	final
TPH aliphatic C8-C10	None	>sat	>sat	final
TPH aliphatic C10-C12	None	>sat	>sat	final
TPH aliphatic C12-C16	None	>sat	>sat	final
TPH aliphatic C16-C21	None	Not calculated (see note 3)		
TPH aliphatic C21-C35	None			
TPH aromatic C16-C21	None			
TPH aromatic C21-C35	None			
Total TPH (Phase 1)	8.20E+04	Not calculated (see note 9)		
Total TPH (Process Area)	3.50E+04			
Total TPH (North Tank Farm)	1.40E+04			
Total TPH (South Tank Farm)	3.48E+04			
1,2-Dichloroethane	6.50E-01	1.73E+00	2.75E+00	final
1,1,1-Trichloroethane	3.25E+03	>sat	>sat	final
Tetrachloroethene	3.68E+02	3.98E+02	1.06E+03	final
Trichloroethene	2.80E+01	2.88E+01	7.07E+01	final
Vinyl chloride	1.60E+00	1.54E-01	2.14E-01	draft
Dichloromethane	6.65E+02	6.77E+02	9.76E+02	final
Cis-1,2-Dichloroethene	9.10E+01	3.51E+01	6.70E+01	draft
Trans-1,2 Dichloroethene		5.34E+01	1.11E+02	draft
Notes				
1. Where the lower of the vapour or aqueous saturation limits have been exceeded by the RTC calculated, the hazard quotient is considered to be less than 1 and as such >sat has been presented				
2. Xylene - the lowest RTC of the three isomers has been presented. Users must consider total exposure from all xylene isomers and not consider them in isolation				
3. TPH >C16 are not considered to be volatile according to the Total Petroleum Hydrocarbon Criteria Working Group (TPHCWG). Consequently the inhalation of vapour pathways have not been considered and therefore no RTC value has been presented here				
4. “None” indicates theoretical RBSL greater than solubility limit				
5. In the S106 (Ref. 1), only one value was presented for 1,2-dichloroethene of 91 mg/kg				
6. ‘Total’ TPH RBSL derived for an area of development, based on individual RBSL and available mass fraction TPH data in soil at time of derivation, using the inverse weighted average approach.				
7. Benzo(a)pyrene RBSL to be compared against sum of 16 US EPA Priority List PAHs using Toxicity Equivalence approach				

Contaminant	S106 RBSL (mg/kg)	RTC 1% Sandy loam (mg/kg)	RTC 3% Sandy loam (mg/kg)	Draft/final
8. TPH aromatic C7-C8 is considered to comprise toluene only by Atkins				
9. No RTC was produced for total TPH as this will be considered further at validation stage				
10. Asbestos has not been considered here as it is being considered in a separate report				
11. Additivity for TPHs and PAHs to be undertaken in line with guidance in this report				
12. The potential presence of free product should be assessed in accordance with information in the S106 (Ref. 1).				

4.3 Comparison of commercial RBSLs and RTC (groundwater)

The commercial RBSLs and RTC for a groundwater source are compared in Table 4.3 below.

Table 4.3 – Comparison of commercial RBSLs and RTC for groundwater (1m below FFL)

Contaminant	S106 RBSL (mg/l)	RTC (mg/l)	Draft/Final
Benzo(a)pyrene	None	>sat	final
Benzene	6.00E+00	1.15E+01	final
Toluene	2.29E+02	>sat	final
Ethylbenzene	5.06E+02	>sat	final
Xylene	6.07E+02	>sat	final
TPH aromatic C7-C8	9.70E+01	>sat	final
TPH aromatic C8-C10	None	>sat	final
TPH aromatic C10-C12	None	>sat	final
TPH aromatic C12-C16	None	>sat	final
TPH aromatic C16-C21	None	Not calculated (see note 6)	final
TPH aromatic C21-C35	None		final
TPH aliphatic C6-C8	None	>sat	final
TPH aliphatic C8-C10	None	>sat	final
TPH aliphatic C10-C12	None	>sat	final
TPH aliphatic C12-C16	None	>sat	final
TPH aliphatic C16-C21	None	Not calculated (see note 6)	final
TPH aliphatic C21-C35	None		final
1,2-Dichloroethane	8.20E-01	4.80E+00	final
1,1,1-Trichloroethane	9.89E+02	>sat	final
Tetrachloroethene	1.15E+02	>sat	final
Trichloroethene	1.30E+01	2.85E+01	final
Vinyl chloride	3.00E-01	3.38E-01	final
Dichloromethane	6.24E+02	1.98E+03	final

Contaminant	S106 RBSL (mg/l)	RTC (mg/l)	Draft/Final
Cis-1,2 Dichloroethene	6.80E+01	7.40E+01	final
Trans-1,2 Dichloroethene	6.80E+01	8.91E+01	final
Notes			
1. Xylene - the lowest RTC of the three isomers has been presented. Users must consider total exposure from all xylene isomers and not consider them in isolation			
2. TPH aromatic C7-C8 is considered to comprise toluene only by Atkins			
3. "None" indicates theoretical RBSL greater than solubility limit			
4. In the S106 (Ref. 1), only one value was presented for 1,2-Dichloroethene of 68 mg/l.			
5. Where indoor and outdoor values were presented by RBCA, these have been integrated in line with SNIFFER (2003). Where both indoor and outdoor values derived by RBCA were greater than the saturation limit, >sat has been presented. Where indoor values were presented by RBCA, and the outdoor values were >sat, only the indoor values have been presented. Therefore >sat indicates that the theoretical RTC is greater than solubility limit.			
6. TPH >C16 are not considered to be volatile according to TPHCWG. Consequently the inhalation of vapour pathways have not been considered			
7. The potential presence of free product should be assessed in accordance with information in the S106 (Ref. 1).			

5. Conclusions and Recommendations

5.1 Commercial RTC

5.1.1 Conclusions

RTC have been derived for a shallow and deep soil source for a commercial land use. As can be seen in Section 4, some RTC were higher than the RBSL and thus the RBSLs would be protective and suitable for use.

In other cases, the RTC were lower than the RBSL and therefore may not be protective of human health based on the assumptions underpinning the RTC. In such cases the RTC have been marked as draft and may require further assessment.

5.1.2 Recommendations

The lower of the RTC/RBSL is recommended for use in order to be protective for the receptor at the site. It is also recommended that the land use assumptions used to develop the CSM are compared to the development plans to establish whether the RTC are suitable for use. For instance, a less permeable soil type than the sand/sandy loam used within the RTC modelling, may result in a higher RTC and less remediation being required. Information regarding the application of the RTC/RBSL is understood to be presented within the remedial strategy and validation plans (as appropriate).

Should exceedances of the RTC/RBSL be reported, it is recommended that the guidelines outlined in the validation plan (in preparation) are followed.

A number of approaches could be considered for those contaminants where the RTC is lower than the RBSL. The recommended approaches include:

- consideration of building development plans on plot specific basis (e.g. areas of hard standing) versus exceedances of RTC/RBSL;

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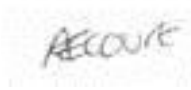
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1. INTRODUCTION

1.1 Scope

This Redevelopment Remediation Works Completion Certificate (RRWCC) has been prepared with reference to the following agreements:

- Section 106 Agreement dated 8 February 2008 between Neath Port Talbot Borough Council (NPTCBC), St Modwen Developments Limited (SMD), St Modwen Properties Plc (SMP), BP Oil Llandarcy Refinery Limited (BPLR) and Coed Darcy Limited (CDL); and
- Remediation and Maintenance Agreement dated 23 May 2008 (RMA) between SMD, SMP and CDL.

Unless advised otherwise, definitions used in this RRWCC can be found in the Section 106 Agreement and/or the RMA.

This RRWCC has been prepared for Phase 68 in response to the receipt of a written request from SMD pursuant to clause 4.3 of the RMA. The phase boundary and intended use on which this RRWCC is based were notified to the Monitor by letter, a copy of which is provided in **Appendix A**.

The intended use for Phase 68 has been declared as “proposed commercial/retail and public open space”, which with reference to the definitions provided in the Section 106 Agreement is considered to comprise part commercial phase and part public open space.

The phase boundary for Phase 68 is the land edged red on drawing 5041216-REM-DWG-1967, a copy of which is provided in **Appendix A**. The approximate location of Phase 68 in relation to the Development Boundary is shown in **Figure 1** below. Phase 68 covers an area of approximately 80,200m². Of this, approximately 29,500m² is proposed for commercial end-use and 50,700m² is designated public open space.

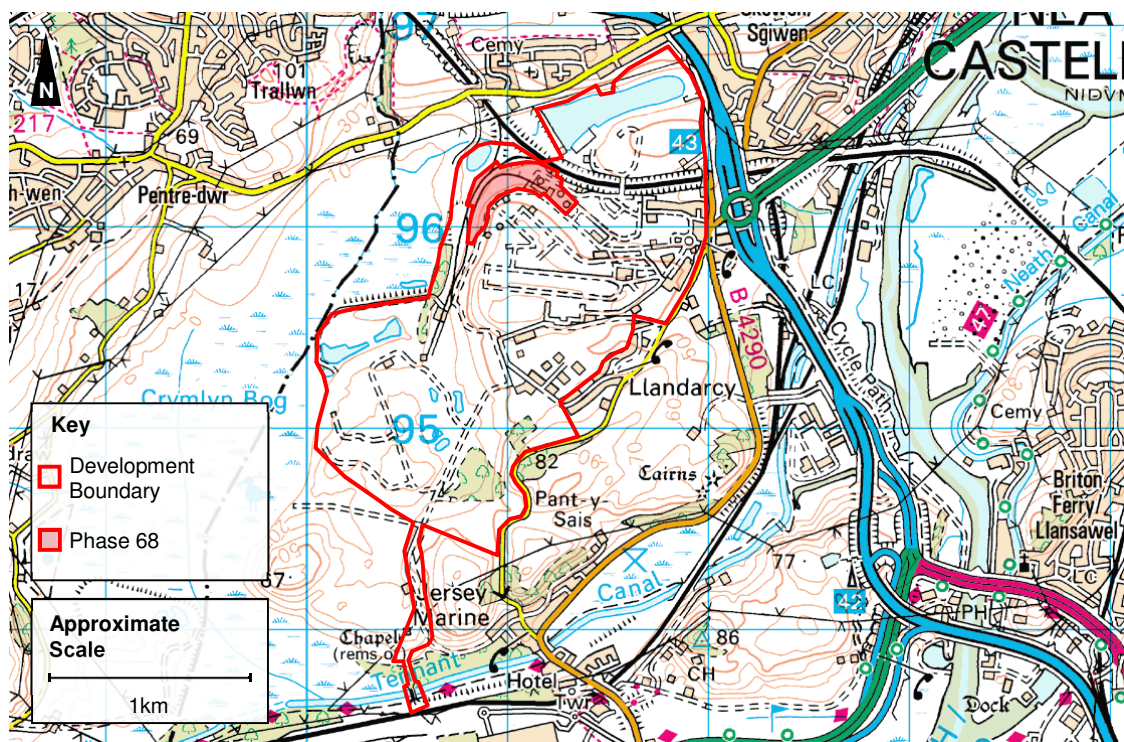


Figure 1 – Location plan

A development layout is yet to be confirmed for Phase 68, however an outline layout is shown on the current masterplan drawing reference 1332/400/MP/SK/TERT Revision H, a copy of which is also provided in **Appendix A**.

The extent of the land proposed for commercial end-use and that proposed as public open space is shown on drawing 5041216-ATK-DR-C-REM-1967.

With reference to the masterplan drawing it should be noted that Phase 68 is situated within an area of proposed residential development, whereas it has been declared as a commercial and public open space phase. With reference to the Monitor's Deed of Appointment, the Monitor is obliged to certify the phase against the intended use that is declared by the developer, irrespective of what is shown on the masterplan. Nevertheless it must be noted that further remediation works will be required in order for the phase to be suitable for residential development if and when that should happen.

In accordance with the requirements of the Monitor's Deed of Appointment, this RRWCC shall:

- Describe the remedial action which in the Monitor's professional opinion has been carried out for the purposes of completing the redevelopment remediation works in relation to Phase 68; and
- Certify whether or not in the Monitor's professional opinion the redevelopment remediation works have been satisfactorily completed for Phase 68 in accordance with the purpose, objectives and requirements of Schedule 8 of the Section 106 Agreement, having regard to the intended use.

A copy of Schedule 8 of the Section 106 Agreement is provided in **Appendix B**.

1.2 Background

1.2.1 Objectives of the Redevelopment Remediation Works

Part One of Schedule 8 of the Section 106 Agreement outlines the purpose and objectives of the redevelopment remediation works as follows:

- The purpose and objectives of the redevelopment remediation works are the carrying out of all such remedial action over and above that actually carried out as part of the RAP Works that is necessary in order to make each part of the property suitable for its intended use. A part of the property will only be suitable for its intended use if and when the Phase Works Completion Date (PWCD) is declared in respect of that part of the property.
- This objective will be deemed to be met for the purposes of the Section 106 Agreement and the RMA on the date specified in a notice from CDL declaring the PWCD for the phase. The PWCD will be declared once CDL is satisfied that the remediation necessary for the specified intended use for the phase has been completed.

Part Two of Schedule 8 of the Section 106 Agreement places a number of obligations on SMD as the Developer. The main obligations pertinent to this phase are as follows:

- The Developer shall carry out or procure the carrying out of all Remedial Action necessary in order to achieve the purpose and objective as outlined in Part 1 of Schedule 8 of the Section 106 Agreement. The design and specification of any remediation shall take account of the principles and objectives and the design assumptions for the RAP Works and shall not prejudice the achievement and future sustainability of these principles and objectives.
- In order to determine the need for Remedial Action in the first place it is necessary to undertake an appropriate site assessment. This assessment needs to take account of the site history, potential and/or actual measured extent of contamination and the associated

implied risk. Only by developing a thorough understanding of both potential and actual contamination will it be possible to confirm that all necessary Remedial Action likely to have been completed. This obligation should be satisfied through completion of an appropriate desk study and intrusive investigation.

- The Risk Based Screening Levels (RBSLs) set out in Tables 1 and 2 [in Schedule 8 of the Section 106 Agreement] and the aesthetic criteria, remediation quality and scope (including the depth below Final Finished Level (FFL) to which quality standards are achieved), as the same may be varied in accordance with this Schedule 8, shall be achieved for each part of the property at the minimum validation frequencies set out in Clause 8 of Part 3 (as applicable depending upon whether such part of the property is intended for use as residential, commercial or recreational land) as a minimum base level standard.

It should be noted that SMD has procured the services of Atkins Ltd. to assist in discharging the above obligations.

Tables 1, 2, 3 and 4 from Schedule 8 of the Section 106 Agreement are reproduced below for reference.

Table 1 Summary of Soil RBSLs

<i>Contaminant</i>	<i>Land-Use Specific Soil RBSL Surface to 1m below FFL (mg/kg)¹</i>			<i>Land-Use Specific RBSL Soil below 1m depth (mg/kg)</i>		
	<i>Residential</i>	<i>Commercial</i>	<i>Recreational</i>	<i>Residential</i>	<i>Commercial</i>	<i>Recreational</i>
<u>METALS & METALLOIDS</u>						
Arsenic	64	500	64	-	-	-
Cadmium	2.6	1400	2.6	-	-	-
Chromium	130	5000	200	-	-	-
Mercury	1	480	1	-	-	-
Nickel	50	5000	75	-	-	-
Selenium	3	8000	3	-	-	-
Lead	337	750	337	-	-	-
Vanadium	416	16000	640	-	-	-
Copper	200	-	200	-	-	-
Zinc	478	-	478	-	-	-
<u>ORGANIC SPECIES</u>						
Benzene	0.12	5	13	0.4	5	48
Benzo(a)pyrene ²	0.9	29	0.9	none	none	none
Toluene	36	1160	8110	52	389	none

<i>Contaminant</i>	<i>Land-Use Specific Soil RBSL Surface to 1m below FFL (mg/kg)¹</i>			<i>Land-Use Specific RBSL Soil below 1m depth (mg/kg)</i>		
	<i>Residential</i>	<i>Commercial</i>	<i>Recreational</i>	<i>Residential</i>	<i>Commercial</i>	<i>Recreational</i>
Ethylbenzene	41	122000	4740	140	none	none
Xylenes	32	121000	7940	58	none	none
1,2-Dichloroethane	0.04	2	4.5	0.1	0.65	6
Dichloromethane	5	1650	241	84	665	6220
Tetrachloroethene	11	1050	641	34	368	1780
Trichloroethene	1	84	193	2	28	269
Vinyl Chloride	0.01	4	0.7	0.04	1.6	16
1,2 Dichloroethene	4	273	632	7	91	881
1,1,1-Trichloroethane	154	577000	27900	160	3250	none
TPH Aromatic EC>C7-C8	125	1840	21337	146	617	none
TPH Aromatic EC>C8-C10	94	913	4025	257	547	none
TPH Aromatic EC>C10-C12	118	26515	4589	1394	none	none
TPH Aromatic EC>C12-C16	131	64875	4799	none	none	none
TPH Aromatic EC>C16-C21	82	51449	3639	none	none	none
TPH Aromatic EC>C21-C35	1130	51449	3639	none	none	none
TPH Aliphatic EC>C6-C8	8335	8517587	606191	none	none	none
TPH Aliphatic EC>C8-C10	112	158890	12075	158	none	none
TPH Aliphatic EC>C10-C12	3204	163360	12094	none	none	none
TPH Aliphatic EC>C12-C16	4513	169032	12117	none	none	none
TPH Aliphatic EC>C16-C21	94174	3429944	242573	none	none	none
TPH Aliphatic EC>C21-C35	94820	3429944	242573	none	none	none
Total TPH (Phase 1) ³	1717	81413	9061	9182	81956	None
Total TPH (Process Area) ³	2601	44344	10830	4098	35014	None
Total TPH (North Tank Farm) ³	1104	25875	9419	3802	13974	None
Total TPH (South Tank Farm) ²	1015	37230	6349	2792	34797	None
<u>ASBESTOS</u>						

<i>Contaminant</i>	<i>Land-Use Specific Soil RBSL Surface to 1m below FFL (mg/kg)¹</i>			<i>Land-Use Specific RBSL Soil below 1m depth (mg/kg)</i>		
	<i>Residential</i>	<i>Commercial</i>	<i>Recreational</i>	<i>Residential</i>	<i>Commercial</i>	<i>Recreational</i>
Sum of all Types of ACM	200	300	200	200 ⁴	-	-

Notes

- “-” value not applicable to scenario
- “none” RBSL value exceeds soil saturation limits and free phase assessment appropriate
- 1 Lower value of human health RBSL or Soil Code value if higher than background LCL value (applicable to metals & metalloids only)
- 2 Benzo(a)pyrene RBSL to be compared against sum of 16 US EPA Priority List PAHs using Toxicity Equivalence approach
- 3 ‘Total’ TPH RBSL derived for an area of development, based on individual RBSLs provided and available mass fraction TPH data in soil at time of derivation, using the inverse weighted average approach
- 4 Refer to Section 106 Agreement for specification of relevant depth ranges

Table 2 Summary of RBSLs for Groundwater

<i>Contaminant</i>	<i>Land-Use Specific RBSL (mg/l)</i>		
	<i>Residential</i>	<i>Commercial</i>	<i>Recreational</i>
TPH Aliphatic EC>C6-C8	none	none	none
TPH Aliphatic EC>C8-C10	none	none	none
TPH Aliphatic EC>C10-C12	none	none	none
TPH Aliphatic EC>C12-C16	none	none	none
TPH Aliphatic EC>C16-C21	none	none	none
TPH Aliphatic EC>C21-C35	none	none	none
TPH Aromatic EC>C7-C8	20	97	none
TPH Aromatic EC>C8-C10	22	none	none
TPH Aromatic EC>C10-C12	none	none	none
TPH Aromatic EC>C12-C16	none	none	none
TPH Aromatic EC>C16-C21	none	none	none

Land-Use Specific RBSL (mg/l)

<i>Contaminant</i>	<i>Residential</i>	<i>Commercial</i>	<i>Recreational</i>
TPH Aromatic EC>C21-C35	none	none	none
Benzene	0.7	6	198
Benzo(a)pyrene	none	none	none
Toluene	47	229	none
Ethylbenzene	102	506	none
Xylenes	43	607	none
1,2-Dichloroethane	0.2	0.82	45
Dichloromethane	150	624	none
Tetrachloroethene	22	115	none
Trichloroethene	2.6	13	813
Vinyl Chloride	0.06	0.3	18
1,2-Dichloroethene	15	68	none
1,1,1-Trichloroethane	193	989	none

Notes

“none” theoretical RBSL greater than solubility limit

Table 3 Scale of Aesthetic Criteria

<i>Class</i>	<i>Visual</i>	<i>Olfactory</i>
0	No visible staining of soil, no visible suspect ACM	No detectable odour on soil
1	Occasional staining of soil, no visible suspect ACM	Faint odour on soil
2	Frequent staining of soil	Distinct but not strong odour on soil
3	Occasional heavy staining of soil	Strong odour on soil
4	Heavy staining of soil	Strong odour discernible in ambient air
5	Visible hydrocarbon product	Overwhelming Odour

Notes

Visible suspect ACM refers to asbestos containing material visible to the naked eye which a reasonable and prudent person used to managing asbestos may suspect to be asbestos containing.

Table 4 Minimum Validation Testing Frequencies

<i>Testing for the Validation Suite at the following frequency:</i>	<i>Shallow Soils (Residential <1m FFL)</i>	<i>Deeper Soils (Residential >1m below FFL)</i>	<i>Soils (Commercial all relevant depths)</i>
Imported quarried material	1 per 500m ³ ex situ, composite of 5 regular sub-samples	1 per 1000m ³ ex situ, composite of 5 regular sub-samples	1 per 1000m ³ ex situ, composite of 5 regular sub-samples
Imported soil from verified greenfield site	1 per 250m ³ ex situ, composite of 5 regular sub-samples	1 per 500m ³ ex situ, composite of 5 regular sub-samples	1 per 500m ³ ex situ, composite of 5 regular sub-samples
Imported soil from characterised brownfield site ¹	1 per 25m ³ ex situ, composite of 5 sub-samples	1 per 50m ³ ex situ, composite of 5 sub-samples	1 per 100m ³ ex situ, composite of 5 sub-samples
0.5-1m below FFL in-situ	Regular grid of 1 per 50m ² , sample over 0.5m depth	n/a	Regular grid of 1 per 400m ² , sample over 0.5m depth
>1m below FFL in-situ	n/a	Regular grid of 1 per 100m ² , sample over 1m depth	Regular grid of 1 per 400m ² , sample over 0.5m depth
Stockpiled excavated site materials for re-use	1 per 50m ³ ex situ, composite of 5 sub-samples	1 per 100m ³ ex situ, composite of 5 sub-samples	1 per 400m ³ ex situ, composite of 5 sub-samples
Face of remedial excavations <1m deep	1 per 10m, minimum of 1 per face, worst case VO sample	n/a	1 per 15m, minimum of 1 per face, worst case VO sample
Face of remedial excavations >1m deep	n/a	1 per 10m ² , minimum of 1 per face, worst case VO sample	1 per 15m ² , minimum of 1 per face, worst case VO sample
Along redundant service excavations	1 per 20m of trench, worst case VO sample	1 per 20m of trench, worst case VO sample	1 per 20m of trench, worst case VO sample
Soil treated ex-situ and homogenised	1 per 200m ³ , composite of 5 regular sub-samples	1 per 200m ³ , composite of 5 regular sub-samples	1 per 500m ³ , composite of 5 regular sub-samples

Notes

- “1” Validation suite to reflect prior use of the originating brownfield site and the design and purpose of the relevant area of Coed Darcy.
- “VO” Visual/olfactory (i.e. aesthetic) observation

1.2.2 Remediation Action Plan (RAP) Works

In addition to the requirements of the redevelopment remediation works, the Developer must also complete a series of statutory remedial works which are referred to as the RAP Works. The requirements for the RAP Works are outlined in Schedule 7 of the Section 106 Agreement.

It is intended that this report, which is the RRWCC, will be complemented by a RAP Works Completion Statement (RAPWCS) in order to provide the information required by CDL to enable the PWCD to be declared.

Details of the scope of works and associated validation completed to satisfy the RAP requirements pertinent to this phase are reported separately in RAPWCS ref. 49310747/BRRP00152/Cert 68a.

1.3

Information Sources

A summary of the information sources that the Monitor has been provided with in relation to Phase 68 is provided below in **Table 5**. Unless otherwise stated, the Monitor has relied solely on these information sources as the basis for issuing this RRWCC. Upon a review of the information sources, in the Monitor's reasonable professional opinion, such information and the manner in which it was obtained appears sufficiently up to date, reliable and robust to justify such reliance. No verification of the data has been completed by the Monitor unless noted in the following sections.

Electronic copies of the information sources are provided in **Appendix C**.

Table 5 Information Sources

<i>Ref.</i>	<i>Document Reference</i>	<i>Format</i>	<i>Title</i>	<i>Author</i>	<i>Date Received</i>
1	39991-044-785-FR1287	Report	Whole Site Investigation BP Llandarcy Refinery	URS	August 2005
2	44382742/BRRP0001	Report	BP Llandarcy Refinery Desk Study	URS	July 2007
3	5041216-OSW-RPT-0001404	Report	Validation Report Monitor Phase 68 Revision 1	Atkins	October 2015
4	5041216-OSW-TN-0001487	Technical Note	Phase 68 Response to Monitor RFI 0149	Atkins	October 2015

1.4

Requests for Information (RFIs) Issued by the Monitor

The Monitor has raised one RFI in relation to Phase 68, as summarised in **Table 6** below. A copy of the RFI is provided in **Appendix D**. Copies of the responses received are included in the information sources provided in **Appendix C**.

Table 6 RFIs

<i>RFI Ref.</i>	<i>Title</i>	<i>Associated Atkins Document</i>	<i>Date Raised</i>	<i>Complete</i>	<i>Comments</i>
149	Review of Atkins' Validation Report for Monitor Phase 68	Atkins Validation Report for Monitor Phase 68 ref. 5041216-OSW-RPT-0001404	May 2015	Yes	Response to RFI and updated validation report received

2. DESCRIPTION OF THE REMEDIAL ACTION

The following section provides a description of the remedial action that has been carried out for the purposes of completing the redevelopment remediation works in relation to Phase 68. This section of the report is structured as follows:

1. Site Assessment
2. Remediation Strategy
3. Redevelopment Remediation Works
4. Validation

2.1 Site Assessment

As discussed above, the Section 106 Agreement requires the Developer to undertake an appropriate site assessment which needs to take account of the site history, potential and/or actual measured extent of contamination and the associated implied risk. The Section 106 Agreement also states that only by developing a thorough understanding of both potential and actual contamination will it be possible to confirm that all necessary Remedial Action is likely to have been completed. This obligation should be satisfied through completion of an appropriate desk study and intrusive investigation.

2.1.1 Desk Study

From the information presented in Atkins' validation report (Information Source 3) it is evident that Atkins has reviewed the findings of previous site investigations and desk studies to develop an understanding of both potential and actual contamination within Phase 68. The following is of note.

Phase 68 lies within the north west of the former Llandarcy Oil Refinery. The eastern area of the Phase was previously occupied by the bitumen plant which was still operational when the site was bought by St Modwen but was decommissioned and eventually demolished in 2010. With reference to the historical maps presented in **Appendix E** it can be seen that Phase 68 was historically occupied by rail sidings, the bitumen plant and bitumen cooling bays in the north eastern part of the Phase; a barrelling plant in the west; and a lube oil pump house, a rail car loading depot and a sulphur despatch unit in the north of the Phase.

With regards geology, Atkins reports that the British Geological Survey Sheet for Swansea (Sheet 247) Drift Edition indicates that this part of the refinery is underlain by Glacial Till (Diamicton) overlying Hughes and Brithdir Member Pennant Sandstone.

With regards hydrology, groundwater within Phase 68 is generally situated within the underlying bedrock and it is considered that groundwater flow is generally towards the north and northwest. The underlying sandstones are classified as a Secondary A Aquifer, which are defined by the Environment Agency as 'permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers'. The closest surface water body to Phase 68 is the South Site Reservoir which is located approximately 40m north west of Phase 68. The North Site Reservoir lies approximately 150m to the north. The Crymlyn Bog (SSSI) is located approximately 60m to the west of Phase 68.

2.1.2 Intrusive Investigations

URS carried out a number of historical site investigations on behalf of the operator of the former refinery, as reported in URS' site investigation report FR1287 (Information Source 1). These investigations included 79 exploratory holes within Phase 68.

Based on the findings of the site investigations, URS designated a number of 'Special Process Areas' across the former refinery which represented areas of potentially increased contamination associated with historical activities or processes. Four Special Process Areas were designated within Phase 68, comprising the former barrelling plant on the north western boundary of Phase 68, the lube oil pump house, the rail car loading depot and an area of TPH contamination associated with the railhead.

Between December 2014 and March 2015 Atkins undertook a further site investigation which included the excavation of a further 397 trial pits across Phase 68. This site investigation was carried out after the removal of historical structures within this area. Details of these site investigations are presented in Atkins' validation report (Information Source 3).

Logs from the trial pits indicate ground conditions to be consistent with the reported geology discussed above. Generally the soils comprised made ground, underlain with glacial soils over sandstone bedrock. Bedrock was predominantly encountered as a weathered zone comprising clayey silty sandy tabular sandstone gravel, cobbles and boulders. The trial pits were generally terminated on bedrock at depths ranging from 0.5m to 4.8m. Trial pits were terminated on concrete obstructions in 31 locations, ten at ground level.

Land contamination is reported to have been evident within the soils in the form of staining and odours. There were no exceedances of RBSLs for commercial or recreational end use.

Potential asbestos was noted in one trial pit. Analysis of the soil sample quantified asbestos concentration of <0.001%. A total of 363 samples underwent laboratory analysis with asbestos detected in 111 samples.

2.2 Remediation Strategy

Schedule 8 of the Section 106 Agreement sets out the minimum remedial action required depending on the intended use and the groundwater regime.

As discussed above, the intended use has been declared as a mixture of commercial and public open space. Therefore, with reference to the requirements that are specified in Schedule 8 of the Section 106 Agreement, the minimum remedial action required for these end uses is as detailed below.

2.2.1 Commercial End Use

Schedule 8 of the Section 106 Agreement does not include specific minimum requirements for Commercial end-use where groundwater is primarily in rock as this scenario was not envisaged as part of the masterplan. The Section 106 Agreement does however state that in the event such development is proposed, remedial action consistent with the standards specified in the Section 106 Agreement would be required, adapted as necessary to local conditions. The following minimum requirements specified for a commercial end use where groundwater is in soil are considered appropriate:

- All oil saturated soils and soil containing free product other than minor sheens shall be removed to a minimum depth of 2 m FFL or 0.5 m below the likely lowest seasonal groundwater elevation following development of the intended Urban Village, whichever is the deeper. This depth is to be established by consideration of all available groundwater level monitoring data.
- All soils must meet the RBSL for TPH to at least 1m below FFL.
- All soils must meet in bulk, considering both dispersed fibres and pieces of ACM, the RBSL for ACM to at least 1m below FFL and any visible ACM encountered during construction in the first 1m below FFL is to be removed.

- Where there is a risk of the migration in ground of hazardous gas or contaminated liquid into remediated areas, the Developer shall take all appropriate measures to prevent this occurring. Such measures could include the installation of interception trenches and management of discharge from those. The Developer shall monitor whatever measures are put in place after their installation to continue to demonstrate their effectiveness.
- Where necessary, seeps, sheens and iron rich discharges from the bedrock must be controlled such that there is no visible discharge at surface and little or no odour. Acceptable methodologies for remediation may include, but are not limited to the use of land drainage via interceptors.

2.2.2 Public Open Space End Use

Schedule 8 of the Section 106 Agreement requires the following remedial action for this end use:

- The Developer shall remediate areas of the 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.
- 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 agreed 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.

2.2.3 General Requirements

In addition to the minimum remedial action requirements outlined above, Schedule 10 of the Section 106 Agreement sets out additional generic remedial requirements, the following of which are relevant to Phase 68:

- Irrespective of the intended use of each phase or part thereof, all existing buried services at the property shall be removed and the routes of those services shall be backfilled with material no more permeable than the general material in the vicinity. Where backfill to new underground services may become a pathway for residential pre-transfer date contamination, appropriate control measures such as land drainage or venting measures shall be installed so as to appropriately protect remediated and/or developed areas
- Wherever there is a risk that following construction of the Urban Village groundwater or organic phase liquid may contaminate soils within the top one metre below FFL such that any of the relevant RBSLs and/or aesthetic criteria specified in Schedule 8 may be exceeded, the Developer shall ensure that all necessary steps are taken to mitigate these risks. Suitable measures may include, but not be limited to, the installation of land drains and/or the raising of the site ground levels such that groundwater will not be able to influence shallow soil quality.

- To provide a minimum thickness of suitable garden soils in residential areas, soils for landscaping in public and commercial areas and sub-base for hardsurfaced areas, the Developer shall build up the final elevation after completion of the RAP and redevelopment remediation works with a minimum of 0.5m of quality controlled imported fill materials suitable for the use to which they are to be put and of better quality than all RBSLs for the relevant end-use and meeting aesthetic type 0 for residential use and type 1 or better for commercial use as specified in Schedule 8 of the Section 106 Agreement. For the avoidance of doubt, the minimum remediation standards set out above therefore assume that the first half metre below FFL will comprise such imported material in all circumstances of residential and commercial end-use.

2.3 Redevelopment Remediation Works

The redevelopment remediation works that have been completed for Phase 68 are described in Atkins' validation report (Information Source 3) and can be summarised as follows:

- Further investigation of trial pits where free product was observed;
- Further investigation of elevated aesthetic criteria scores;
- Further investigation in areas that were inaccessible during the initial intrusive investigations due to stockpiles of crushed concrete and a concrete slab associated with the former bitumen plant;
- Removal of approximately 255m³ of soils where RBSL/RTC exceedances were identified; and
- Removal of pipework that had been identified in 20 locations.

The Monitor attended site and was generally satisfied that the above works were being carried out appropriately and that the requirements of the Section 106 Agreement were likely to be achieved.

It should be noted that the remediation works that have been carried out were focused on addressing areas of concern that had been identified in the site investigation, rather than a more general turnover of soils as has been seen on a number of previous Phases elsewhere on site. Whereas these previous Phases involved a wider stripping of soils, allowing a more comprehensive inspection of the soils and increased confidence over the presence of contamination, the trial pit based approach adopted on this Phase means there is an inherent risk that contamination may have been missed. Nevertheless, the testing frequencies specified in the Section 106 Agreement are relatively conservative, and furthermore the ground investigation was undertaken in line with the residential testing frequencies, rather than the commercial frequencies, which improves confidence and reduces the likelihood that contamination could have been missed. Furthermore the Section 106 Agreement does not specify the exact manner in which the works should be undertaken, so the Developer has not contravened any of the requirements. The Monitor is therefore satisfied that the works have been undertaken in accordance with the requirements of the Section 106 Agreement.

2.4 Validation

With reference to the remediation requirements discussed in Section 2.2 of this report, the following sections aim to demonstrate whether or not the requirements of the Section 106 Agreement have been achieved.

It should be noted that in the absence of a detailed layout for the proposed development and confirmed FFLs, Atkins has assumed that the existing ground levels, having completed the redevelopment remediation works, represent FFL minus 1m. This applies to the entire phase, including the commercial and public open space areas, albeit the Monitor considers it unlikely that 1m of fill would be placed on the public open space. This potential discrepancy is not

considered to be overly significant with regards the validation of the public open space within Phase 68 and therefore the Monitor has, as advised by Atkins, assumed that the existing ground levels represent FFL minus 1m across the entire phase.

A topographical record of the ground levels upon which this certificate is based are shown on drawing 5041216-ATK-DR-C-REM-2133 Rev P1 a copy of which is provided in **Appendix F**.

2.4.1 Aesthetic Criteria and the Removal of Oil Saturated Soils

The Section 106 Agreement, as amended as described in Section 2.2.1 of this report, requires that for a commercial phase all oil saturated soils and soil containing free product other than minor sheens shall be removed from ground level down to the surface of the underlying bedrock.

During the site investigation, soils were logged in accordance with the aesthetic criteria listed in **Table 3** of this report. Soils achieving an aesthetic classification of 5 (visible hydrocarbon product and/or overwhelming odour) were deemed to comprise oil saturated soils and/or soil containing free product and were therefore unsuitable for retention within the area designated for a commercial end-use. With regards the area designated as public open space, locations where free product was encountered were also scheduled for re-investigation and where necessary free product was recovered.

Atkins reports that further investigations were undertaken in 13 locations where suspected contamination had been identified during the site investigations. Contaminated soils were removed from seven of these locations where free product was encountered. The excavations were extended until visual/olfactory scores of ≤ 4 were achieved.

From the soil descriptions provided in Atkins' validation report (Information Source 3) and the trial pit logs provided, the Monitor is satisfied that following the completion of the redevelopment remediation works, oil saturated soils and soil containing free product appear to have been removed from the commercial area within Phase 68.

2.4.2 Soil Chemical Quality and Testing Frequencies

The Section 106 Agreement requires that all soils within a commercial area must meet the RBSLs at the specified depths and in particular the RBSL for TPH to at least 1m below FFL. It should be noted that in addition to the RBSLs specified in the Section 106 Agreement, Atkins has also developed Remediation Target Concentrations (RTCs). These RTCs are intended to be health protective and it has been agreed with NPTCBC that where the RTCs are more conservative than the RBSLs, then the RTCs shall take precedence. A summary of the RBSLs and RTCs is presented in **Appendix G**.

With regards to the requirement to achieve the RBSL for TPH to at least 1m below FFL, given that the ground profile upon which this certificate is based represents FFL minus 1m, this requirement is not considered to be relevant to this phase and therefore only the RBSL/RTCs for deep commercial soils have been considered.

The Section 106 Agreement also requires that the soils must be tested in accordance with the specified minimum validation testing frequencies set out in **Table 4** in this report. With reference to that table, the following testing frequency is considered to be relevant to the commercial area within Phase 68:

- In situ soils are to be tested on a regular grid at a minimum frequency of 1 per 400m², irrespective of the depth below FFL.

Atkins reports that soil samples were collected from a total of 439 trial pits across Phase 68, the area of which is approximately 80,200m². This equates to a testing frequency of 1 per 183m² which is compliant with the minimum testing frequency specified in the Section 106

Agreement of 1 per 400m². It should be noted that this includes testing across both the commercial area and public open space.

It should be noted that the testing frequency that has been achieved significantly exceeds the minimum testing frequency for a commercial phase. The site investigations were carried out in general accordance with the residential testing frequencies specified in the Section 106 Agreement because at the time of the site investigation it was initially intended that Phase 68 would be declared as a residential phase.

Atkins reports that approximately 255m³ of soils were removed from the remedial excavations where RBSL/RTC exceedances had been identified. Soil samples were collected from the base and sides of the remediation excavations in order to demonstrate the acceptability of the remaining soils. Atkins reports that one validation sample was taken from the base of the excavation around IP4177 to comply with the 1 per 400m² frequency and that four validation samples were taken from the excavation faces of to comply with the 1 per 15m² frequency.

Atkins reports that a benzene RBSL/RTC exceedance that had been recorded in trial pit IP4175 was not removed because of the significant depth of the sample, 4.5m below ground level (bgl), and the confinement laterally and vertically whereby soil samples taken from the adjacent soils did not indicate a wider problem. The Monitor considers this to be appropriate.

In summary, following the completion of the above works, laboratory analysis of the soil samples collected from the proposed commercial area indicate that the soils achieved the necessary RBSL/RTCs for deep soils in a commercial phase.

With regards the public open space, the Section 106 Agreement does not provide specific validation requirements but states that an 'appropriate scheme of validation testing' must be undertaken. From the details provided in Atkins' validation report, it is evident that the same validation approach has been adopted across the public open space as in the commercial area. The Monitor considers this to be appropriate. Further discussion of the validation requirements for the Public Open Space is presented in Section 2.4.7 of this report.

In summary, the Monitor is satisfied that the soils within Phase 68 meet the necessary chemical quality requirements as specified in the Section 106 Agreement. It should however be noted that if the development layout and proposed FFLs differ significantly from the assumed FFLs, or if the intended use should change, then further remediation works may be required.

2.4.3 Groundwater Quality

In addition to the RBSLs for soils, the Section 106 Agreement also specifies RBSLs for groundwater as detailed in **Table 2** in this report. However the Section 106 Agreement does not envisage the remediation of groundwater contamination within bedrock, so long as it is controlled, for example seeps, sheens and iron rich discharges from bedrock must be controlled such that there is no visible discharge at surface and little or no odour.

Whilst Atkins does not report any groundwater sampling within Phase 68, given the depth of groundwater in relation to the FFL it is considered unlikely that seeps, sheens and iron rich staining would discharge at ground surface. Accordingly, Atkins does not report any such matters that are considered to require control to prevent discharge at ground surface.

The Monitor is satisfied that groundwater quality is unlikely to have a detrimental impact on Phase 68 and no further control measures are considered necessary in relation to the management of seeps, sheens and iron rich discharges.

2.4.4 Measures to Prevent Contamination Migration

The Section 106 Agreement states that where there is a risk of the migration in ground of hazardous gas or contaminated liquid into remediated areas, the Developer shall take all appropriate measures to prevent this occurring.

As discussed in Section 2.1.1 of this report, groundwater flow within Phase 68 is likely to be towards the west, following the general topography of the ground. Given the absence of free product and oil saturated soils within Phase 68, as reported by Atkins, including both the commercial area and the public open space, the recontamination of down gradient areas is considered unlikely. Therefore measures to prevent the migration of contamination are not considered necessary for Phase 68.

In summary the Monitor is satisfied that there is minimal risk of migration in ground of hazardous gas or contaminated liquid into our out of Phase 68 and therefore no measures are considered necessary to prevent the recontamination of soils.

2.4.5 Asbestos

The Section 106 Agreement requires that all soils within a Commercial area must meet in bulk, considering both dispersed fibres and pieces of ACM, the RBSL for ACM to at least 1m below FFL and that any visible ACM encountered during construction in the first 1m below FFL must be removed.

Given that the ground profile upon which this certificate is based represents FFL minus 1m, it is not necessary for the soils to meet the specified requirements in relation to asbestos. Nevertheless, Atkins has assessed the soils, as follows.

Atkins reports that visible ACM was identified in one trial pit during the site investigations. This was recorded as a white waxy material and logged by the engineer as possible asbestos. Subsequent laboratory screening of the soil sample identified the possible presence of chrysotile asbestos. Quantification indicated a concentration of <0.001%, which is below the RBSL/RTC.

Atkins also reports that asbestos gaskets identified at trial pit TPE3376 were removed.

In addition, Atkins reports that a total of 406 soil samples collected during the site investigations received a routine asbestos screening and 123 samples returned positive results, indicating the potential presence of asbestos. However, due to the depth of the soils being greater than 1m below FFL, no further quantified analysis was undertaken.

Given that the current ground profile is greater than 1m below FFL and there are no specific requirements for asbestos, the Monitor is satisfied that the remaining soils comply with the requirements of the Section 106 Agreement in respect of asbestos. However, should the FFLs be amended then further assessment of the remaining soils may be required.

2.4.6 Detailed Designs to Manage Access into the Public Open Space

The Section 106 Agreement requires detailed designs to be prepared to demonstrate how access will be managed within the public open spaces.

The site investigations did not indicate significant cause for concern within the area intended as public open space and therefore the Monitor is satisfied that there is no need to manage access into this area.

2.4.7 Protection of Human Health within the Public Open Space

The Section 106 Agreement requires that the detailed designs protect human health considering the reasonably anticipatable use of the land.

As noted above, the area that is intended for public open space generally meets the requirements for a commercial end-use and therefore measures to protect human health are unlikely to be required. However it is noted that the Special Process Areas described in Section 2.1.2 above were not included in Atkins' site investigation.

Atkins reports that these areas were not investigated due to the presence of a knotweed treatment area which could not be disturbed. However, Atkins reports that investigations undertaken hydraulically down-gradient of, and immediately adjacent to these areas confirmed the absence of contaminated soils or free product.

These observations suggest that there is unlikely to be a significant source of free product within the footprint of the former buildings, albeit without intrusive investigation within this area the absence of contamination from possible leaks and spillages cannot be proven.

Despite this, the Monitor is satisfied that no further measures are necessary to protect human health.

2.4.8 *Removal of Buried Services*

The Section 106 Agreement states that irrespective of the intended use, all existing buried services shall be removed.

Atkins reports that pipework was encountered in 20 locations during the site investigation and that all pipework that was encountered was removed. Atkins also reports that excavations were extended to confirm absence of further pipework.

The Monitor is satisfied that the buried services that were encountered during the site investigation appear to have been removed from Phase 68. However, given the nature of the site investigation it is considered possible that other buried services could have been missed and may still be present within Phase 68.

2.4.9 *Recontamination of Soils*

The Section 106 Agreement states that wherever there is a risk that following construction of the Urban Village groundwater or organic phase liquid may contaminate soils within the top 1m below FFL such that any of the relevant RBSLs and/or aesthetic criteria may be exceeded, then all necessary steps should be taken to mitigate these risks. This may involve the installation of land drains and/or the raising of the site ground levels.

Observations during the works indicate groundwater levels to be significantly below the FFL and therefore the risk of recontamination of the top 1m of soils is considered unlikely. As such, the Monitor is satisfied that the installation of land drains and/or the raising of the site ground levels is not necessary in relation to this phase.

2.4.10 *Fill to Achieve FFL*

The Section 106 Agreement requires that the build-up of the final elevation after completion of the redevelopment remediation works must comprise a minimum of 0.5m of quality controlled imported fill materials suitable for the use to which they are to be put and of better quality than all RBSLs for the relevant end-use and meeting aesthetic type 1 or better for commercial use.

Atkins' validation report (Information Source 3) states that the post-remediation ground levels upon which this certificate are based generally represent FFL minus 1m and therefore the top 1m of soils, including the top 0.5m of quality controlled imported fill materials, are yet to be placed. As such this requirement is yet to be met for this phase.

A topographical record of the ground levels upon which this certificate is based is shown on drawing 5041216-ATK-DR-C-REM-2133 Rev P1 a copy of which is provided in **Appendix F**.

It should be noted that if there is any significant change in the development proposals or the proposed FFLs then reconsideration of the information contained within this certificate may be necessary. Furthermore, any subsequent import of material and/or removal of material from the phase following certification will need to be controlled by the Local Planning Authority as the Monitor will have no formal on-going role to control subsequent works once this RRWCC has been issued.

3. CERTIFICATION

3.1 Redevelopment Remediation Works

The following section aims to confirm whether or not in the Monitor's professional opinion the redevelopment remediation works have been satisfactorily completed in accordance with the purpose, objectives and requirements of Schedule 8 of the Section 106 Agreement, having regard to the intended use. **Table 7** provides a list of the minimum remedial action required for a commercial phase where groundwater is in rock, as described in Section 2.2 of this report, and summarises whether or not each requirement has been achieved.

Table 7 Certificate Summary

<i>Requirement</i>	<i>Status</i>	<i>Comments</i>
The RBSLs and the aesthetic criteria, remediation quality and scope (including the depth below FFL to which quality standards are achieved) shall be achieved for each part of the property at the minimum validation frequencies set out in the Section 106 Agreement.	Complete	Refer to Section 2.4 of this report.
All oil saturated soils and soil containing free product other than minor sheens shall be removed from the commercial area from ground level down to the surface of bedrock.	Complete	Refer to Section 2.4.1 of this report.
All soils must meet the RBSL for TPH to at least 1m below FFL.	Not applicable	The top 1m of soils is yet to be placed. Refer to Section 2.4.2 of this report.
The relevant RBSLs (recreational RBSLs) must be achieved to an appropriate depth within the public open space.	Complete	Refer to Section 2.4.2 of this report.
An appropriate scheme of validation testing is required for the public open space.	Complete	Refer to Section 2.4.2 of this report.
Where necessary, seeps, sheens and iron rich discharges from the bedrock must be controlled such that there is no visible discharge at surface and little or no odour.	Complete	Refer to Section 2.4.3 of this report.
Where there is a risk of the migration in ground of hazardous gas or contaminated liquid into remediated areas, the Developer shall take all appropriate measures to prevent this occurring.	Complete	Refer to Section 2.4.4 of this report.

<i>Requirement</i>	<i>Status</i>	<i>Comments</i>
All soils must meet in bulk, considering both dispersed fibres and pieces of ACM, the RBSL for ACM to at least 1m below FFL and any visible ACM encountered during construction in the first 1m below FFL is to be removed.	Not applicable	The top 1m of soils is yet to be placed. Refer to Section 2.4.5 of this report.
Develop detailed designs to manage access within the public open space.	Complete	Refer to Section 2.4.6 of this report.
The detailed designs must be protective of human health considering the reasonably anticipatable use of the land.	Complete	Refer to Section 2.4.7 of this report.
All existing buried services shall be removed.	Complete	Refer to Section 2.4.8 of this report.
Wherever there is a risk that following construction of the Urban Village groundwater or organic phase liquid may contaminate soils within the top one metre below FFL such that any of the relevant RBSLs and/or aesthetic criteria specified in Schedule 8 may be exceeded, the Developer shall ensure that all necessary steps are taken to mitigate these risks.	Complete	Refer to Section 2.4.9 of this report.
To provide a minimum thickness of suitable garden soils in residential areas, soils for landscaping in public and commercial areas and sub-base for hardsurfaced areas, the Developer shall build up the final elevation after completion of the RAP and redevelopment remediation works with a minimum of 0.5m of quality controlled imported fill materials suitable for the use to which they are to be put and of better quality than all RBSLs for the relevant end-use and meeting aesthetic type 0 for residential use and type 1 or better for commercial use as specified in Schedule 8 of the Section 106 Agreement.	Not applicable	The top 1m of soils is yet to be placed. Refer to Section 2.4.10 of this report.

3.2

Preventative Measures

In addition to preparing the RAPWCS and RRWCC, the Monitor is also obliged, if requested by CDL, to review any certificate or other documentation produced to CDL by or on behalf of the Developer purporting to confirm that Preventative Measures have been completed or are not required in relation to any phase or part thereof providing CDL in writing of its professional opinion as to:

- whether the author is suitably qualified to issue the certificate; and
- whether the certificate contains or reflects any manifest error, omission or bias, etc. and certifies that the land is fit for its purpose.

The Monitor has not received any such documentation or requests in relation to Phase 68.

3.2.1 Ground Gas

The Section 106 Agreement states that a proprietary and appropriate ground gas resistant membrane and appropriate venting system shall be installed in all structures that will be entered by people and any structure where there is a potential for gas accumulation if ground gas is present.

Atkins is yet to undertake a detailed ground gas assessment for Phase 68 but this will be necessary in order to specify appropriate gas and vapour protection measures. Such measures will need to be agreed with the relevant regulatory authorities prior to installation.

4. CONCLUSIONS

4.1 RRWCC

This RRWCC confirms that in the Monitor's professional opinion, and on the basis of the information provided within the information sources as well as observations made by the Monitor on site during the remediation works, the Monitor is satisfied that the Phase 68 redevelopment remediation works appear to have been completed in general accordance with the purpose, objectives and requirements of Schedule 8 of the Section 106 Agreement, having regard to the specified intended uses, and that the purpose, objectives and requirements of Schedule 8 of the Section 106 Agreement are likely to continue to be met for the foreseeable future without the need for further remedial action in relation to or affecting the area within the phase boundary.

It should be noted that Phase 68 is hereby certified as a commercial phase and public open space, which differs from the residential end-use shown on the current masterplan. If Phase 68 is developed as a residential phase then further redevelopment remediation works will be required. The scope of such works will need to be agreed with the Local Authority as the Monitor will have no formal on-going role to control subsequent works once this RRWCC has been issued.

4.2 PWCD

The PWCD will be declared once CDL is satisfied that the remediation necessary for the specified intended uses for the phase has been completed. This report, which is the RRWCC, will be complemented by a RAPWCS in order to provide the information required by CDL to enable the PWCD to be declared.

APPENDIX A DECLARATION OF PHASE BOUNDARY, INTENDED USE AND PROPOSED DEVELOPMENT LAYOUT



ST. MODWEN DEVELOPMENTS LIMITED - a ST. MODWEN company

Registration England 892832

Park Point, 17 High Street, Longbridge, Birmingham, B31 2UQ

T: 0121 222 9400 **W:** www.stmodwen.co.uk

21st May 2015

Our ref:

Coed Darcy Limited
Dumfries House
Dumfries Place
Cardiff
CF10 3ZF

Dear Sirs

Coed Darcy
Monitor Phase 68
Request for Phase Works Completion Date

We hereby give our written request seeking the declaration of the Phase Works Completion Date for Monitor Phase 68 of Coed Darcy as required under Clause 4.6 of the Remediation Agreement made between Coed Darcy Limited, St. Modwen Developments Limited and St. Modwen Properties PLC dated 23rd May 2008.

The Phase 68 boundary is shown on the attached Drawing No. 5041216-REM-DWG-1967.

The "Intended Use" for Phase 68 is assumed as that of proposed public open space and commercial/retail end use.

As required by the Remediation Agreement, we have copied this letter to the Monitor.

Yours faithfully

Neil Williams

For and on behalf of St. Modwen Developments Limited

Cc Rhys Mander, Llancoed House, Coed Darcy, Neath, SA11 8AZ

St. Modwen Properties PLC

Head Office & Registered Office: Sir Stanley Clarke House, 7 Ridgeway, Quinton Business Park, Birmingham, B32 1AF

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