



API Separators pre-remediation
 3 September 2010



Dewatering – note hydrocarbon sheens
 14 February 2011



Addition of wood chippings to stabilise sludge
 14 February 2011



Example of basal sludge following dewatering
 29 June 2011



Chamber following sludge removal – note hydrocarbon staining on sides
 29 June 2011



Example of brick structures – note hydrocarbon staining
 29 June 2011



API Separators following completion of the works
 4 July 2011



API Separators following completion of the works
 4 July 2011

4.3 Monitoring

4.3.1 Introduction

In order to verify that the works have achieved the RAP requirements, Atkins' criteria for verification were as follows:

- Visual evidence of removal by inspections of the base and sides following sludge removal;
- Observations of the structure following sludge removal;
- Observations of the structure following oil stain removal; and
- Observations of any seepages.

The following sections summarise Atkins' and Celtic's validation/verification findings.

4.3.2 Visual Assessments

Verification comprised a detailed visual inspection of the API Separators by Celtic and Atkins to confirm the removal of the sludge. URS also carried out an inspection from the sides of the API Separators.

The inspections confirmed that the API Separators appeared free of sludge, although some oil staining to brickwork, and to a lesser extent concrete, remained. It was reported that it was not possible to fully remove this staining. Atkins concludes that the staining is considered minor and that it is unlikely to have a significant impact on water quality within the API Separators. Atkins also concludes that the staining is unlikely to impact on the re-use of the material following demolition. URS advises that appropriate testing be carried out prior to re-use of the material to confirm its acceptability with regards being a potential source of contamination.

4.4 Environment Agency Consultation

Schedule 7 of the S106 Agreement places a general obligation on the Developer to maintain open and constructive dialogue with the Environment Agency regarding the progress and all other aspects of the RAP Works. In addition, Schedule 7 of the S106 Agreement specifically states that the sludge in the API Separators shall be removed and treated to the satisfaction of the Environment Agency.

To this end, it is understood that Atkins has liaised with the Environment Agency, confirmation that the works have been completed to the satisfaction of the Environment Agency is awaited. This RWCS shall remain draft until such confirmation has been received from the Environment Agency.

5. CONCLUSIONS

- This draft RWCS refers to the Phase 12 API Separators Sludge Removal RAP Works as envisaged by the S106 Agreement and the RMA.
- The primary objective of the works was to remove basal sludge from the API Separators.
- The location and extent of the works are shown in Atkins drawing ref 5041216-RAP-DWG-1056, a copy of which is attached provided in **Appendix A**.
- No changes to the scope of the RAP Works pertaining to the API Separators as outlined in Schedule 7 of the S106 Agreement were proposed.
- The works were carried out by Celtic from 22 January 2011 to 27 June 2011. URS considers the scope of works that have been completed to be in accordance with the objectives of the RAP requirements.
- It is reported that approximately 3,200m³ of sludge was removed from the API Separators during the works.
- Bioremediation of the removed sludge is ongoing and shall be subject to further validation and certification prior to its re-use on site. This certification is considered outside the scope of this draft RWCS.
- Visual inspections made by Celtic and Atkins indicate the satisfactory completion of the works although some oil staining remains.
- It is considered unlikely that the oil staining will have a significant impact on water quality within the API Separators.
- It is suggested that the API Separators are likely to be demolished and that the materials may be recycled. URS advises that appropriate testing be carried out prior to re-use of the material to confirm its acceptability with regards being a potential source of contamination.

In summary, notwithstanding the above, the works appear to have been completed in general accordance with the requirements of the S106 Agreement. The information provided to URS suggests the works have been executed, validated and verified appropriately.

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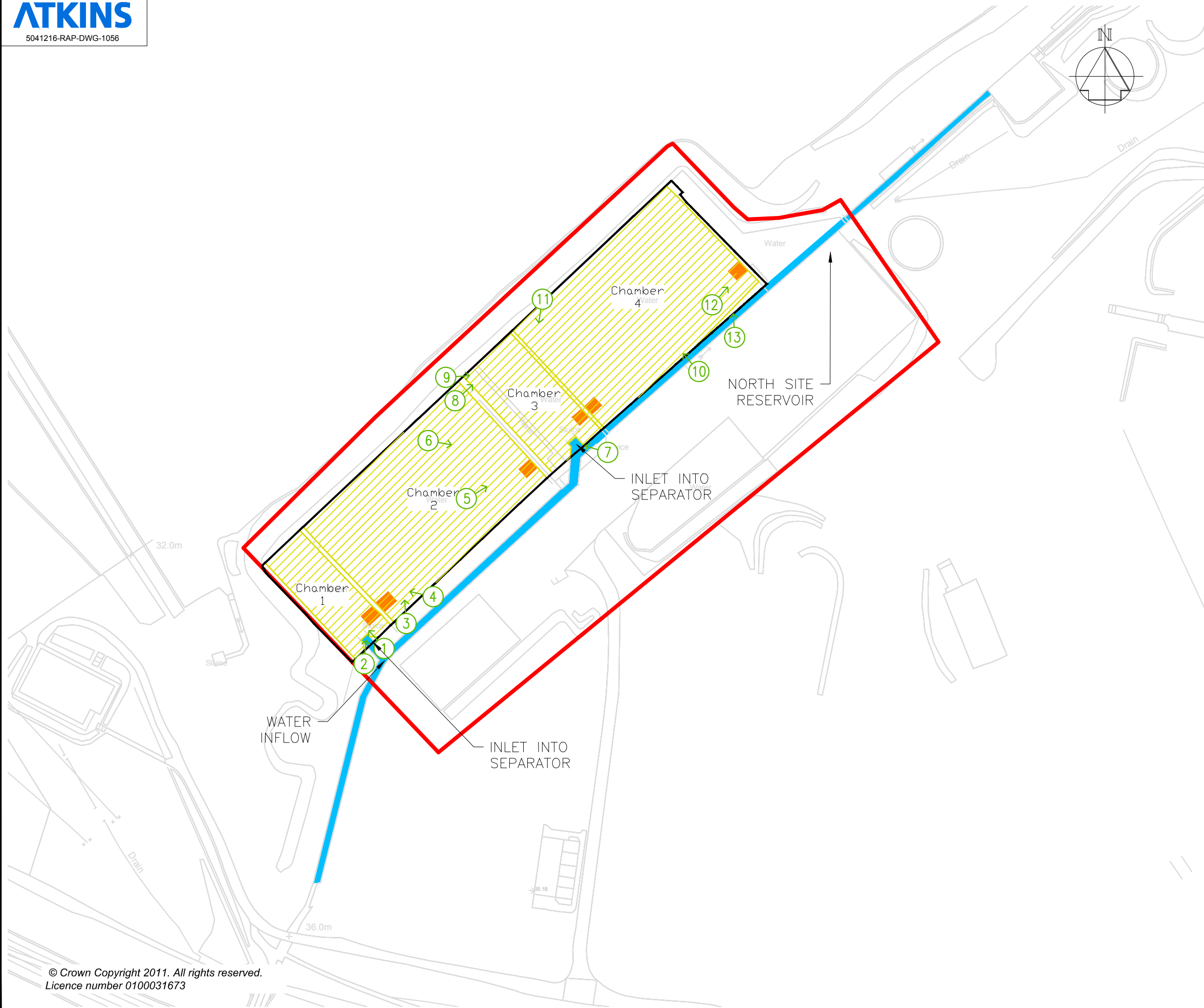
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Appendix A Phase Boundary

KEY:

- PHASE BOUNDARY 12
- ①→ PHOTO DIRECTION
- CHAMBERS
- REMOVED CHAMBERS
- EXISTING CONCRETE DRAINAGE CHANNEL



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Appendix B Information Sources (Digital)



Coed Darcy Monitor

Phase 15 RAPWCS
Western Margins RAP
Feature 3

DRAFT

August 2013

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BRRP00053 / Cert 15a

Prepared for:
Coed Darcy Limited

UNITED
KINGDOM &
IRELAND



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Scope

This Remedial Action Plan (RAP) Works Completion Statement (RAPWCS) 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 (RMA) dated 23 May 2008 between SMD, SMP and CDL.

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

This RAPWCS has been prepared for Phase 15 which forms part of the Western Margins. With reference to the Figure References listed in Table 1 of Schedule 7 of the Section 106 Agreement, this RAPWCS relates to RAP Feature 3 which requires the installation of free-phase product interception and recovery trenches.

This RAPWCS has been prepared 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 RAPWCS is based were notified to URS by letter, a copy of which is provided in **Appendix A**.

The Phase Boundary for Phase 15 is shown as the land edged in red on drawing no. 5041216-RAP-DWG-1164, a copy of which is provided in **Appendix A**.

The Intended Use has been declared as 'residential'.

In accordance with the requirements of URS' Deed of Appointment, this RAPWCS shall:

- Describe the Remedial Action which in URS' professional opinion has been carried out for the purposes of completing the RAP Works in relation to the Phase; and
- Confirm whether or not in URS' professional opinion the RAP Works have been satisfactorily completed for the Phase in accordance with the purpose, objectives and requirements of Schedule 7 of the Section 106 Agreement having regard to the Intended Use.

Furthermore, URS is required to confirm it is satisfied that the purpose, objectives and requirements of Schedule 7 of the Section 106 Agreement have been met and 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 covered by the Phase.

A copy of Schedule 7 of the Section 106 Agreement is provided in **Appendix B**.

Background

Purpose and Objectives of the RAP Works

As defined in Schedule 7 of the Section 106 Agreement the RAP Works are a programme of on-going voluntary Remedial Action in relation to Pre-Transfer Date Environmental Matters at or in the vicinity of the Property which were agreed between the Owner and the relevant Environmental Authorities in lieu of the imposition of formal Remedial Action requirements by any such Environmental Authorities. The RAP Works were designed to protect ecological and

controlled waters receptors close to the site. The RAP Works are not intended to enable redevelopment.

RAP Requirements

In order to prepare this RAPWCS, there are a number of obligations that the Developer needs to demonstrate have been met so that URS can provide opinion on whether or not the Phase is suitable for its Intended Use. These obligations are detailed in Schedules 7 and 10 of the Section 106 Agreement. The principal obligations for the Developer with regards the RAP Works are summarised below.

The Developer shall:

- Carry out or procure the carrying out of all outstanding Remedial Action identified in Table 1 of Schedule 7 of the Section 106 Agreement necessary and sufficient in the context of both the current use of the Property and the Intended Use or such other use as may be determined from time to time;
- Prevent (or where that is not possible, minimise, remedy or mitigate as far as reasonably practicable the effects of) migration from the Property of Pre-Transfer Date Contamination and any Developer Contamination;
- Assess with a frequency agreed as sufficient by the relevant Environmental Authorities and keep under review the condition of the environment at and in the vicinity of the Property and the progress and effectiveness of natural attenuation processes;
- Demonstrate whether or not any Pre-Transfer Date Environmental Matters are posing or may pose an unacceptable risk to the environment beyond the boundaries of the Property;
- Prevent (or where that is not possible, minimise, remedy or mitigate as far as reasonably practicable the effects of) any harm to the environment or any pollution of controlled waters or any possibility of such harm or pollution being caused;
- Avoid where reasonably practicable any Environmental Claim by any relevant Environmental Authority in relation to or in connection with any Pre-Transfer Date Environmental Matter;
- Take all reasonably practicable steps to seek to secure the final and unconditional acceptance by the relevant Environmental Authority of the surrender of the Waste Management Licence as soon as reasonably practicable.

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

Redevelopment Remediation Works

In addition to meeting the requirements of the RAP Works, the Developer must also complete the necessary Redevelopment Remediation Works, the requirements for which are outlined in Schedule 8 of the Section 106 Agreement.

It is intended that this report, which is the RAPWCS, will, in time, be complemented by a Redevelopment Remediation Works Completion Certificate (RRWCC) in order to provide the information required by CDL to enable the Phase Works Completion Date (PWCD) to be declared.

PWCD

The objective of the RAP Works will be deemed to have been met for the purposes of the Section 106 Agreement and the RMA on the date specified in the notice from CDL declaring the PWCD. The PWCD will be declared once CDL is satisfied that the remediation necessary for the specified Intended Use for the Phase has been completed.

Information Sources

A list of the Information Sources consulted by URS is provided below in Table 1.

Table 1 Information Sources

Ref.	Document Reference	Format	Title	Author	Date
1	39991009/DR869r3	Report	BP Llandarcy Refinery Remedial Action Plan	Dames & Moore	Mar 2000
2	44382742/BRRP0001	Report	BP Llandarcy Refinery Desk Study	URS	Jul 2007
3	N/A	Report	Western Margin and Railhead Geological Conceptual Site Model Report	Atkins	Feb 2011
4	5041216-RAP-RPT-770	Report	RAP Features 2, 3, 4 & 5 – Western Margins RAP Works Assessment Report	Atkins	Oct 2012
5	5041216-RAP-TN-797	Technical Note	Response to RFI103	Atkins	Jul 2012
6	5041216-RAP-TN-949	Technical Note	RAP Feature 5 Assessment	Atkins	Jun 2013

Electronic copies of the Information Sources are provided in **Appendix C**.

Unless otherwise stated, URS has relied solely on the Information Sources as the basis for issuing this RAPWCS. In URS' 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 URS unless otherwise noted in this report.

Requests for Information RFIs Issued by RS

A summary of the RFIs raised by URS in relation to the Western Margins is provided below in Table 2. Copies of the RFIs are provided in **Appendix D**. Copies of the responses received are included in the Information Sources provided in **Appendix C**.

Table 2 RS RFIs

RFI Ref.	Title	Associated Documents	Date Raised	Closed	Comments
N/A	Email re. Western Margins Conceptual Site Model	Western Margin and Railhead Geological Conceptual Site Model Report	21 Feb 2011	Yes	No formal response received but comments addressed in later reports

RFI Ref.	Title	Associated Documents	Date Raised	Closed	Comments
103	Review of Atkins' Western Margins RAP Works Assessment Report	Atkins' Western Margins RAP Works Assessment Report	22 May 2012	Yes	Refer to Atkins Technical Note 5041216-RAP-TN-797

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Location

Phase 15 is located on the western edge of the former refinery between South Site Reservoir and the Tip. Crymlyn Bog is situated directly to the west of the Western Margins, as indicated in **Figure** below. Further reference should also be made to Atkins drawing no. 5041216-REM-DWG-433 Rev A, a copy of which is provided in **Appendix C**, which shows the location and extent of the Western Margins.

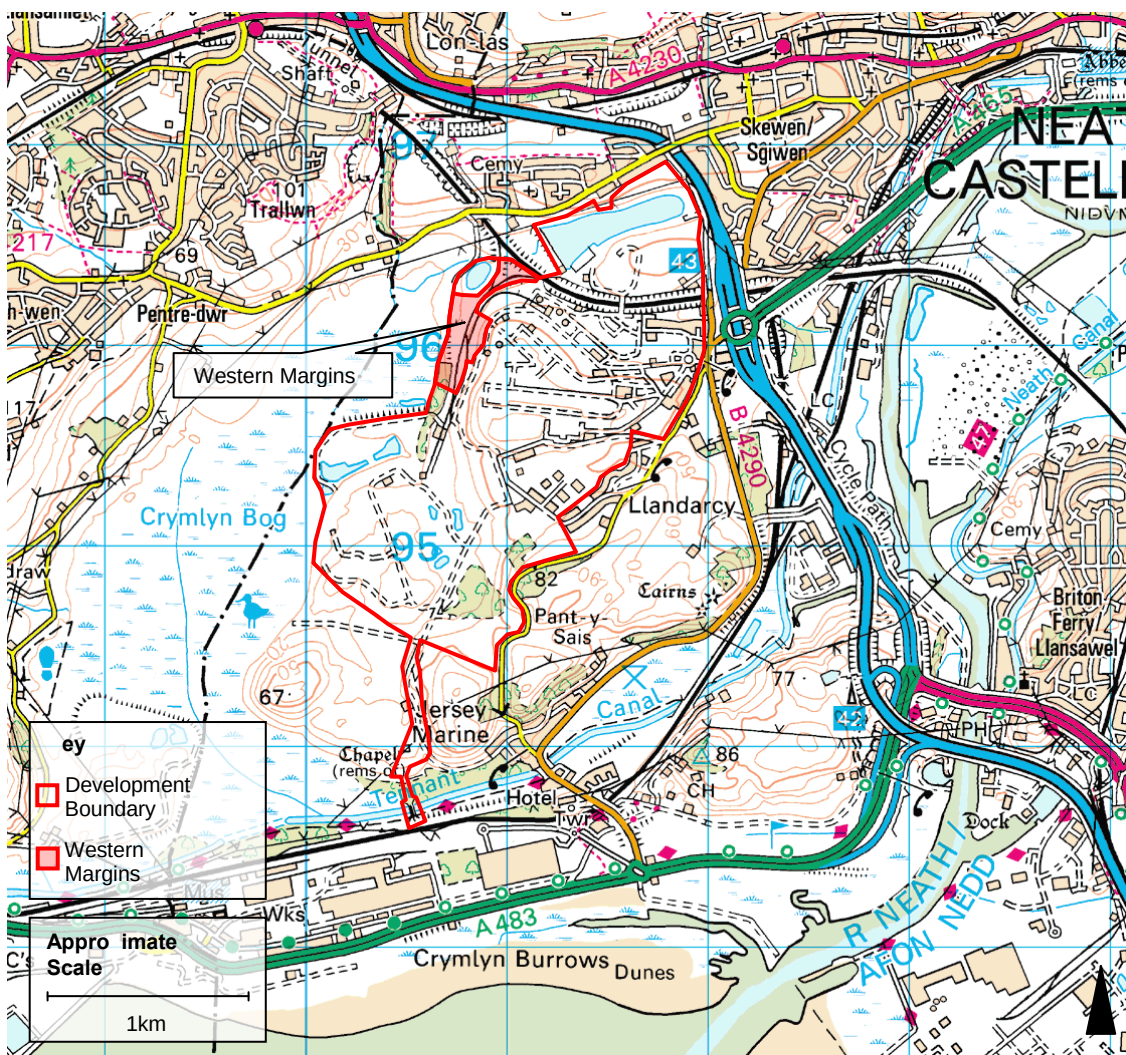


Figure Location plan

Purpose and Scope of the Original RA or s proposals

Crymlyn Bog is the main environmental receptor within the vicinity of the Western Margins and is therefore the focus of remedial actions for the RAP works discussed in this RAPWCS.

The most significant risk to Crymlyn Bog is the potential for free-phase product or contaminated groundwater to migrate beyond the site boundary. With reference to the historical plans provided in **Appendix E**, the major site features from which groundwater and surface water flow are likely to drain to Crymlyn Bog include the southern tank farm, the

containment area, the former process areas and the western parts of the north site tank farm. These groundwater and surface water flows are likely to permeate through the Western Margins before entering Crymlyn Bog, as illustrated in the conceptual site model drawings provided in **Appendix F** which are taken from the BP Llandarcy Refinery Remedial Action Plan report dated March 2000 (Information Source 1)

The conceptual site model drawings also illustrate the RAP Works that were originally proposed with the objective of intercepting and collecting free-phase product to prevent further migration into Crymlyn Bog. These RAP works, as described in Schedule 7 of the Section 106 Agreement, are summarised in Table 3 below.

Table E tract from Table from Schedule of the Section Agreement

RAP Item	Key Issues	Scope of Originally Envisaged Remedial Action	Performance Criteria	Works to Date
2	Potential for cross boundary free product migration at various locations along boundary Dissolved-phase hydrocarbon migration	Product interception and recovery, consisting of the following programme elements: Design-level investigations to assess specific requirements Design and Installation of permanent system to intercept and recover free-phase product Diffuse discharge of water arising from interception system to Bog, via purpose-constructed wetland features. System-specific monitoring of surface and groundwater Above programme of works to include the following as a minimum: Railhead (install 200 x 4 metre trench, and 200 metre linear wetland feature)	Install permanent measures to prevent free product from crossing the site boundary and entering Crymlyn Bog to satisfaction of EA and CCW Diffuse discharge of water arising from interception system to Bog, via purpose-constructed wetland features to reduce dissolved hydrocarbon load and without requirement for a discharge consent. Prevent ochreous precipitate discharges from site to the Crymlyn Bog arising from the interception feature. All works to satisfaction of EA and CCW	Some additional wells installed in 2000 to monitor for free-product.
		Railhead to South reservoir (install 250 x 4 metre trench, interception only, i.e., no wetland)	All works to be protective of future public health and safety assuming unrestricted recreational access.	
		Between North and South reservoirs (install 100 x 2 metre interception and recovery trench only)		
		Design and Install 'Inland' free product interception and collection system between Railhead and Main Site (200 x 3 metres, interception and recovery trench only).	Install permanent system to prevent free product migration to railhead to satisfaction of EA and NPT.	
5	Free-phase seepage leading to gross-contamination of surface soils in interior of site.			

As discussed previously, this RAPWCS considers RAP Feature 3 which requires the installation of a free-phase product interception and recovery trench. RAP features 2, 4 and 5, the requirements for which are crossed through in Table 3 above, will be considered under a separate RAPWCS.

Further reference should be made to the drawings provided in **Appendix** which illustrate the above RAP works as was originally envisaged.

Changes to the Scope of the RAP Works

The RAP Works were outlined and agreed in principle with the Environment Agency (EA) and the Countryside Council for Wales (CCW) prior to the development of plans to regenerate the site as the Coed Darcy Urban Village. For this reason, Schedule 7 of the Section 106 Agreement makes provision for alternative approaches to the listed RAP Works provided agreement can be reached with the relevant Regulators.

As discussed further in Section 3 of this report, although no changes to the approach have been formally requested, the works that have been carried out are not entirely as originally envisaged. The reasons for the alternative approach are discussed in the following sections and URS is satisfied that the works that have been carried out are in general accordance with the purpose, objectives and requirements of Schedule 7 of the Section 106 Agreement.

RE IE OF T E CO L E T E R A O R S

Introduction

The following sections discuss whether or not the requirements specified in Table 1 of Schedule 7 of the Section 106 Agreement have, in URS' professional opinion, been satisfactorily completed in accordance with the purpose, objectives and requirements of the Section 106 Agreement.

Before discussing the works that have been undertaken it is important to recognise that the purpose of RAP Feature 3, as set out in Table 1 of Schedule 7 of the Section 106 Agreement, is to intercept and recover free-phase product. As a result, the following sections focus on the presence, or otherwise, of free-phase product and does not consider other indicators of contamination such as odours, sheens or the dissolved phase, as these are likely to be addressed as part of the Redevelopment Remediation Works when undertaken.

Site Investigations

The Section 106 Agreement requires design-level investigations to be undertaken to assess the specific requirements of the proposed interception and free-phase product recovery trenches. The following sections provide details of the site investigations undertaken by Atkins.

Atkins' Western Margins RAP Works Assessment Report (Information Source 4) states that initial site investigations were undertaken from May 2009 to winter 2010. This involved the excavation of six trial pits to a maximum depth of 2.8 m along the alignment of RAP Feature 3.

Atkins reports that hydrocarbon staining and odours were noted in all of the trial pits but no recoverable free-phase product was encountered. Atkins reports that the trial pits were left open to allow monitoring. Hydrocarbon sheens were observed in three of the six trial pits and ochreous discharges were noted in two of the trial pits.

Atkins reports that three 600 mm diameter monitoring sumps were later installed along the line of RAP Feature 3 to replace three of the trial pits and allow on-going monitoring. The sumps were installed to a depth of approximately 1 m below perched groundwater level.

Monitoring of Surface and Groundwater

The Section 106 Agreement requires system-specific monitoring of surface water and groundwater.

Atkins' Western Margins RAP Works Assessment Report (Information Source 4) states that the monitoring sumps and interception trenches within the Western Margins have been monitored 25 times during a two-year period between February 2010 and January 2012. Also, a number of pre-existing boreholes have been monitored.

With regards RAP Feature 3, droplets of free-phase product were initially observed in two of the monitoring sumps but Atkins reports that no free-phase product or sheens have been observed since March 2011.

Atkins reports (Information Source 4) that 14 up-gradient boreholes in the vicinity of the Western Margins have been monitored for the presence of free-phase product. One borehole is reported to have contained free-phase product, although Atkins reports that this is considered to be localised as other boreholes down-gradient have not shown free-phase product.

Atkins also reports (Information Source 4) that 'draw down' tests were performed on ten of the 31 trial pits that had been excavated within the Western Margins. These tests involved

pumping out groundwater from the trial pits where hydrocarbon sheens had been observed. Groundwater inflow was then observed. Free-phase product returned to eight of the 10 trial pit locations.

Six of the eight locations where free-phase product re-entered the trial pits are situated along the alignment of RAP Feature 2, which is not considered in this RAPWCS. The remaining two locations where free-phase product returned to the trial pit are situated on the alignment of RAP Feature 3, adjacent to South Site Reservoir. The thicknesses reported were a sheen in RHRW029 and 10mm in RHRW035.

Ochreous discharges

The Section 106 Agreement requires the prevention of ochreous precipitate discharges from the site to Crymlyn Bog. As noted above, ochreous discharges have been observed.

Atkins reports (Information Source 4) that proposals for the interception and collection of ochreous seepages will be developed as part of RAP Feature 2 and are likely to comprise a system of reed filled trenches with a monitored discharge point, later to be incorporated into the drainage design as and when the area is developed for residential use.

Given that RAP Feature 2 is located topographically at the lowest point within the Western Margins and is situated directly adjacent to Crymlyn Bog, URS considers this to be an acceptable approach.

URS Observations during the works

URS attended site during the works to observe progress. The following table provides a summary of URS' observations.

Table 1: URS Observations during the works

Date	URS' Observations
30-Jun-2009	URS inspected the various trial pits that have been installed throughout the Western Margins. Ochreous seepages were noted in many of the pits and free-phase product was evident in some – most notably in those excavated within the vicinity of RAP Feature 2.
24-Nov-2011	Walkover with Atkins to review the monitoring works that have been on-going within the Western Margins. Ochreous discharges are evident in most locations, but most notably in the vicinity of RAP Features 2 and 5. Free-phase product was evident in some of the monitoring sumps with the biggest quantities in those sumps along RAP Feature 2. Elsewhere free-phase product was limited to sheens and some droplets.
26-Jul-2012	Walked over the Western Margins and discussed the latest monitoring results with Atkins. It would appear that there would be limited benefit to carrying out further works for RAP Features 3, 4 and 5 due to the limited volumes of free-phase product that have been observed. However, ochreous seepages, especially along RAP Feature 5, are evident. Also, RAP Feature 2 remains a concern where free-phase product was noted within the monitoring sumps and observation trenches. Oily seepages were also observed at ground level here.

Date	URS' Observations
17-Apr-2013	Walked over the Western Margins with Atkins to discuss RAP Features 2 and 5. With regards RAP Feature 5 it was confirmed that reed growth that is already evident within the trench will be encouraged with a view to polishing the ochreous discharges. With regards RAP Feature 2 free-phase product was again observed within the monitoring sumps and interception trenches. It was confirmed that the existing trenches would be re-excavated and the monitoring sumps refurbished to increase the zone of influence through the introduction of new granular backfill. It was agreed that the existing reed bed, including the inlet and outlet level controls, will also be refurbished.

A selection of photographs is provided in **Appendi** .

Summary

The Section 106 Agreement requires the design and installation of a permanent system to intercept free-phase product comprising a 250 x 4 m trench between the Railhead to South Site Reservoir.

As discussed in Section 3.2 of this report, six trial pits were excavated along the alignment of RAP Feature 3 and three monitoring sumps were later installed to allow on-going monitoring. As discussed in Section 3.3 droplets of free-phase product were initially observed in two of the monitoring sumps but Atkins reports that no free-phase product or sheens have been observed since March 2011.

Although the trial pits and sumps were not installed to the 4 m depth originally specified in the Section 106 Agreement, Atkins reports that the monitoring sumps were installed to a depth of approximately 1 m below perched groundwater level.

In summary, although the RAP works as originally envisaged have not been undertaken, URS is satisfied that the investigations and subsequent monitoring that has taken place has adequately shown that the originally proposed free-phase product interception features would not have recovered significant volumes of free-phase product. Therefore URS is satisfied that RAP Feature 3, as originally envisaged, is not necessary and that the purpose, objectives and requirements of Schedule 7 of the Section 106 Agreement will still be achieved.

rotection of Future ublic ealth

The Section 106 Agreement requires all works to be protective of future public health and safety assuming unrestricted recreational access.

As minimal free-phase product has been observed during the site investigations and subsequent monitoring, unrestrictive recreational access is unlikely to result in members of the public coming into contact with free-phase product in this location.

It should be noted that in order to be certified for redevelopment as a residential phase, further Redevelopment Remediation Works shall be required in accordance with Schedule 8 of the Section 106 Agreement. These works are aimed at being protective of future human health.

Consultation with the EA and CC

The Section 106 Agreement requires all works to be completed to the satisfaction of the EA and CCW. Both organisations now form part of Natural Resources Wales.

URS is yet to receive confirmation that Natural Resources Wales is satisfied with the works that have been carried out. Therefore, this RAPWCS shall remain draft until confirmation has been received.

CERTIFICATIO

The following table, which summarises the requirements specified in Table 1 of Schedule 7 of the Section 106 Agreement, aims to confirm whether or not in URS' professional opinion the RAP Works have been satisfactorily completed in accordance with the purpose, objectives and requirements of Schedule 7 of the Section 106 Agreement.

Table Certification Summary

Requirement	Status	Comments
Design-level investigations to assess specific requirements	Complete	Refer to Section 3.2 of this report.
Design and installation of permanent system to intercept and recover free-phase product and prevent free product from crossing the site boundary and entering Crymlyn Bog: Railhead to South Site Reservoir - Install 250 x 4 m trench, interception only, i.e. no wetland (RAP Feature 3)	Not Required	Refer to Section 3.6 of this report.
System-specific monitoring of surface and groundwater	Complete	Refer to Section 3.3 of this report.
Prevent ochreous precipitate discharges from site to Crymlyn Bog arising from the interception feature	Complete	Refer to Section 3.4 of this report. It should also be noted that further works will be required under RAP Feature 2.
All works to be completed to the satisfaction of the EA and CCW	Not Complete	Refer to Section 3.8 of this report.
All works to be protective of future public health and safety assuming unrestricted recreational access	Complete	Refer to Section 3.7 of this report.

CO CL SIO S**Overview**

- This RAPWCS refers to the Western Margins RAP Feature 3 as envisaged by the Section 106 Agreement and the RMA.
- The Phase Boundary for Phase 15 is shown as the land edged in red on drawing no. 5041216-RAP-DWG-1164, a copy of which is provided in **Appendix A**.
- The primary objective of the RAP Works as originally proposed was to install free-phase product interception and recovery features within the Western Margins to prevent migration into Crymlyn Bog.
- The location and extent of the works are shown in Atkins drawing no. 5041216-REM-DWG-433, a copy of which is provided in **Appendix C**.
- No changes to the scope of the RAP Works as outlined in Schedule 7 of the Section 106 Agreement were proposed, albeit site investigations and subsequent monitoring indicated that the originally proposed free-phase product interception and recovery features would have resulted in the recovery of negligible volumes of free-phase product. Therefore it was concluded that the installation of permanent features is not necessary.
- Written confirmation is required from Natural Resources Wales that the works have been completed to their satisfaction. This RAPWCS shall remain draft until such time as this confirmation is received.

RA CS

This RAPWCS confirms that in URS' professional opinion, on the basis of the information provided within the Information Sources and observations made by URS and notwithstanding the limitations listed in Section 5.3 below, the RAP Works for Phase 15 (RAP Feature 3) appear to have been completed satisfactorily in general accordance with the purpose, objectives and requirements of Schedule 7 of the Section 106 Agreement.

Furthermore, again notwithstanding the limitations listed in Section 5.3 below, URS is satisfied that the purpose, objectives and requirements of Schedule 7 of the Section 106 Agreement have been met and 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 covered by the Phase.

Specific Limitations in Relation to this RA CS

As discussed in Section 3.8 of this report, the Section 106 Agreement requires all works to be completed to the satisfaction of Natural Resources Wales. As URS is yet to receive confirmation that Natural Resources Wales is satisfied with the works that have been carried out, this RAPWCS shall remain draft until confirmation has been received.

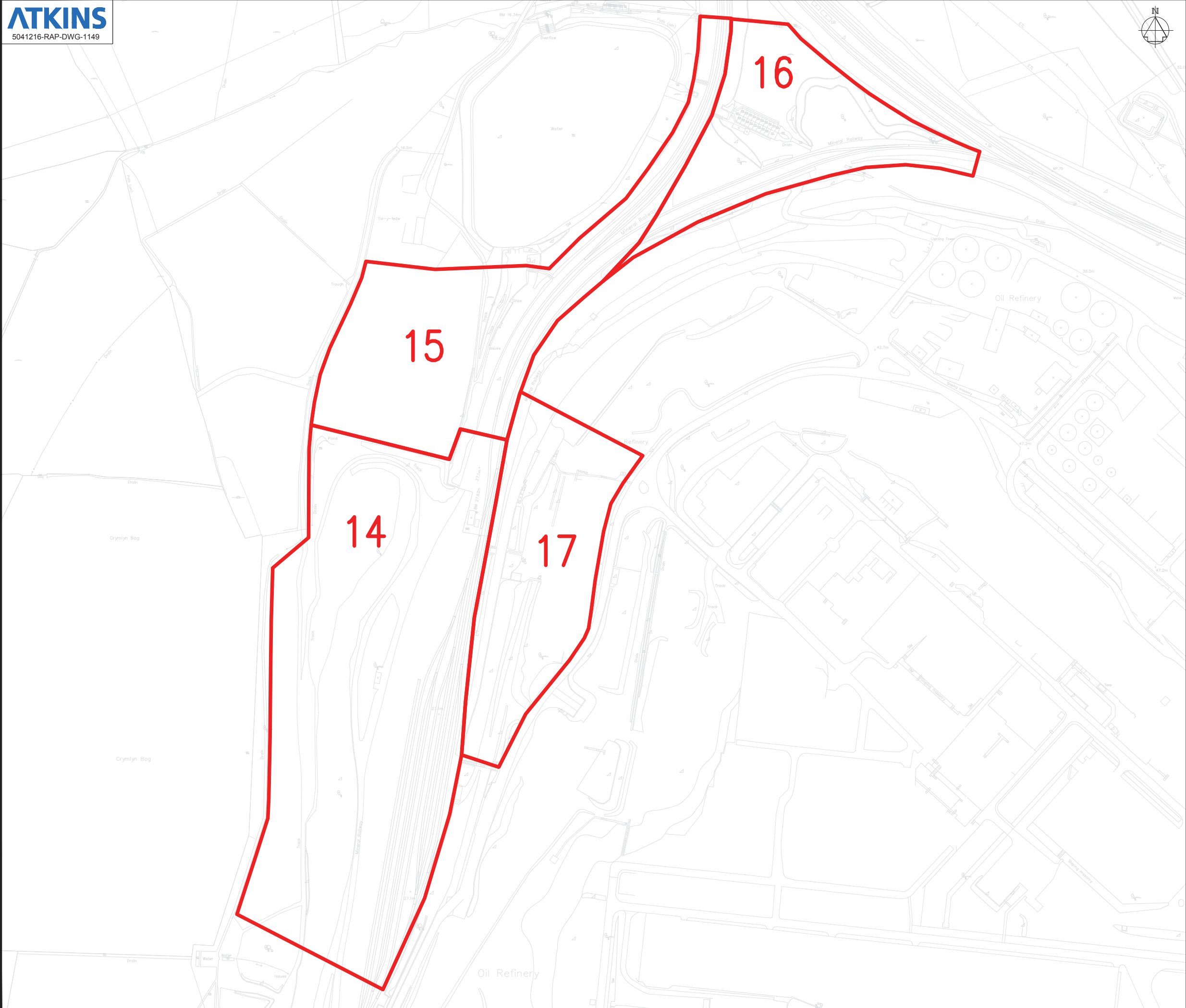
Furthermore, this RAPWCS is issued on the basis that RAP Feature 2 will be installed and that this will include measures to deal with the ochreous seepages that have been observed throughout the Western Margins.

C

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



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KEY



PHASE BOUNDARIES

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REVISIONS	Drawn By	Checked By	Date
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PURPOSE OF ISSUE	Rev.	Authorised for issue	Date
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THIS DRAWING IS NOT TO BE SCALED

CLIENT



PROJECT

Coed Darcy Urban Village

DRAWING TITLE

Western Margain Phase Boundaries RAP 2-5

Scales 1:1250	DRAWN A.J	CHECKED H.M	CO-ORD CHECK
	DATE 27.02.12	DATE 27.02.12	DATE
DRAWING NO 5041216-RAP-DWG-1164		SHEET A1	PLOT DATE 23.03.12 REV -

A E I B SC E LE OF T E SECTIO A REE E T

SCHEDULE 7

The RAP Works

Purpose, objectives and requirements of the RAP Works

Part 1

1. Purpose and objectives of the RAP Works

- 1.1 The RAP Works (a programme of ongoing voluntary Remedial Action in relation to Pre-Transfer Date Environmental Matters at or in the vicinity of the Property) have been agreed between the Owner and the relevant Environmental Authorities in lieu of the imposition of formal Remedial Action requirements by any such Environmental Authorities.
- 1.2 The current requirements and status of the RAP Works are as set out in Table 1 below.
- 1.3 The parties to this Agreement agree that the purpose and objectives of the RAP Works are the carrying out of the appropriate Remedial Action necessary, and sufficient in the context of both the current use of the Property and the Intended Use or such other use as may be determined from time to time:
 - 1.3.1 to prevent (or where that is not possible, minimise, remedy or mitigate as far as reasonably practicable the effects of) migration from the Property of Pre-Transfer Date Contamination and any Developer Contamination; and
 - 1.3.2 to assess with a frequency agreed as sufficient by the relevant Environmental Authorities and keep under review:
 - (a) the condition of the Environment at and (provided appropriate access is procured (the Developer having used reasonable endeavours to obtain it)) in the vicinity of the Property, including any controlled waters that are or may be affected by such condition, and (provided appropriate access is procured (the Developer having used reasonable endeavours to obtain it)) any land adjoining or adjacent to the Property; and
 - (b) the progress and effectiveness of natural attenuation processesin order in each case to demonstrate whether or not any Pre-Transfer Date Environmental Matters are posing or may pose an unacceptable risk to the Environment beyond the boundaries of the Property in the light of Environmental Law; and
 - 1.3.3 to prevent (or where that is not possible, minimise, remedy or mitigate as far as reasonably practicable the effects of) any harm to the Environment or any pollution of controlled waters or any possibility of such harm or pollution being caused in each case by or as a result of any Pre-Transfer Date Environmental Matter including the containment of free phase Hydrocarbons within the Property boundaries; and
 - 1.3.4 to avoid where reasonably practicable any Environmental Claim by any relevant Environmental Authority in relation to or in connection with any Pre-Transfer Date Environmental Matter, including without limitation to avoid service on any party in relation to or in connection with any Pre-Transfer Date Environmental Matters of:
 - (a) a "remediation notice" under Part IIA of the Environmental Protection Act 1990; or

- (b) a "works notice" under Chapter 1 of Part VII of the Water Resources Act 1991; or
 - (c) a notice under Section 59 of the Environmental Protection Act 1990 requiring removal of waste or the carrying out of steps to eliminate or reduce the consequences of deposited waste; or
 - (d) the imposition of a requirement by any relevant Environmental Authority for any party to carry out any Remedial Action pursuant to EU Directive 2004/35/CE of 21 April 2004 and/or pursuant to any legislation implementing such Directive in England and Wales, or to recover the costs of the taking of such Remedial Action by any such Environmental Authority; and
- 1.3.5 to take all reasonably practicable steps to seek to secure the final and unconditional acceptance by the relevant Environmental Authority of the surrender of the Waste Management Licence as soon as reasonably practicable.

Table 1
Current RAP Works and Status

Site Area / Potential Receptor	Key Issues	Scope of Currently Envisaged Remedial Action	Figure Reference	Performance Criteria	Works to Date
Whole Site	Continued demonstration of natural attenuation of dissolved phase hydrocarbons. Consultation with EA and CCW	Six monthly: - Liquid level measurements - Analytical samples from 120 ground and surface water sample locations. Locations specified in the semi-annual reports submitted to the Environment Agency. - Six-monthly reporting of trends. Regular update meetings (minimum bi-annually) with EA and CCW for lifetime of RAP	NA	Routine programme of groundwater level and quality and product thickness monitoring. Annual scope to be agreed with EA on rolling basis.	Ongoing since 2000. Annual reductions in scope have been agreed with EA on basis of data received.

Site Area / Potential Receptor	Key Issues	Scope of Currently Envisaged Remedial Action	Figure Reference	Performance Criteria	Works to Date
Western flank of main site / Crymlyn Bog / Boundary with North Reservoir	- Potential for cross boundary free product migration at various locations along boundary - Dissolved-phase hydrocarbon migration	- Monitor 30 'sentinel' wells along northwest and southeast boundaries of North Site for presence of free product. Locations included in 'Whole Site' above. - Install permanent product interception trench system along boundary of North Site, if sentinel well data suggests a risk of downgradient product migration occurring and in any event install a product interception trench to, at a minimum, replace the current sentinel wells prior to redevelopment (300 x 4 metres minimum). Any interception trench must prevent further downgradient migration of free product and allow recovery of intercepted product.	1	Continued six-monthly monitoring of free product thickness, and assess potential for further downgradient migration. All works to be protective of future public health and safety assuming unrestricted recreational access.	Sentinel well installations complete on North Site, and listed in semi-annual monitoring reports.

Site Area / Potential Receptor	Key Issues	Scope of Currently Envisaged Remedial Action	Figure Reference	Performance Criteria	Works to Date
Western flank of main site / Crymlyn Bog / Boundary with North Reservoir (cont.)		2. Product interception and recovery, consisting of the following programme elements: 1. Design-level investigations to assess specific requirements 2. Design and Installation of permanent system to intercept and recover free-phase product 3. Diffuse discharge of water arising from interception system to Bog, via purpose-constructed wetland features. 4. System-specific monitoring of surface and groundwater Above programme of works to include the following as a minimum: • Railhead (install 200 x 4 metre trench, and 200 metre linear wetland feature) • Railhead to South reservoir (install 250 x 4 metre trench, interception only, ie, no wetland) • Between North and South reservoirs (install 100 x 2 metre interception and recovery trench only)	2 3 4	Install permanent measures to prevent free product from crossing the site boundary and entering Crymlyn Bog to satisfaction of EA and CCW Diffuse discharge of water arising from interception system to Bog, via purpose-constructed wetland features to reduce dissolved hydrocarbon load and without requirement for a discharge consent. Prevent ochreous precipitate discharges from site to the Crymlyn Bog arising from the interception feature. All works to satisfaction of EA and CCW. All works to be protective of future public health and safety assuming unrestricted recreational access.	Some additional wells installed in 2000 to monitor for free-product.

Site Area / Potential Receptor	Key Issues	Scope of Currently Envisaged Remedial Action	Figure Reference	Performance Criteria	Works to Date
Containment Area	Free product migration from filled area into Crymlyn Bog, Crymlyn Bog Lagoon, and South Bay.	Product interception and recovery, consisting of the following programme elements:		Remove free product with a temporary in-situ system to extent practicable until recovery is asymptotic from a system which hydraulically influences the free product contaminated filled area to the satisfaction of EA	System installed in 2005, recovery ongoing.
		1. Complete design-level investigations to assess specific requirements 2. Design and Installation of permanent system to intercept and recover free-phase product 3. System-specific monitoring		Install permanent measures to prevent free product from:	Temporary (plywood bund) system in place; regularly maintained.
		Above programme of Works to include the following as a minimum:	6	• leaving site boundary and entering Crymlyn Bog • entering Crymlyn Bog Lagoon from filled area in Tip	Some survey information collected along Tip perimeter
		• Filled area; expand on existing system; upgrade to 12 pumping wells	7	• entering the licensed area from Tank farm	Some site investigation and monitoring data available to assist in design.
		• Northern Tip perimeter adjacent to Crymlyn Bog (install permanent engineered and covered 500 x 1 metre product interception and recovery feature in place of current plywood bund)	8	in all cases permitting the free flow of groundwater past the interception features and to permit recovery of product, all to satisfaction of EA, NPT and CCW.	
		• Filled area to South Bay/Crymlyn Bog (install 500 x 4 metre, product interception and recovery trench)	9		
		• From north Tank Farm into licensed area (ie, South Bay, and Crymlyn Bog lagoon install 300 x 4 metre product interception and recovery trench)			

Site Area / Potential Receptor	Key Issues	Scope of Currently Envisaged Remedial Action	Figure Reference	Performance Criteria	Works to Date
Containment Area	Hydrocarbon-containing peat and sludges.	Excavation and treatment of peats and sludges in (all quantities estimated and unverified): • South Bay (15,000m3) • West Bay (10,000 m3) • Crymlyn Bog Lagoon (20,000m3)	10 11 11	Removal and treatment to achieve restoration quality standards agreed with the Environment Agency of hydrocarbon contaminated surface and near surface soil and sediment to satisfaction of EA.	7,000 m3 peats/sludges removed from lagoon and treated in 2006/7.
	Surrender of Waste Management Licence EAWML34004 (licence status active, but landfill 'closed or closing').	In addition to free-product issues above, the following are also required: • Agree programme of works with EA to permanently restore Tip and secure Waste Management Licence surrender.	6, 12 12	Surrender Waste Management Licence.	Design work commenced to utilise material from Area 1. Ongoing.
	Dissolved-phase hydrocarbon discharge to Crymlyn Bog.	• Ensuring of long term security and immobilisation of wastes in the filled area. • Construct permeable cap and re-profile filled area with cover material (at least 50,000 m2) • Construct engineered wetland in lagoon (15,000 m2) to reduce dissolved hydrocarbon load in surface water exiting Tip. • alterations to drainage regime such that flow to Crymlyn Bog from the site is diffuse, rather than from a point-source, as currently exists.	13 14	Reduce dissolved phase hydrocarbon load in groundwater and surface water leaving the Tip and entering Crymlyn Bog.	
				All works to be protective of future public health and safety assuming unrestricted recreational access.	

Site Area / Potential Receptor	Key Issues	Scope of Currently Envisaged Remedial Action	Figure Reference	Performance Criteria	Works to Date
South Tank Farm	Potential dissolved-phase hydrocarbon discharge to stream discharging to Crymlyn Bog to south	- Constructed wetland (2500 m2), - groundwater monitoring programme	15	Reduction of dissolved phase hydrocarbon load to Crymlyn Bog	Monitoring
North Reservoir and East Bay	- Basal sludges. - Reconfigure reservoir to meet near pre-refinery conditions as part of return of land to the landowner. - Restoration of original drainage patterns.	Design and implement sludge removal and treatment programme for (all quantities estimated and unverified): - North Site Reservoir (40,000 m3), - East Bay (5,000m3) - API Separators (5,000 m3) Isolate reservoir from site drainage system Drain reservoir Remove dam Restore and landscape valley	16 17 18 19 16, 17 20 16, 17	- Sludge removed, treated to satisfaction of EA dependent on fate and disposed of or re-used. - Water removed, treated as required and disposed of. No discharge of NSR water to Crymlyn Bog permitted unless otherwise agreed with appropriate Environmental Authorities. - Valley restored to near pre-refinery conditions so as to be suitable for uncontrolled recreational access. - Dam removed and materials re-used. - Post restoration water management programme implemented consistent with restored valley. All works to be protective of future public health and safety assuming unrestricted recreational access.	Sludge removal from East Bay (part complete); no work on reservoir yet. Not commenced. Not commenced. Not commenced. Not commenced.

Site Area / Potential Receptor	Key Issues	Scope of Currently Envisaged Remedial Action	Figure Reference	Performance Criteria	Works to Date
South Reservoir	Hydrocarbon contaminated sludges to which contaminated groundwater discharges.	1. Design and implement programme of sludge removal and treatment (estimated at 5,000 m3). 2. Prevent / mitigate hydrocarbon seepage from walls and floor of reservoir (150 m) 3. "Soften" walls and landscape to satisfaction of CCW to enhance ecological value	21	Retain significant portion of South Reservoir as "clean" water feature. Reduction of hydrocarbon seepage from walls of reservoir as far as possible to satisfaction of EA. Discharge re-routed. CCW sign off on 'softening' and landscaping to increase ecological value. All works to be protective of future public health and safety assuming unrestricted recreational access.	Not commenced
Southern edge of process area / Llandarcy Bog	Potential free product migration to Llandarcy Bog. Dissolved-phase hydrocarbon discharge to bog/culverted drain.	Intercept free product. Six-monthly water monitoring programme (as specified in 'Whole Site', above) Construct linear wetland (100 m2).	22 23	Install permanent product interception feature. Reduce dissolved phase hydrocarbon load and ochreous precipitate discharges from site as far as possible to satisfaction of EA. All works to be protective of future public health and safety assuming unrestricted recreational access.	Completed in 2005. Not commenced, monitoring ongoing.

Site Area / Potential Receptor	Key Issues	Scope of Currently Envisaged Remedial Action	Figure Reference	Performance Criteria	Works to Date
Eastern process area / Neath valley and river	Potential cross boundary free product migration into railway cutting.	Monitor 30 sentinel wells for free-phase product on six-monthly basis. Install permanent product interception trench system along boundary of North Site, if sentinel well data suggests a risk of downgradient product migration occurring and in any event install such a trench to, at a minimum, replace the current sentinel wells prior to redevelopment (500 x 3 metres minimum). Any interception trench must prevent further downgradient migration of free product and allow recovery of intercepted product.	24	Install permanent interception feature to prevent free product migration downgradient and permit recovery of intercepted product.	Sentinel well installation complete. Groundwater monitoring only.
	Known and or suspected presence of free phase hydrocarbon and chlorinated hydrocarbons. Dissolved hydrocarbon and chlorinated hydrocarbon migration away from areas of product.	Either containment of hydrocarbon and chlorinated hydrocarbon product, vapour and dissolved phase, or; source-reduction solution (of area 30,000m2) to render containment permanently unnecessary, with the following programme elements: 1. Design-level investigations 2. Feasibility tests 3. System implementation and installation 4. Groundwater and air and soil vapour monitoring programme	25	Permanent maintenance of acceptable risk to agreed controlled waters receptors (River Neath and Crymlyn Bog) to the satisfaction of EA and NPT.	Limited work may be required for the RAP subject to results of long term monitoring. Substantial additional (containment) work likely to be required in the event of development.

Figure references are references to the RAP Plan annexed to this Deed

Report References (The following reports contain information which may be of relevance to the development and implementation of the RAP. This list is not exhaustive.):

Report Title	URS Report Ref.	URS Job no.	Issue Date
Environmental Liability Assessment, Llandarcy Refinery Desk Study Findings Vol 1	2048R	37491-001	29-Sep-97
Environmental Liability Assessment Llandarcy Refinery Interpretative Report Vol 2	2049R	37491-002	30-Sep-97
Risk Assessment Methodology Document (see DR810)	2271R	39991-001-401/P1	05-Aug-98
Report - Phase II, Stage 1 Data Report, BP Llandarcy Refinery - Neath, W Glamorgan - for BP Llandarcy Refinery LTD	R642	39991-001	26-Aug-98
Draft Report - Phase II Interim Data Assessment - BP Llandarcy Refinery, Neath, W Glamorgan	DR664	39991-002	06-Nov-98
Preliminary Sludge Treatability Study Report	DR666	39991-001	10-Nov-98
Phase 2 Site Assessment Vol 1, 2 and 3 Phase 2 Final Data Report	DR785	39991-004	28-Jul-99
Risk Assessment Methodology	DR810	39991-005	13-Sep-99
Draft Summary Report Stage 1 Solvent Recovery Pilot Test, DiMe Plant Area	DR829	39991-007	17-Nov-99
Water Balance Report	R835A	39991-009	14-Jan-00
Remedial Action Plan	DR869r3	39991-005	18-Feb-00
Synopsis of Site Assessment and Proposed Remedial Works on behalf of BP Llandarcy Refinery	R896	39991pfound	31-May-00
Phase 2 Site Assessment Crymlyn Bog Historical Spill	DR898	39991-011	12-Jun-00
Routine GW Monitoring Mar - Sept 2000 Vol 1 Draft Report	CD954	39991-013	01-Jan-01
Data & Risk Assessment of the Main Tank Farm	DR946	39991-017	05-Jan-01
Draft Remedial Plan, Vanadium Lagoon	DR962	39991-016	01-May-01
Additional Site Characterisation & Remedial Action Plan	DR963	39991-016	02-May-01
Final Report - Phase II Investigation & Human Health Risk Assessment for BP OIL, Swansea	FR979	39991-019	13-Jul-01
Monitoring Data Summary Report (Sept 2000)	DR980	39991-013	18-Jul-01
Monitoring Data Summary Report (March 2001)	DR980	39991-013	18-Jul-01
Progress Report on the Constructed Wetland Pilot Tests	DR1042	39991-016	01-Feb-02
Final Report - Sept 2001 Monitoring Data Summary Report - BP Llandarcy Refinery, Neath	FR1044	39991-023	08-Feb-02
Water Balance Addendum	DR1031	39991-016	01-Apr-02
South Site Reservoir Sampling Results	6681	39991-025	14-Jun-02
Site Characterisation & Remedial Action Plan Llandarcy Bog	DR1078A	39991-041	31-Jul-02
March 2002 Monitoring Data Summary Report	DR1081	39991-029	02-Aug-02
DiMe Mineralisation Tests	6732/MC	39991-016	16-Aug-02

Report Title	URS Report Ref.	URS Job no.	Issue Date
Informational Supplement for DiMe Plant Area	DR1096	39991-022	01-Sep-02
Results of Sentinel Well Product Mobility	6767	39991-032	12-Sep-02
Site Characterisation Works & Bypass Ditch Outline Design North Site Reservoir	DR1111	39991-016	12-Feb-03
September 2002 Monitoring Data Summary Report	DR1119	39991-036	28-Feb-03
Oil Recovery Tests Containment Area	DR1130	39991-026	25-Apr-03
March 2003 Monitoring Data Summary Report	DR1137	39991-036	01-Jul-03
Draft Factual Report - Site Investigation	DR1140	39991-035-785	10-Jul-03
Draft Factual Report DiMe Area	DR1144	39991-037	11-Jul-03
Rail Cutting Inspection	DR1161	39991-032	06-Aug-03
Specification Report Llandarcy Bog Interception & Recovery System	DR1168	39991-041-785	22-Aug-03
September 2003 Monitoring Data Summary Report	DR1191	39991-036	13-Feb-04
Draft Factual Report Whole Site Investigation	DR1209	39991-044	01-Jun-04
Whole Site Remediation Strategy	DR1224A	39991-035	29-Jun-04
Draft Report Outline Remedial Options Assessment - BP Llandarcy Refinery, Neath, W Glamorgan	DR1158	39991-037	19-Jul-04
March 2004 Monitoring Data Summary Report	DR1220	39991-049	30-Jul-04
September 2004, Monitoring Data Summary Report	R1263	39991-055	14-Dec-04
Solvent Pit RAP Issues: Additional Llandarcy Bog Water Samples	7601	39991-056-785	26-Jan-05
Area 1 - Main Workshop Former Degreasing Pit Investigation	R1278	39991-056	28-Jan-05
Draft Report Containment Area Perimeter Trench Performance Specification	BPRP0005	39991-054	01-May-05
Report on the Constructed Wetland Pilot Tests. Issue no.1	R1236	39991-021	25-May-05
Soil Stockpile Sampling Report. BP Llandarcy Barn Store & Waste Tip - Issue no 1 - DRAFT	R1304	44382527	01-Jun-05
Final Factual Report Site Investigation Phase 1 Area	FR1275	39991-035	22-Jul-05
Groundwater Monitoring and Sampling- BP Oil Llandarcy Refinery	DR1307	44382526-1943	01-Aug-05
Final Factual Report Whole Site Investigation	FR1287	39991-044-785	12-Aug-05
Groundwater Monitoring and Sampling - Factual Report	DR1356	44382526	01-Sep-05
Tip Closure and Completion Strategy Report	R1360	44382538	15-Mar-06
March 2006 Groundwater Report	R1396	44382534	11-Aug-06

Part 2

1. Developer obligations regarding RAP Works

- 1.1 The Developer shall carry out or procure the carrying out of all outstanding Remedial Action identified in Table 1 above in order to achieve the purpose and objectives set out in sub-paragraph 1.3 (including 1.3.1-1.3.5 thereof) of Part 1 of this Schedule and the performance criteria specified in Table 1 (and shall do so to the satisfaction of relevant Environmental Authorities) subject to any variations thereto that may be required in writing by the relevant Environmental Authorities from time to time.
- 1.2 The Developer shall carry out or procure the carrying out of all such further Remedial Action (whether identified in Table 1 above or not) necessary, including any that may be requested or required at any time by any Environmental Authority, acting lawfully, in order to achieve the purpose and objectives set out in sub-paragraph 1.3 (including 1.3.1-1.3.5 thereof) of Part 1 of this Schedule and the performance criteria specified in Table 1 and any such further Remedial Action which a reasonable and prudent owner of the Property bearing full legal responsibility for all Pre-Transfer Date Environmental Matters would otherwise regard as necessary or appropriate from time to time in order to achieve the purpose and objectives set out in sub-paragraph 1.3 (including 1.3.1-1.3.5 thereof) of Part 1 of this Schedule and the performance criteria specified in Table 1 and shall in each case do so to the satisfaction of the relevant Environmental Authorities provided that nothing in this sub-paragraph shall oblige the Developer to perform Remedial Action in relation to Unknown Off-Site Contamination or any Pre-Transfer Date Personal Injury.
- 1.3 The Developer shall take all reasonable steps promptly to create and thereafter maintain an open and constructive dialogue between it and the relevant Environmental Authorities regarding the progress and all other aspects of the RAP Works (including any impact or potential impact on any aspect of the RAP Works of any aspect of the Redevelopment Remediation Works and the inter-relationship between the two) and shall procure that any person acting on its behalf in connection with the RAP Works shall do the same. Without prejudice to the generality of the foregoing, the Developer shall:
 - 1.3.1 Convene a formal meeting with the relevant Environmental Authorities and representatives of the Authority to take place before or as soon as reasonably practicable after the Transfer Date in order to discuss with such Environmental Authorities the current status of the RAP Works, the Developer's plans for redevelopment of the Property as an Urban Village, the future programme of RAP Works in the light of those plans and the Redevelopment Remediation Works and to agree a schedule for future meetings between the Developer, those acting on its behalf and the relevant Environmental Authorities and the Authority such schedule to include as a minimum 6 monthly RAP Works review meetings; and
 - 1.3.2 Promptly comply with all lawful requests for information regarding any aspect of the RAP Works received from any Environmental Authority or the Authority at any time.
- 1.4 The Developer shall, and shall procure that any person acting on its behalf in relation to any aspect of the RAP Works required by this schedule shall, at all times comply with the requirements of Schedule 10 (General Remediation Requirements).

2. Variations to the RAP Works

- 2.1 The Developer shall promptly notify CDL, the Monitor and the Authority if at any time it is notified by a relevant Environmental Authority that such Environmental Authority requires a variation to the RAP Works in which case the following procedure shall apply:
- 2.1.1 As soon as reasonably practicable after serving a notice under paragraph 2.1 above, the Developer shall prepare proposals for the variation to the RAP Works that are consistent with the purpose and objectives of the RAP Works as set out in 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 variation to the RAP Works has been derived.
 - 2.1.2 Not earlier than the day of submission of its proposals to CDL the Monitor and the Authority in accordance with sub-paragraph 2.1.1 above, the Developer may 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 variation to the RAP Works. 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 2.1.1 above and a copy of this Agreement clearly drawing attention to the purpose, objectives and requirements of the RAP Works set out therein and the proposed changes thereto.
 - 2.1.3 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 to the Authority at the same time.
 - 2.1.4 The Developer shall ensure that the RAP Works achieve compliance with any variation to the specification for the RAP Works approved in writing by the appropriate Environmental Authorities pursuant to this paragraph 2.1, as if they were also set out in the Table to this Schedule.
 - 2.1.5 No such proposed variation to the RAP Works shall be implemented unless it has been approved in writing by the Environmental Authorities in accordance with this paragraph 2.1 (or if the Developer has only oral approval (or non objection) of the relevant Environmental Authorities no such proposed variation to the RAP Works shall be implemented unless the Developer notifies the relevant Environmental Authorities in writing (copied at the same time to CDL and the Monitor) that it proposes to proceed with the implementation of the proposed variation to the RAP Works 10 Working Days after the date of such notice and no written objection of any relevant Environmental Authority is received within such 10 Working Day period in respect of the same).
 - 2.1.6 Any reference in this Deed to the RAP Works shall be to the RAP Works as varied in accordance with this paragraph 2.1.



A E I C I FOR ATIO SO RCES



A E I RS RE ESTS FOR I FOR ATIO RFI



Simon Gibbons/Bristol/URSCorp

21/02/2011 13:10

To "Morris, Howel" <Howel.Morris@atkinsglobal.com>

cc

bcc

Subject Re: Western Margin 

Howel,

Attached are my comments. I would like to see the cross sections and logs and all dipping data if possible. You also need to characterise the product to see if it is the same at all locations. Based on the dipping from the trench sumps it appears to be more mobile in the summer so you need to be sure you have good data sets from July-November for the whole of the western margin.

I appreciate that this needs to be an iterative approach to assessing the data but I don't see anything in the report that pulls the Sources and Pathways together. How did the product migrate through the ground? Why is it where Atkins measure it? How could redevelopment affect options? Most of the monitoring is in the glacial deposits - how does that geology link back to the hillside where there was tankage and pipelines? I like CSMs to formulate answers that can then be investigated - at present the CSM is quite a factual summary of what has been found but no reason put forward as to why? In some circumstances it may not be possible to demonstrate a full understanding - particularly given the nature of the geology but I don't feel Atkins are much closer to understanding where and what type of feature may be required - although I appreciate conclusions section is yet to be completed.

Much of the geological discussion is from previous URS work - I would think that can be updated - particularly if you believe the PSD data and some of the higher permeability results we have from slug tests in the glacial deposits.

I think more trial pits in the areas east of the proposed trench alignments would help understand the sources of contamination more and what might ultimately need to be recovered/remediated. If there is such limited volumes of product currently Atkins need to assess why that is the case. Is it simply weathered/degraded and poorly mobile and/or will the product be more easily addressed through source removal during redevelopment works?

Looking at drawing 864 has the investigation gone far enough south? I don't have a figure showing the results of product dipping to know where the current areas of concern are. A drawing showing the product thickness trends next to locations would help and clearer information on screen depths, units installed in will also help. The geology at the very toe of the slope does become challenging and there isn't much review presented about the clay unit separating the glacial from the bedrock in the bog margins. Is there any product in the bedrock or is that a red herring?

I think in terms of general information its getting there but it needs to start pulling a few of the strands together - particularly based on historical product thicknesses so that the next stage can be considered more clearly. I would be happy to discuss in a meeting with Atkins if that would help but would like a bit more of the raw data to digest first.

Drawing 867 isn't referenced and I am not sure what it is showing me?

I have attached a couple of example figures from a Queens Dock CSM report which would assist the process for western margin. These show the various elements discussed in the report to help set the scene, cross sections, inferred fill thicknesses, GW contours, product thickness hydrographs and different product fingerprints for different areas of the site. All of these helped to put together the CSM for product migration through more permeable fill at this site. Something needs to be pulled together for the western margin if possible to help link the various processes that have led to the observed current product distribution. There may well be gaps (eg product typing) and some spatial uncertainty but having these types of schematic drawings will help to focus you on where you should be looking to get more information. Either that or Atkins need to be more assertive on whether it really matters in the context of redevelopment or more simply because product is currently not migrating (although a few more tests may be required at the right time of year to support this).

Regards

Simon



Western Margin CSM report_DRAFT 1_Issued for Comments_SG.docx QD_Supporting_CSM_Figures.pdf

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Technical Director
Hydrogeological Risk Assessment Ireland

RS Scott Wilson

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18/02/2011 16:18

To "Simon_Gibbons@URSCorp.com"
<Simon_Gibbons@URSCorp.com>

cc

Subject Western Margin

Simon

Please find attached the CSM report for the Western Margin. I have sent the document in word format for ease of comment. We anticipate a period of amendments and suggestion for further works.

Jayne and Tukh would be keen to meet following your review to agree and resolve any issues.

Also, I have been working on the West Bay Summary Report but need to clarify with you as to whether the summary report is required for RAP sign of the sludge removal or is it for redevelopment sign off pending surrender of the license in this area.

Regards

Howel Morris

Senior Geoenvironmental Consultant,
Water and Environment

AT I S

The official engineering design services provider

for the London 2012 Olympic and Paralympic Games

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Consider the environment. Please don't print this e-mail unless you really need to. [attachment "863 - Western Margin Ground Water Monitoring.pdf" deleted by Simon Gibbons/Bristol/URSCorp] [attachment "864 - Western Margin Composite Exploratory Hole Plan.pdf" deleted by Simon Gibbons/Bristol/URSCorp] [attachment "Western Margin CSM report_DRAFT 1_Issued for Comments.docx" deleted by Simon Gibbons/Bristol/URSCorp]

Contract Name: Coed Darcy Monitor RFI No:
 Contract Number: GNP/NJR/13773-2 Date Raised: 22 May 2012
 Subject: Review of Atkins' Western Margins RAP Works Assessment Report
 To: Howel Morris Atkins
 Cc: Mike Poland Atkins
 From: Rhys Mander URS

Response Required Within:

1 Day		3 Days		5 Days		10 Days	✓
-------	--	--------	--	--------	--	---------	---

Comments

This RFI has been prepared following a review of Atkins' Report ref. 5041216-RAP-RPT-770 'RAP Features 2, 3, 4 & 5 Western Margins RAP Works Assessment Report'. The following queries are raised:

- Please clarify what the Monitor is being asked to do. Is the Monitor being asked to prepare RAP Works Completion Statements (RAPWCS) for Phases 15, 16 and 17?
- If RAPWCSs are to be prepared then it is important to note that the works undertaken represent a variation from the s106, as the permanent interception features will not be installed. The reason for this variation appears to be that there are insufficient quantities of recoverable product to warrant the installation of permanent features. We need to understand the process for implementing such variations as set out in the s106 which states:

The Developer shall promptly notify CDL, the Monitor and the Authority if at any time it is notified by a relevant Environmental Authority that such Environmental Authority requires a variation to the RAP Works in which case the following procedure shall apply...

The above does not cover this scenario, whereby the Developer wants to make the variation rather than the Environmental Authority. Atkins may wish to consider the implications of this. Nevertheless, it is suggested that the Environment Agency and the Local Authority and if necessary CCW should be consulted.

- Notwithstanding the above comment, is Atkins satisfied that the trial pits, trenches, monitoring sumps etc. that have been installed are located appropriately and are to a sufficient depth? Furthermore, do the features have an adequate zone of influence? The geology in this area is complex with confined and artesian groundwater. Shallow excavations may not intercept all contamination. For example, it is noted that some excavations were stopped either at groundwater, or due to collapse. Contaminated groundwater may be deeper. Please refer to the attached CSM cross-sections that were prepared in 2000 which may be useful. Could the cross-sections be updated? Are the boreholes being monitored?
- The report focuses on the recovery of free product. Ochreous discharge is evident. How will this be managed?
- Groundwater is likely to be high in dissolved phase contamination. How will this be managed?
- With regards RAP Feature 2, the report recommends ongoing recovery for 6 months, perhaps with a trench thereafter. Please explain what this will involve. As above, how will ochreous discharge and dissolved phase be managed?
- For RAP Features 3, 4 & 5 the sumps initially encountered product, sheens and ochreous discharge. The sumps are isolated features and so there is no flow to mobilise surrounding product. The original RAP features were designed to be connected to encourage controlled groundwater flow. Additionally there is evidence that there is an ongoing up-gradient source (e.g. MSMW015) in the Bitumen Plant Area. Also there are only a limited number of trial pits and sumps etc. Are you satisfied that the area is sufficiently covered?
- In Table 3.5 the thicknesses of product initially observed in RHRW010 and RHRW024B are large, but following product recovery no further ingress of product was observed. Is there any explanation for this?
- The triangle separator is situated within Phase 16. What is happening with this?

Signed: 

Date: 22 May 2012

Reply
Signed: Date:

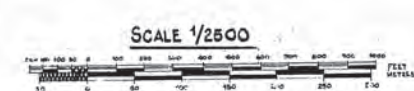
istribution

To	cc	ame	Company
✓		Howel Morris	Atkins
	✓	Mike Poland	Atkins
	✓	Michelle Lee	Atkins

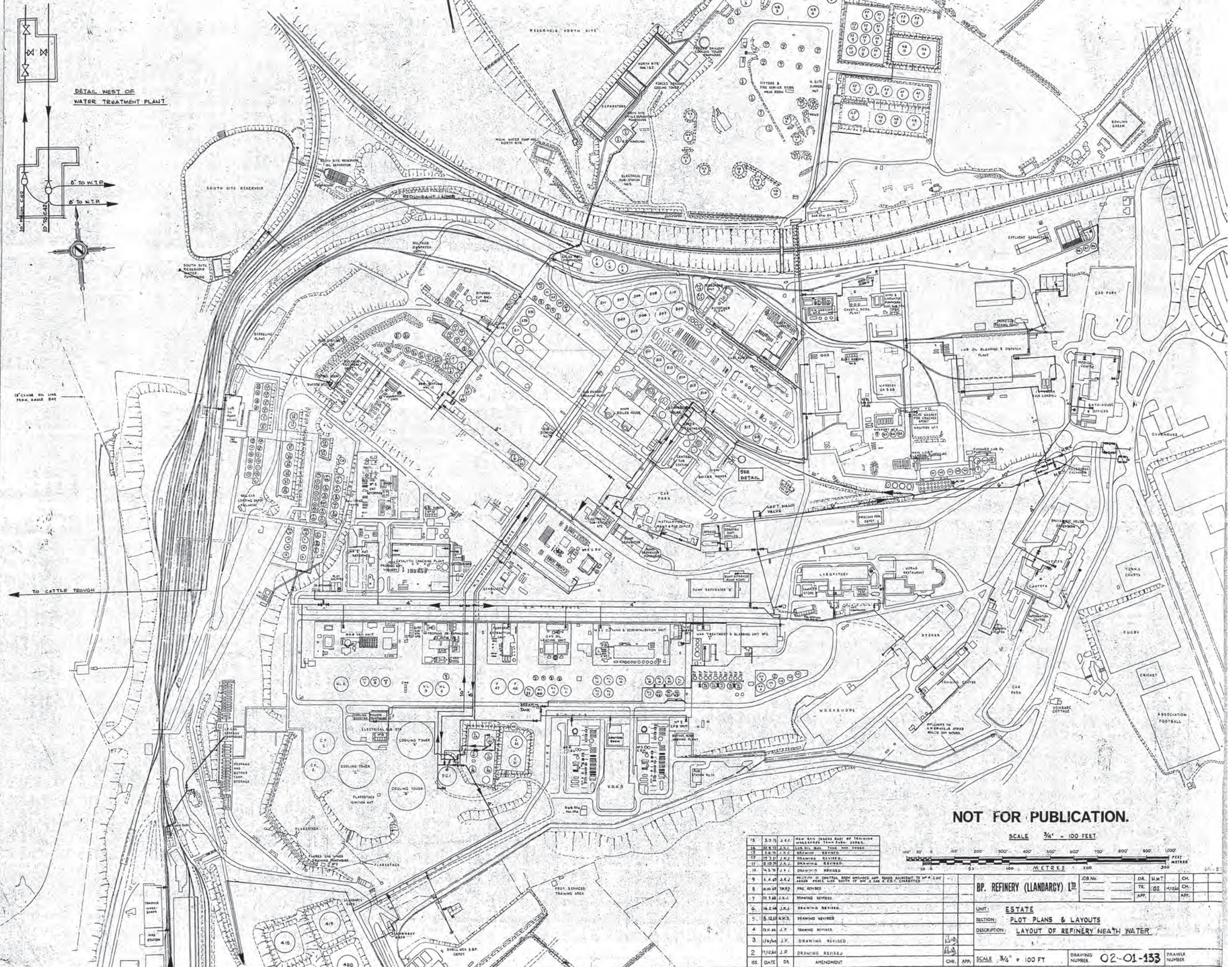
A E I E HISTORICAL LA S



ISSUE 1
 DELETED - MERCH UNIT, POWER STN NO 2, SUMP SEPARATORS A & B,
 COOLING TOWERS A, B & C, LUB OIL BLENDING DISPATCH PLANT,
 BUTTERED GAS DISPATCH PLANT,
 TANKS 105, 106, 107, 110, 111, 113, 114, 115, 227 TO 233 INC.,
 301 TO 318 INC., 400 TO 412 INC., 415 TO 430 INC., 433, 434, 437, 438,
 107, 108, 109, 200, 210.
 ADDED - WALKER GAS STATION, VDU PREHEAT & COOLING TOWER,
 WHITE OIL SLUDGE WASH ROAD LOADING CRANE, WHITE OIL & LPO,
 ROAD LOADING CRANES, TANK DMR, TANKS D3, D4, D5, D7, D8,
 D9, D10, LOBBY PARK.



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ISS	DATE	DL			
BP. REFINERY (LLANDARCY) LTD			JOB No.	DR	CH
			TE	CH	APP
			APP	APP	
UNIT: ESTATES					
SECTION: PLOT, PLANS & LAYOUTS.					
DESCRIPTION: LAYOUT OF REFINERY & TANK FARM.					
X02-01-48					
SCALE 1/2500		DRAWING NUMBER 02-01-48		DRAWER NUMBER	



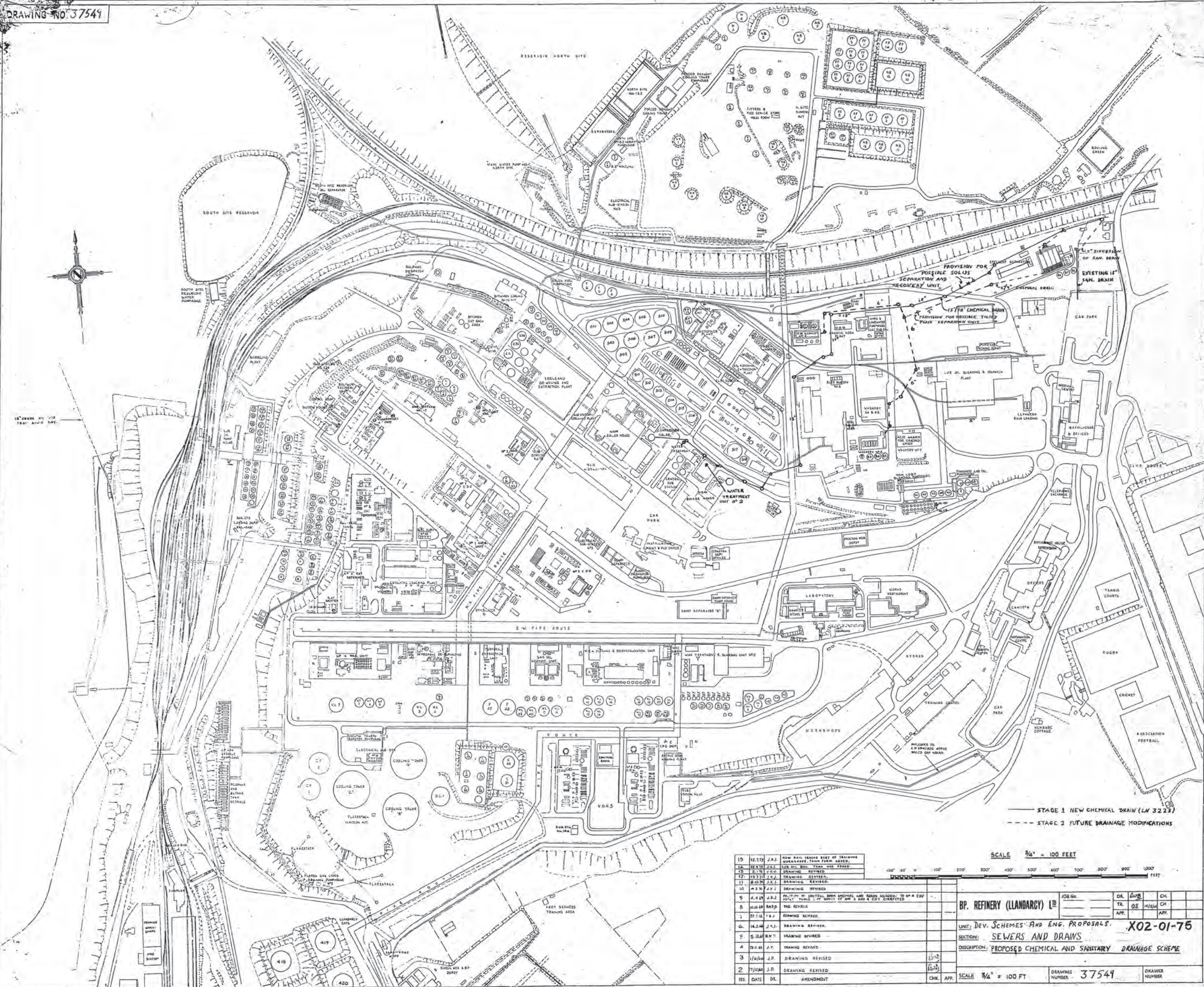
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SCALE 3/4" = 100 FEET

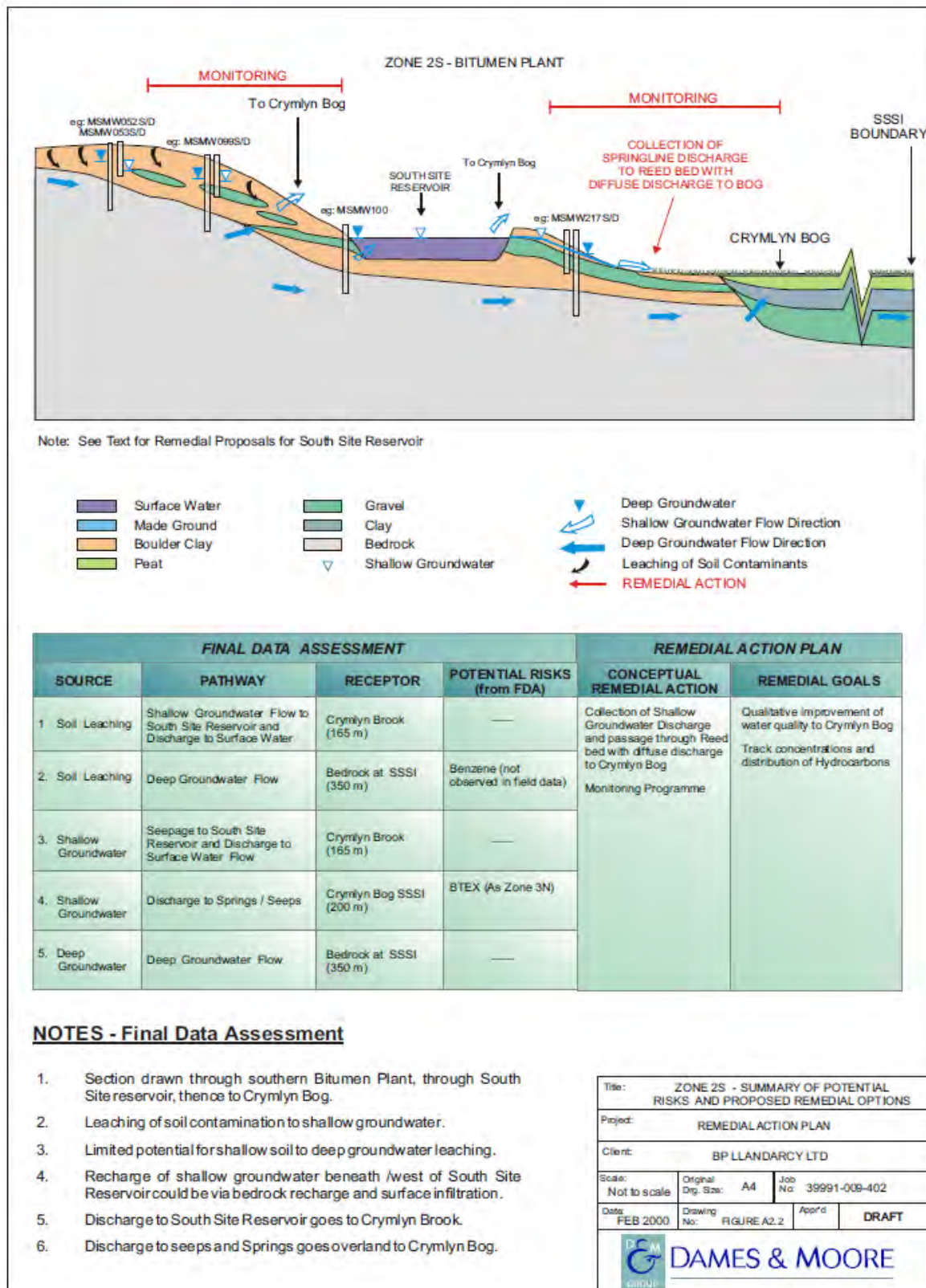


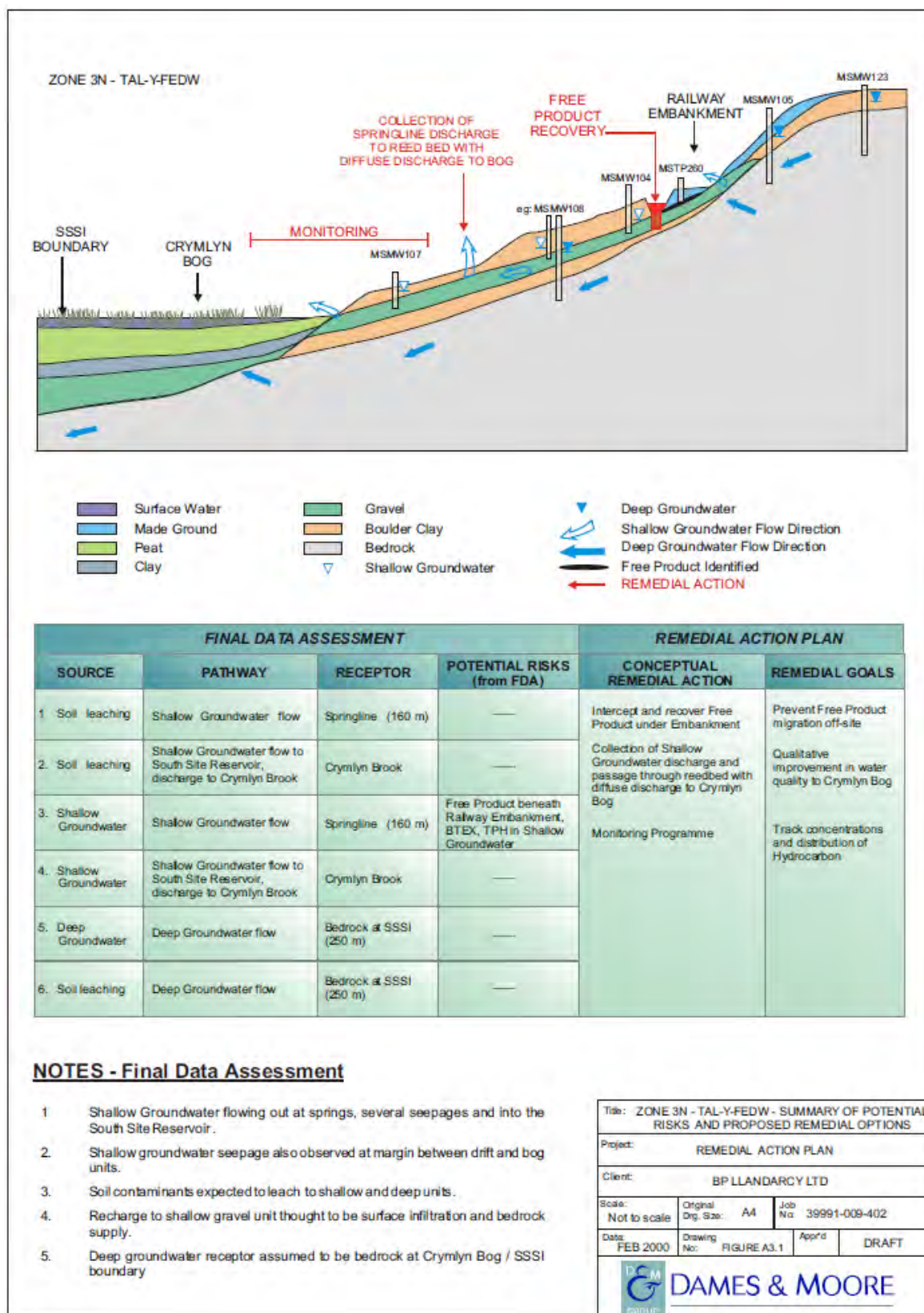
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14	10.3.75	J.R.	ADD. 50' WIDE TANK ROAD.
13	3.4.75	J.R.	DRAWING REVISED.
12	12.7.74	J.R.	DRAWING REVISED.
11	8.10.74	J.R.	DRAWING REVISED.
10	4.5.74	J.R.	DRAWING REVISED.
9	1.4.74	J.R.	REVISION TO CONTROL ROOM SHOWN AND ROAD ADJACENT TO W.P. 4. COR. ADDED. PUMP LINE SOUTH OF W.P. 3 AND 4 COR. CORRECTED.
8	10.10.73	J.R.	DWG. REVISED.
7	12.3.68	J.R.	DRAWING REVISED.
6	14.2.64	J.R.	DRAWING REVISED.
5	8.12.63	J.R.	DRAWING REVISED.
4	12.1.64	J.R.	DRAWING REVISED.
3	1/6/64	J.R.	DRAWING REVISED.
2	7/12/64	J.R.	DRAWING REVISED.
15	DATE	DA	AMENDMENT

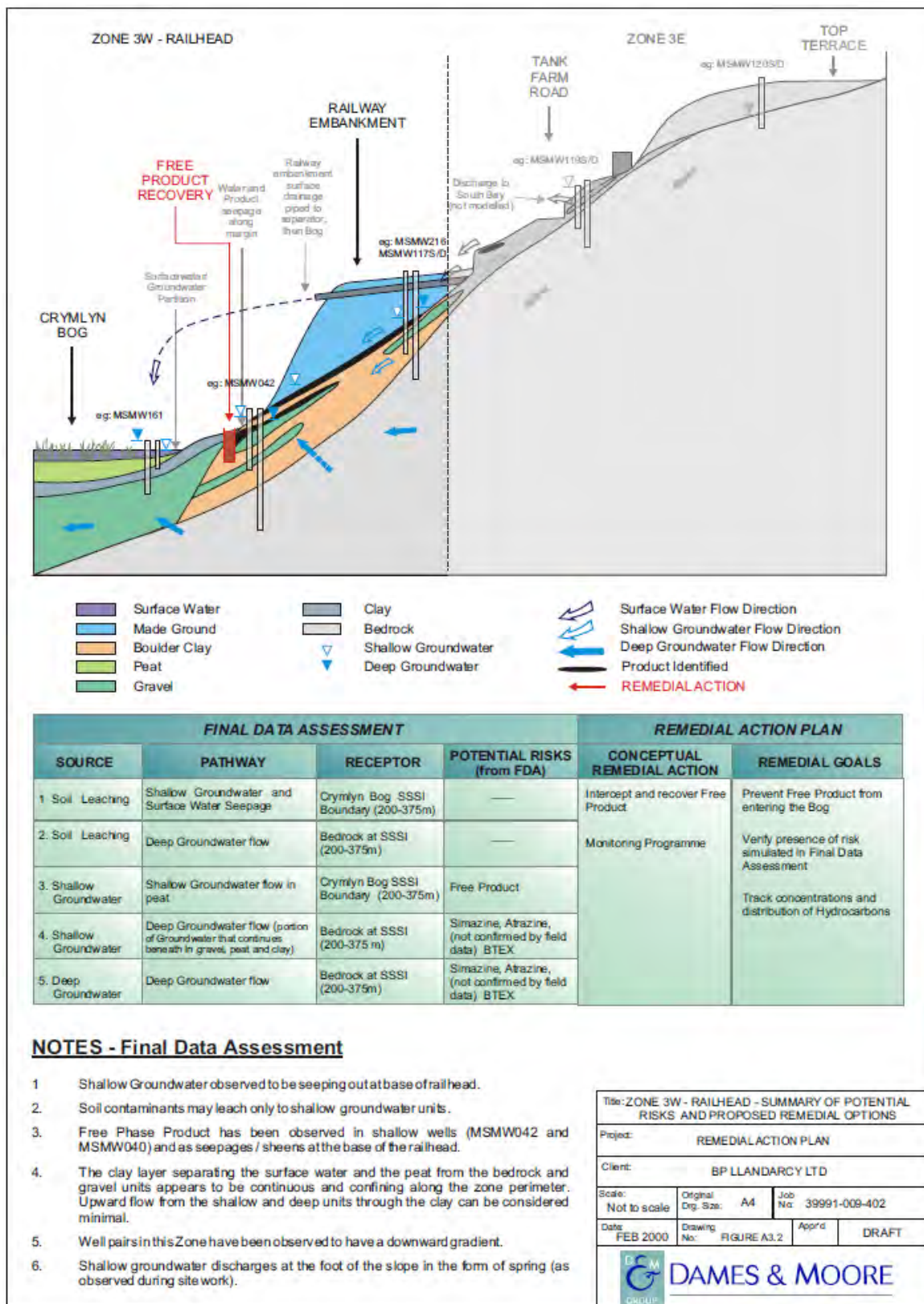
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		TR.	OS.	1/12/64	CH.
		APP.			APP.
UNIT: ESTATE					
SECTION: PLOT PLANS & LAYOUTS					
DESCRIPTION: LAYOUT OF REFINERY NEAR WATER					
SCALE 3/4" = 100 FT		DRAWING NUMBER 02-01-133		DRAWER NUMBER	

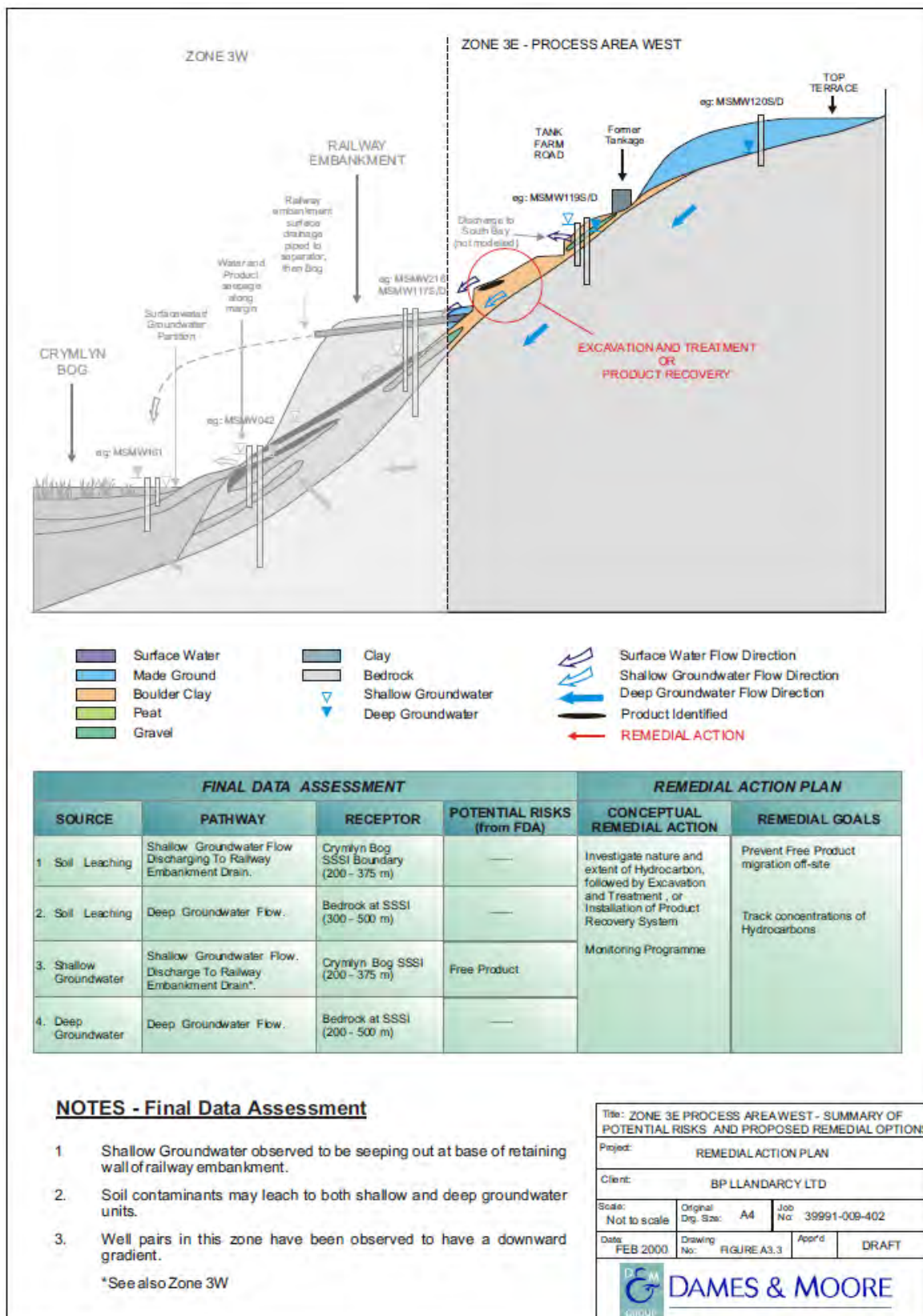


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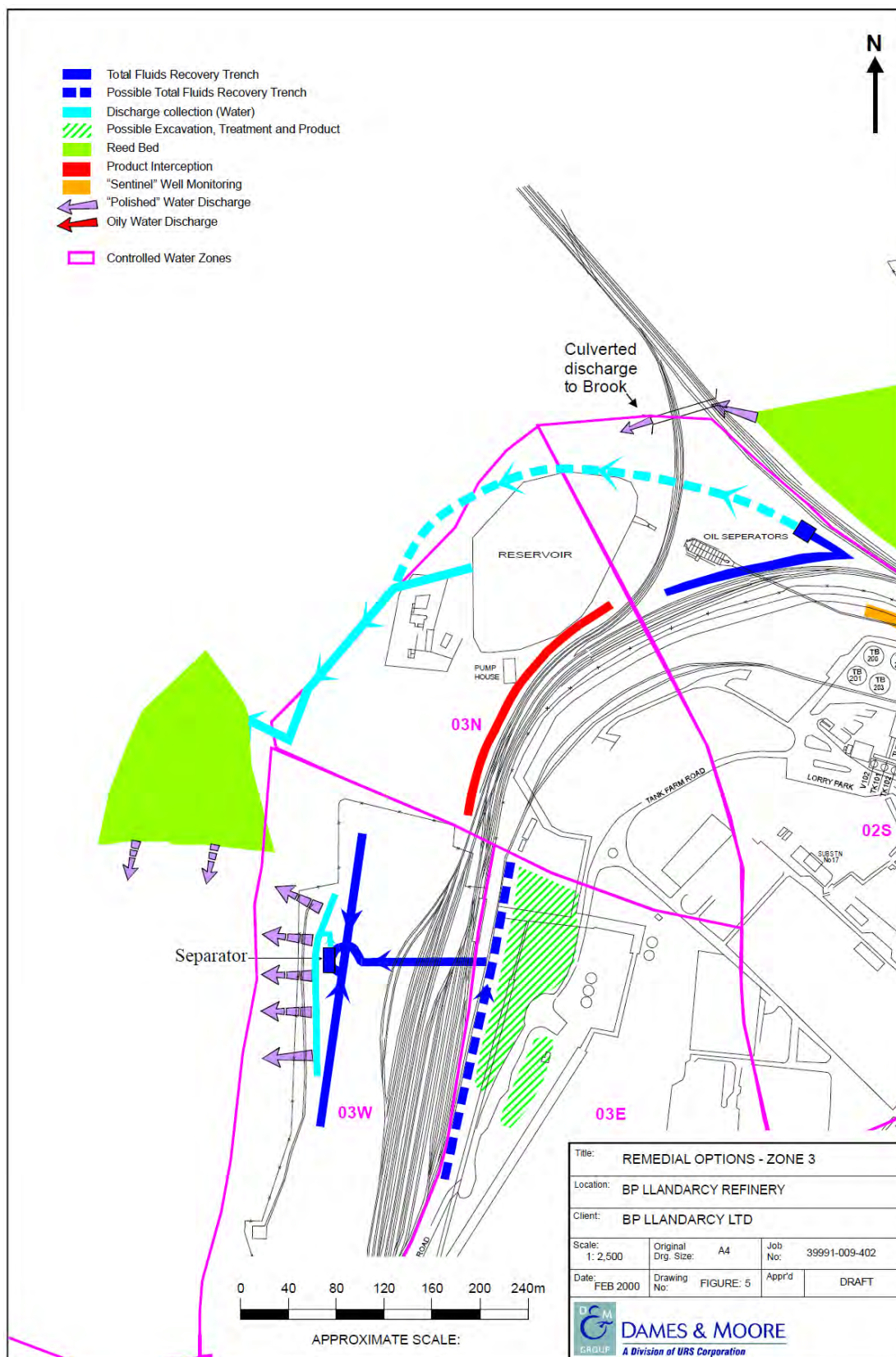


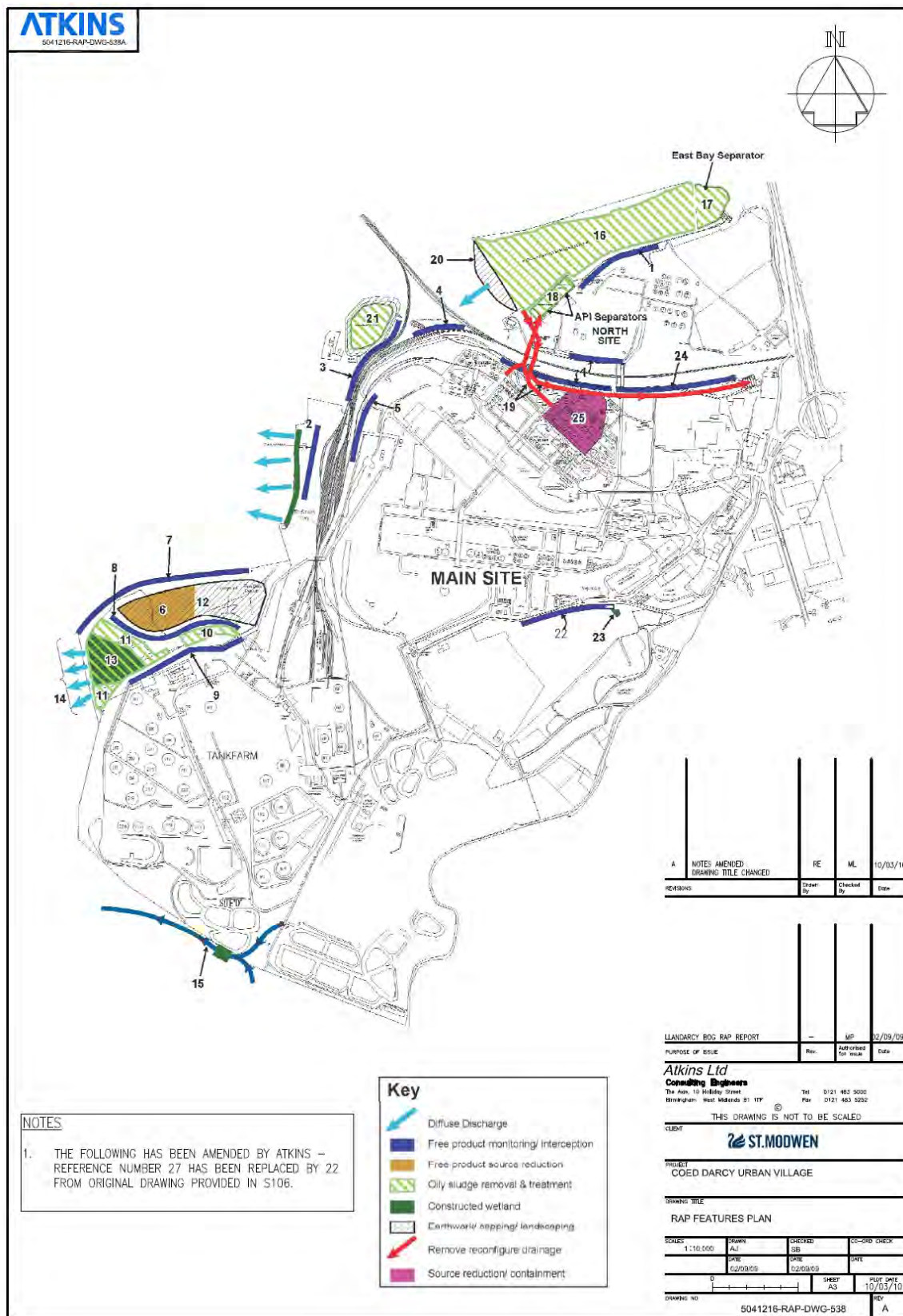






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A E I OTO RA S



Coed Darcy Monitor

Phase 16 RAPWCS
Western Margins RAP
Feature 4

DRAFT

August 2013

49310747
BRRP00054 / Cert 16a

Prepared for:
Coed Darcy Limited

UNITED
KINGDOM &
IRELAND



Rev	Date	Details	Prepared by	Checked by	Approved by
1	14-Aug-2013	Original issue	Rhys Mander Senior Consultant Signed: _____	Geoff Jones Managing Principal Signed: _____	Geoff Jones Managing Principal Signed: _____

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Scope

This Remedial Action Plan (RAP) Works Completion Statement (RAPWCS) 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 (RMA) dated 23 May 2008 between SMD, SMP and CDL.

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

This RAPWCS has been prepared for Phase 16 which forms part of the Western Margins. With reference to the Figure References listed in Table 1 of Schedule 7 of the Section 106 Agreement, this RAPWCS relates to RAP Feature 4 which requires the installation of free-phase product interception and recovery trenches.

This RAPWCS has been prepared 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 RAPWCS is based were notified to URS by letter, a copy of which is provided in **Appendix A**.

The Phase Boundary for Phase 16 is shown as the land edged in red on drawing no. 5041216-RAP-DWG-1164, a copy of which is provided in **Appendix A**.

The Intended Use has been declared as 'residential'.

In accordance with the requirements of URS' Deed of Appointment, this RAPWCS shall:

- Describe the Remedial Action which in URS' professional opinion has been carried out for the purposes of completing the RAP Works in relation to the Phase; and
- Confirm whether or not in URS' professional opinion the RAP Works have been satisfactorily completed for the Phase in accordance with the purpose, objectives and requirements of Schedule 7 of the Section 106 Agreement having regard to the Intended Use.

Furthermore, URS is required to confirm it is satisfied that the purpose, objectives and requirements of Schedule 7 of the Section 106 Agreement have been met and 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 covered by the Phase.

A copy of Schedule 7 of the Section 106 Agreement is provided in **Appendix B**.

Background

Purpose and Objectives of the RAP Works

As defined in Schedule 7 of the Section 106 Agreement the RAP Works are a programme of on-going voluntary Remedial Action in relation to Pre-Transfer Date Environmental Matters at or in the vicinity of the Property which were agreed between the Owner and the relevant Environmental Authorities in lieu of the imposition of formal Remedial Action requirements by any such Environmental Authorities. The RAP Works were designed to protect ecological and

controlled waters receptors close to the site. The RAP Works are not intended to enable redevelopment.

RAP Requirements

In order to prepare this RAPWCS, there are a number of obligations that the Developer needs to demonstrate have been met so that URS can provide opinion on whether or not the Phase is suitable for its Intended Use. These obligations are detailed in Schedules 7 and 10 of the Section 106 Agreement. The principal obligations for the Developer with regards the RAP Works are summarised below.

The Developer shall:

- Carry out or procure the carrying out of all outstanding Remedial Action identified in Table 1 of Schedule 7 of the Section 106 Agreement necessary and sufficient in the context of both the current use of the Property and the Intended Use or such other use as may be determined from time to time;
- Prevent (or where that is not possible, minimise, remedy or mitigate as far as reasonably practicable the effects of) migration from the Property of Pre-Transfer Date Contamination and any Developer Contamination;
- Assess with a frequency agreed as sufficient by the relevant Environmental Authorities and keep under review the condition of the environment at and in the vicinity of the Property and the progress and effectiveness of natural attenuation processes;
- Demonstrate whether or not any Pre-Transfer Date Environmental Matters are posing or may pose an unacceptable risk to the environment beyond the boundaries of the Property;
- Prevent (or where that is not possible, minimise, remedy or mitigate as far as reasonably practicable the effects of) any harm to the environment or any pollution of controlled waters or any possibility of such harm or pollution being caused;
- Avoid where reasonably practicable any Environmental Claim by any relevant Environmental Authority in relation to or in connection with any Pre-Transfer Date Environmental Matter;
- Take all reasonably practicable steps to seek to secure the final and unconditional acceptance by the relevant Environmental Authority of the surrender of the Waste Management Licence as soon as reasonably practicable.

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

Redevelopment Remediation Works

In addition to meeting the requirements of the RAP Works, the Developer must also complete the necessary Redevelopment Remediation Works, the requirements for which are outlined in Schedule 8 of the Section 106 Agreement.

It is intended that this report, which is the RAPWCS, will, in time, be complemented by a Redevelopment Remediation Works Completion Certificate (RRWCC) in order to provide the information required by CDL to enable the Phase Works Completion Date (PWCD) to be declared.

PWCD

The objective of the RAP Works will be deemed to have been met for the purposes of the Section 106 Agreement and the RMA on the date specified in the notice from CDL declaring the PWCD. The PWCD will be declared once CDL is satisfied that the remediation necessary for the specified Intended Use for the Phase has been completed.

Information Sources

A list of the Information Sources consulted by URS is provided below in Table 1.

Table Information Sources

Ref.	Document Reference	Format	Title	Author	Date
1	39991009/DR869r3	Report	BP Llandarcy Refinery Remedial Action Plan	Dames & Moore	Mar 2000
2	44382742/BRRP0001	Report	BP Llandarcy Refinery Desk Study	URS	Jul 2007
3	N/A	Report	Western Margin and Railhead Geological Conceptual Site Model Report	Atkins	Feb 2011
4	5041216-RAP-RPT-770	Report	RAP Features 2, 3, 4 & 5 – Western Margins RAP Works Assessment Report	Atkins	Oct 2012
5	5041216-RAP-TN-797	Technical Note	Response to RFI103	Atkins	Jul 2012
6	5041216-RAP-TN-949	Technical Note	RAP Feature 5 Assessment	Atkins	Jun 2013

Electronic copies of the Information Sources are provided in **Appendi C**.

Unless otherwise stated, URS has relied solely on the Information Sources as the basis for issuing this RAPWCS. In URS' 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 URS unless otherwise noted in this report.

Requests for Information RFIs Issued by RS

A summary of the RFIs raised by URS in relation to the Western Margins is provided below in Table 2. Copies of the RFIs are provided in **Appendi** . Copies of the responses received are included in the Information Sources provided in **Appendi C**.

Table RS RFIs

RFI Ref.	Title	Associated Documents	Date Raised	Closed	Comments
N/A	Email re. Western Margins Conceptual Site Model	Western Margin and Railhead Geological Conceptual Site Model Report	21 Feb 2011	Yes	No formal response received but comments addressed in later reports

RFI Ref.	Title	Associated Documents	Date Raised	Closed	Comments
103	Review of Atkins' Western Margins RAP Works Assessment Report	Atkins' Western Margins RAP Works Assessment Report	22 May 2012	Yes	Refer to Atkins Technical Note 5041216-RAP-TN-797

SAR OF T ERA OR SORI I ALL RO OSE

Location

Phase 16 is located on the western edge of the former refinery between South Site Reservoir and the Tip. Crymlyn Bog is situated directly to the west of the Western Margins, as indicated in **Figure** below. Further reference should also be made to Atkins drawing no. 5041216-REM-DWG-433 Rev A, a copy of which is provided in **Appendix C**, which shows the location and extent of the Western Margins.

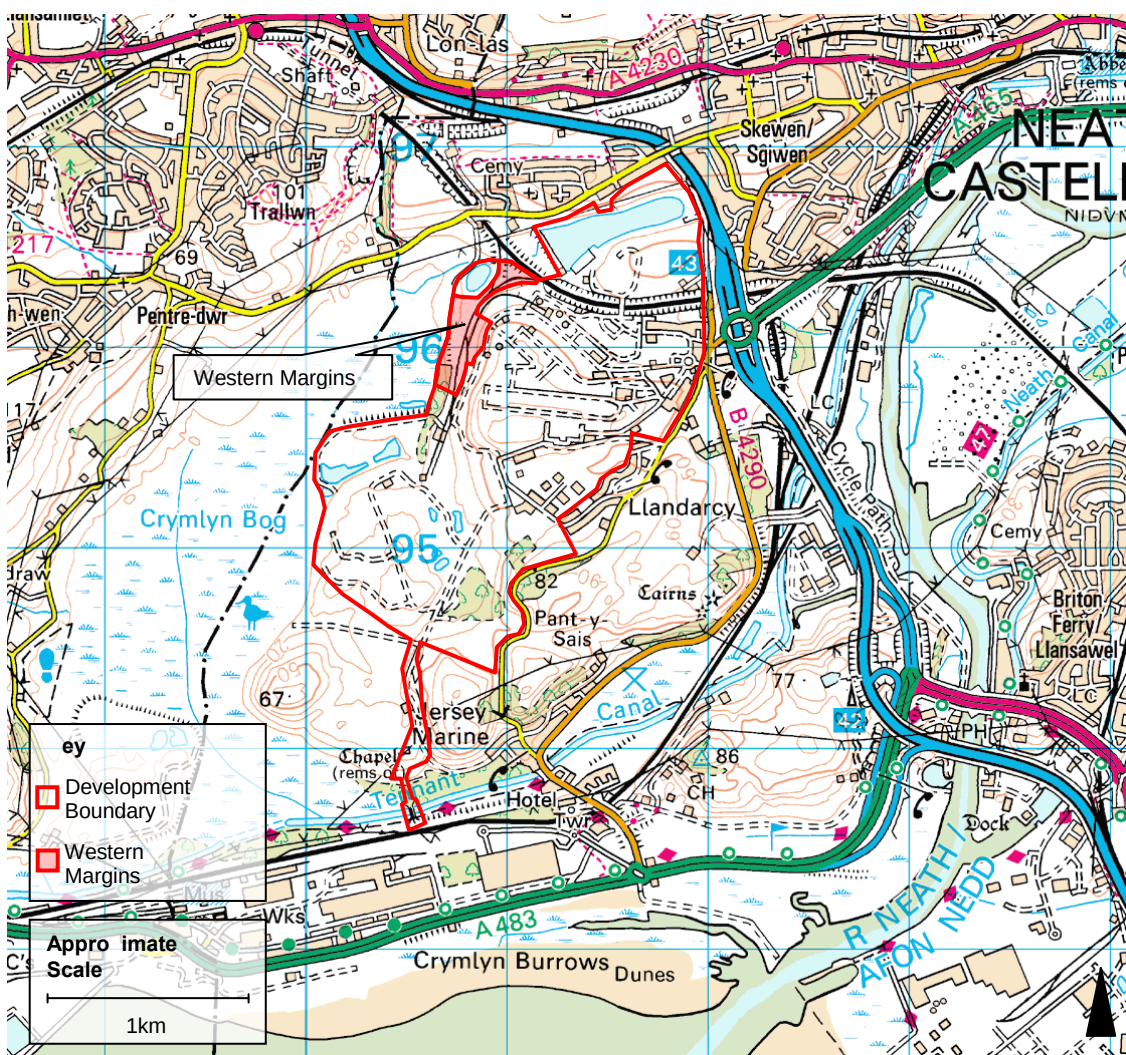


Figure Location plan

Purpose and Scope of the Original RA or s proposals

Crymlyn Bog is the main environmental receptor within the vicinity of the Western Margins and is therefore the focus of remedial actions for the RAP works discussed in this RAPWCS.

The most significant risk to Crymlyn Bog is the potential for free-phase product or contaminated groundwater to migrate beyond the site boundary. With reference to the historical plans provided in **Appendix E**, the major site features from which groundwater and surface water flow are likely to drain to Crymlyn Bog include the southern tank farm, the

containment area, the former process areas and the western parts of the north site tank farm. These groundwater and surface water flows are likely to permeate through the Western Margins before entering Crymlyn Bog, as illustrated in the conceptual site model drawings provided in **Appendix F** which are taken from the BP Llandarcy Refinery Remedial Action Plan report dated March 2000 (Information Source 1)

The conceptual site model drawings also illustrate the RAP Works that were originally proposed with the objective of intercepting and collecting free-phase product to prevent further migration into Crymlyn Bog. These RAP works, as described in Schedule 7 of the Section 106 Agreement, are summarised in Table 3 below.

Table E tract from Table from Schedule of the Section Agreement

RAP Item	Key Issues	Scope of Originally Envisaged Remedial Action	Performance Criteria	Works to Date
2	Potential for cross boundary free product migration at various locations along boundary Dissolved-phase hydrocarbon migration	Product interception and recovery, consisting of the following programme elements: Design-level investigations to assess specific requirements Design and Installation of permanent system to intercept and recover free-phase product Diffuse discharge of water arising from interception system to Bog, via purpose-constructed wetland features. System-specific monitoring of surface and groundwater Above programme of works to include the following as a minimum: Railhead (install 200 x 4 metre trench, and 200 metre linear wetland feature)	Install permanent measures to prevent free product from crossing the site boundary and entering Crymlyn Bog to satisfaction of EA and CCW Diffuse discharge of water arising from interception system to Bog, via purpose-constructed wetland features to reduce dissolved hydrocarbon load and without requirement for a discharge consent. Prevent ochreous precipitate discharges from site to the Crymlyn Bog arising from the interception feature. All works to satisfaction of EA and CCW	Some additional wells installed in 2000 to monitor for free-product.
		Railhead to South reservoir (install 250 x 4 metre trench, interception only, i.e., no wetland)	All works to be protective of future public health and safety assuming unrestricted recreational access.	
		Between North and South reservoirs (install 100 x 2 metre interception and recovery trench only)		
		Design and Install 'Inland' free product interception and collection system between Railhead and Main Site (200 x 3 metres, interception and recovery trench only).	Install permanent system to prevent free product migration to railhead to satisfaction of EA and NPT.	
5	Free-phase seepage leading to gross-contamination of surface soils in interior of site.			

As discussed previously, this RAPWCS considers RAP Feature 4 which requires the installation of a free-phase product interception and recovery trench. RAP features 2, 3 and 5, the requirements for which are crossed through in Table 3 above, will be considered under a separate RAPWCS.

Further reference should be made to the drawings provided in **Appendi** which illustrate the above RAP works as was originally envisaged.

Changes to the Scope of the RA or s

The RAP Works were outlined and agreed in principle with the Environment Agency (EA) and the Countryside Council for Wales (CCW) prior to the development of plans to regenerate the site as the Coed Darcy Urban Village. For this reason, Schedule 7 of the Section 106 Agreement makes provision for alternative approaches to the listed RAP Works provided agreement can be reached with the relevant Regulators.

As discussed further in Section 3 of this report, although no changes to the approach have been formally requested, the works that have been carried out are not entirely as originally envisaged. The reasons for the alternative approach are discussed in the following sections and URS is satisfied that the works that have been carried out are in general accordance with the purpose, objectives and requirements of Schedule 7 of the Section 106 Agreement.

RE IE OF T E CO L E T E R A O R S

Introduction

The following sections discuss whether or not the requirements specified in Table 1 of Schedule 7 of the Section 106 Agreement have, in URS' professional opinion, been satisfactorily completed in accordance with the purpose, objectives and requirements of the Section 106 Agreement.

Before discussing the works that have been undertaken it is important to recognise that the purpose of RAP Feature 4, as set out in Table 1 of Schedule 7 of the Section 106 Agreement, is to intercept and recover free-phase product. As a result, the following sections focus on the presence, or otherwise, of free-phase product and does not consider other indicators of contamination such as odours, sheens or the dissolved phase, as these are likely to be addressed as part of the Redevelopment Remediation Works when undertaken.

Site Investigations

The Section 106 Agreement requires design-level investigations to be undertaken to assess the specific requirements of the proposed interception and free-phase product recovery trenches. The following sections provide details of the site investigations undertaken by Atkins.

Atkins' Western Margins RAP Works Assessment Report (Information Source 4) states that initial site investigations were undertaken from May 2009 to winter 2010. This involved the excavation of four trial pits to a maximum depth of 2.5 m along the alignment of RAP Feature 4.

Atkins reports that hydrocarbon staining and odours were noted in all of the trial pits but no recoverable free-phase product was encountered. Atkins reports that the trial pits were left open to allow monitoring. Hydrocarbon droplet and sheens were observed in all four trial pits.

Atkins reports that two 600 mm diameter monitoring sumps were later installed along the line of RAP Feature 4 to replace two of the trial pits and allow on-going monitoring. The sumps were installed to a depth of approximately 1 m below perched groundwater level.

Monitoring of Surface and Groundwater

The Section 106 Agreement requires system-specific monitoring of surface water and groundwater.

Atkins' Western Margins RAP Works Assessment Report (Information Source 4) states that the monitoring sumps and interception trenches within the Western Margins have been monitored 25 times during a two-year period between February 2010 and January 2012. Also, a number of pre-existing boreholes have been monitored.

With regards RAP Feature 4, droplets of free-phase product were observed in both of the monitoring sumps. Atkins reports that free-phase product has not been observed in WMS12 since April 2010 whereas free-phase product was last observed in WMS13 in February 2010.

Atkins reports (Information Source 4) that 14 up-gradient boreholes in the vicinity of the Western Margins have been monitored for the presence of free-phase product. One borehole is reported to have contained free-phase product, although Atkins reports that this is considered to be localised as other boreholes down-gradient have not shown free-phase product.

Atkins also reports (Information Source 4) that 'draw down' tests were performed on ten of the 31 trial pits that had been excavated within the Western Margins. These tests involved

pumping out groundwater from the trial pits where hydrocarbon sheens had been observed. Groundwater inflow was then observed. Free-phase product returned to eight of the 10 trial pit locations.

Six of the eight locations where free-phase product re-entered the trial pits are situated along the alignment of RAP Feature 2, which is not considered in this RAPWCS. The remaining two locations where free-phase product returned to the trial pit are situated on the alignment of RAP Feature 3, which is also not considered in this RAPWCS.

Ochreous discharges

The Section 106 Agreement requires the prevention of ochreous precipitate discharges from the site to Crymlyn Bog. As noted above, ochreous discharges have been observed.

Atkins reports (Information Source 4) that proposals for the interception and collection of ochreous seepages will be developed as part of RAP Feature 2 and are likely to comprise a system of reed filled trenches with a monitored discharge point, later to be incorporated into the drainage design as and when the area is developed for residential use.

Given that RAP Feature 2 is located topographically at the lowest point within the Western Margins and is situated directly adjacent to Crymlyn Bog, URS considers this to be an acceptable approach.

RS Observations during the works

URS attended site during the works to observe progress. The following table provides a summary of URS' observations.

Table RS Observations during the works

Date	URS' Observations
30-Jun-2009	URS inspected the various trial pits that have been installed throughout the Western Margins. Ochreous seepages were noted in many of the pits and free-phase product was evident in some – most notably in those excavated within the vicinity of RAP Feature 2.
24-Nov-2011	Walkover with Atkins to review the monitoring works that have been on-going within the Western Margins. Ochreous discharges are evident in most locations, but most notably in the vicinity of RAP Features 2 and 5. Free-phase product was evident in some of the monitoring sumps with the biggest quantities in those sumps along RAP Feature 2. Elsewhere free-phase product was limited to sheens and some droplets.
26-Jul-2012	Walked over the Western Margins and discussed the latest monitoring results with Atkins. It would appear that there would be limited benefit to carrying out further works for RAP Features 3, 4 and 5 due to the limited volumes of free-phase product that have been observed. However, ochreous seepages, especially along RAP Feature 5, are evident. Also, RAP Feature 2 remains a concern where free-phase product was noted within the monitoring sumps and observation trenches. Oily seepages were also observed at ground level here.
17-Apr-2013	Walked over the Western Margins with Atkins to discuss RAP Features 2 and 5. With regards RAP Feature 5 it was confirmed that reed growth that is already evident within the trench will be encouraged with a view to polishing the ochreous discharges. With regards RAP Feature 2 free-phase product was again observed within the monitoring sumps and interception trenches. It was confirmed that the existing trenches would be re-excavated and the monitoring sumps refurbished to increase the zone of influence through the introduction of new granular backfill. It was agreed that the existing reed bed, including the inlet and outlet level controls, will also be refurbished.

A selection of photographs is provided in **Appendix** .

Summary

The Section 106 Agreement requires the design and installation of a permanent system to intercept and recover free-phase product comprising a 100 x 2 m trench between North Site Reservoir and South Site Reservoir.

As discussed in Section 3.2 of this report, four trial pits were excavated along the alignment of RAP Feature 4 and two monitoring sumps were later installed to allow on-going monitoring. As discussed in Section 3.3 droplets of free-phase product were initially observed in the two monitoring sumps but Atkins reports that no free-phase product has been observed since April 2010.

Atkins reports that the trial pits were installed to a greater depth than the 2 m originally specified in the Section 106 Agreement and that the monitoring sumps were installed to a depth of approximately 1 m below perched groundwater level.

In summary, although the RAP works as originally envisaged have not been undertaken, URS is satisfied that the investigations and subsequent monitoring that has taken place has adequately shown that the originally proposed free-phase product interception features would not have recovered significant volumes of free-phase product. Therefore URS is satisfied that RAP Feature 4, as originally envisaged, is not necessary and that the purpose, objectives and requirements of Schedule 7 of the Section 106 Agreement will still be achieved.

Protection of Future Public Health

The Section 106 Agreement requires all works to be protective of future public health and safety assuming unrestricted recreational access.

As minimal free-phase product has been observed during the site investigations and subsequent monitoring, unrestricted recreational access is unlikely to result in members of the public coming into contact with free-phase product in this location.

It should be noted that in order to be certified for redevelopment as a residential phase, further Redevelopment Remediation Works shall be required in accordance with Schedule 8 of the Section 106 Agreement. These works are aimed at being protective of future human health.

Consultation with the EA and CC

The Section 106 Agreement requires all works to be completed to the satisfaction of the EA and CCW. Both organisations now form part of Natural Resources Wales.

URS is yet to receive confirmation that Natural Resources Wales is satisfied with the works that have been carried out. Therefore, this RAPWCS shall remain draft until confirmation has been received.

CERTIFICATIO

The following table, which summarises the requirements specified in Table 1 of Schedule 7 of the Section 106 Agreement, aims to confirm whether or not in URS' professional opinion the RAP Works have been satisfactorily completed in accordance with the purpose, objectives and requirements of Schedule 7 of the Section 106 Agreement.

Table Certification Summary

Requirement	Status	Comments
Design-level investigations to assess specific requirements	Complete	Refer to Section 3.2 of this report.
Design and installation of permanent system to intercept and recover free-phase product and prevent free product from crossing the site boundary and entering Crymlyn Bog: Between North and South Site Reservoirs - Install 100 x 2 m interception and recovery trench only (RAP Feature 4)	Not Required	Refer to Section 3.6 of this report.
System-specific monitoring of surface and groundwater	Complete	Refer to Section 3.3 of this report.
Prevent ochreous precipitate discharges from site to Crymlyn Bog arising from the interception feature	Complete	Refer to Section 3.4 of this report. It should also be noted that further works will be required under RAP Feature 2.
All works to be completed to the satisfaction of the EA and CCW	Not Complete	Refer to Section 3.8 of this report.
All works to be protective of future public health and safety assuming unrestricted recreational access	Complete	Refer to Section 3.7 of this report.

CO CL SIO S**Overview**

- This RAPWCS refers to the Western Margins RAP Feature 4 as envisaged by the Section 106 Agreement and the RMA.
- The Phase Boundary for Phase 16 is shown as the land edged in red on drawing no. 5041216-RAP-DWG-1164, a copy of which is provided in **Appendix A**.
- The primary objective of the RAP Works as originally proposed was to install free-phase product interception and recovery features within the Western Margins to prevent migration into Crymlyn Bog.
- The location and extent of the works are shown in Atkins drawing no. 5041216-REM-DWG-433, a copy of which is provided in **Appendix C**.
- No changes to the scope of the RAP Works as outlined in Schedule 7 of the Section 106 Agreement were proposed, albeit site investigations and subsequent monitoring indicated that the originally proposed free-phase product interception and recovery features would have resulted in the recovery of negligible volumes of free-phase product. Therefore it was concluded that the installation of permanent features is not necessary.
- Written confirmation is required from Natural Resources Wales that the works have been completed to their satisfaction. This RAPWCS shall remain draft until such time as this confirmation is received.

RA CS

This RAPWCS confirms that in URS' professional opinion, on the basis of the information provided within the Information Sources and observations made by URS and notwithstanding the limitations listed in Section 5.3 below, the RAP Works for Phase 16 (RAP Feature 4) appear to have been completed satisfactorily in general accordance with the purpose, objectives and requirements of Schedule 7 of the Section 106 Agreement.

Furthermore, again notwithstanding the limitations listed in Section 5.3 below, URS is satisfied that the purpose, objectives and requirements of Schedule 7 of the Section 106 Agreement have been met and 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 covered by the Phase.

Specific Limitations in Relation to this RA CS

As discussed in Section 3.8 of this report, the Section 106 Agreement requires all works to be completed to the satisfaction of Natural Resources Wales. As URS is yet to receive confirmation that Natural Resources Wales is satisfied with the works that have been carried out, this RAPWCS shall remain draft until confirmation has been received.

Furthermore, this RAPWCS is issued on the basis that RAP Feature 2 will be installed and that this will include measures to deal with the ochreous seepages that have been observed throughout the Western Margins.

C

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



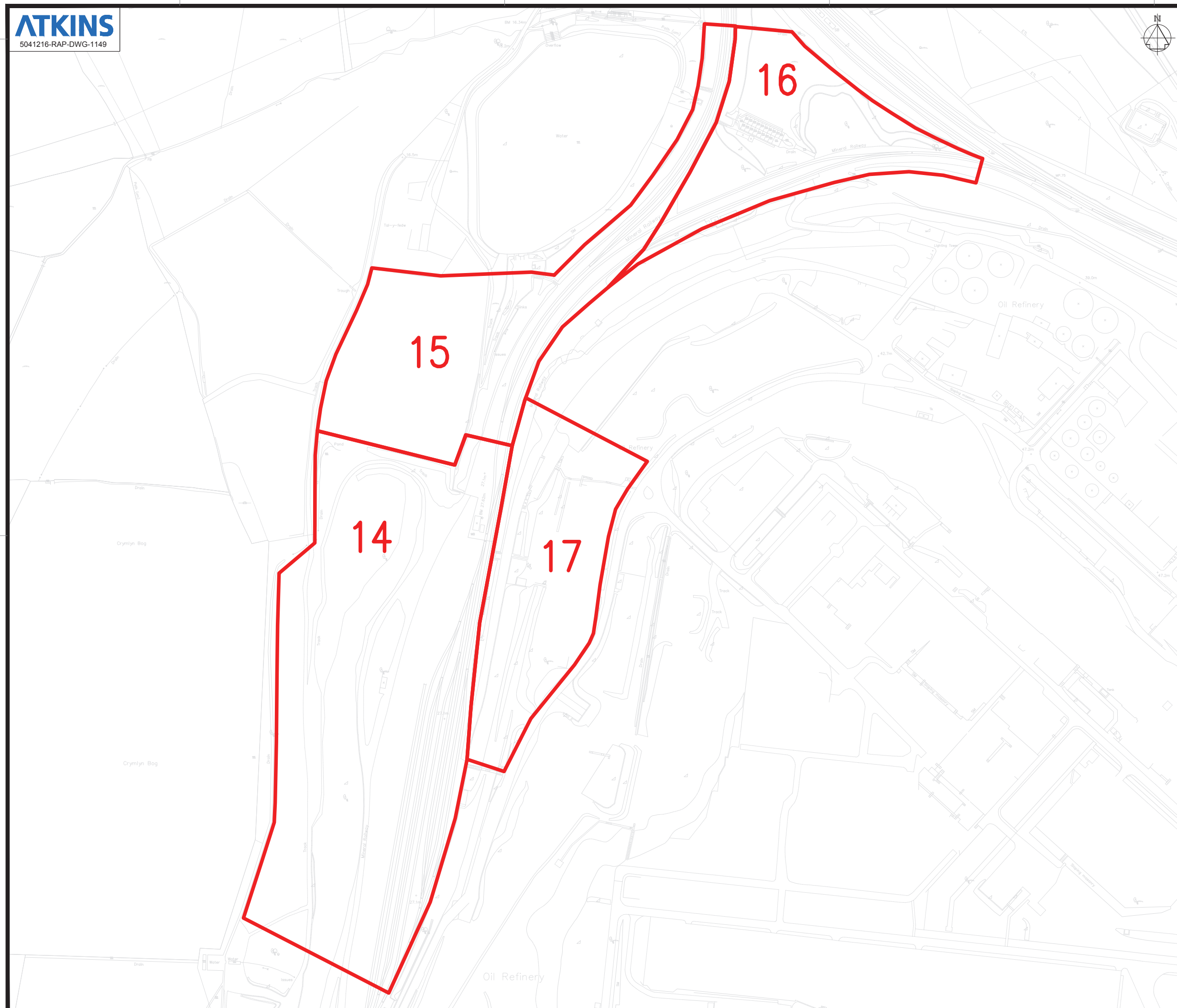
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KEY



PHASE BOUNDARIES



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REVISIONS	Drawn By	Checked By	Date
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PURPOSE OF ISSUE	Rev.	Authorised for issue	Date
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CLIENT



PROJECT

Coed Darcy Urban Village

DRAWING TITLE

Western Margin Phase Boundaries RAP 2-5

Scales 1:1250	DRAWN A.J	CHECKED H.M	CO-ORD CHECK	
	DATE 27.02.12	DATE 27.02.12	DATE	
		SHEET A.1	PLOT DATE 23.03.12	
DRAWING NO 5041216-RAP-DWG-1164			REV -	

A E I B SC E LE OF T E SECTIO A REE E T

SCHEDULE 7

The RAP Works

Purpose, objectives and requirements of the RAP Works

Part 1

1. Purpose and objectives of the RAP Works

- 1.1 The RAP Works (a programme of ongoing voluntary Remedial Action in relation to Pre-Transfer Date Environmental Matters at or in the vicinity of the Property) have been agreed between the Owner and the relevant Environmental Authorities in lieu of the imposition of formal Remedial Action requirements by any such Environmental Authorities.
- 1.2 The current requirements and status of the RAP Works are as set out in Table 1 below.
- 1.3 The parties to this Agreement agree that the purpose and objectives of the RAP Works are the carrying out of the appropriate Remedial Action necessary, and sufficient in the context of both the current use of the Property and the Intended Use or such other use as may be determined from time to time:
 - 1.3.1 to prevent (or where that is not possible, minimise, remedy or mitigate as far as reasonably practicable the effects of) migration from the Property of Pre-Transfer Date Contamination and any Developer Contamination; and
 - 1.3.2 to assess with a frequency agreed as sufficient by the relevant Environmental Authorities and keep under review:
 - (a) the condition of the Environment at and (provided appropriate access is procured (the Developer having used reasonable endeavours to obtain it)) in the vicinity of the Property, including any controlled waters that are or may be affected by such condition, and (provided appropriate access is procured (the Developer having used reasonable endeavours to obtain it)) any land adjoining or adjacent to the Property; and
 - (b) the progress and effectiveness of natural attenuation processesin order in each case to demonstrate whether or not any Pre-Transfer Date Environmental Matters are posing or may pose an unacceptable risk to the Environment beyond the boundaries of the Property in the light of Environmental Law; and
 - 1.3.3 to prevent (or where that is not possible, minimise, remedy or mitigate as far as reasonably practicable the effects of) any harm to the Environment or any pollution of controlled waters or any possibility of such harm or pollution being caused in each case by or as a result of any Pre-Transfer Date Environmental Matter including the containment of free phase Hydrocarbons within the Property boundaries; and
 - 1.3.4 to avoid where reasonably practicable any Environmental Claim by any relevant Environmental Authority in relation to or in connection with any Pre-Transfer Date Environmental Matter, including without limitation to avoid service on any party in relation to or in connection with any Pre-Transfer Date Environmental Matters of:
 - (a) a "remediation notice" under Part IIA of the Environmental Protection Act 1990; or

- (b) a "works notice" under Chapter 1 of Part VII of the Water Resources Act 1991; or
 - (c) a notice under Section 59 of the Environmental Protection Act 1990 requiring removal of waste or the carrying out of steps to eliminate or reduce the consequences of deposited waste; or
 - (d) the imposition of a requirement by any relevant Environmental Authority for any party to carry out any Remedial Action pursuant to EU Directive 2004/35/CE of 21 April 2004 and/or pursuant to any legislation implementing such Directive in England and Wales, or to recover the costs of the taking of such Remedial Action by any such Environmental Authority; and
- 1.3.5 to take all reasonably practicable steps to seek to secure the final and unconditional acceptance by the relevant Environmental Authority of the surrender of the Waste Management Licence as soon as reasonably practicable.

Table 1
Current RAP Works and Status

Site Area / Potential Receptor	Key Issues	Scope of Currently Envisaged Remedial Action	Figure Reference	Performance Criteria	Works to Date
Whole Site	Continued demonstration of natural attenuation of dissolved phase hydrocarbons. Consultation with EA and CCW	Six monthly: - Liquid level measurements - Analytical samples from 120 ground and surface water sample locations. Locations specified in the semi-annual reports submitted to the Environment Agency. - Six-monthly reporting of trends. Regular update meetings (minimum bi-annually) with EA and CCW for lifetime of RAP	NA	Routine programme of groundwater level and quality and product thickness monitoring. Annual scope to be agreed with EA on rolling basis.	Ongoing since 2000. Annual reductions in scope have been agreed with EA on basis of data received.

Site Area / Potential Receptor	Key Issues	Scope of Currently Envisaged Remedial Action	Figure Reference	Performance Criteria	Works to Date
Western flank of main site / Crymlyn Bog / Boundary with North Reservoir	- Potential for cross boundary free product migration at various locations along boundary - Dissolved-phase hydrocarbon migration	- Monitor 30 'sentinel' wells along northwest and southeast boundaries of North Site for presence of free product. Locations included in 'Whole Site' above. - Install permanent product interception trench system along boundary of North Site, if sentinel well data suggests a risk of downgradient product migration occurring and in any event install a product interception trench to, at a minimum, replace the current sentinel wells prior to redevelopment (300 x 4 metres minimum). Any interception trench must prevent further downgradient migration of free product and allow recovery of intercepted product.	1	Continued six-monthly monitoring of free product thickness, and assess potential for further downgradient migration. All works to be protective of future public health and safety assuming unrestricted recreational access.	Sentinel well installations complete on North Site, and listed in semi-annual monitoring reports.

Site Area / Potential Receptor	Key Issues	Scope of Currently Envisaged Remedial Action	Figure Reference	Performance Criteria	Works to Date
Western flank of main site / Crymlyn Bog / Boundary with North Reservoir (cont.)		2. Product interception and recovery, consisting of the following programme elements: 1. Design-level investigations to assess specific requirements 2. Design and Installation of permanent system to intercept and recover free-phase product 3. Diffuse discharge of water arising from interception system to Bog, via purpose-constructed wetland features. 4. System-specific monitoring of surface and groundwater Above programme of works to include the following as a minimum: • Railhead (install 200 x 4 metre trench, and 200 metre linear wetland feature) • Railhead to South reservoir (install 250 x 4 metre trench, interception only, ie, no wetland) • Between North and South reservoirs (install 100 x 2 metre interception and recovery trench only)	2 3 4	Install permanent measures to prevent free product from crossing the site boundary and entering Crymlyn Bog to satisfaction of EA and CCW Diffuse discharge of water arising from interception system to Bog, via purpose-constructed wetland features to reduce dissolved hydrocarbon load and without requirement for a discharge consent. Prevent ochreous precipitate discharges from site to the Crymlyn Bog arising from the interception feature. All works to satisfaction of EA and CCW. All works to be protective of future public health and safety assuming unrestricted recreational access.	Some additional wells installed in 2000 to monitor for free-product.

Site Area / Potential Receptor	Key Issues	Scope of Currently Envisaged Remedial Action	Figure Reference	Performance Criteria	Works to Date
Western flank of main site / Crymlyn Bog / Boundary with North Reservoir (cont.) C:1998905v1	Free-phase seepage leading to gross-contamination of surface soils in interior of site.	Design and Install 'Inland' free-product interception and collection system between Railhead and Main Site (200 x 3 metres, interception and recovery trench only).	5	Install permanent system to prevent free product migration to railhead to satisfaction of EA and NPT.	Not commenced.

Site Area / Potential Receptor	Key Issues	Scope of Currently Envisaged Remedial Action	Figure Reference	Performance Criteria	Works to Date
Containment Area	Free product migration from filled area into Crymlyn Bog, Crymlyn Bog Lagoon, and South Bay.	Product interception and recovery, consisting of the following programme elements:		Remove free product with a temporary in-situ system to extent practicable until recovery is asymptotic from a system which hydraulically influences the free product contaminated filled area to the satisfaction of EA	System installed in 2005, recovery ongoing.
		1. Complete design-level investigations to assess specific requirements 2. Design and Installation of permanent system to intercept and recover free-phase product 3. System-specific monitoring		Install permanent measures to prevent free product from:	Temporary (plywood bund) system in place; regularly maintained.
		Above programme of Works to include the following as a minimum:	6	• leaving site boundary and entering Crymlyn Bog • entering Crymlyn Bog Lagoon from filled area in Tip	Some survey information collected along Tip perimeter
		• Filled area; expand on existing system; upgrade to 12 pumping wells	7	• entering the licensed area from Tank farm	Some site investigation and monitoring data available to assist in design.
		• Northern Tip perimeter adjacent to Crymlyn Bog (install permanent engineered and covered 500 x 1 metre product interception and recovery feature in place of current plywood bund)	8	in all cases permitting the free flow of groundwater past the interception features and to permit recovery of product, all to satisfaction of EA, NPT and CCW.	
		• Filled area to South Bay/Crymlyn Bog (install 500 x 4 metre, product interception and recovery trench)	9		
		• From north Tank Farm into licensed area (ie, South Bay, and Crymlyn Bog lagoon install 300 x 4 metre product interception and recovery trench)			

Site Area / Potential Receptor	Key Issues	Scope of Currently Envisaged Remedial Action	Figure Reference	Performance Criteria	Works to Date
Containment Area	Hydrocarbon-containing peat and sludges.	Excavation and treatment of peats and sludges in (all quantities estimated and unverified): • South Bay (15,000m3) • West Bay (10,000 m3) • Crymlyn Bog Lagoon (20,000m3)	10 11 11	Removal and treatment to achieve restoration quality standards agreed with the Environment Agency of hydrocarbon contaminated surface and near surface soil and sediment to satisfaction of EA.	7,000 m3 peats/sludges removed from lagoon and treated in 2006/7.
	Surrender of Waste Management Licence EAWML34004 (licence status active, but landfill 'closed or closing').	In addition to free-product issues above, the following are also required: • Agree programme of works with EA to permanently restore Tip and secure Waste Management Licence surrender.	6, 12 12	Surrender Waste Management Licence.	Design work commenced to utilise material from Area 1. Ongoing.
	Dissolved-phase hydrocarbon discharge to Crymlyn Bog.	• Ensuring of long term security and immobilisation of wastes in the filled area. • Construct permeable cap and re-profile filled area with cover material (at least 50,000 m2) • Construct engineered wetland in lagoon (15,000 m2) to reduce dissolved hydrocarbon load in surface water exiting Tip. • alterations to drainage regime such that flow to Crymlyn Bog from the site is diffuse, rather than from a point-source, as currently exists.	13 14	Reduce dissolved phase hydrocarbon load in groundwater and surface water leaving the Tip and entering Crymlyn Bog.	
				All works to be protective of future public health and safety assuming unrestricted recreational access.	

Site Area / Potential Receptor	Key Issues	Scope of Currently Envisaged Remedial Action	Figure Reference	Performance Criteria	Works to Date
South Tank Farm	Potential dissolved-phase hydrocarbon discharge to stream discharging to Crymlyn Bog to south	- Constructed wetland (2500 m2), - groundwater monitoring programme	15	Reduction of dissolved phase hydrocarbon load to Crymlyn Bog	Monitoring
North Reservoir and East Bay	- Basal sludges. - Reconfigure reservoir to meet near pre-refinery conditions as part of return of land to the landowner. - Restoration of original drainage patterns.	Design and implement sludge removal and treatment programme for (all quantities estimated and unverified): - North Site Reservoir (40,000 m3), - East Bay (5,000m3) - API Separators (5,000 m3) Isolate reservoir from site drainage system Drain reservoir Remove dam Restore and landscape valley	16 17 18 19 16, 17 20 16, 17	- Sludge removed, treated to satisfaction of EA dependent on fate and disposed of or re-used. - Water removed, treated as required and disposed of. No discharge of NSR water to Crymlyn Bog permitted unless otherwise agreed with appropriate Environmental Authorities. - Valley restored to near pre-refinery conditions so as to be suitable for uncontrolled recreational access. - Dam removed and materials re-used. - Post restoration water management programme implemented consistent with restored valley. All works to be protective of future public health and safety assuming unrestricted recreational access.	Sludge removal from East Bay (part complete); no work on reservoir yet. Not commenced. Not commenced. Not commenced. Not commenced.

Site Area / Potential Receptor	Key Issues	Scope of Currently Envisaged Remedial Action	Figure Reference	Performance Criteria	Works to Date
South Reservoir	Hydrocarbon contaminated sludges to which contaminated groundwater discharges.	1. Design and implement programme of sludge removal and treatment (estimated at 5,000 m3). 2. Prevent / mitigate hydrocarbon seepage from walls and floor of reservoir (150 m) 3. "Soften" walls and landscape to satisfaction of CCW to enhance ecological value	21	Retain significant portion of South Reservoir as "clean" water feature. Reduction of hydrocarbon seepage from walls of reservoir as far as possible to satisfaction of EA. Discharge re-routed. CCW sign off on 'softening' and landscaping to increase ecological value. All works to be protective of future public health and safety assuming unrestricted recreational access.	Not commenced
Southern edge of process area / Llandarcy Bog	Potential free product migration to Llandarcy Bog. Dissolved-phase hydrocarbon discharge to bog/culverted drain.	Intercept free product. Six-monthly water monitoring programme (as specified in 'Whole Site', above) Construct linear wetland (100 m2).	22 23	Install permanent product interception feature. Reduce dissolved phase hydrocarbon load and ochreous precipitate discharges from site as far as possible to satisfaction of EA. All works to be protective of future public health and safety assuming unrestricted recreational access.	Completed in 2005. Not commenced, monitoring ongoing.

Site Area / Potential Receptor	Key Issues	Scope of Currently Envisaged Remedial Action	Figure Reference	Performance Criteria	Works to Date
Eastern process area / Neath valley and river	Potential cross boundary free product migration into railway cutting.	Monitor 30 sentinel wells for free-phase product on six-monthly basis. Install permanent product interception trench system along boundary of North Site, if sentinel well data suggests a risk of downgradient product migration occurring and in any event install such a trench to, at a minimum, replace the current sentinel wells prior to redevelopment (500 x 3 metres minimum). Any interception trench must prevent further downgradient migration of free product and allow recovery of intercepted product.	24	Install permanent interception feature to prevent free product migration downgradient and permit recovery of intercepted product.	Sentinel well installation complete. Groundwater monitoring only.
	Known and or suspected presence of free phase hydrocarbon and chlorinated hydrocarbons. Dissolved hydrocarbon and chlorinated hydrocarbon migration away from areas of product.	Either containment of hydrocarbon and chlorinated hydrocarbon product, vapour and dissolved phase, or; source-reduction solution (of area 30,000m2) to render containment permanently unnecessary, with the following programme elements: 1. Design-level investigations 2. Feasibility tests 3. System implementation and installation 4. Groundwater and air and soil vapour monitoring programme	25	Permanent maintenance of acceptable risk to agreed controlled waters receptors (River Neath and Crymlyn Bog) to the satisfaction of EA and NPT.	Limited work may be required for the RAP subject to results of long term monitoring. Substantial additional (containment) work likely to be required in the event of development.

Figure references are references to the RAP Plan annexed to this Deed

Report References (The following reports contain information which may be of relevance to the development and implementation of the RAP. This list is not exhaustive.):

Report Title	URS Report Ref.	URS Job no.	Issue Date
Environmental Liability Assessment, Llandarcy Refinery Desk Study Findings Vol 1	2048R	37491-001	29-Sep-97
Environmental Liability Assessment Llandarcy Refinery Interpretative Report Vol 2	2049R	37491-002	30-Sep-97
Risk Assessment Methodology Document (see DR810)	2271R	39991-001-401/P1	05-Aug-98
Report - Phase II, Stage 1 Data Report, BP Llandarcy Refinery - Neath, W Glamorgan - for BP Llandarcy Refinery LTD	R642	39991-001	26-Aug-98
Draft Report - Phase II Interim Data Assessment - BP Llandarcy Refinery, Neath, W Glamorgan	DR664	39991-002	06-Nov-98
Preliminary Sludge Treatability Study Report	DR666	39991-001	10-Nov-98
Phase 2 Site Assessment Vol 1, 2 and 3 Phase 2 Final Data Report	DR785	39991-004	28-Jul-99
Risk Assessment Methodology	DR810	39991-005	13-Sep-99
Draft Summary Report Stage 1 Solvent Recovery Pilot Test, DiMe Plant Area	DR829	39991-007	17-Nov-99
Water Balance Report	R835A	39991-009	14-Jan-00
Remedial Action Plan	DR869r3	39991-005	18-Feb-00
Synopsis of Site Assessment and Proposed Remedial Works on behalf of BP Llandarcy Refinery	R896	39991pfound	31-May-00
Phase 2 Site Assessment Crymlyn Bog Historical Spill	DR898	39991-011	12-Jun-00
Routine GW Monitoring Mar - Sept 2000 Vol 1 Draft Report	CD954	39991-013	01-Jan-01
Data & Risk Assessment of the Main Tank Farm	DR946	39991-017	05-Jan-01
Draft Remedial Plan, Vanadium Lagoon	DR962	39991-016	01-May-01
Additional Site Characterisation & Remedial Action Plan	DR963	39991-016	02-May-01
Final Report - Phase II Investigation & Human Health Risk Assessment for BP OIL, Swansea	FR979	39991-019	13-Jul-01
Monitoring Data Summary Report (Sept 2000)	DR980	39991-013	18-Jul-01
Monitoring Data Summary Report (March 2001)	DR980	39991-013	18-Jul-01
Progress Report on the Constructed Wetland Pilot Tests	DR1042	39991-016	01-Feb-02
Final Report - Sept 2001 Monitoring Data Summary Report - BP Llandarcy Refinery, Neath	FR1044	39991-023	08-Feb-02
Water Balance Addendum	DR1031	39991-016	01-Apr-02
South Site Reservoir Sampling Results	6681	39991-025	14-Jun-02
Site Characterisation & Remedial Action Plan Llandarcy Bog	DR1078A	39991-041	31-Jul-02
March 2002 Monitoring Data Summary Report	DR1081	39991-029	02-Aug-02
DiMe Mineralisation Tests	6732/MC	39991-016	16-Aug-02

Report Title	URS Report Ref.	URS Job no.	Issue Date
Informational Supplement for DiMe Plant Area	DR1096	39991-022	01-Sep-02
Results of Sentinel Well Product Mobility	6767	39991-032	12-Sep-02
Site Characterisation Works & Bypass Ditch Outline Design North Site Reservoir	DR1111	39991-016	12-Feb-03
September 2002 Monitoring Data Summary Report	DR1119	39991-036	28-Feb-03
Oil Recovery Tests Containment Area	DR1130	39991-026	25-Apr-03
March 2003 Monitoring Data Summary Report	DR1137	39991-036	01-Jul-03
Draft Factual Report - Site Investigation	DR1140	39991-035-785	10-Jul-03
Draft Factual Report DiMe Area	DR1144	39991-037	11-Jul-03
Rail Cutting Inspection	DR1161	39991-032	06-Aug-03
Specification Report Llandarcy Bog Interception & Recovery System	DR1168	39991-041-785	22-Aug-03
September 2003 Monitoring Data Summary Report	DR1191	39991-036	13-Feb-04
Draft Factual Report Whole Site Investigation	DR1209	39991-044	01-Jun-04
Whole Site Remediation Strategy	DR1224A	39991-035	29-Jun-04
Draft Report Outline Remedial Options Assessment - BP Llandarcy Refinery, Neath, W Glamorgan	DR1158	39991-037	19-Jul-04
March 2004 Monitoring Data Summary Report	DR1220	39991-049	30-Jul-04
September 2004, Monitoring Data Summary Report	R1263	39991-055	14-Dec-04
Solvent Pit RAP Issues: Additional Llandarcy Bog Water Samples	7601	39991-056-785	26-Jan-05
Area 1 - Main Workshop Former Degreasing Pit Investigation	R1278	39991-056	28-Jan-05
Draft Report Containment Area Perimeter Trench Performance Specification	BPRP0005	39991-054	01-May-05
Report on the Constructed Wetland Pilot Tests. Issue no.1	R1236	39991-021	25-May-05
Soil Stockpile Sampling Report. BP Llandarcy Barn Store & Waste Tip - Issue no 1 - DRAFT	R1304	44382527	01-Jun-05
Final Factual Report Site Investigation Phase 1 Area	FR1275	39991-035	22-Jul-05
Groundwater Monitoring and Sampling- BP Oil Llandarcy Refinery	DR1307	44382526-1943	01-Aug-05
Final Factual Report Whole Site Investigation	FR1287	39991-044-785	12-Aug-05
Groundwater Monitoring and Sampling - Factual Report	DR1356	44382526	01-Sep-05
Tip Closure and Completion Strategy Report	R1360	44382538	15-Mar-06
March 2006 Groundwater Report	R1396	44382534	11-Aug-06

Part 2

1. Developer obligations regarding RAP Works

- 1.1 The Developer shall carry out or procure the carrying out of all outstanding Remedial Action identified in Table 1 above in order to achieve the purpose and objectives set out in sub-paragraph 1.3 (including 1.3.1-1.3.5 thereof) of Part 1 of this Schedule and the performance criteria specified in Table 1 (and shall do so to the satisfaction of relevant Environmental Authorities) subject to any variations thereto that may be required in writing by the relevant Environmental Authorities from time to time.
- 1.2 The Developer shall carry out or procure the carrying out of all such further Remedial Action (whether identified in Table 1 above or not) necessary, including any that may be requested or required at any time by any Environmental Authority, acting lawfully, in order to achieve the purpose and objectives set out in sub-paragraph 1.3 (including 1.3.1-1.3.5 thereof) of Part 1 of this Schedule and the performance criteria specified in Table 1 and any such further Remedial Action which a reasonable and prudent owner of the Property bearing full legal responsibility for all Pre-Transfer Date Environmental Matters would otherwise regard as necessary or appropriate from time to time in order to achieve the purpose and objectives set out in sub-paragraph 1.3 (including 1.3.1-1.3.5 thereof) of Part 1 of this Schedule and the performance criteria specified in Table 1 and shall in each case do so to the satisfaction of the relevant Environmental Authorities provided that nothing in this sub-paragraph shall oblige the Developer to perform Remedial Action in relation to Unknown Off-Site Contamination or any Pre-Transfer Date Personal Injury.
- 1.3 The Developer shall take all reasonable steps promptly to create and thereafter maintain an open and constructive dialogue between it and the relevant Environmental Authorities regarding the progress and all other aspects of the RAP Works (including any impact or potential impact on any aspect of the RAP Works of any aspect of the Redevelopment Remediation Works and the inter-relationship between the two) and shall procure that any person acting on its behalf in connection with the RAP Works shall do the same. Without prejudice to the generality of the foregoing, the Developer shall:
 - 1.3.1 Convene a formal meeting with the relevant Environmental Authorities and representatives of the Authority to take place before or as soon as reasonably practicable after the Transfer Date in order to discuss with such Environmental Authorities the current status of the RAP Works, the Developer's plans for redevelopment of the Property as an Urban Village, the future programme of RAP Works in the light of those plans and the Redevelopment Remediation Works and to agree a schedule for future meetings between the Developer, those acting on its behalf and the relevant Environmental Authorities and the Authority such schedule to include as a minimum 6 monthly RAP Works review meetings; and
 - 1.3.2 Promptly comply with all lawful requests for information regarding any aspect of the RAP Works received from any Environmental Authority or the Authority at any time.
- 1.4 The Developer shall, and shall procure that any person acting on its behalf in relation to any aspect of the RAP Works required by this schedule shall, at all times comply with the requirements of Schedule 10 (General Remediation Requirements).

2. Variations to the RAP Works

- 2.1 The Developer shall promptly notify CDL, the Monitor and the Authority if at any time it is notified by a relevant Environmental Authority that such Environmental Authority requires a variation to the RAP Works in which case the following procedure shall apply:
- 2.1.1 As soon as reasonably practicable after serving a notice under paragraph 2.1 above, the Developer shall prepare proposals for the variation to the RAP Works that are consistent with the purpose and objectives of the RAP Works as set out in 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 variation to the RAP Works has been derived.
 - 2.1.2 Not earlier than the day of submission of its proposals to CDL the Monitor and the Authority in accordance with sub-paragraph 2.1.1 above, the Developer may 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 variation to the RAP Works. 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 2.1.1 above and a copy of this Agreement clearly drawing attention to the purpose, objectives and requirements of the RAP Works set out therein and the proposed changes thereto.
 - 2.1.3 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 to the Authority at the same time.
 - 2.1.4 The Developer shall ensure that the RAP Works achieve compliance with any variation to the specification for the RAP Works approved in writing by the appropriate Environmental Authorities pursuant to this paragraph 2.1, as if they were also set out in the Table to this Schedule.
 - 2.1.5 No such proposed variation to the RAP Works shall be implemented unless it has been approved in writing by the Environmental Authorities in accordance with this paragraph 2.1 (or if the Developer has only oral approval (or non objection) of the relevant Environmental Authorities no such proposed variation to the RAP Works shall be implemented unless the Developer notifies the relevant Environmental Authorities in writing (copied at the same time to CDL and the Monitor) that it proposes to proceed with the implementation of the proposed variation to the RAP Works 10 Working Days after the date of such notice and no written objection of any relevant Environmental Authority is received within such 10 Working Day period in respect of the same).
 - 2.1.6 Any reference in this Deed to the RAP Works shall be to the RAP Works as varied in accordance with this paragraph 2.1.



A E I C I FOR ATIO SO RCES



A E I RS RE ESTS FOR I FOR ATIO RFI



Simon Gibbons/Bristol/URSCorp

21/02/2011 13:10

To "Morris, Howel" <Howel.Morris@atkinsglobal.com>

cc

bcc

Subject Re: Western Margin 

Howel,

Attached are my comments. I would like to see the cross sections and logs and all dipping data if possible. You also need to characterise the product to see if it is the same at all locations. Based on the dipping from the trench sumps it appears to be more mobile in the summer so you need to be sure you have good data sets from July-November for the whole of the western margin.

I appreciate that this needs to be an iterative approach to assessing the data but I don't see anything in the report that pulls the Sources and Pathways together. How did the product migrate through the ground? Why is it where Atkins measure it? How could redevelopment affect options? Most of the monitoring is in the glacial deposits - how does that geology link back to the hillside where there was tankage and pipelines? I like CSMs to formulate answers that can then be investigated - at present the CSM is quite a factual summary of what has been found but no reason put forward as to why? In some circumstances it may not be possible to demonstrate a full understanding - particularly given the nature of the geology but I don't feel Atkins are much closer to understanding where and what type of feature may be required - although I appreciate conclusions section is yet to be completed.

Much of the geological discussion is from previous URS work - I would think that can be updated - particularly if you believe the PSD data and some of the higher permeability results we have from slug tests in the glacial deposits.

I think more trial pits in the areas east of the proposed trench alignments would help understand the sources of contamination more and what might ultimately need to be recovered/remediated. If there is such limited volumes of product currently Atkins need to assess why that is the case. Is it simply weathered/degraded and poorly mobile and/or will the product be more easily addressed through source removal during redevelopment works?

Looking at drawing 864 has the investigation gone far enough south? I don't have a figure showing the results of product dipping to know where the current areas of concern are. A drawing showing the product thickness trends next to locations would help and clearer information on screen depths, units installed in will also help. The geology at the very toe of the slope does become challenging and there isn't much review presented about the clay unit separating the glacial from the bedrock in the bog margins. Is there any product in the bedrock or is that a red herring?

I think in terms of general information its getting there but it needs to start pulling a few of the strands together - particularly based on historical product thicknesses so that the next stage can be considered more clearly. I would be happy to discuss in a meeting with Atkins if that would help but would like a bit more of the raw data to digest first.

Drawing 867 isn't referenced and I am not sure what it is showing me?

I have attached a couple of example figures from a Queens Dock CSM report which would assist the process for western margin. These show the various elements discussed in the report to help set the scene, cross sections, inferred fill thicknesses, GW contours, product thickness hydrographs and different product fingerprints for different areas of the site. All of these helped to put together the CSM for product migration through more permeable fill at this site. Something needs to be pulled together for the western margin if possible to help link the various processes that have led to the observed current product distribution. There may well be gaps (eg product typing) and some spatial uncertainty but having these types of schematic drawings will help to focus you on where you should be looking to get more information. Either that or Atkins need to be more assertive on whether it really matters in the context of redevelopment or more simply because product is currently not migrating (although a few more tests may be required at the right time of year to support this).

Regards

Simon



Western Margin CSM report_DRAFT 1_Issued for Comments_SG.docx QD_Supporting_CSM_Figures.pdf

Simon Gibbons

Technical Director
Hydrogeological Risk Assessment Ireland

RS Scott Wilson

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Registered number: 118271

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"Morris, Howel"
<Howel.Morris@atkinsglobal.com>

18/02/2011 16:18

To "Simon_Gibbons@URSCorp.com"
<Simon_Gibbons@URSCorp.com>

cc

Subject Western Margin

Simon

Please find attached the CSM report for the Western Margin. I have sent the document in word format for ease of comment. We anticipate a period of amendments and suggestion for further works.

Jayne and Tukh would be keen to meet following your review to agree and resolve any issues.

Also, I have been working on the West Bay Summary Report but need to clarify with you as to whether the summary report is required for RAP sign of the sludge removal or is it for redevelopment sign off pending surrender of the license in this area.

Regards

Howel Morris

Senior Geoenvironmental Consultant,
Water and Environment

AT I S

The official engineering design services provider

for the London 2012 Olympic and Paralympic Games

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Email: Howel.Morris@atkinsglobal.com Web: www.atkinsglobal.com

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Consider the environment. Please don't print this e-mail unless you really need to. [attachment "863 - Western Margin Ground Water Monitoring.pdf" deleted by Simon Gibbons/Bristol/URSCorp] [attachment "864 - Western Margin Composite Exploratory Hole Plan.pdf" deleted by Simon Gibbons/Bristol/URSCorp] [attachment "Western Margin CSM report_DRAFT 1_Issued for Comments.docx" deleted by Simon Gibbons/Bristol/URSCorp]

Contract Name: Coed Darcy Monitor RFI No:
 Contract Number: GNP/NJR/13773-2 Date Raised: 22 May 2012
 Subject: Review of Atkins' Western Margins RAP Works Assessment Report
 To: Howel Morris Atkins
 Cc: Mike Poland Atkins
 From: Rhys Mander URS

Response Required Within:

1 Day		3 Days		5 Days		10 Days	✓
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Comments

This RFI has been prepared following a review of Atkins' Report ref. 5041216-RAP-RPT-770 'RAP Features 2, 3, 4 & 5 Western Margins RAP Works Assessment Report'. The following queries are raised:

- Please clarify what the Monitor is being asked to do. Is the Monitor being asked to prepare RAP Works Completion Statements (RAPWCS) for Phases 15, 16 and 17?
- If RAPWCSs are to be prepared then it is important to note that the works undertaken represent a variation from the s106, as the permanent interception features will not be installed. The reason for this variation appears to be that there are insufficient quantities of recoverable product to warrant the installation of permanent features. We need to understand the process for implementing such variations as set out in the s106 which states:

The Developer shall promptly notify CDL, the Monitor and the Authority if at any time it is notified by a relevant Environmental Authority that such Environmental Authority requires a variation to the RAP Works in which case the following procedure shall apply...

The above does not cover this scenario, whereby the Developer wants to make the variation rather than the Environmental Authority. Atkins may wish to consider the implications of this. Nevertheless, it is suggested that the Environment Agency and the Local Authority and if necessary CCW should be consulted.

- Notwithstanding the above comment, is Atkins satisfied that the trial pits, trenches, monitoring sumps etc. that have been installed are located appropriately and are to a sufficient depth? Furthermore, do the features have an adequate zone of influence? The geology in this area is complex with confined and artesian groundwater. Shallow excavations may not intercept all contamination. For example, it is noted that some excavations were stopped either at groundwater, or due to collapse. Contaminated groundwater may be deeper. Please refer to the attached CSM cross-sections that were prepared in 2000 which may be useful. Could the cross-sections be updated? Are the boreholes being monitored?
- The report focuses on the recovery of free product. Ochreous discharge is evident. How will this be managed?
- Groundwater is likely to be high in dissolved phase contamination. How will this be managed?
- With regards RAP Feature 2, the report recommends ongoing recovery for 6 months, perhaps with a trench thereafter. Please explain what this will involve. As above, how will ochreous discharge and dissolved phase be managed?
- For RAP Features 3, 4 & 5 the sumps initially encountered product, sheens and ochreous discharge. The sumps are isolated features and so there is no flow to mobilise surrounding product. The original RAP features were designed to be connected to encourage controlled groundwater flow. Additionally there is evidence that there is an ongoing up-gradient source (e.g. MSMW015) in the Bitumen Plant Area. Also there are only a limited number of trial pits and sumps etc. Are you satisfied that the area is sufficiently covered?
- In Table 3.5 the thicknesses of product initially observed in RHRW010 and RHRW024B are large, but following product recovery no further ingress of product was observed. Is there any explanation for this?
- The triangle separator is situated within Phase 16. What is happening with this?

Signed: 

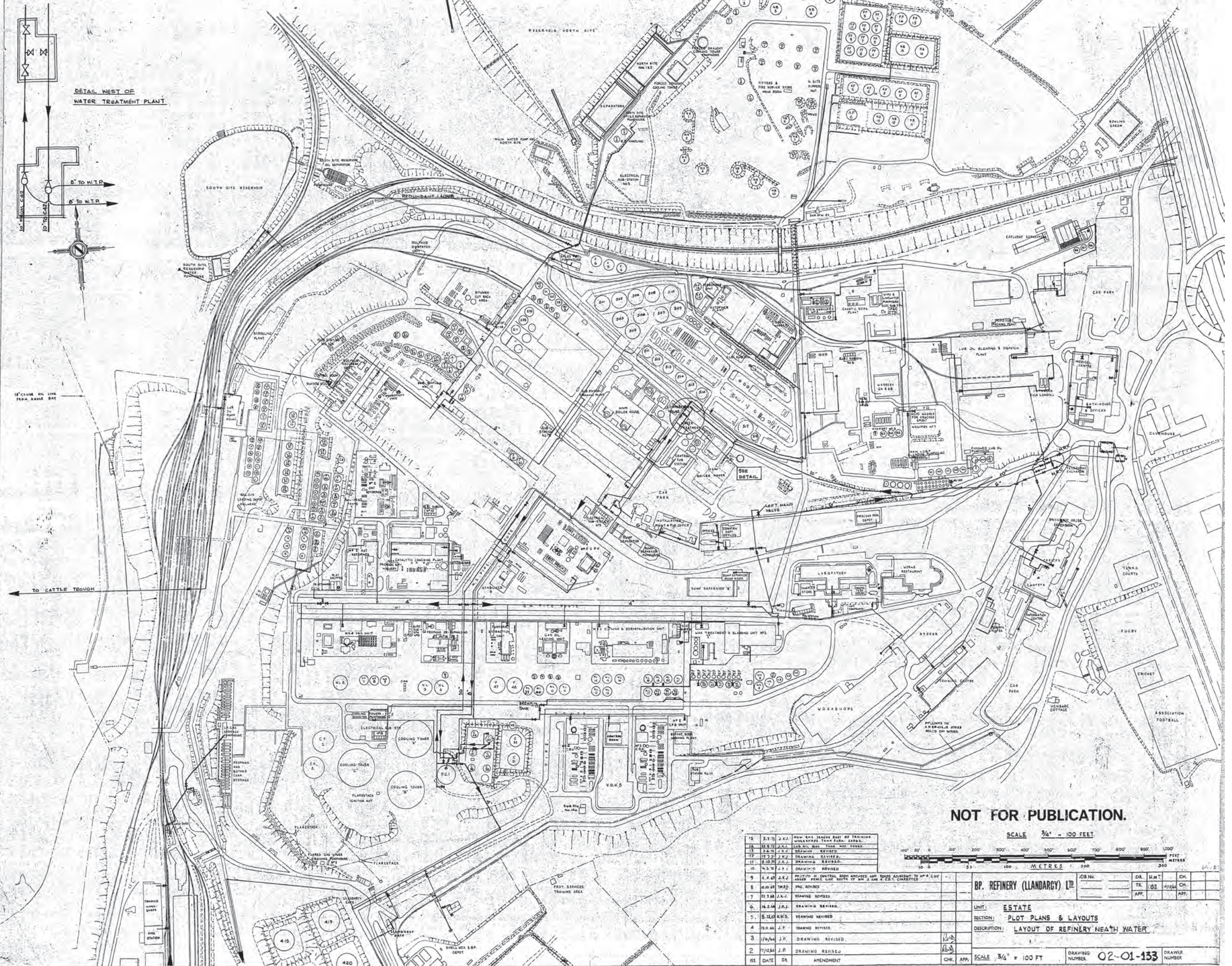
Date: 22 May 2012

Reply
Signed: Date:

istribution

To	cc	ame	Company
✓		Howel Morris	Atkins
	✓	Mike Poland	Atkins
	✓	Michelle Lee	Atkins

A E I E HISTORICAL LA S

DETAIL WEST OF
WATER TREATMENT PLANT

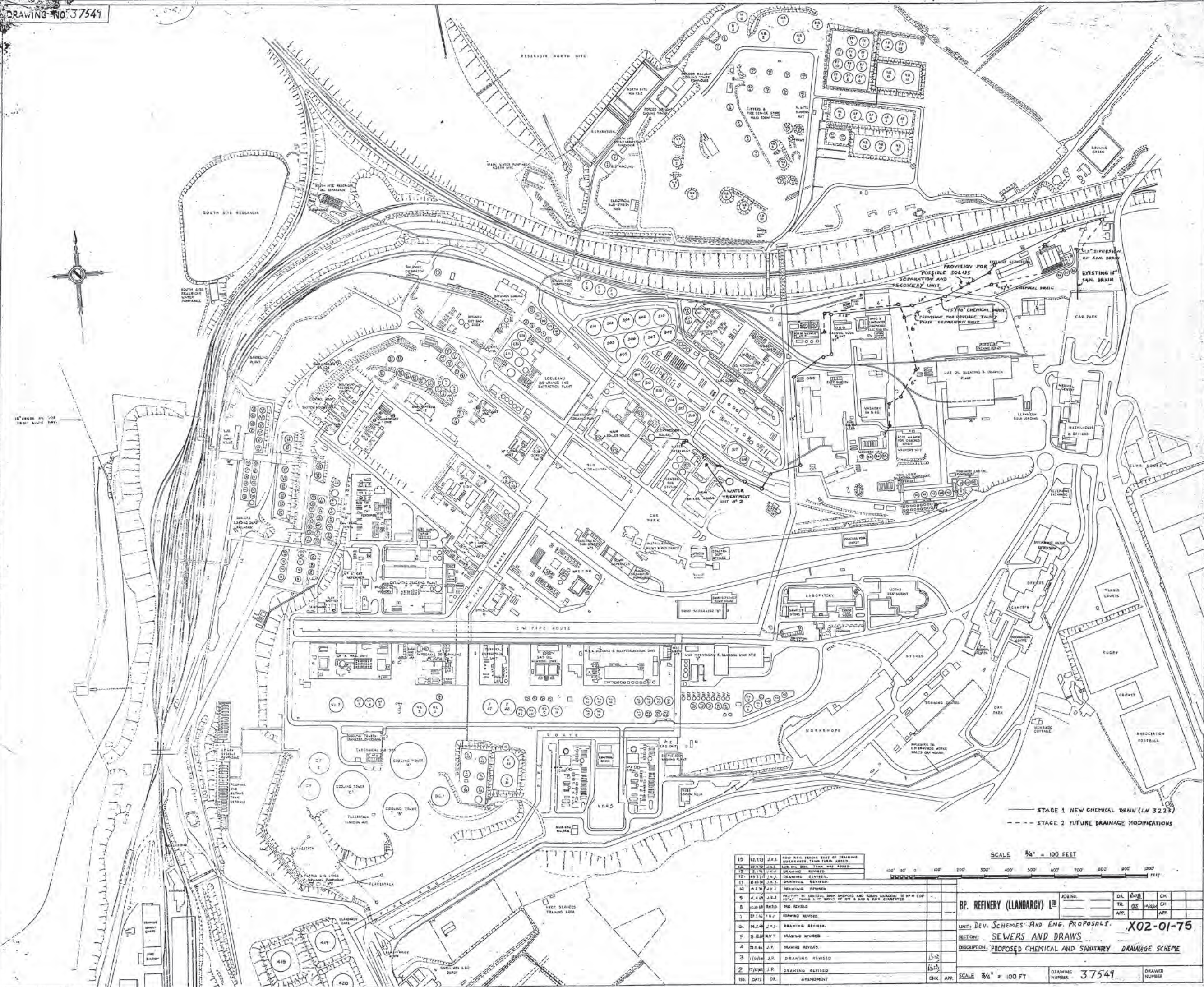
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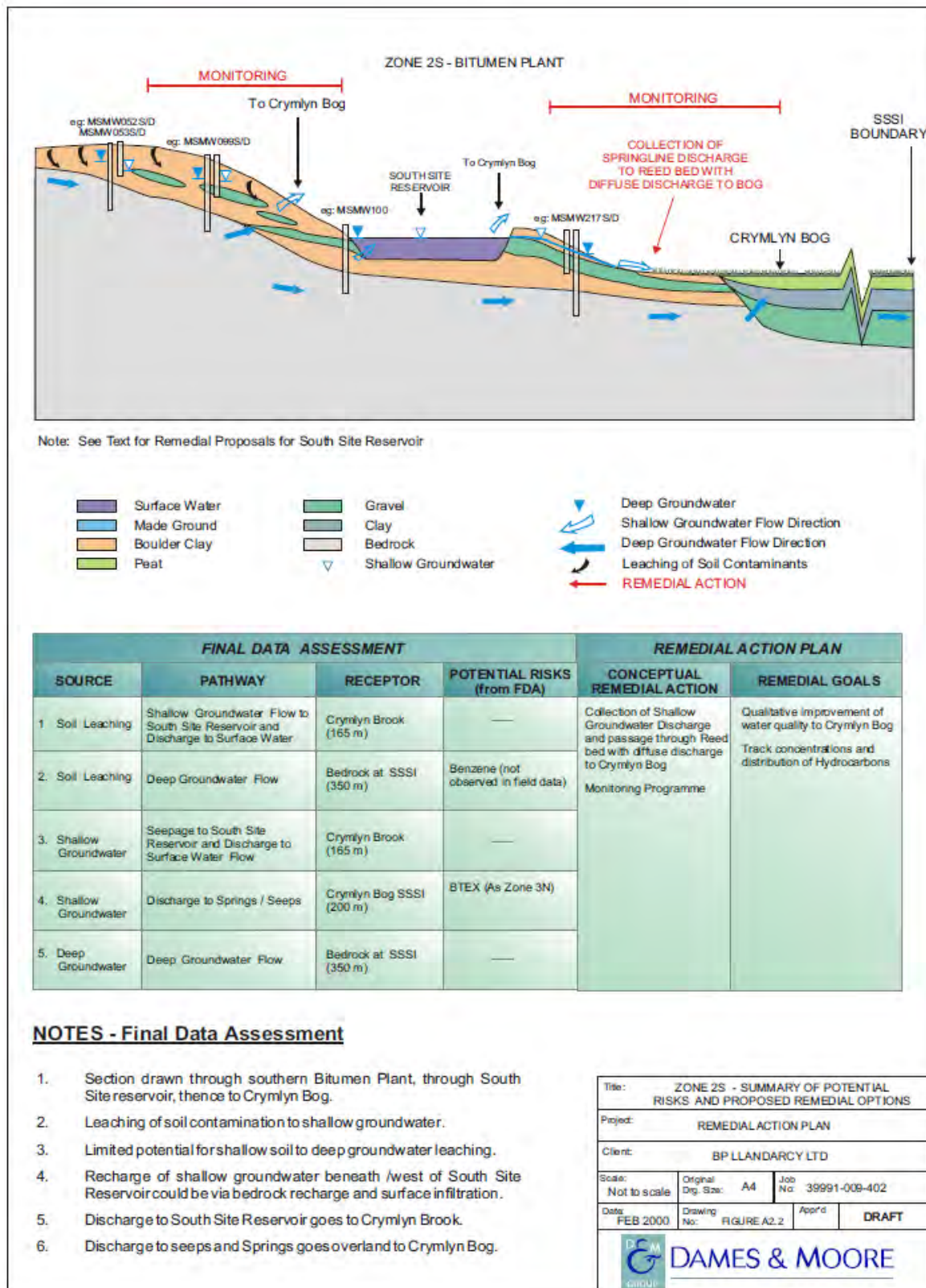


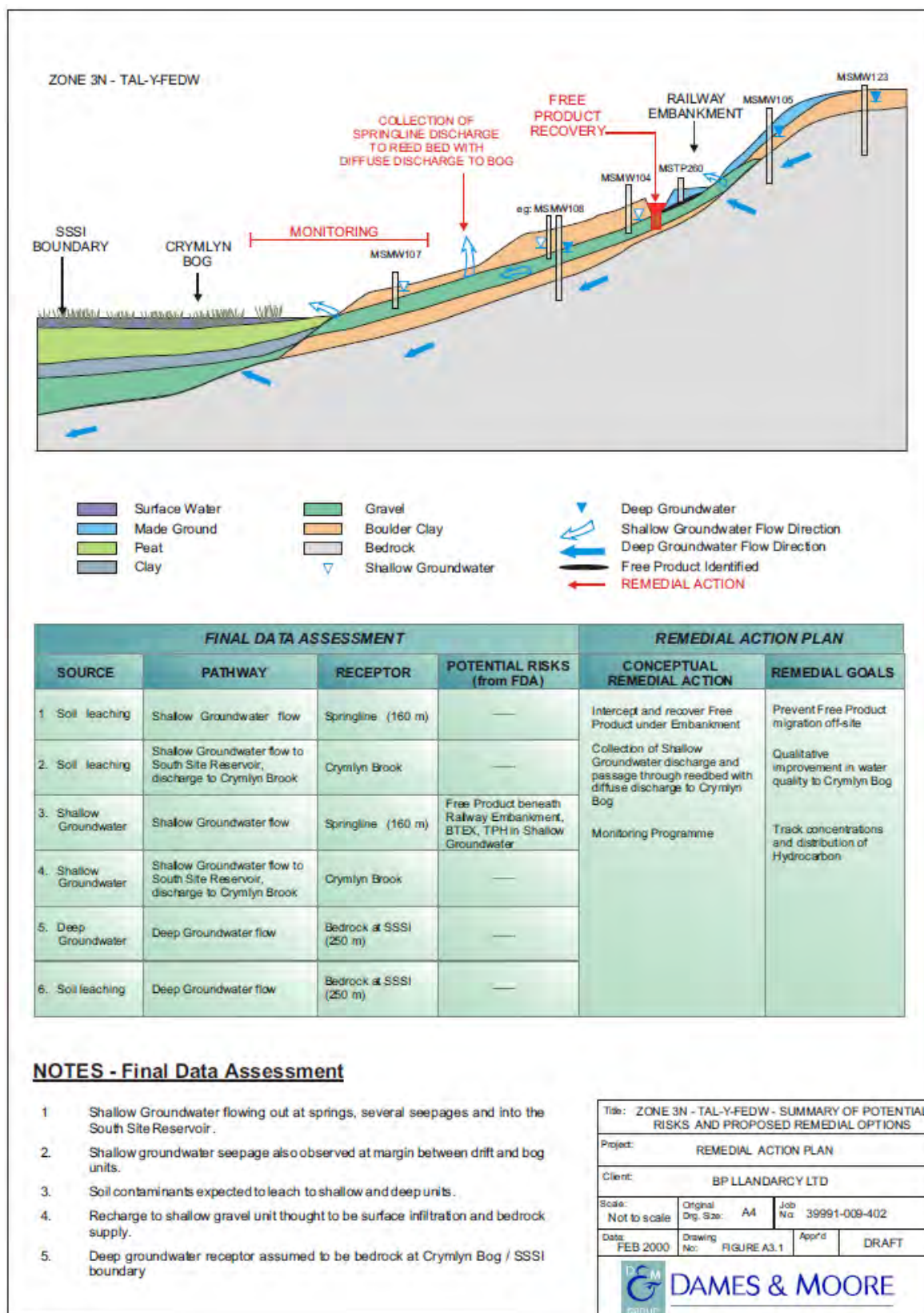
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14	10.3.75	J.R.	ADD. 50' WIDE TANK FARM. ADDED.
13	3.4.75	J.R.	DRAWING REVISED.
12	12.7.74	J.R.	DRAWING REVISED.
11	8.10.74	J.R.	DRAWING REVISED.
10	4.5.74	J.R.	DRAWING REVISED.
9	1.4.74	J.R.	REVISION TO CONTROL ROOM SHOWN AND ROAD ADJACENT TO W.P. 4. COR. ADDED. PUMP LINE SOUTH OF W.P. 3 AND 4. COR. CORRECTED.
8	10.10.73	J.R.	DWG. REVISED.
7	12.3.68	J.R.	DRAWING REVISED.
6	14.2.64	J.R.	DRAWING REVISED.
5	8.12.63	J.R.	DRAWING REVISED.
4	12.1.64	J.R.	DRAWING REVISED.
3	1/6/64	J.R.	DRAWING REVISED.
2	7/12/64	J.R.	DRAWING REVISED.
15	DATE	DA	AMENDMENT

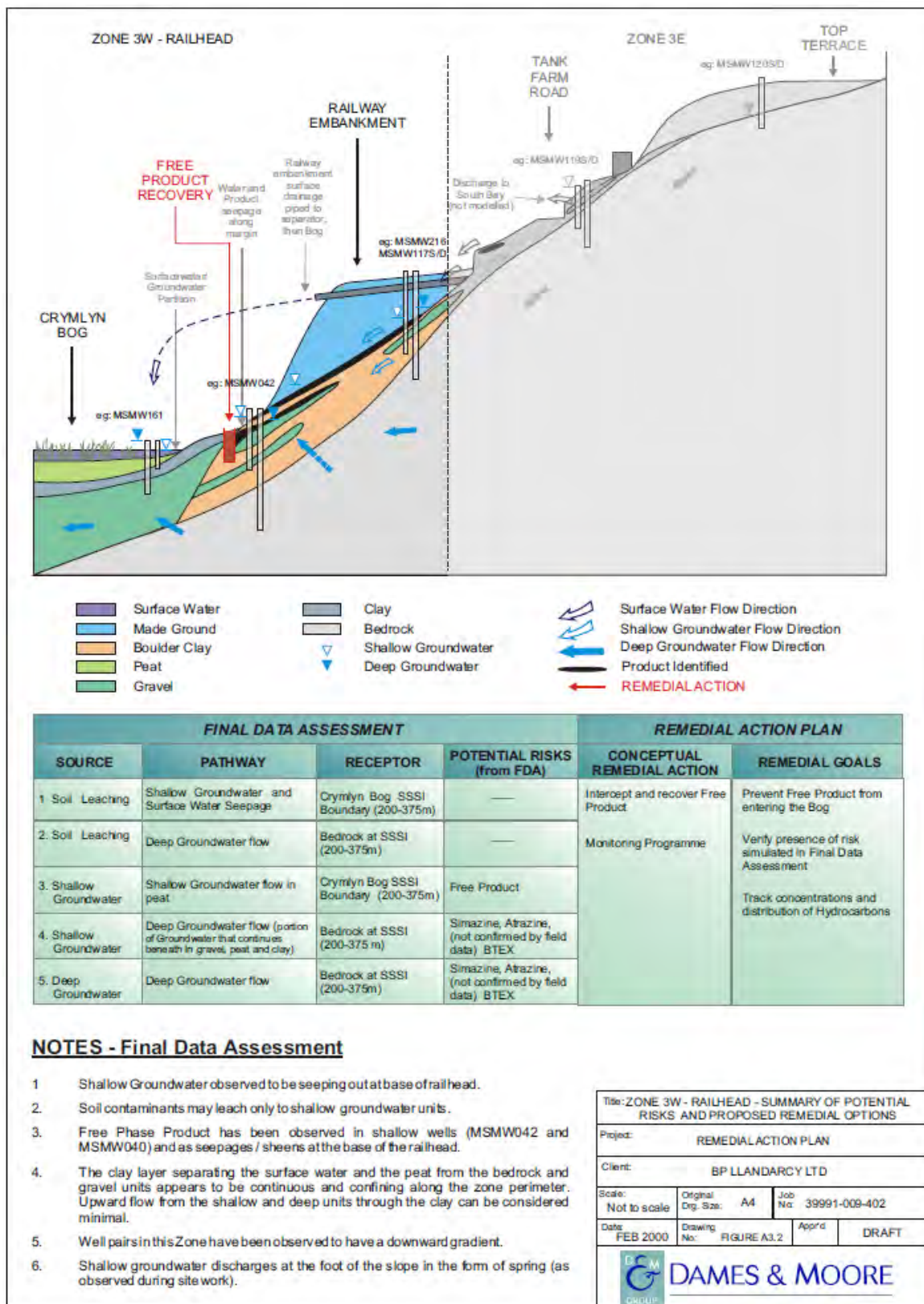
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		DRIVER NUMBER			

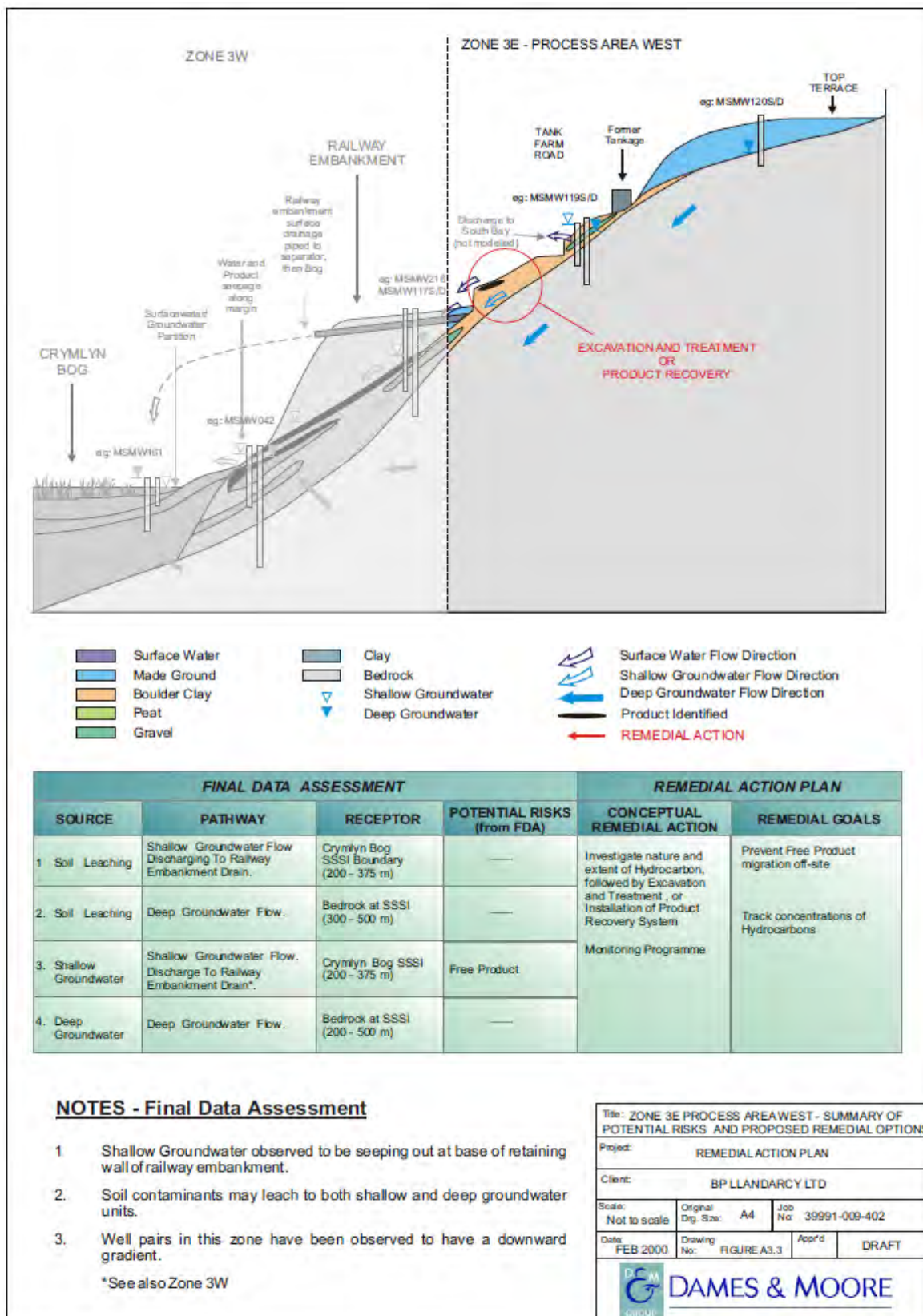


A E I F O R I A L C O C E T A L S I T E O E L

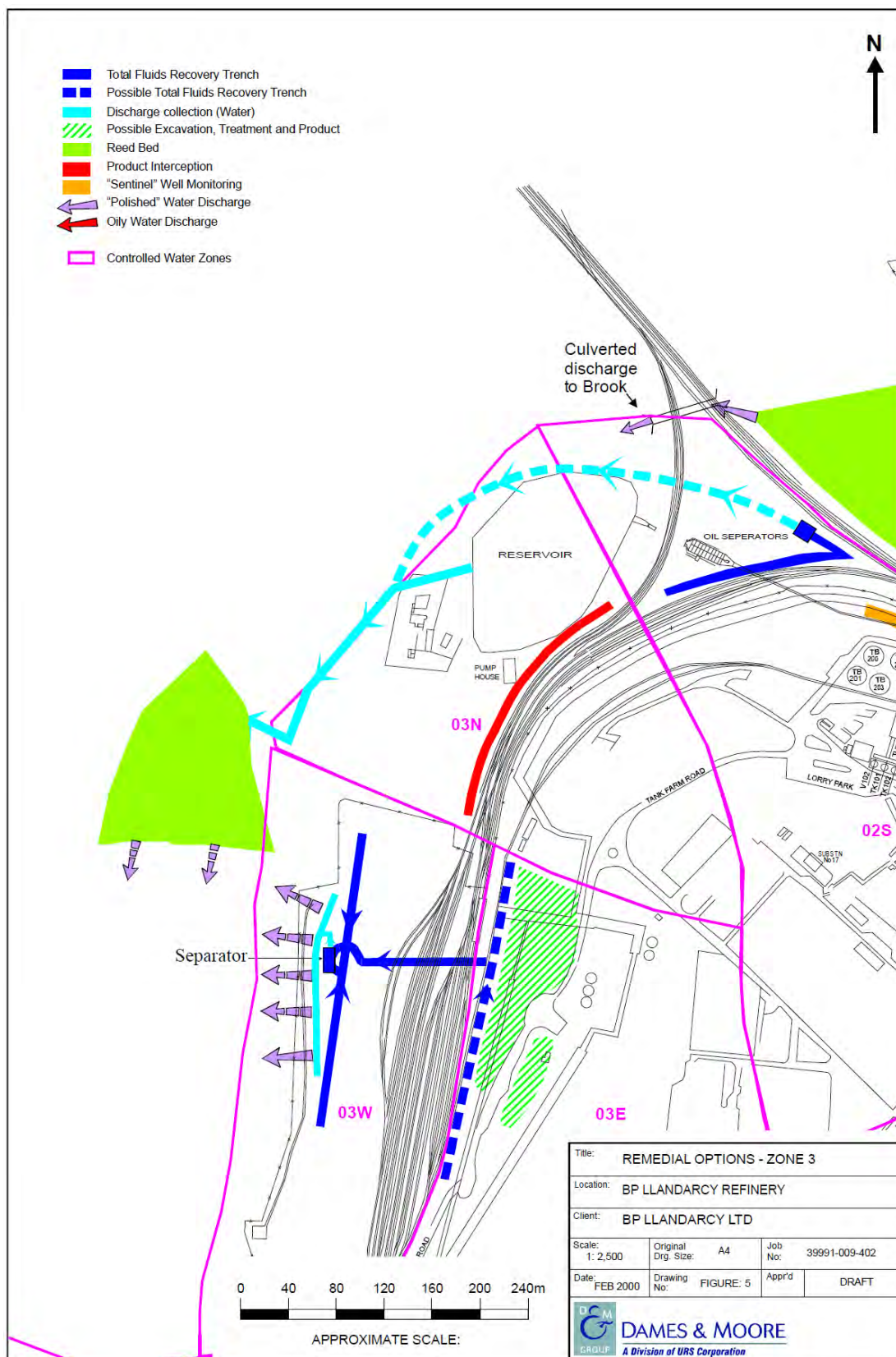


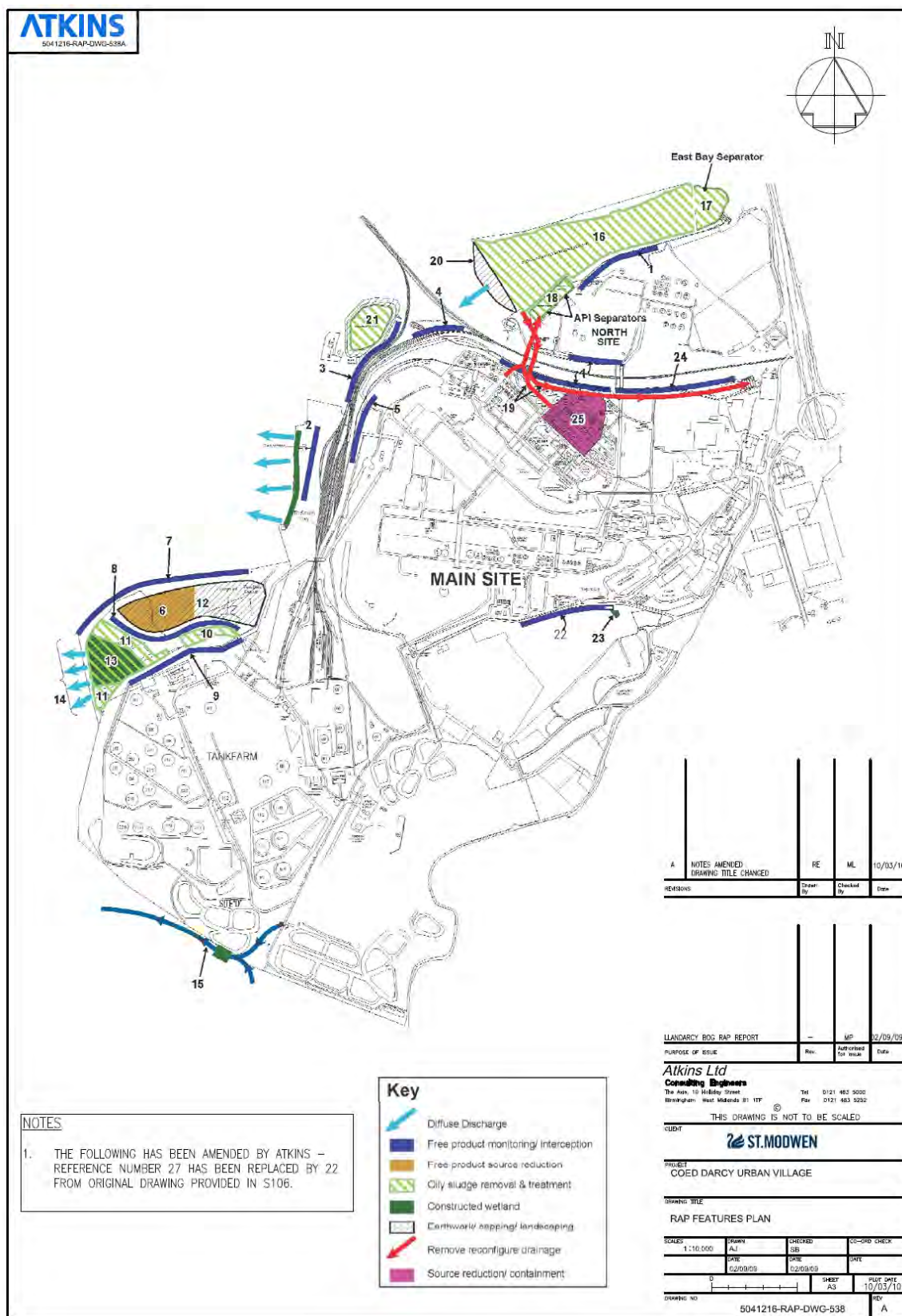






A E I RA OR S RA I S







A E I OTO RA S



Coed Darcy Monitor

Phase 17 RAPWCS
Western Margins RAP
Feature 5

DRAFT

August 2013

49310747
BRRP00055 / Cert 17a

Prepared for:
Coed Darcy Limited

UNITED
KINGDOM &
IRELAND



Rev	Date	Details	Prepared by	Checked by	Approved by
1	14-Aug-2013	Original issue	Rhys Mander Senior Consultant Signed: _____	Geoff Jones Managing Principal Signed: _____	Geoff Jones Managing Principal Signed: _____

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The methodology adopted and the sources of information used by URS in providing its services are outlined in this Report. The work described in this Report was undertaken between May 2009 and June 2013 and is based on the conditions encountered and the information available during the said period of time. The scope of this Report and the services are accordingly factually limited by these circumstances.

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I TRO CTIO

Scope

This Remedial Action Plan (RAP) Works Completion Statement (RAPWCS) 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 (RMA) dated 23 May 2008 between SMD, SMP and CDL.

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

This RAPWCS has been prepared for Phase 17 which forms part of the Western Margins. With reference to the Figure References listed in Table 1 of Schedule 7 of the Section 106 Agreement, this RAPWCS relates to RAP Feature 5 which requires the installation of free-phase product interception and recovery trenches.

This RAPWCS has been prepared 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 RAPWCS is based were notified to URS by letter, a copy of which is provided in **Appendix A**.

The Phase Boundary for Phase 17 is shown as the land edged in red on drawing no. 5041216-RAP-DWG-1164, a copy of which is provided in **Appendix A**.

The Intended Use has been declared as 'residential'.

In accordance with the requirements of URS' Deed of Appointment, this RAPWCS shall:

- Describe the Remedial Action which in URS' professional opinion has been carried out for the purposes of completing the RAP Works in relation to the Phase; and
- Confirm whether or not in URS' professional opinion the RAP Works have been satisfactorily completed for the Phase in accordance with the purpose, objectives and requirements of Schedule 7 of the Section 106 Agreement having regard to the Intended Use.

Furthermore, URS is required to confirm it is satisfied that the purpose, objectives and requirements of Schedule 7 of the Section 106 Agreement have been met and 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 covered by the Phase.

A copy of Schedule 7 of the Section 106 Agreement is provided in **Appendix B**.

Background

Purpose and Objectives of the RAP Works

As defined in Schedule 7 of the Section 106 Agreement the RAP Works are a programme of on-going voluntary Remedial Action in relation to Pre-Transfer Date Environmental Matters at or in the vicinity of the Property which were agreed between the Owner and the relevant Environmental Authorities in lieu of the imposition of formal Remedial Action requirements by any such Environmental Authorities. The RAP Works were designed to protect ecological and

controlled waters receptors close to the site. The RAP Works are not intended to enable redevelopment.

RAP Requirements

In order to prepare this RAPWCS, there are a number of obligations that the Developer needs to demonstrate have been met so that URS can provide opinion on whether or not the Phase is suitable for its Intended Use. These obligations are detailed in Schedules 7 and 10 of the Section 106 Agreement. The principal obligations for the Developer with regards the RAP Works are summarised below.

The Developer shall:

- Carry out or procure the carrying out of all outstanding Remedial Action identified in Table 1 of Schedule 7 of the Section 106 Agreement necessary and sufficient in the context of both the current use of the Property and the Intended Use or such other use as may be determined from time to time;
- Prevent (or where that is not possible, minimise, remedy or mitigate as far as reasonably practicable the effects of) migration from the Property of Pre-Transfer Date Contamination and any Developer Contamination;
- Assess with a frequency agreed as sufficient by the relevant Environmental Authorities and keep under review the condition of the environment at and in the vicinity of the Property and the progress and effectiveness of natural attenuation processes;
- Demonstrate whether or not any Pre-Transfer Date Environmental Matters are posing or may pose an unacceptable risk to the environment beyond the boundaries of the Property;
- Prevent (or where that is not possible, minimise, remedy or mitigate as far as reasonably practicable the effects of) any harm to the environment or any pollution of controlled waters or any possibility of such harm or pollution being caused;
- Avoid where reasonably practicable any Environmental Claim by any relevant Environmental Authority in relation to or in connection with any Pre-Transfer Date Environmental Matter;
- Take all reasonably practicable steps to seek to secure the final and unconditional acceptance by the relevant Environmental Authority of the surrender of the Waste Management Licence as soon as reasonably practicable.

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

Redevelopment Remediation Works

In addition to meeting the requirements of the RAP Works, the Developer must also complete the necessary Redevelopment Remediation Works, the requirements for which are outlined in Schedule 8 of the Section 106 Agreement.

It is intended that this report, which is the RAPWCS, will, in time, be complemented by a Redevelopment Remediation Works Completion Certificate (RRWCC) in order to provide the information required by CDL to enable the Phase Works Completion Date (PWCD) to be declared.

PWCD

The objective of the RAP Works will be deemed to have been met for the purposes of the Section 106 Agreement and the RMA on the date specified in the notice from CDL declaring the PWCD. The PWCD will be declared once CDL is satisfied that the remediation necessary for the specified Intended Use for the Phase has been completed.

Information Sources

A list of the Information Sources consulted by URS is provided below in Table 1.

Table 1 Information Sources

Ref.	Document Reference	Format	Title	Author	Date
1	39991009/DR869r3	Report	BP Llandarcy Refinery Remedial Action Plan	Dames & Moore	Mar 2000
2	44382742/BRRP0001	Report	BP Llandarcy Refinery Desk Study	URS	Jul 2007
3	N/A	Report	Western Margin and Railhead Geological Conceptual Site Model Report	Atkins	Feb 2011
4	5041216-RAP-RPT-770	Report	RAP Features 2, 3, 4 & 5 – Western Margins RAP Works Assessment Report	Atkins	Oct 2012
5	5041216-RAP-TN-797	Technical Note	Response to RFI103	Atkins	Jul 2012
6	5041216-RAP-TN-949	Technical Note	RAP Feature 5 Assessment	Atkins	Jun 2013

Electronic copies of the Information Sources are provided in **Appendix C**.

Unless otherwise stated, URS has relied solely on the Information Sources as the basis for issuing this RAPWCS. In URS' 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 URS unless otherwise noted in this report.

Requests for Information RFIs Issued by RS

A summary of the RFIs raised by URS in relation to the Western Margins is provided below in Table 2. Copies of the RFIs are provided in **Appendix C**. Copies of the responses received are included in the Information Sources provided in **Appendix C**.

Table 2 RS RFIs

RFI Ref.	Title	Associated Documents	Date Raised	Closed	Comments
N/A	Email re. Western Margins Conceptual Site Model	Western Margin and Railhead Geological Conceptual Site Model Report	21 Feb 2011	Yes	No formal response received but comments addressed in later reports

RFI Ref.	Title	Associated Documents	Date Raised	Closed	Comments
103	Review of Atkins' Western Margins RAP Works Assessment Report	Atkins' Western Margins RAP Works Assessment Report	22 May 2012	Yes	Refer to Atkins Technical Note 5041216-RAP-TN-797

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Location

Phase 17 is located on the western edge of the former refinery between South Site Reservoir and the Tip. Crymlyn Bog is situated directly to the west of the Western Margins, as indicated in **Figure** below. Further reference should also be made to Atkins drawing no. 5041216-REM-DWG-433 Rev A, a copy of which is provided in **Appendi C**, which shows the location and extent of the Western Margins.

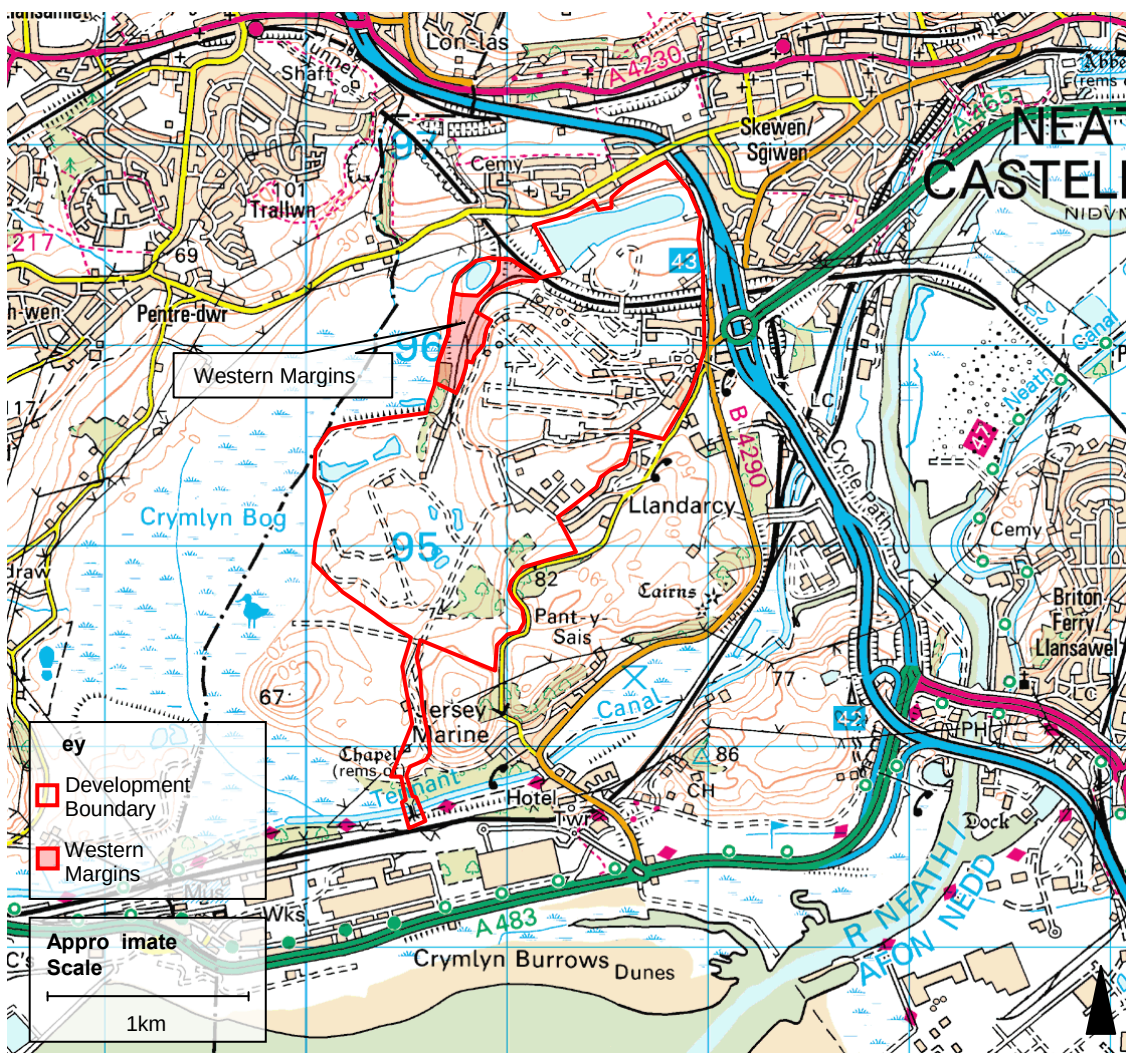


Figure Location plan

Purpose and Scope of the Original RA or s proposals

Crymlyn Bog is the main environmental receptor within the vicinity of the Western Margins and is therefore the focus of remedial actions for the RAP works discussed in this RAPWCS.

The most significant risk to Crymlyn Bog is the potential for free-phase product or contaminated groundwater to migrate beyond the site boundary. With reference to the historical plans provided in **Appendi E**, the major site features from which groundwater and surface water flow are likely to drain to Crymlyn Bog include the southern tank farm, the

containment area, the former process areas and the western parts of the north site tank farm. These groundwater and surface water flows are likely to permeate through the Western Margins before entering Crymlyn Bog, as illustrated in the conceptual site model drawings provided in **Appendix F** which are taken from the BP Llandarcy Refinery Remedial Action Plan report dated March 2000 (Information Source 1)

The conceptual site model drawings also illustrate the RAP Works that were originally proposed with the objective of intercepting and collecting free-phase product to prevent further migration into Crymlyn Bog. These RAP works, as described in Schedule 7 of the Section 106 Agreement, are summarised in Table 3 below.

Table E Extract from Table from Schedule of the Section Agreement

RAP Item	Key Issues	Scope of Originally Envisaged Remedial Action	Performance Criteria	Works to Date
2	Potential for cross boundary free product migration at various locations along boundary Dissolved-phase hydrocarbon migration	Product interception and recovery, consisting of the following programme elements: Design-level investigations to assess specific requirements Design and Installation of permanent system to intercept and recover free-phase product Diffuse discharge of water arising from interception system to Bog, via purpose-constructed wetland features. System-specific monitoring of surface and groundwater Above programme of works to include the following as a minimum: Railhead (install 200 x 4 metre trench, and 200 metre linear wetland feature)	Install permanent measures to prevent free product from crossing the site boundary and entering Crymlyn Bog to satisfaction of EA and CCW Diffuse discharge of water arising from interception system to Bog, via purpose-constructed wetland features to reduce dissolved hydrocarbon load and without requirement for a discharge consent. Prevent ochreous precipitate discharges from site to the Crymlyn Bog arising from the interception feature. All works to satisfaction of EA and CCW	Some additional wells installed in 2000 to monitor for free-product.
		Railhead to South reservoir (install 250 x 4 metre trench, interception only, i.e., no wetland)	All works to be protective of future public health and safety assuming unrestricted recreational access.	
		Between North and South reservoirs (install 100 x 2 metre interception and recovery trench only)		
5	Free-phase seepage leading to gross-contamination of surface soils in interior of site.	Design and Install 'Inland' free-product interception and collection system between Railhead and Main Site (200 x 3 metres, interception and recovery trench only).	Install permanent system to prevent free product migration to railhead to satisfaction of EA and NPT.	

As discussed previously, this RAPWCS considers RAP Feature 5 which requires the installation of a free-phase product interception and recovery trench. RAP features 2, 3 and 4, the requirements for which are crossed through in Table 3 above, will be considered under a separate RAPWCS.

Further reference should be made to the drawings provided in **Appendix** which illustrate the above RAP works as was originally envisaged.

Changes to the Scope of the RAP Works

The RAP Works were outlined and agreed in principle with the Environment Agency (EA) and the Countryside Council for Wales (CCW) prior to the development of plans to regenerate the site as the Coed Darcy Urban Village. For this reason, Schedule 7 of the Section 106 Agreement makes provision for alternative approaches to the listed RAP Works provided agreement can be reached with the relevant Regulators.

As discussed further in Section 3 of this report, although no changes to the approach have been formally requested, the works that have been carried out are not entirely as originally envisaged. The reasons for the alternative approach are discussed in the following sections and URS is satisfied that the works that have been carried out are in general accordance with the purpose, objectives and requirements of Schedule 7 of the Section 106 Agreement.

RE IE OF T E CO L E T E R A O R S

Introduction

The following sections discuss whether or not the requirements specified in Table 1 of Schedule 7 of the Section 106 Agreement have, in URS' professional opinion, been satisfactorily completed in accordance with the purpose, objectives and requirements of the Section 106 Agreement.

Before discussing the works that have been undertaken it is important to recognise that the purpose of RAP Feature 5, as set out in Table 1 of Schedule 7 of the Section 106 Agreement, is to intercept and recover free-phase product. As a result, the following sections focus on the presence, or otherwise, of free-phase product and does not consider other indicators of contamination such as odours, sheens or the dissolved phase, as these are likely to be addressed as part of the Redevelopment Remediation Works when undertaken.

Site Investigations

The Section 106 Agreement requires design-level investigations to be undertaken to assess the specific requirements of the proposed interception and free-phase product recovery trenches. The following sections provide details of the site investigations undertaken by Atkins.

Atkins' Western Margins RAP Works Assessment Report (Information Source 4) states that initial site investigations were undertaken from May 2009 to July 2009. This involved the excavation of 12 trial pits to a maximum depth of 3.0 m along the alignment of RAP Feature 5.

Atkins reports that occasional hydrocarbon staining and some light odours were noted in all of the trial pits but no recoverable free-phase product was encountered. Atkins reports that seven of the 12 trial pits were left open to allow monitoring. Hydrocarbon sheens and ochreous discharges were observed in four of the seven trial pits.

Atkins reports that three 600 mm diameter monitoring sumps were later installed along the line of RAP Feature 5 to replace three of the trial pits and allow on-going monitoring. As groundwater at this location is near surface, the sumps were installed to a depth of approximately 1 m below ground level.

Furthermore, a trench was excavated along the line of RAP Feature 5, linking the trial pits and monitoring sumps as illustrated in Atkins' drawing no. 5041216-REM-DWG-864 (Information Source 6). Atkins reports that the trench was excavated to a depth of approximately 1 m below ground level. The trench has been left open to allow monitoring.

onitoring of Surface and oundwater

The Section 106 Agreement requires system-specific monitoring of surface water and groundwater.

Atkins' Western Margins RAP Works Assessment Report (Information Source 4) states that the monitoring sumps and interception trenches within the Western Margins have been monitored 25 times during a two-year period between February 2010 and January 2012. Also, a number of pre-existing boreholes have been monitored.

With regards RAP Feature 5, two of the monitoring sumps observed hydrocarbon sheens and free-phase product was noted in one sump, although none has been observed during the last three monitoring rounds. Atkins also reports that free-phase product has not been observed in the interception trench, although it is discoloured through ochreous discharge. Atkins reports that this is considered to be indicative of groundwater flow through the iron-rich sandstone, rather than as a result of free-phase product migration.

Atkins reports (Information Source 4) that 14 up-gradient boreholes in the vicinity of the Western Margins have been monitored for the presence of free-phase product. One borehole is reported to have contained free-phase product, although Atkins reports that this is considered to be localised as other boreholes down-gradient have not shown free-phase product.

Atkins also reports (Information Source 4) that 'draw down' tests were performed on ten of the 31 trial pits that had been excavated within the Western Margins. These tests involved pumping out groundwater from the trial pits where hydrocarbon sheens had been observed. Groundwater inflow was then observed. Free-phase product returned to eight of the 10 trial pit locations.

Six of the eight locations where free-phase product re-entered the trial pits are situated along the alignment of RAP Feature 2, which is not considered in this RAPWCS. The remaining two locations where free-phase product returned to the trial pit are situated on the alignment of RAP Feature 3, which is also not considered in this RAPWCS.

Ochreous discharges

The Section 106 Agreement requires the prevention of ochreous precipitate discharges from the site to Crymlyn Bog. As noted above, ochreous discharges have been observed.

Atkins reports (Information Source 4) that proposals for the interception and collection of ochreous seepages will be developed as part of RAP Feature 2 and are likely to comprise a system of reed filled trenches with a monitored discharge point, later to be incorporated into the drainage design as and when the area is developed for residential use.

Given that RAP Feature 2 is located topographically at the lowest point within the Western Margins and is situated directly adjacent to Crymlyn Bog, URS considers this to be an acceptable approach.

URS Observations during the works

URS attended site during the works to observe progress. The following table provides a summary of URS' observations.

Table 1: URS Observations during the works

Date	URS' Observations
30-Jun-2009	URS inspected the various trial pits that have been installed throughout the Western Margins. Ochreous seepages were noted in many of the pits and free-phase product was evident in some – most notably in those excavated within the vicinity of RAP Feature 2.
24-Nov-2011	Walkover with Atkins to review the monitoring works that have been on-going within the Western Margins. Ochreous discharges are evident in most locations, but most notably in the vicinity of RAP Features 2 and 5. Free-phase product was evident in some of the monitoring sumps with the biggest quantities in those sumps along RAP Feature 2. Elsewhere free-phase product was limited to sheens and some droplets.
26-Jul-2012	Walked over the Western Margins and discussed the latest monitoring results with Atkins. It would appear that there would be limited benefit to carrying out further works for RAP Features 3, 4 and 5 due to the limited volumes of free-phase product that have been observed. However, ochreous seepages, especially along RAP Feature 5, are evident. Also, RAP Feature 2 remains a concern where free-phase product was noted within the monitoring sumps and observation trenches. Oily seepages were also observed at ground level here.

Date	URS' Observations
17-Apr-2013	Walked over the Western Margins with Atkins to discuss RAP Features 2 and 5. With regards RAP Feature 5 it was confirmed that reed growth that is already evident within the trench will be encouraged with a view to polishing the ochreous discharges. With regards RAP Feature 2 free-phase product was again observed within the monitoring sumps and interception trenches. It was confirmed that the existing trenches would be re-excavated and the monitoring sumps refurbished to increase the zone of influence through the introduction of new granular backfill. It was agreed that the existing reed bed, including the inlet and outlet level controls, will also be refurbished.

A selection of photographs is provided in **Appendi** .

Summary

The Section 106 Agreement requires the design and installation of a permanent system to intercept and recover free-phase product comprising a 200 x 3 m trench between the Railhead and the main site

As discussed in Section 3.2 of this report, 12 trial pits were excavated along the alignment of RAP Feature 5 and three monitoring sumps were later installed to allow on-going monitoring. As discussed in Section 3.3 free-phase product was initially observed in one of the monitoring sumps but Atkins reports that no free-phase product has been observed for some time.

Atkins reports that the trial pits were installed to a depth of 3 m as originally specified in the Section 106 Agreement and that the monitoring sumps were installed to a depth of approximately 1 m below perched groundwater level, which at this location is near surface.

A trench was also excavated along the alignment of RAP Feature 5 to connect the trial pits and monitoring sumps. Although the trench has only been installed to a depth of approximately 1 m below ground level, Atkins reports that perched groundwater is near surface and therefore the depth of the trench is appropriate for intercepting and monitoring groundwater.

Atkins reports that free-phase product has not been observed in the interception trench, although it is discoloured through ochreous discharge. Atkins reports that this is considered to be indicative of groundwater flow through the iron-rich sandstone, rather than as a result of free-phase product migration.

Atkins reports that the trench will remain in-situ and that the reed growth that is already evident will be encouraged with a view to addressing the ochreous discharges that have been observed. URS is satisfied with this approach.

In summary, although the RAP works as originally envisaged have not been undertaken, URS is satisfied that the investigations and subsequent monitoring that has taken place has adequately shown that the originally proposed free-phase product interception features would not have recovered significant volumes of free-phase product. Therefore URS is satisfied that RAP Feature 5, as originally envisaged, is not necessary and that the purpose, objectives and requirements of Schedule 7 of the Section 106 Agreement will still be achieved.

rotection of Future ublic ealth

The Section 106 Agreement requires all works to be protective of future public health and safety assuming unrestricted recreational access.

As minimal free-phase product has been observed during the site investigations and subsequent monitoring, unrestrictive recreational access is unlikely to result in members of the public coming into contact with free-phase product in this location.

It should be noted that in order to be certified for redevelopment as a residential phase, further Redevelopment Remediation Works shall be required in accordance with Schedule 8 of the Section 106 Agreement. These works are aimed at being protective of future human health.

Consultation with the EA and CC

The Section 106 Agreement requires all works to be completed to the satisfaction of the EA and CCW. Both organisations now form part of Natural Resources Wales.

URS is yet to receive confirmation that Natural Resources Wales is satisfied with the works that have been carried out. Therefore, this RAPWCS shall remain draft until confirmation has been received.

CERTIFICATION

The following table, which summarises the requirements specified in Table 1 of Schedule 7 of the Section 106 Agreement, aims to confirm whether or not in URS' professional opinion the RAP Works have been satisfactorily completed in accordance with the purpose, objectives and requirements of Schedule 7 of the Section 106 Agreement.

Table Certification Summary

Requirement	Status	Comments
Design-level investigations to assess specific requirements	Complete	Refer to Section 3.2 of this report.
Design and installation of permanent system to intercept and recover free-phase product and prevent free product from crossing the site boundary and entering Crymlyn Bog: Design and install inland free-product interception and collection system between Railhead and main site (200 x 3 m interception and recovery trench only) (RAP Feature 5)	Not Required	Refer to Section 3.6 of this report.
System-specific monitoring of surface and groundwater	Complete	Refer to Section 3.3 of this report.
Prevent ochreous precipitate discharges from site to Crymlyn Bog arising from the interception feature	Complete	Refer to Section 3.4 of this report. It should also be noted that further works will be required under RAP Feature 2.
All works to be completed to the satisfaction of the EA and CCW	Not Complete	Refer to Section 3.8 of this report.
All works to be protective of future public health and safety assuming unrestricted recreational access	Complete	Refer to Section 3.7 of this report.

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Overview

- This RAPWCS refers to the Western Margins RAP Feature 5 as envisaged by the Section 106 Agreement and the RMA.
- The Phase Boundary for Phase 17 is shown as the land edged in red on drawing no. 5041216-RAP-DWG-1164, a copy of which is provided in **Appendix A**.
- The primary objective of the RAP Works as originally proposed was to install free-phase product interception and recovery features within the Western Margins to prevent migration into Crymlyn Bog.
- The location and extent of the works are shown in Atkins drawing no. 5041216-REM-DWG-433, a copy of which is provided in **Appendix C**.
- No changes to the scope of the RAP Works as outlined in Schedule 7 of the Section 106 Agreement were proposed, albeit site investigations and subsequent monitoring indicated that the originally proposed free-phase product interception and recovery features would have resulted in the recovery of negligible volumes of free-phase product. Therefore it was concluded that the installation of permanent features is not necessary.
- Written confirmation is required from Natural Resources Wales that the works have been completed to their satisfaction. This RAPWCS shall remain draft until such time as this confirmation is received.

RA CS

This RAPWCS confirms that in URS' professional opinion, on the basis of the information provided within the Information Sources and observations made by URS and notwithstanding the limitations listed in Section 5.3 below, the RAP Works for Phase 17 (RAP Feature 5) appear to have been completed satisfactorily in general accordance with the purpose, objectives and requirements of Schedule 7 of the Section 106 Agreement.

Furthermore, again notwithstanding the limitations listed in Section 5.3 below, URS is satisfied that the purpose, objectives and requirements of Schedule 7 of the Section 106 Agreement have been met and 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 covered by the Phase.

Specific Limitations in Relation to this RA CS

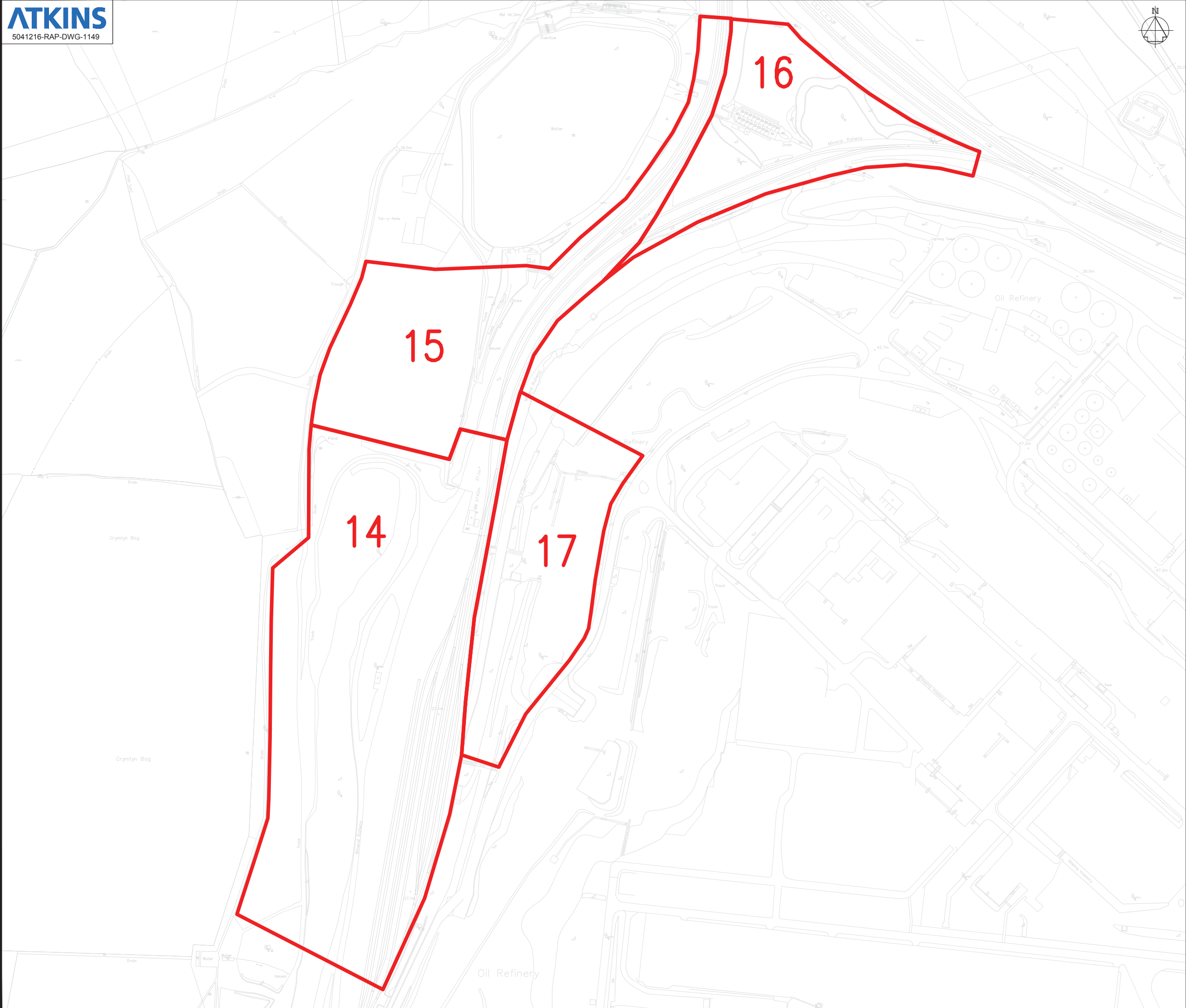
As discussed in Section 3.8 of this report, the Section 106 Agreement requires all works to be completed to the satisfaction of Natural Resources Wales. As URS is yet to receive confirmation that Natural Resources Wales is satisfied with the works that have been carried out, this RAPWCS shall remain draft until confirmation has been received.

Furthermore, this RAPWCS is issued on the basis that RAP Feature 2 will be installed and that this will include measures to deal with the ochreous seepages that have been observed throughout the Western Margins.

C

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

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KEY



PHASE BOUNDARIES

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REVISIONS	Drawn By	Checked By	Date
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PURPOSE OF ISSUE	Rev.	Authorised for issue	Date
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THIS DRAWING IS NOT TO BE SCALED

CLIENT



PROJECT

Coed Darcy Urban Village

DRAWING TITLE

Western Margain Phase Boundaries RAP 2-5

Scales 1:1250	DRAWN A.J	CHECKED H.M	CO-ORD CHECK
	DATE 27.02.12	DATE 27.02.12	DATE
DRAWING NO 5041216-RAP-DWG-1164		SHEET A1	PLOT DATE 23.03.12
		REV	-

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SCHEDULE 7

The RAP Works

Purpose, objectives and requirements of the RAP Works

Part 1

1. Purpose and objectives of the RAP Works

- 1.1 The RAP Works (a programme of ongoing voluntary Remedial Action in relation to Pre-Transfer Date Environmental Matters at or in the vicinity of the Property) have been agreed between the Owner and the relevant Environmental Authorities in lieu of the imposition of formal Remedial Action requirements by any such Environmental Authorities.
- 1.2 The current requirements and status of the RAP Works are as set out in Table 1 below.
- 1.3 The parties to this Agreement agree that the purpose and objectives of the RAP Works are the carrying out of the appropriate Remedial Action necessary, and sufficient in the context of both the current use of the Property and the Intended Use or such other use as may be determined from time to time:
 - 1.3.1 to prevent (or where that is not possible, minimise, remedy or mitigate as far as reasonably practicable the effects of) migration from the Property of Pre-Transfer Date Contamination and any Developer Contamination; and
 - 1.3.2 to assess with a frequency agreed as sufficient by the relevant Environmental Authorities and keep under review:
 - (a) the condition of the Environment at and (provided appropriate access is procured (the Developer having used reasonable endeavours to obtain it)) in the vicinity of the Property, including any controlled waters that are or may be affected by such condition, and (provided appropriate access is procured (the Developer having used reasonable endeavours to obtain it)) any land adjoining or adjacent to the Property; and
 - (b) the progress and effectiveness of natural attenuation processesin order in each case to demonstrate whether or not any Pre-Transfer Date Environmental Matters are posing or may pose an unacceptable risk to the Environment beyond the boundaries of the Property in the light of Environmental Law; and
 - 1.3.3 to prevent (or where that is not possible, minimise, remedy or mitigate as far as reasonably practicable the effects of) any harm to the Environment or any pollution of controlled waters or any possibility of such harm or pollution being caused in each case by or as a result of any Pre-Transfer Date Environmental Matter including the containment of free phase Hydrocarbons within the Property boundaries; and
 - 1.3.4 to avoid where reasonably practicable any Environmental Claim by any relevant Environmental Authority in relation to or in connection with any Pre-Transfer Date Environmental Matter, including without limitation to avoid service on any party in relation to or in connection with any Pre-Transfer Date Environmental Matters of:
 - (a) a "remediation notice" under Part IIA of the Environmental Protection Act 1990; or

- (b) a "works notice" under Chapter 1 of Part VII of the Water Resources Act 1991; or
 - (c) a notice under Section 59 of the Environmental Protection Act 1990 requiring removal of waste or the carrying out of steps to eliminate or reduce the consequences of deposited waste; or
 - (d) the imposition of a requirement by any relevant Environmental Authority for any party to carry out any Remedial Action pursuant to EU Directive 2004/35/CE of 21 April 2004 and/or pursuant to any legislation implementing such Directive in England and Wales, or to recover the costs of the taking of such Remedial Action by any such Environmental Authority; and
- 1.3.5 to take all reasonably practicable steps to seek to secure the final and unconditional acceptance by the relevant Environmental Authority of the surrender of the Waste Management Licence as soon as reasonably practicable.

Table 1
Current RAP Works and Status

Site Area / Potential Receptor	Key Issues	Scope of Currently Envisaged Remedial Action	Figure Reference	Performance Criteria	Works to Date
Whole Site	Continued demonstration of natural attenuation of dissolved phase hydrocarbons. Consultation with EA and CCW	Six monthly: - Liquid level measurements - Analytical samples from 120 ground and surface water sample locations. Locations specified in the semi-annual reports submitted to the Environment Agency. - Six-monthly reporting of trends. Regular update meetings (minimum bi-annually) with EA and CCW for lifetime of RAP	NA	Routine programme of groundwater level and quality and product thickness monitoring. Annual scope to be agreed with EA on rolling basis.	Ongoing since 2000. Annual reductions in scope have been agreed with EA on basis of data received.

Site Area / Potential Receptor	Key Issues	Scope of Currently Envisaged Remedial Action	Figure Reference	Performance Criteria	Works to Date
Western flank of main site / Crymlyn Bog / Boundary with North Reservoir	- Potential for cross boundary free product migration at various locations along boundary - Dissolved-phase hydrocarbon migration	- Monitor 30 'sentinel' wells along northwest and southeast boundaries of North Site for presence of free product. Locations included in 'Whole Site' above. - Install permanent product interception trench system along boundary of North Site, if sentinel well data suggests a risk of downgradient product migration occurring and in any event install a product interception trench to, at a minimum, replace the current sentinel wells prior to redevelopment (300 x 4 metres minimum). Any interception trench must prevent further downgradient migration of free product and allow recovery of intercepted product.	1	Continued six-monthly monitoring of free product thickness, and assess potential for further downgradient migration. All works to be protective of future public health and safety assuming unrestricted recreational access.	Sentinel well installations complete on North Site, and listed in semi-annual monitoring reports.

Site Area / Potential Receptor	Key Issues	Scope of Currently Envisaged Remedial Action	Figure Reference	Performance Criteria	Works to Date
Western flank of main site / Crymlyn Bog / Boundary with North Reservoir (cont.)		2. Product interception and recovery, consisting of the following programme elements: 1. Design-level investigations to assess specific requirements 2. Design and Installation of permanent system to intercept and recover free-phase product 3. Diffuse discharge of water arising from interception system to Bog, via purpose-constructed wetland features. 4. System-specific monitoring of surface and groundwater Above programme of works to include the following as a minimum: • Railhead (install 200 x 4 metre trench, and 200 metre linear wetland feature) • Railhead to South reservoir (install 250 x 4 metre trench, interception only, ie, no wetland) • Between North and South reservoirs (install 100 x 2 metre interception and recovery trench only)	2 3 4	Install permanent measures to prevent free product from crossing the site boundary and entering Crymlyn Bog to satisfaction of EA and CCW Diffuse discharge of water arising from interception system to Bog, via purpose-constructed wetland features to reduce dissolved hydrocarbon load and without requirement for a discharge consent. Prevent ochreous precipitate discharges from site to the Crymlyn Bog arising from the interception feature. All works to satisfaction of EA and CCW. All works to be protective of future public health and safety assuming unrestricted recreational access.	Some additional wells installed in 2000 to monitor for free-product.

Site Area / Potential Receptor	Key Issues	Scope of Currently Envisaged Remedial Action	Figure Reference	Performance Criteria	Works to Date
Containment Area	Free product migration from filled area into Crymlyn Bog, Crymlyn Bog Lagoon, and South Bay.	Product interception and recovery, consisting of the following programme elements:		Remove free product with a temporary in-situ system to extent practicable until recovery is asymptotic from a system which hydraulically influences the free product contaminated filled area to the satisfaction of EA	System installed in 2005, recovery ongoing.
		1. Complete design-level investigations to assess specific requirements 2. Design and Installation of permanent system to intercept and recover free-phase product 3. System-specific monitoring		Install permanent measures to prevent free product from:	Temporary (plywood bund) system in place; regularly maintained.
		Above programme of Works to include the following as a minimum:	6	• leaving site boundary and entering Crymlyn Bog • entering Crymlyn Bog Lagoon from filled area in Tip	Some survey information collected along Tip perimeter
		• Filled area; expand on existing system; upgrade to 12 pumping wells	7	• entering the licensed area from Tank farm	Some site investigation and monitoring data available to assist in design.
		• Northern Tip perimeter adjacent to Crymlyn Bog (install permanent engineered and covered 500 x 1 metre product interception and recovery feature in place of current plywood bund)	8	in all cases permitting the free flow of groundwater past the interception features and to permit recovery of product, all to satisfaction of EA, NPT and CCW.	
		• Filled area to South Bay/Crymlyn Bog (install 500 x 4 metre, product interception and recovery trench)	9		
		• From north Tank Farm into licensed area (ie, South Bay, and Crymlyn Bog lagoon install 300 x 4 metre product interception and recovery trench)			

Site Area / Potential Receptor	Key Issues	Scope of Currently Envisaged Remedial Action	Figure Reference	Performance Criteria	Works to Date
Containment Area	Hydrocarbon-containing peat and sludges.	Excavation and treatment of peats and sludges in (all quantities estimated and unverified): • South Bay (15,000m3) • West Bay (10,000 m3) • Crymlyn Bog Lagoon (20,000m3)	10 11 11	Removal and treatment to achieve restoration quality standards agreed with the Environment Agency of hydrocarbon contaminated surface and near surface soil and sediment to satisfaction of EA.	7,000 m3 peats/sludges removed from lagoon and treated in 2006/7.
	Surrender of Waste Management Licence EAWML34004 (licence status active, but landfill 'closed or closing').	In addition to free-product issues above, the following are also required: • Agree programme of works with EA to permanently restore Tip and secure Waste Management Licence surrender.	6, 12 12	Surrender Waste Management Licence.	Design work commenced to utilise material from Area 1. Ongoing.
	Dissolved-phase hydrocarbon discharge to Crymlyn Bog.	• Ensuring of long term security and immobilisation of wastes in the filled area. • Construct permeable cap and re-profile filled area with cover material (at least 50,000 m2) • Construct engineered wetland in lagoon (15,000 m2) to reduce dissolved hydrocarbon load in surface water exiting Tip. • alterations to drainage regime such that flow to Crymlyn Bog from the site is diffuse, rather than from a point-source, as currently exists.	13 14	Reduce dissolved phase hydrocarbon load in groundwater and surface water leaving the Tip and entering Crymlyn Bog.	
				All works to be protective of future public health and safety assuming unrestricted recreational access.	

Site Area / Potential Receptor	Key Issues	Scope of Currently Envisaged Remedial Action	Figure Reference	Performance Criteria	Works to Date
South Tank Farm	Potential dissolved-phase hydrocarbon discharge to stream discharging to Crymlyn Bog to south	- Constructed wetland (2500 m2), - groundwater monitoring programme	15	Reduction of dissolved phase hydrocarbon load to Crymlyn Bog	Monitoring
North Reservoir and East Bay	- Basal sludges. - Reconfigure reservoir to meet near pre-refinery conditions as part of return of land to the landowner. - Restoration of original drainage patterns.	Design and implement sludge removal and treatment programme for (all quantities estimated and unverified): - North Site Reservoir (40,000 m3), - East Bay (5,000m3) - API Separators (5,000 m3) Isolate reservoir from site drainage system Drain reservoir Remove dam Restore and landscape valley	16 17 18 19 16, 17 20 16, 17	- Sludge removed, treated to satisfaction of EA dependent on fate and disposed of or re-used. - Water removed, treated as required and disposed of. No discharge of NSR water to Crymlyn Bog permitted unless otherwise agreed with appropriate Environmental Authorities. - Valley restored to near pre-refinery conditions so as to be suitable for uncontrolled recreational access. - Dam removed and materials re-used. - Post restoration water management programme implemented consistent with restored valley. All works to be protective of future public health and safety assuming unrestricted recreational access.	Sludge removal from East Bay (part complete); no work on reservoir yet. Not commenced. Not commenced. Not commenced. Not commenced.

Site Area / Potential Receptor	Key Issues	Scope of Currently Envisaged Remedial Action	Figure Reference	Performance Criteria	Works to Date
South Reservoir	Hydrocarbon contaminated sludges to which contaminated groundwater discharges.	1. Design and implement programme of sludge removal and treatment (estimated at 5,000 m³). 2. Prevent / mitigate hydrocarbon seepage from walls and floor of reservoir (150 m) 3. "Soften" walls and landscape to satisfaction of CCW to enhance ecological value	21	Retain significant portion of South Reservoir as "clean" water feature. Reduction of hydrocarbon seepage from walls of reservoir as far as possible to satisfaction of EA. Discharge re-routed. CCW sign off on 'softening' and landscaping to increase ecological value. All works to be protective of future public health and safety assuming unrestricted recreational access.	Not commenced
Southern edge of process area / Llandarcy Bog	Potential free product migration to Llandarcy Bog. Dissolved-phase hydrocarbon discharge to bog/culverted drain.	Intercept free product. Six-monthly water monitoring programme (as specified in 'Whole Site', above) Construct linear wetland (100 m²).	22 23	Install permanent product interception feature. Reduce dissolved phase hydrocarbon load and ochreous precipitate discharges from site as far as possible to satisfaction of EA. All works to be protective of future public health and safety assuming unrestricted recreational access.	Completed in 2005. Not commenced, monitoring ongoing.

Site Area / Potential Receptor	Key Issues	Scope of Currently Envisaged Remedial Action	Figure Reference	Performance Criteria	Works to Date
Eastern process area / Neath valley and river	Potential cross boundary free product migration into railway cutting.	Monitor 30 sentinel wells for free-phase product on six-monthly basis. Install permanent product interception trench system along boundary of North Site, if sentinel well data suggests a risk of downgradient product migration occurring and in any event install such a trench to, at a minimum, replace the current sentinel wells prior to redevelopment (500 x 3 metres minimum). Any interception trench must prevent further downgradient migration of free product and allow recovery of intercepted product.	24	Install permanent interception feature to prevent free product migration downgradient and permit recovery of intercepted product.	Sentinel well installation complete. Groundwater monitoring only.
	Known and or suspected presence of free phase hydrocarbon and chlorinated hydrocarbons. Dissolved hydrocarbon and chlorinated hydrocarbon migration away from areas of product.	Either containment of hydrocarbon and chlorinated hydrocarbon product, vapour and dissolved phase, or; source-reduction solution (of area 30,000m2) to render containment permanently unnecessary, with the following programme elements: 1. Design-level investigations 2. Feasibility tests 3. System implementation and installation 4. Groundwater and air and soil vapour monitoring programme	25	Permanent maintenance of acceptable risk to agreed controlled waters receptors (River Neath and Crymlyn Bog) to the satisfaction of EA and NPT.	Limited work may be required for the RAP subject to results of long term monitoring. Substantial additional (containment) work likely to be required in the event of development.

Figure references are references to the RAP Plan annexed to this Deed

Report References (The following reports contain information which may be of relevance to the development and implementation of the RAP. This list is not exhaustive.):

Report Title	URS Report Ref.	URS Job no.	Issue Date
Environmental Liability Assessment, Llandarcy Refinery Desk Study Findings Vol 1	2048R	37491-001	29-Sep-97
Environmental Liability Assessment Llandarcy Refinery Interpretative Report Vol 2	2049R	37491-002	30-Sep-97
Risk Assessment Methodology Document (see DR810)	2271R	39991-001-401/P1	05-Aug-98
Report - Phase II, Stage 1 Data Report, BP Llandarcy Refinery - Neath, W Glamorgan - for BP Llandarcy Refinery LTD	R642	39991-001	26-Aug-98
Draft Report - Phase II Interim Data Assessment - BP Llandarcy Refinery, Neath, W Glamorgan	DR664	39991-002	06-Nov-98
Preliminary Sludge Treatability Study Report	DR666	39991-001	10-Nov-98
Phase 2 Site Assessment Vol 1, 2 and 3 Phase 2 Final Data Report	DR785	39991-004	28-Jul-99
Risk Assessment Methodology	DR810	39991-005	13-Sep-99
Draft Summary Report Stage 1 Solvent Recovery Pilot Test, DiMe Plant Area	DR829	39991-007	17-Nov-99
Water Balance Report	R835A	39991-009	14-Jan-00
Remedial Action Plan	DR869r3	39991-005	18-Feb-00
Synopsis of Site Assessment and Proposed Remedial Works on behalf of BP Llandarcy Refinery	R896	39991pfound	31-May-00
Phase 2 Site Assessment Crymlyn Bog Historical Spill	DR898	39991-011	12-Jun-00
Routine GW Monitoring Mar - Sept 2000 Vol 1 Draft Report	CD954	39991-013	01-Jan-01
Data & Risk Assessment of the Main Tank Farm	DR946	39991-017	05-Jan-01
Draft Remedial Plan, Vanadium Lagoon	DR962	39991-016	01-May-01
Additional Site Characterisation & Remedial Action Plan	DR963	39991-016	02-May-01
Final Report - Phase II Investigation & Human Health Risk Assessment for BP OIL, Swansea	FR979	39991-019	13-Jul-01
Monitoring Data Summary Report (Sept 2000)	DR980	39991-013	18-Jul-01
Monitoring Data Summary Report (March 2001)	DR980	39991-013	18-Jul-01
Progress Report on the Constructed Wetland Pilot Tests	DR1042	39991-016	01-Feb-02
Final Report - Sept 2001 Monitoring Data Summary Report - BP Llandarcy Refinery, Neath	FR1044	39991-023	08-Feb-02
Water Balance Addendum	DR1031	39991-016	01-Apr-02
South Site Reservoir Sampling Results	6681	39991-025	14-Jun-02
Site Characterisation & Remedial Action Plan Llandarcy Bog	DR1078A	39991-041	31-Jul-02
March 2002 Monitoring Data Summary Report	DR1081	39991-029	02-Aug-02
DiMe Mineralisation Tests	6732/MC	39991-016	16-Aug-02

Report Title	URS Report Ref.	URS Job no.	Issue Date
Informational Supplement for DiMe Plant Area	DR1096	39991-022	01-Sep-02
Results of Sentinel Well Product Mobility	6767	39991-032	12-Sep-02
Site Characterisation Works & Bypass Ditch Outline Design North Site Reservoir	DR1111	39991-016	12-Feb-03
September 2002 Monitoring Data Summary Report	DR1119	39991-036	28-Feb-03
Oil Recovery Tests Containment Area	DR1130	39991-026	25-Apr-03
March 2003 Monitoring Data Summary Report	DR1137	39991-036	01-Jul-03
Draft Factual Report - Site Investigation	DR1140	39991-035-785	10-Jul-03
Draft Factual Report DiMe Area	DR1144	39991-037	11-Jul-03
Rail Cutting Inspection	DR1161	39991-032	06-Aug-03
Specification Report Llandarcy Bog Interception & Recovery System	DR1168	39991-041-785	22-Aug-03
September 2003 Monitoring Data Summary Report	DR1191	39991-036	13-Feb-04
Draft Factual Report Whole Site Investigation	DR1209	39991-044	01-Jun-04
Whole Site Remediation Strategy	DR1224A	39991-035	29-Jun-04
Draft Report Outline Remedial Options Assessment - BP Llandarcy Refinery, Neath, W Glamorgan	DR1158	39991-037	19-Jul-04
March 2004 Monitoring Data Summary Report	DR1220	39991-049	30-Jul-04
September 2004, Monitoring Data Summary Report	R1263	39991-055	14-Dec-04
Solvent Pit RAP Issues: Additional Llandarcy Bog Water Samples	7601	39991-056-785	26-Jan-05
Area 1 - Main Workshop Former Degreasing Pit Investigation	R1278	39991-056	28-Jan-05
Draft Report Containment Area Perimeter Trench Performance Specification	BPRP0005	39991-054	01-May-05
Report on the Constructed Wetland Pilot Tests. Issue no.1	R1236	39991-021	25-May-05
Soil Stockpile Sampling Report. BP Llandarcy Barn Store & Waste Tip - Issue no 1 - DRAFT	R1304	44382527	01-Jun-05
Final Factual Report Site Investigation Phase 1 Area	FR1275	39991-035	22-Jul-05
Groundwater Monitoring and Sampling- BP Oil Llandarcy Refinery	DR1307	44382526-1943	01-Aug-05
Final Factual Report Whole Site Investigation	FR1287	39991-044-785	12-Aug-05
Groundwater Monitoring and Sampling - Factual Report	DR1356	44382526	01-Sep-05
Tip Closure and Completion Strategy Report	R1360	44382538	15-Mar-06
March 2006 Groundwater Report	R1396	44382534	11-Aug-06

Part 2

1. Developer obligations regarding RAP Works

- 1.1 The Developer shall carry out or procure the carrying out of all outstanding Remedial Action identified in Table 1 above in order to achieve the purpose and objectives set out in sub-paragraph 1.3 (including 1.3.1-1.3.5 thereof) of Part 1 of this Schedule and the performance criteria specified in Table 1 (and shall do so to the satisfaction of relevant Environmental Authorities) subject to any variations thereto that may be required in writing by the relevant Environmental Authorities from time to time.
- 1.2 The Developer shall carry out or procure the carrying out of all such further Remedial Action (whether identified in Table 1 above or not) necessary, including any that may be requested or required at any time by any Environmental Authority, acting lawfully, in order to achieve the purpose and objectives set out in sub-paragraph 1.3 (including 1.3.1-1.3.5 thereof) of Part 1 of this Schedule and the performance criteria specified in Table 1 and any such further Remedial Action which a reasonable and prudent owner of the Property bearing full legal responsibility for all Pre-Transfer Date Environmental Matters would otherwise regard as necessary or appropriate from time to time in order to achieve the purpose and objectives set out in sub-paragraph 1.3 (including 1.3.1-1.3.5 thereof) of Part 1 of this Schedule and the performance criteria specified in Table 1 and shall in each case do so to the satisfaction of the relevant Environmental Authorities provided that nothing in this sub-paragraph shall oblige the Developer to perform Remedial Action in relation to Unknown Off-Site Contamination or any Pre-Transfer Date Personal Injury.
- 1.3 The Developer shall take all reasonable steps promptly to create and thereafter maintain an open and constructive dialogue between it and the relevant Environmental Authorities regarding the progress and all other aspects of the RAP Works (including any impact or potential impact on any aspect of the RAP Works of any aspect of the Redevelopment Remediation Works and the inter-relationship between the two) and shall procure that any person acting on its behalf in connection with the RAP Works shall do the same. Without prejudice to the generality of the foregoing, the Developer shall:
 - 1.3.1 Convene a formal meeting with the relevant Environmental Authorities and representatives of the Authority to take place before or as soon as reasonably practicable after the Transfer Date in order to discuss with such Environmental Authorities the current status of the RAP Works, the Developer's plans for redevelopment of the Property as an Urban Village, the future programme of RAP Works in the light of those plans and the Redevelopment Remediation Works and to agree a schedule for future meetings between the Developer, those acting on its behalf and the relevant Environmental Authorities and the Authority such schedule to include as a minimum 6 monthly RAP Works review meetings; and
 - 1.3.2 Promptly comply with all lawful requests for information regarding any aspect of the RAP Works received from any Environmental Authority or the Authority at any time.
- 1.4 The Developer shall, and shall procure that any person acting on its behalf in relation to any aspect of the RAP Works required by this schedule shall, at all times comply with the requirements of Schedule 10 (General Remediation Requirements).

2. Variations to the RAP Works

- 2.1 The Developer shall promptly notify CDL, the Monitor and the Authority if at any time it is notified by a relevant Environmental Authority that such Environmental Authority requires a variation to the RAP Works in which case the following procedure shall apply:
- 2.1.1 As soon as reasonably practicable after serving a notice under paragraph 2.1 above, the Developer shall prepare proposals for the variation to the RAP Works that are consistent with the purpose and objectives of the RAP Works as set out in 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 variation to the RAP Works has been derived.
 - 2.1.2 Not earlier than the day of submission of its proposals to CDL the Monitor and the Authority in accordance with sub-paragraph 2.1.1 above, the Developer may 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 variation to the RAP Works. 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 2.1.1 above and a copy of this Agreement clearly drawing attention to the purpose, objectives and requirements of the RAP Works set out therein and the proposed changes thereto.
 - 2.1.3 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 to the Authority at the same time.
 - 2.1.4 The Developer shall ensure that the RAP Works achieve compliance with any variation to the specification for the RAP Works approved in writing by the appropriate Environmental Authorities pursuant to this paragraph 2.1, as if they were also set out in the Table to this Schedule.
 - 2.1.5 No such proposed variation to the RAP Works shall be implemented unless it has been approved in writing by the Environmental Authorities in accordance with this paragraph 2.1 (or if the Developer has only oral approval (or non objection) of the relevant Environmental Authorities no such proposed variation to the RAP Works shall be implemented unless the Developer notifies the relevant Environmental Authorities in writing (copied at the same time to CDL and the Monitor) that it proposes to proceed with the implementation of the proposed variation to the RAP Works 10 Working Days after the date of such notice and no written objection of any relevant Environmental Authority is received within such 10 Working Day period in respect of the same).
 - 2.1.6 Any reference in this Deed to the RAP Works shall be to the RAP Works as varied in accordance with this paragraph 2.1.

A E I C I FOR ATIO SO RCES



A E I RS RE ESTS FOR I FOR ATIO RFI



Simon Gibbons/Bristol/URSCorp

21/02/2011 13:10

To "Morris, Howel" <Howel.Morris@atkinsglobal.com>

cc

bcc

Subject Re: Western Margin 

Howel,

Attached are my comments. I would like to see the cross sections and logs and all dipping data if possible. You also need to characterise the product to see if it is the same at all locations. Based on the dipping from the trench sumps it appears to be more mobile in the summer so you need to be sure you have good data sets from July-November for the whole of the western margin.

I appreciate that this needs to be an iterative approach to assessing the data but I don't see anything in the report that pulls the Sources and Pathways together. How did the product migrate through the ground? Why is it where Atkins measure it? How could redevelopment affect options? Most of the monitoring is in the glacial deposits - how does that geology link back to the hillside where there was tankage and pipelines? I like CSMs to formulate answers that can then be investigated - at present the CSM is quite a factual summary of what has been found but no reason put forward as to why? In some circumstances it may not be possible to demonstrate a full understanding - particularly given the nature of the geology but I don't feel Atkins are much closer to understanding where and what type of feature may be required - although I appreciate conclusions section is yet to be completed.

Much of the geological discussion is from previous URS work - I would think that can be updated - particularly if you believe the PSD data and some of the higher permeability results we have from slug tests in the glacial deposits.

I think more trial pits in the areas east of the proposed trench alignments would help understand the sources of contamination more and what might ultimately need to be recovered/remediated. If there is such limited volumes of product currently Atkins need to assess why that is the case. Is it simply weathered/degraded and poorly mobile and/or will the product be more easily addressed through source removal during redevelopment works?

Looking at drawing 864 has the investigation gone far enough south? I don't have a figure showing the results of product dipping to know where the current areas of concern are. A drawing showing the product thickness trends next to locations would help and clearer information on screen depths, units installed in will also help. The geology at the very toe of the slope does become challenging and there isn't much review presented about the clay unit separating the glacial from the bedrock in the bog margins. Is there any product in the bedrock or is that a red herring?

I think in terms of general information its getting there but it needs to start pulling a few of the strands together - particularly based on historical product thicknesses so that the next stage can be considered more clearly. I would be happy to discuss in a meeting with Atkins if that would help but would like a bit more of the raw data to digest first.

Drawing 867 isn't referenced and I am not sure what it is showing me?

I have attached a couple of example figures from a Queens Dock CSM report which would assist the process for western margin. These show the various elements discussed in the report to help set the scene, cross sections, inferred fill thicknesses, GW contours, product thickness hydrographs and different product fingerprints for different areas of the site. All of these helped to put together the CSM for product migration through more permeable fill at this site. Something needs to be pulled together for the western margin if possible to help link the various processes that have led to the observed current product distribution. There may well be gaps (eg product typing) and some spatial uncertainty but having these types of schematic drawings will help to focus you on where you should be looking to get more information. Either that or Atkins need to be more assertive on whether it really matters in the context of redevelopment or more simply because product is currently not migrating (although a few more tests may be required at the right time of year to support this).

Regards

Simon



Western Margin CSM report_DRAFT 1_Issued for Comments_SG.docx QD_Supporting_CSM_Figures.pdf

Simon Gibbons

Technical Director
Hydrogeological Risk Assessment Ireland

RS Scott Wilson

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Registered number: 118271

Registered office: 243 West George Street, Glasgow G2 4QE

"Morris, Howel" <Howel.Morris@atkinsglobal.com>



"Morris, Howel"
<Howel.Morris@atkinsglobal.com>

18/02/2011 16:18

To "Simon_Gibbons@URSCorp.com"
<Simon_Gibbons@URSCorp.com>

cc

Subject Western Margin

Simon

Please find attached the CSM report for the Western Margin. I have sent the document in word format for ease of comment. We anticipate a period of amendments and suggestion for further works.

Jayne and Tukh would be keen to meet following your review to agree and resolve any issues.

Also, I have been working on the West Bay Summary Report but need to clarify with you as to whether the summary report is required for RAP sign of the sludge removal or is it for redevelopment sign off pending surrender of the license in this area.

Regards

Howel Morris

Senior Geoenvironmental Consultant,
Water and Environment

ATIS

The official engineering design services provider

for the London 2012 Olympic and Paralympic Games

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Email: Howel.Morris@atkinsglobal.com Web: www.atkinsglobal.com

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Consider the environment. Please don't print this e-mail unless you really need to.[attachment "863 - Western Margin Ground Water Monitoring.pdf" deleted by Simon Gibbons/Bristol/URSCorp] [attachment "864 - Western Margin Composite Exploratory Hole Plan.pdf" deleted by Simon Gibbons/Bristol/URSCorp] [attachment "Western Margin CSM report_DRAFT 1_Issued for Comments.docx" deleted by Simon Gibbons/Bristol/URSCorp]

Contract Name: Coed Darcy Monitor RFI No:
 Contract Number: GNP/NJR/13773-2 Date Raised: 22 May 2012
 Subject: Review of Atkins' Western Margins RAP Works Assessment Report
 To: Howel Morris Atkins
 Cc: Mike Poland Atkins
 From: Rhys Mander URS

Response Required Within:

1 Day		3 Days		5 Days		10 Days	✓
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Comments

This RFI has been prepared following a review of Atkins' Report ref. 5041216-RAP-RPT-770 'RAP Features 2, 3, 4 & 5 Western Margins RAP Works Assessment Report'. The following queries are raised:

- Please clarify what the Monitor is being asked to do. Is the Monitor being asked to prepare RAP Works Completion Statements (RAPWCS) for Phases 15, 16 and 17?
- If RAPWCSs are to be prepared then it is important to note that the works undertaken represent a variation from the s106, as the permanent interception features will not be installed. The reason for this variation appears to be that there are insufficient quantities of recoverable product to warrant the installation of permanent features. We need to understand the process for implementing such variations as set out in the s106 which states:

The Developer shall promptly notify CDL, the Monitor and the Authority if at any time it is notified by a relevant Environmental Authority that such Environmental Authority requires a variation to the RAP Works in which case the following procedure shall apply...

The above does not cover this scenario, whereby the Developer wants to make the variation rather than the Environmental Authority. Atkins may wish to consider the implications of this. Nevertheless, it is suggested that the Environment Agency and the Local Authority and if necessary CCW should be consulted.

- Notwithstanding the above comment, is Atkins satisfied that the trial pits, trenches, monitoring sumps etc. that have been installed are located appropriately and are to a sufficient depth? Furthermore, do the features have an adequate zone of influence? The geology in this area is complex with confined and artesian groundwater. Shallow excavations may not intercept all contamination. For example, it is noted that some excavations were stopped either at groundwater, or due to collapse. Contaminated groundwater may be deeper. Please refer to the attached CSM cross-sections that were prepared in 2000 which may be useful. Could the cross-sections be updated? Are the boreholes being monitored?
- The report focuses on the recovery of free product. Ochreous discharge is evident. How will this be managed?
- Groundwater is likely to be high in dissolved phase contamination. How will this be managed?
- With regards RAP Feature 2, the report recommends ongoing recovery for 6 months, perhaps with a trench thereafter. Please explain what this will involve. As above, how will ochreous discharge and dissolved phase be managed?
- For RAP Features 3, 4 & 5 the sumps initially encountered product, sheens and ochreous discharge. The sumps are isolated features and so there is no flow to mobilise surrounding product. The original RAP features were designed to be connected to encourage controlled groundwater flow. Additionally there is evidence that there is an ongoing up-gradient source (e.g. MSMW015) in the Bitumen Plant Area. Also there are only a limited number of trial pits and sumps etc. Are you satisfied that the area is sufficiently covered?
- In Table 3.5 the thicknesses of product initially observed in RHRW010 and RHRW024B are large, but following product recovery no further ingress of product was observed. Is there any explanation for this?
- The triangle separator is situated within Phase 16. What is happening with this?

Signed: 

Date: 22 May 2012

Reply
Signed: Date:

istribution

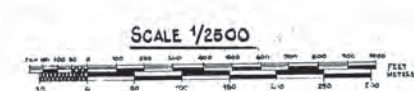
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	✓	Mike Poland	Atkins
	✓	Michelle Lee	Atkins

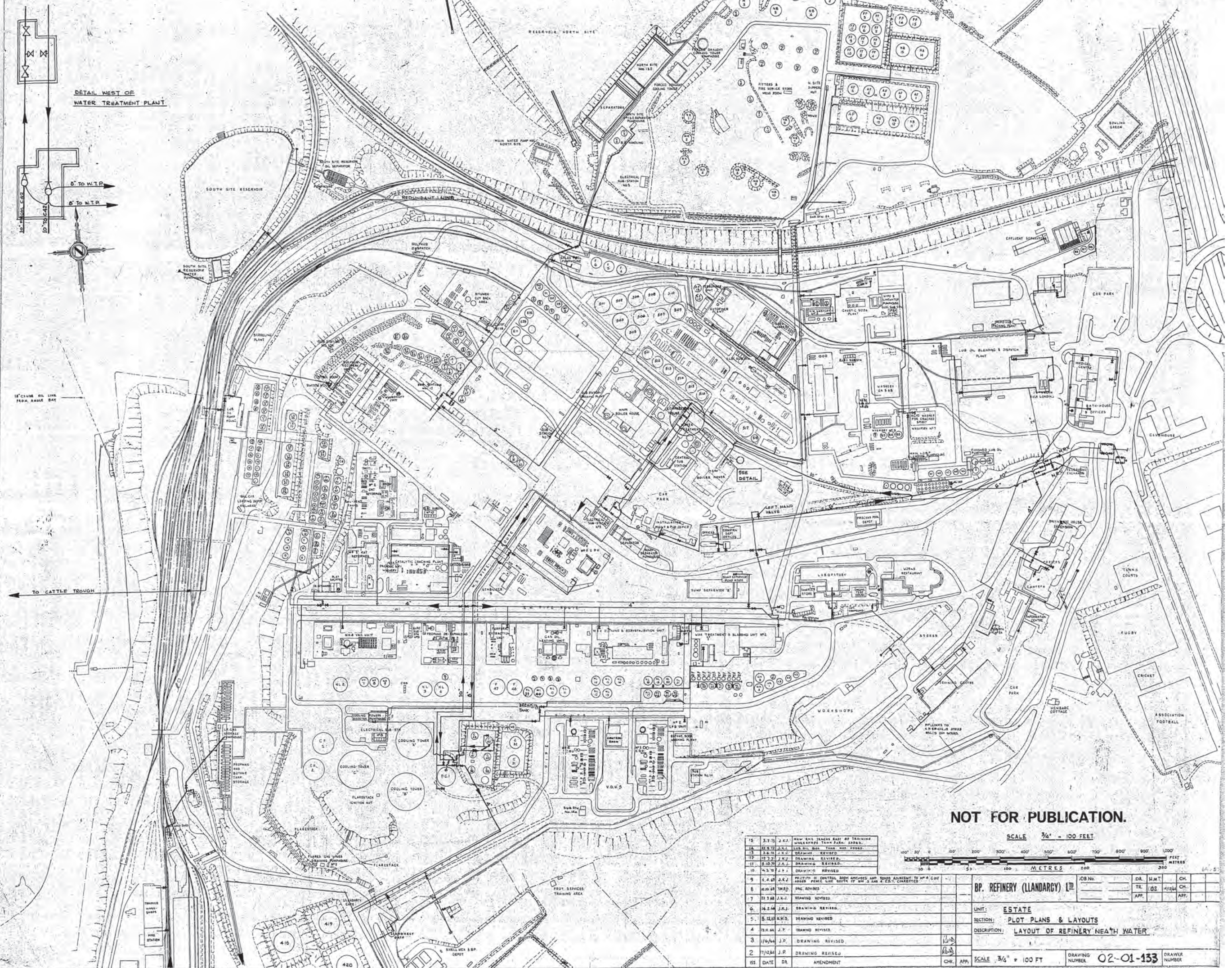
A E I E HISTORICAL LA S



ISSUE 1
DELETED - MERCH UNIT; POWER STN NO 2; SUMP SEPARATORS A & B;
COOLING TOWERS A, B & C; LUB OIL BLENDING DISPATCH PLANT;
BOTTLED GAS DISPATCH PLANT;
TANKS 105, 106, 107, 110, 111, 113, 114, 115; 227 TO 233 INC.;
301 TO 318 INC.; 400 TO 412 INC. 415 TO 430 INC. 433, 434, 437, 438,
107, 108, 109, 200, 210.
ADDED - WALKER GAS STATION; VDU PREHEAT & COOLING TOWER;
WHITE OIL SLUDGE WASH ROAD LOADING CRANE; WHITE OIL & LPO.
ROAD LOADING CRANES; TANK DMR; TANKS D3, D4, D5, D7, D8,
D9, D10, LOBBY PARK.

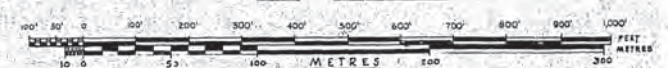
1		REVISED		UPDATED AS ABOVE		CH		APP		
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BP. REFINERY (LLANDARCY) LTD			JOB No.		DL	CH				
			TE		TE	CH				
			APP		APP	APP				
UNIT			ESTATES							
SECTION			PLOT, PLANS & LAYOUTS.							
DESCRIPTION			LAYOUT OF REFINERY & TANK FARM.							
			X02-01-48							
SCALE			1/2500		DRAWING NUMBER		02-01-48		DRAWER NUMBER	





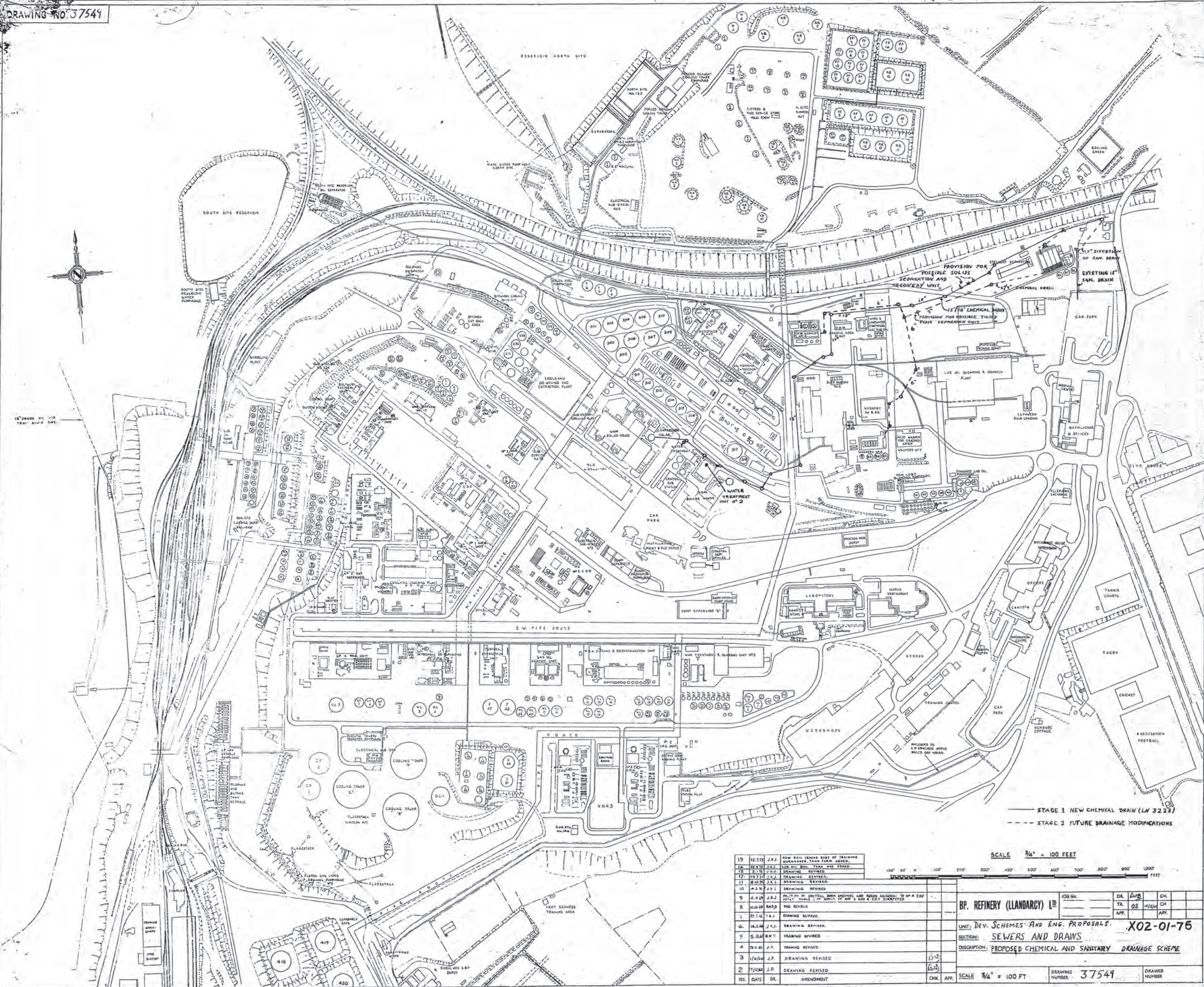
NOT FOR PUBLICATION.

SCALE 3/4" = 100 FEET



15	3.7.75	J.R.	NEW RAIL TRACKS EAST OF TRAINING WALKWAYS TANK FARM. ADDED.
14	10.3.75	J.R.	ADD. 50' DIA. TANK. NEW ADDED.
13	3.8.75	J.R.	DRAWING REVISED.
12	12.7.75	J.R.	DRAWING REVISED.
11	8.10.75	J.R.	DRAWING REVISED.
10	4.5.75	J.R.	DRAWING REVISED.
9	1.4.75	J.R.	REVISION TO CONTROL ROOM SHOWN AND ROAD ADJACENT TO W.P. 4. COR. ADDED. PUMP LINE SOUTH OF W.P. 3 AND 4 COR. CORRECTED.
8	10.10.74	THD	PAC REVISED.
7	23.3.68	J.R.	DRAWING REVISED.
6	14.2.64	J.R.	DRAWING REVISED.
5	8.12.63	A.W.S.	DRAWING REVISED.
4	12.1.64	J.R.	DRAWING REVISED.
3	1/6/64	J.R.	DRAWING REVISED.
2	7/12/64	J.R.	DRAWING REVISED.
15	DATE	DA	AMENDMENT

BP. REFINERY (LLANDARY) LTD		JOB No.	DR.	H.M.T.	CH.
			TR.	OS.	CH.
			APP.		APP.
UNIT: ESTATE					
SECTION: PLOT PLANS & LAYOUTS					
DESCRIPTION: LAYOUT OF REFINERY NEAR WATER					
SCALE 3/4" = 100 FT		DRAWING NUMBER	02-01-133		
		DRIVER NUMBER			



15	12.17	J.R.	NEW RAIL TRACKS EAST OF TRAINING WORKSHOPS, TANK FARM ADDED.		
14	12.17	J.R.	LN 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000		
13	12.17	J.R.	DRAWING REVISED.		
12	12.17	J.R.	DRAWING REVISED.		
11	12.17	J.R.	DRAWING REVISED.		
10	12.17	J.R.	DRAWING REVISED.		
9	12.17	J.R.	REVISION TO DRAINAGE, SEEN ABOVE, AND ROAD ADJACENT TO N° 4 COU.		
8	12.17	J.R.	REV. REVISED.		
7	12.17	J.R.	DRAWING REVISED.		
6	12.17	J.R.	DRAWING REVISED.		
5	12.17	J.R.	DRAWING REVISED.		
4	12.17	J.R.	DRAWING REVISED.		
3	12.17	J.R.	DRAWING REVISED.		
2	12.17	J.R.	DRAWING REVISED.		
155	DATE	DL	AMENDMENT		

BP. REFINERY (LLANDARCY) LTD

UNIT: DEV. SCHEMES AND ENG. PROPOSALS.

SECTION: SEWERS AND DRAWS

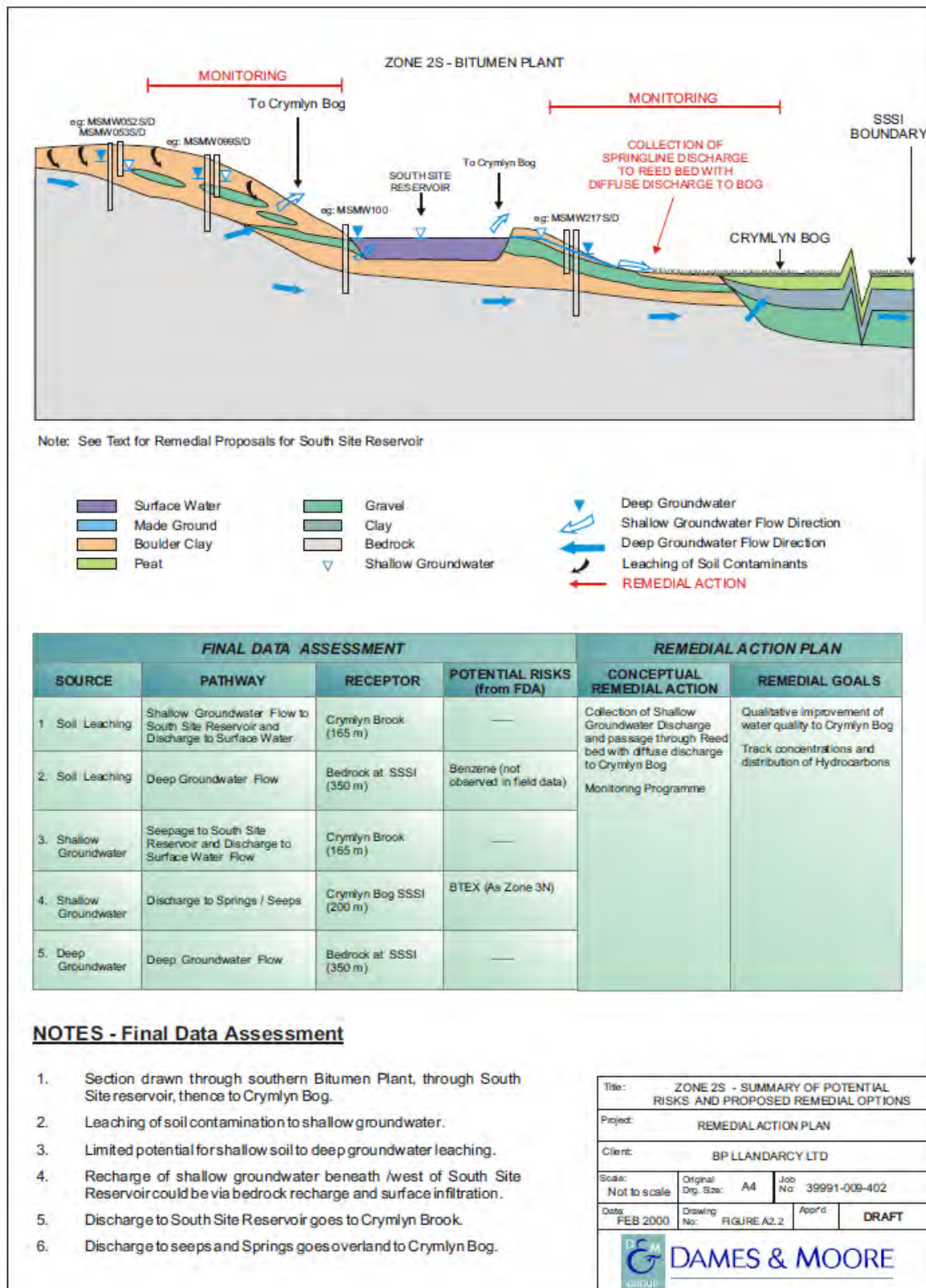
DESCRIPTION: PROPOSED CHEMICAL AND SANITARY DRAINAGE SCHEME

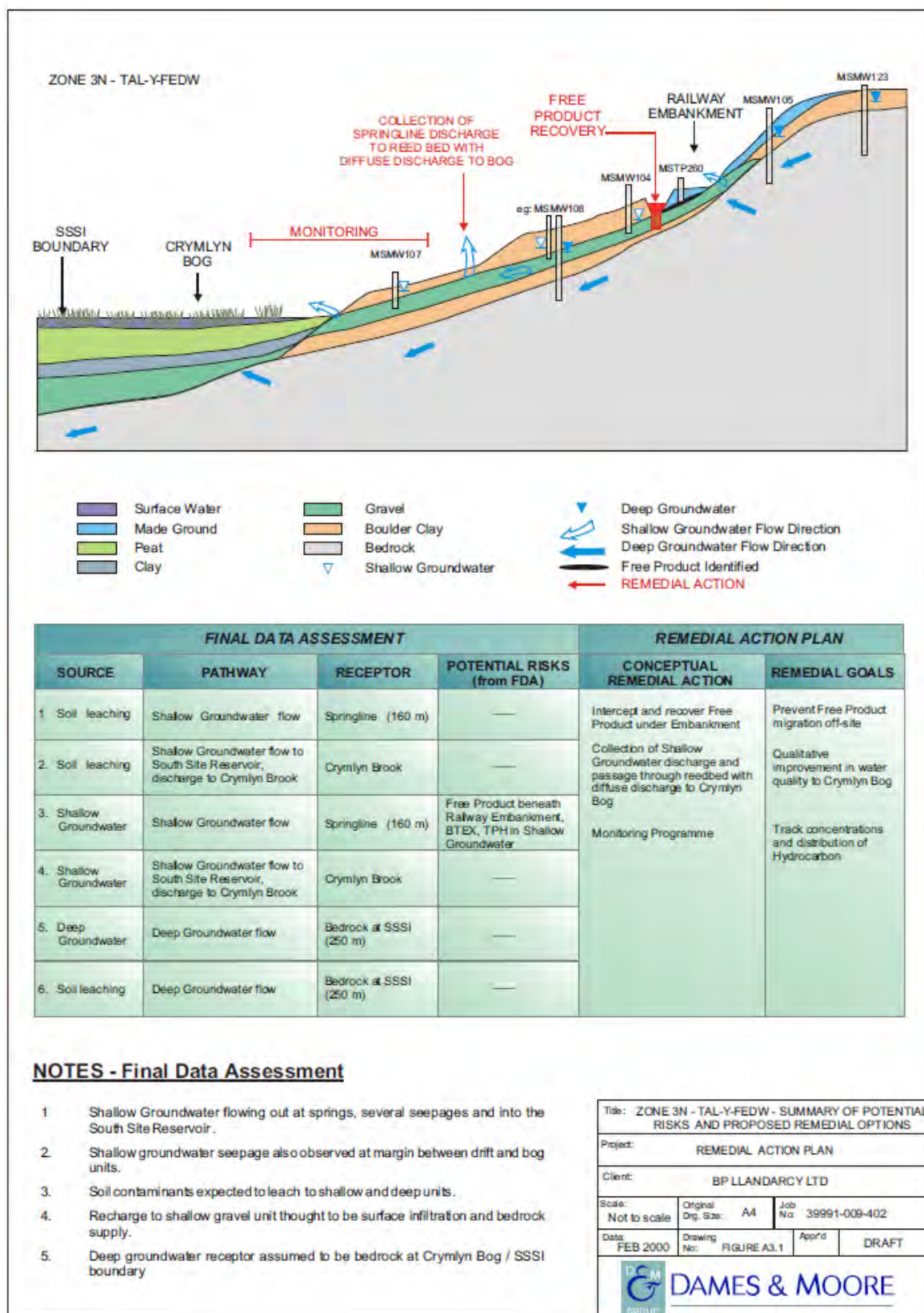
SCALE 3/4" = 100 FT

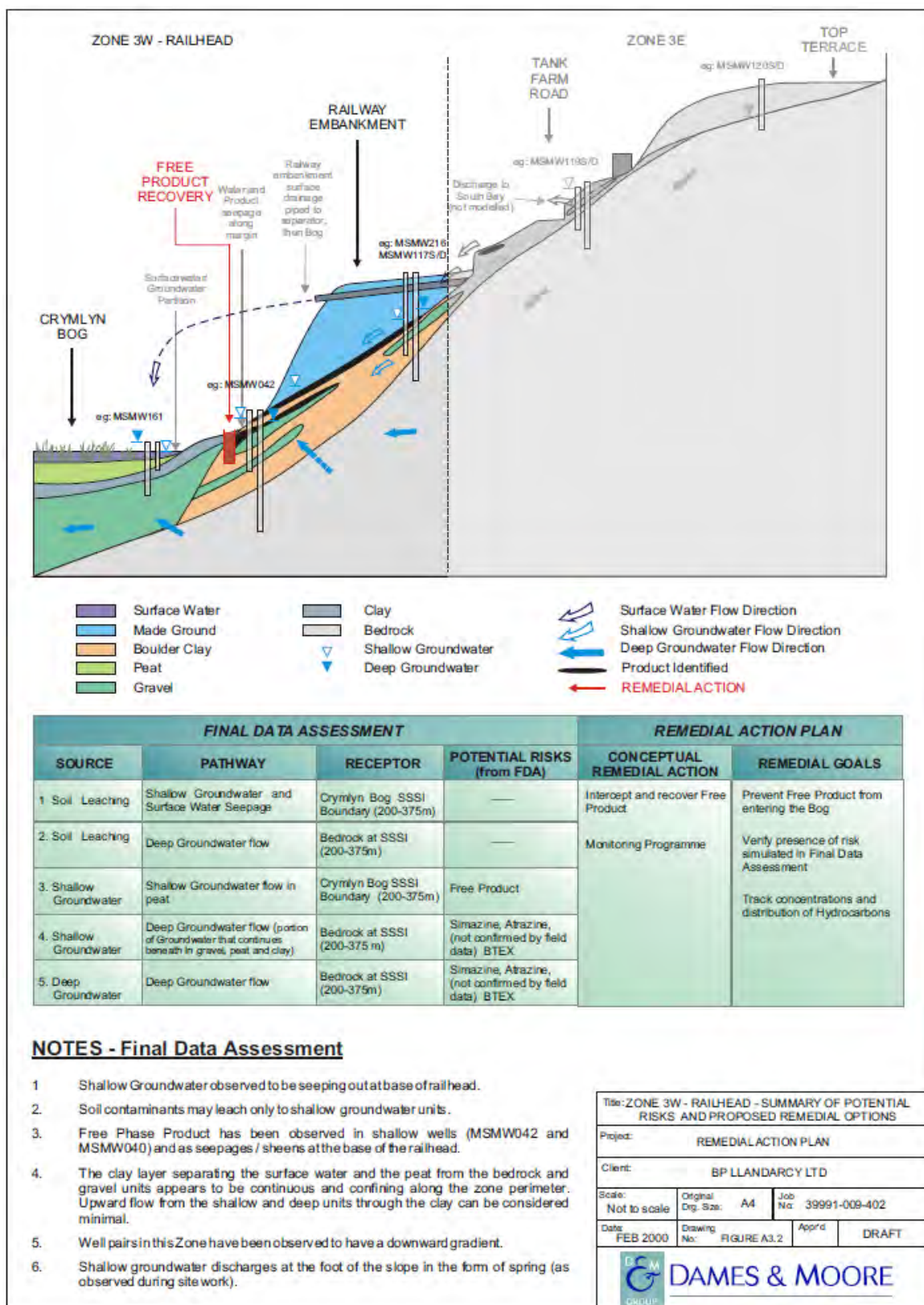
DRAWING NUMBER 37549

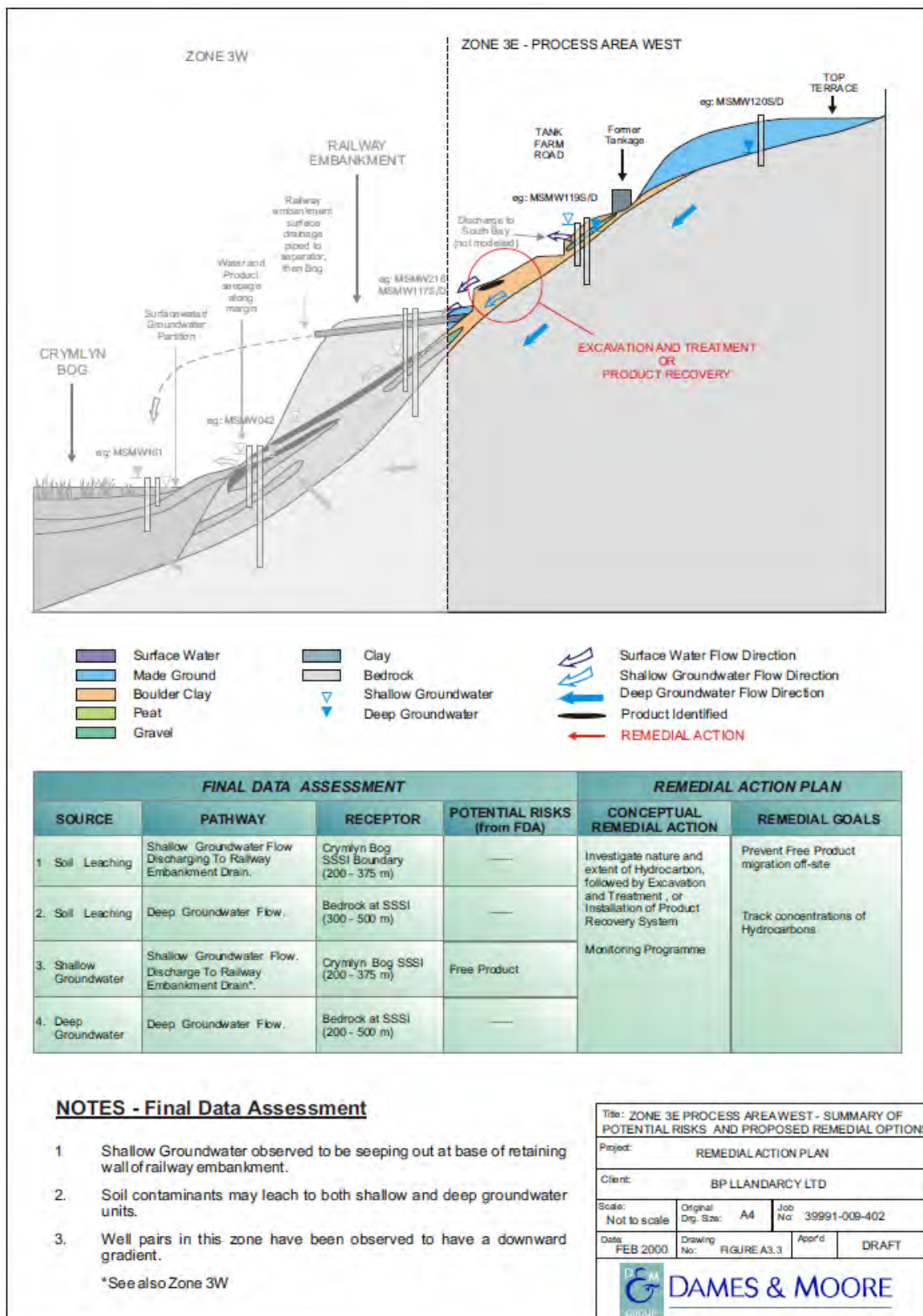
DRAWER

A E I F O R I A L C O C E T A L S I T E O E L



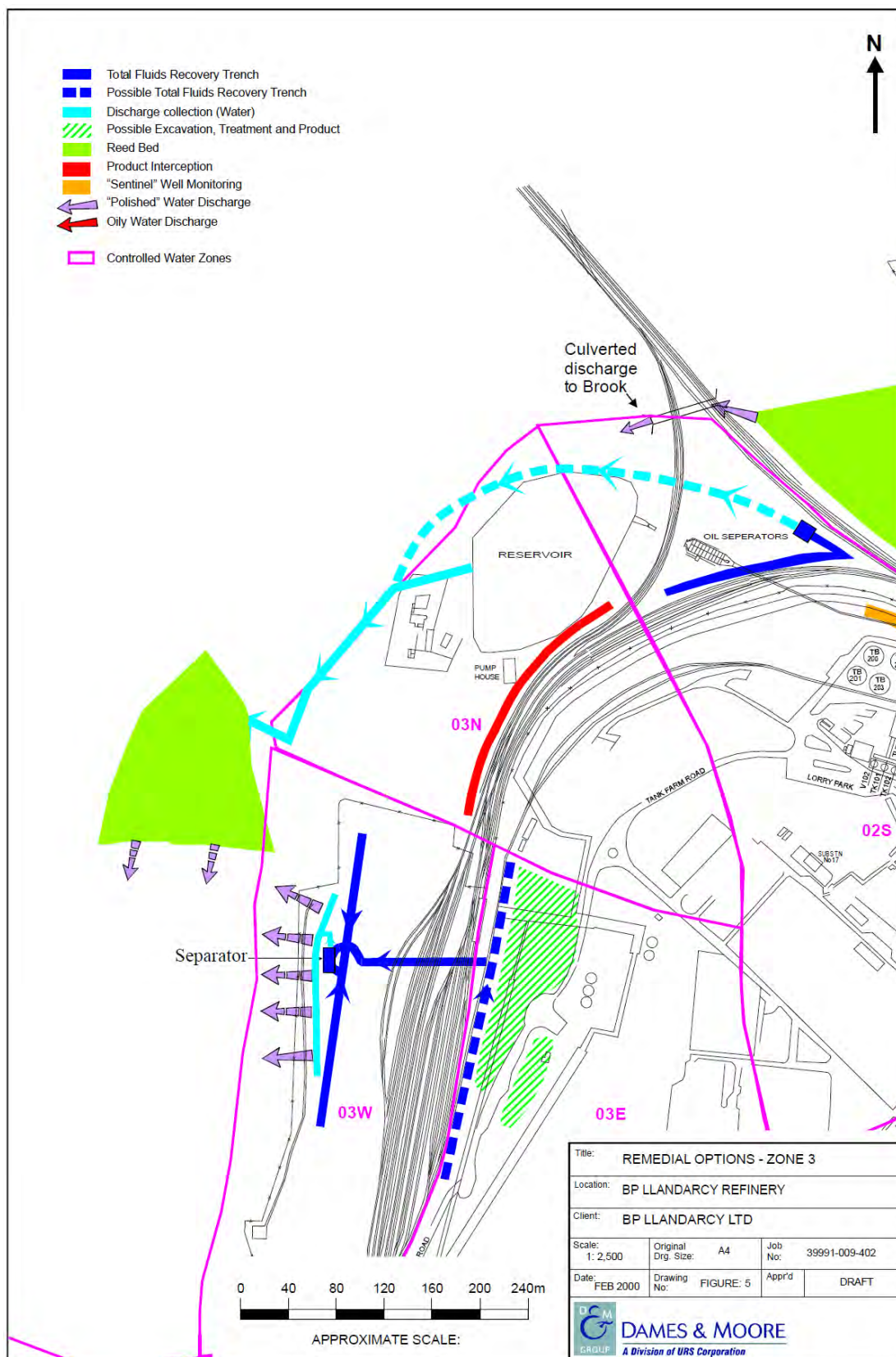


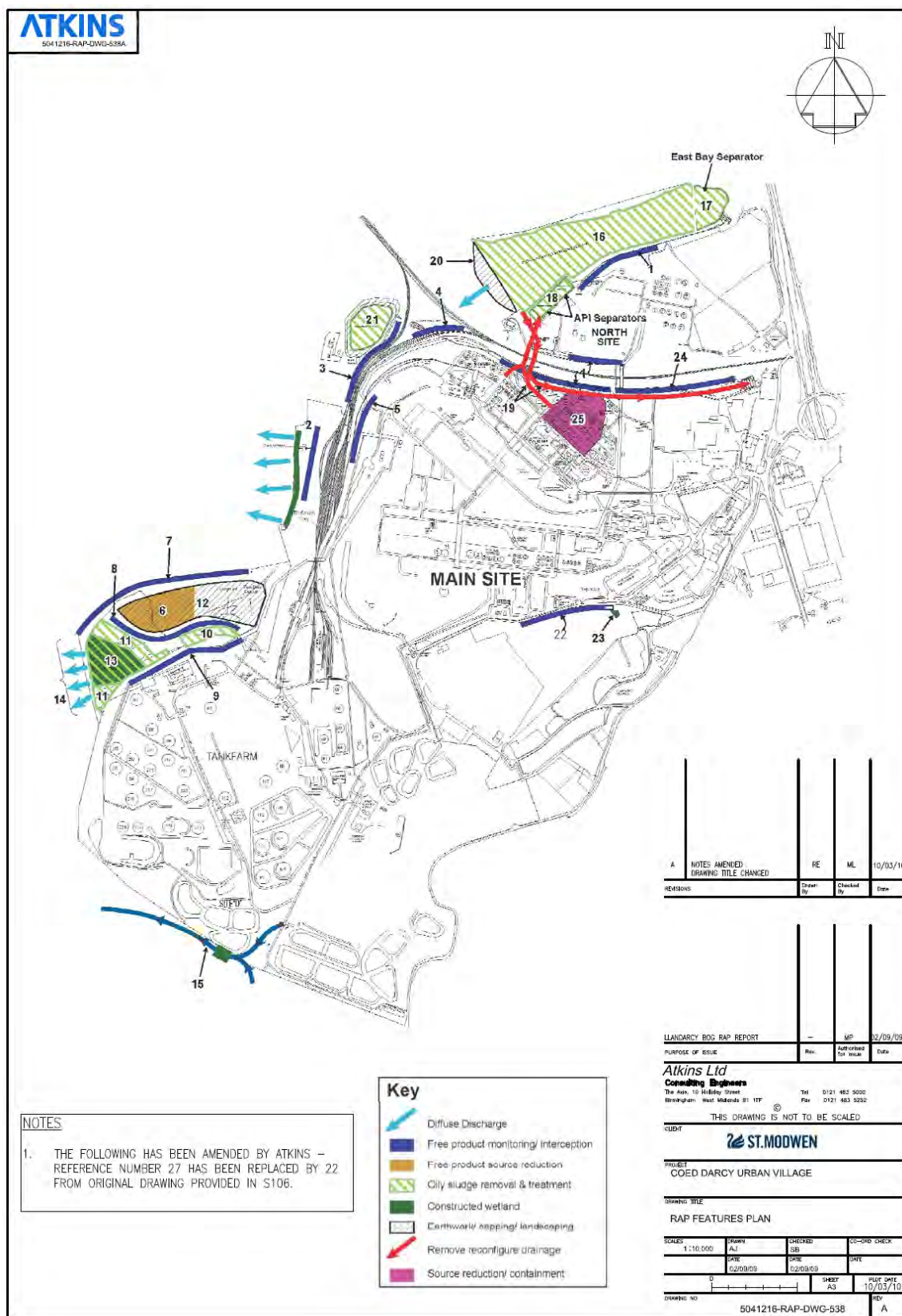






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repared for
Coed arcy Limited

repared by
AECO Infrastructure Environment Limited

Rev	Date	Revision Details	Prepared by	Checked by	Approved by
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INTRODUCTION

Scope

This Remedial Action Plan (RAP) Works Completion Statement (RAPWCS) 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 (RMA) dated 23 May 2008 between SMD, SMP and CDL.

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

This RAPWCS has been prepared for Phase 43 in response to a written request from SMD pursuant to clause 4.3 of the RMA. The phase boundary and intended use on which this RAPWCS is based were notified to the Monitor by letter, a copy of which is provided in **Appendix A**.

The intended use for Phase 43 has been declared as public open space comprising playing fields. The phase boundary is the land edged red on drawing 5041216-REM-DWG-1666, a copy of which is provided in **Appendix A**. The approximate location of Phase 43 in relation to the Development Boundary is shown in **Figure** below. Phase 43 covers an area of approximately 75,800m².

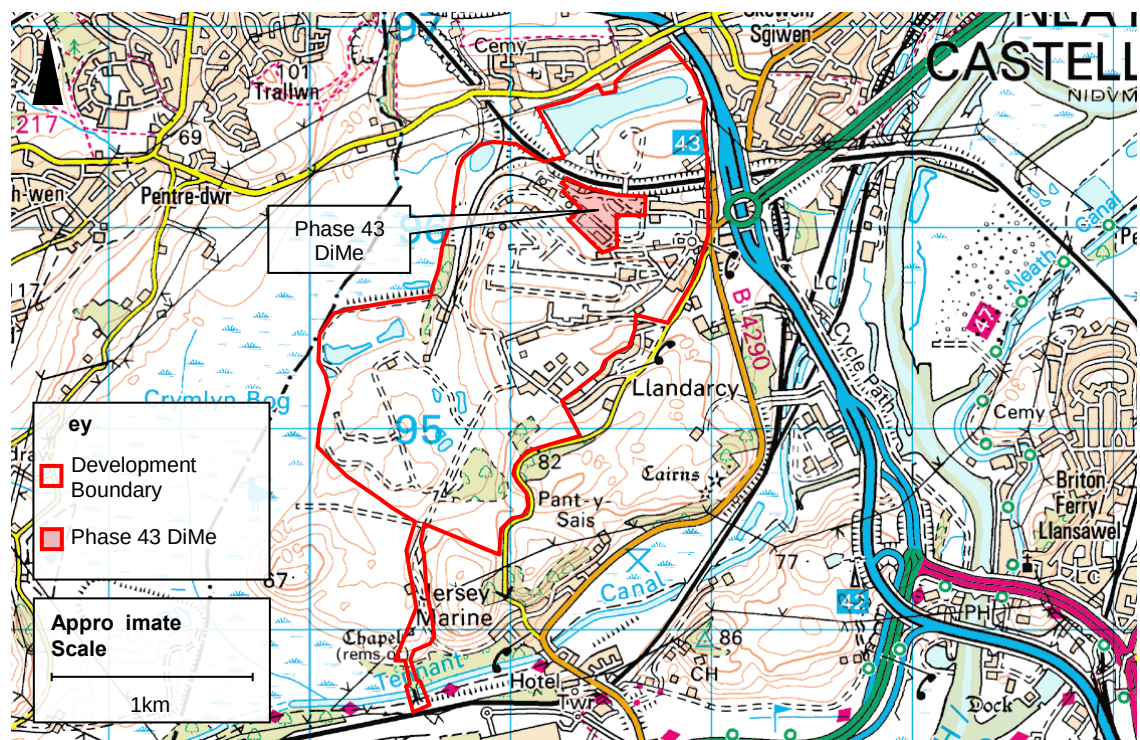


Figure Location plan

With reference to the RAP Feature Plan, an extract from which is reproduced in **Figure** with the Phase boundary overlaid for ease of reference, it can be seen that RAP Features 1, 19, 24 and 25 fall within Phase 43. This RAPWCS examines each of these RAP Features.

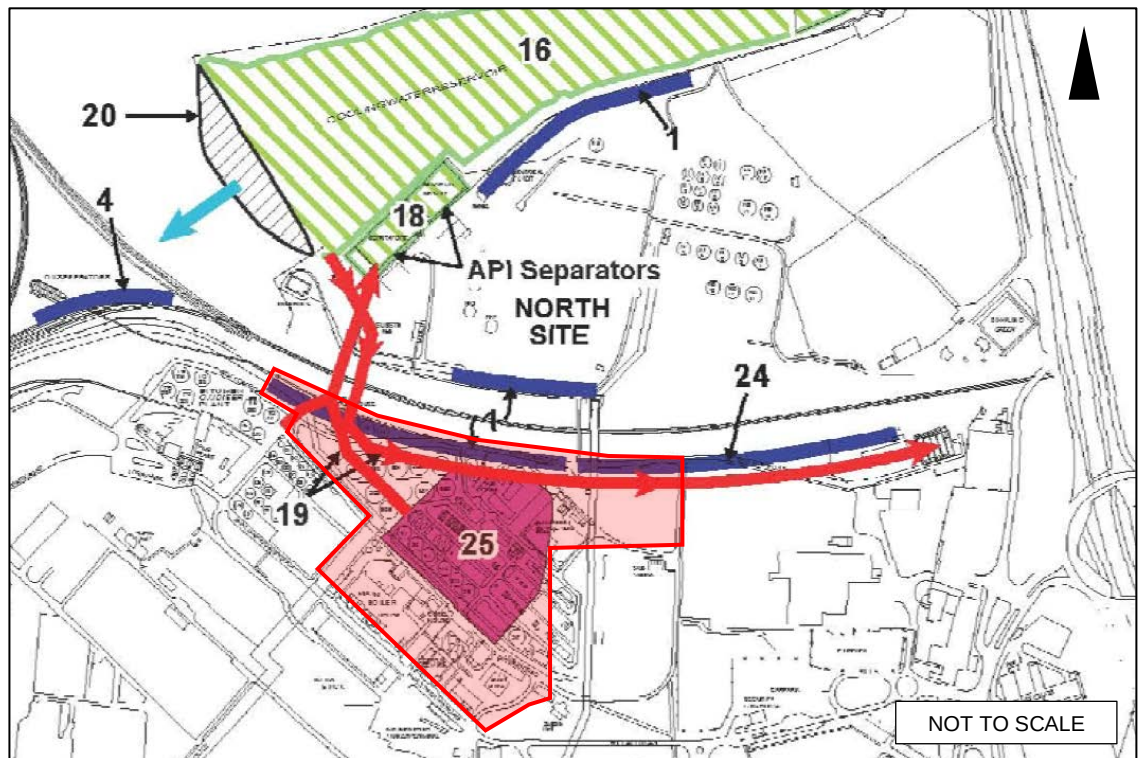


Figure proposed RA or s

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

- Describe the Remedial Action which in the Monitor's professional opinion has been carried out for the purposes of completing the RAP Works in relation to the Phase; and
- Confirm whether or not in the Monitor's professional opinion the RAP Works have been satisfactorily completed for the Phase in accordance with the purpose, objectives and requirements of Schedule 7 of the Section 106 Agreement having regard to the Intended Use.

Furthermore, the Monitor is required to confirm it is satisfied that the purpose, objectives and requirements of Schedule 7 of the Section 106 Agreement have been met and 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 covered by the Phase.

A copy of Schedule 7 of the Section 106 Agreement is provided in **Appendi B**.

Bac ground

Purpose and Objectives of the RAP Works

As defined in Schedule 7 of the Section 106 Agreement, the RAP Works are a programme of on-going voluntary Remedial Action in relation to Pre-Transfer Date Environmental Matters at or in the vicinity of the Property which were agreed between the Owner and the relevant Environmental Authorities in lieu of the imposition of formal Remedial Action requirements by

any such Environmental Authorities. The RAP Works were designed to protect ecological and controlled waters receptors close to the site. The RAP Works are not intended to enable redevelopment.

RAP Requirements

In order to prepare this RAPWCS, there are a number of obligations that the Developer needs to demonstrate have been met so that the Monitor can provide opinion on whether or not the Phase is suitable for its Intended Use. These obligations are detailed in Schedules 7 and 10 of the Section 106 Agreement. The principal obligations for the Developer with regards the RAP Works are summarised below.

The Developer shall:

- Carry out or procure the carrying out of all outstanding Remedial Action identified in Table 1 of Schedule 7 of the Section 106 Agreement necessary and sufficient in the context of both the current use of the Property and the Intended Use or such other use as may be determined from time to time;
- Prevent (or where that is not possible, minimise, remedy or mitigate as far as reasonably practicable the effects of) migration from the Property of Pre-Transfer Date Contamination and any Developer Contamination;
- Assess with a frequency agreed as sufficient by the relevant Environmental Authorities and keep under review the condition of the environment at and in the vicinity of the Property and the progress and effectiveness of natural attenuation processes;
- Demonstrate whether or not any Pre-Transfer Date Environmental Matters are posing or may pose an unacceptable risk to the environment beyond the boundaries of the Property;
- Prevent (or where that is not possible, minimise, remedy or mitigate as far as reasonably practicable the effects of) any harm to the environment or any pollution of controlled waters or any possibility of such harm or pollution being caused;
- Avoid where reasonably practicable any Environmental Claim by any relevant Environmental Authority in relation to or in connection with any Pre-Transfer Date Environmental Matter;
- Take all reasonably practicable steps to seek to secure the final and unconditional acceptance by the relevant Environmental Authority of the surrender of the Waste Management Licence as soon as reasonably practicable.

SMD has procured the services of Atkins Ltd. to assist in discharging the above obligations.

Redevelopment Remediation Works

In addition to meeting the requirements of the RAP Works, the Developer must also complete the necessary Redevelopment Remediation Works, the requirements for which are outlined in Schedule 8 of the Section 106 Agreement.

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

Details of the scope of works and associated validation completed to satisfy the redevelopment remediation requirements pertinent to this Phase are reported separately in RRWCC ref. 49310747/BRRP00023/Cert 43b.

PWCD

The objective of the RAP Works will be deemed to have been met for the purposes of the Section 106 Agreement and the RMA on the date specified in the notice from CDL declaring the PWCD. The PWCD will be declared once CDL is satisfied that the remediation necessary for the specified Intended Use for the Phase has been completed.

Information Sources

A summary of the information sources that the Monitor has been provided with in relation to Phase 43 is provided in **Table** . 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 **Appendi C**.

Table Information Sources

<i>Ref</i>	<i>Document Reference</i>	<i>Format</i>	<i>Title</i>	<i>Author</i>	<i>Date Received</i>
1	39991-007/DR829	Report	Draft Summary Report Stage 1 Solvent Recovery Pilot Test DiMe Plant Area	Dames & Moore	November 1999
2	39991009/DR869r3	Report	BP Llandarcy Refinery Remedial Action Plan	Dames & Moore	March 2000
3	39991-016/6732/MC	Letter	Results of Di and Me Mineralisation Tests DiMe Plant, BP Llandarcy Refinery	URS	August 2002
4	39991-022/DR1096	Report	Information Supplement for DiMe Plant Area	URS	September 2002
5	39991-037-785/DR1144	Report	Draft Factual Report DiMe Area	URS	July 2003
6	39991-032-785/DR1161/LT/7205	Letter	Rail Cutting Inspection	URS	August 2003
7	39991-037/DR1158	Report	Outline Remedial Options Assessment	URS	July 2004
8	39991-044-785-FR1287	Report	Whole Site Investigation BP Llandarcy Refinery	URS	August 2005
9	44382742/BRRP0001	Report	BP Llandarcy Refinery Desk Study	URS	July 2007
10	49310747/BRRP0005	Report	DiMe Investigation Summary	URS	April 2009
11	5041216/ENG/239/OTH/JM/SPEC/0042	Report	Demolition Specification Issue 3	Atkins	April 2009
12	5041216-REM-RPT-000216	Report	Derivation of Remediation Target Criteria Revision 3	Atkins	January 2010

Ref	Document Reference	Format	Title	Author	Date Received
13	5041216-REM-RPT-000316	Report	Remediation Target Criteria for the DiMe Area (Revision 1)	Atkins	December 2010
14	5041216-REM-TN-000467	Technical Note	Detailed Ground Investigations	Atkins	December 2010
15	N/A	Response to RFI	Response to Monitor RFI no. 56 re. Atkins' Remediation Target Criteria for the DiMe Area	Atkins	December 2010
16	5041216-REM-RPT-476	Report	Derivation of Commercial Remediation Target Criteria	Atkins	January 2011
17	N/A	Response to RFI	Response to Monitor RFI no. 79 re. Atkins' Remediation Target Criteria for the DiMe Area	Atkins	January 2011
18	5041216-REM-TN-497	Technical Note	Response to Monitor RFI no. 80 re. DiMe Site Investigation Scope	Atkins	January 2011
19	N/A	Response to RFI	Response to Monitor RFI no. 78 re. Atkins' DiMe Controlled Waters QRA	Atkins	March 2011
20	5041216-REM-RPT-000372	Report	DiMe Area Controlled Waters Risk Assessment v2	Atkins	March 2011
21	5041216/REM/TN/552	Technical Note	Proposed re-use of Existing Stockpiled Materials	Atkins	April 2011
22	N/A	Response to RFI	Response to Monitor RFI no. 85 re. Atkins' DiMe Controlled Waters QRA	Atkins	May 2011
23	5014216/REM/RPT/616	Report	Geo-environmental Assessment & Outline Remediation Strategy	Atkins	August 2011
24	5014216/REM/RPT/372	Report	DiMe Area, Controlled Waters Risk Assessment	Atkins	November 2011
25	5014216/PLOTS/RPT/1016	Report	Commercial Area Validation Report	Atkins	May 2015
26	N/A	Letter	Request for variation to the requirements of Schedule 7 of the Section 106 Agreement	NPTCBC / NRW / AECOM	July 2015
27	5041216/PLOTS/RPT/0001405	Report	Validation Report Monitor Phase 43	Atkins	October 2015
28	5041216/RAP/RPT/001491	Report	RAP Implementation Report – Sentinel Wells	Atkins	November 2015

<i>Ref</i>	<i>Document Reference</i>	<i>Format</i>	<i>Title</i>	<i>Author</i>	<i>Date Received</i>
29	5041216-RAP-TN-1558	Technical Note	RAP Features 1 & 24 – Sentinel Wells, Response to Monitor's Comments	Atkins	February 2016

Requests for Information RFIs Issued by the Monitor

The Monitor has raised eight RFIs in relation to Phase 43, as summarised in **Table 1**. Copies of the RFIs are provided in **Appendix A**. Copies of the responses received from Atkins are included in the Information Sources provided in **Appendix C**.

Table 1 Monitor RFIs

<i>RFI Ref.</i>	<i>Title</i>	<i>Associated Atkins Document</i>	<i>Date Raised</i>	<i>Complete</i>	<i>Comments</i>
56	DiMe RTC Report Review	Atkins report 'Remediation Target Criteria for the DiMe Area' (ref. 5041216/REM/RPT/00316)	April 2010	Yes	Further comments raised in RFI 79
65	Review of DiMe Controlled Waters Risk Assessment	Atkins report 'DiMe Controlled Waters Risk Assessment' (ref. 5041216-REM-RPT-000372)	August 2010	Yes	Further comments raised in RFI 78
78	Review of DiMe Controlled Waters Risk Assessment Rev01	Atkins report 'DiMe Controlled Waters Risk Assessment' (ref. 5041216-REM-RPT-000372)	January 2011	Yes	Further comments raised in RFI 85
79	DiMe RTC Report Review Rev01	Atkins report 'Remediation Target Criteria for the DiMe Area' (ref. 5041216/REM/RPT/000316)	January 2011	Yes	-
80	Review of DiMe Site Investigation Scope	Atkins report 'Detailed Ground Investigation' (ref. 5041216-REM-TN-000467)	January 2011	Yes	-
84	Re-Use of Existing Stockpiled Material on DiMe	Atkins Technical Note 552, 'Proposed re-use of Existing Stockpiled Materials'	April 2011	Yes	-
85	Review of DiMe Controlled Waters Risk Assessment Rev01	Atkins Report 'DiMe Area Controlled Waters Risk Assessment'	April 2011	Yes	-

RFI Ref.	Title	Associated Atkins Document	Date Raised	Complete	Comments
156	Review of Atkins' Validation Report for Monitor Phase 43 (Former DiMe Plant and Proposed Sports Pitches)	Atkins' Validation Report for Phase 43 (ref. 5041216-PLOTS-RPT-1405)	September 2015	Yes	Updated validation report received in October 2015

DESCRIPTION OF TERRAINS

Site description

Phase 43 covers an area of the former refinery referred to as the DiMe Plant which comprised one of the final stages in production of lubrication oils. Within the DiMe Plant, two chlorinated solvents (1,2 Dichloroethane ('Di') and Methylene Chloride ('Me')) were used to remove waxy components from the oils. URS' historical desk study report (Information Source 9) indicates evidence of losses and gradual leakages of solvents as well as occasional larger scale releases at the plant.

With reference to the historical maps presented in **Appendix E**, a number of buildings, including the Main Boiler House, were situated within Phase 43. Many of these buildings were demolished prior to acquisition of the site by St. Modwen in 2008. The Central Substation, Central Control Room and New Bath House were also situated within Phase 43 and it is reported that these buildings were demolished in 2009 to 2010, following the removal of asbestos from the buildings.

With regards geology, Atkins reports that the British Geological Survey Sheet for Swansea (Sheet 247) Drift Edition indicates that Phase 43 is underlain by Glacial Drift overlying Upper Pennant Sandstone Measures. Solid strata are suggested to dip towards the north. There are no recorded faults shown to cross beneath the area of the proposed playing fields.

With regards hydrogeology, Atkins reports that groundwater within Phase 43 is suggested to lie at shallow depth, rising beneath the southern part of the Phase, consistent with the general topography. The Upper Pennant measures underlying Phase 43 are classified as a Secondary A Aquifer, 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'.

With reference to the drawings presented in URS' site investigation report (Information Source 8) groundwater flow with Phase 43 is generally considered to be towards the northeast. The principal surface water receptors, as identified in Atkins' Controlled Waters Risk Assessment (Information Source 20) are Crymlyn Bog (700m to the west) and the River Neath (1.5km to the east). It is noted that North Site Reservoir which is located to the north of Phase 43 is not considered to be in direct continuity with groundwater in the bedrock beneath Phase 43. However it is noted that storm water drainage which passes through Phase 43 discharges into North Site Reservoir.

Purpose and Scope of the Original RAP and Proposals

This RAPWCS has been prepared for Phase 43 which, with reference to the figure references listed in Table 1 of Schedule 7 of the Section 106 Agreement, and also with reference to **Figure** presented in section 1.1 of this report, covers RAP Features 1, 19, 24 and 25. The requirements for each of these RAP features are summarised in **Table** below.

Table E tract from Table from Schedule of the Section Agreement

<i>Rap Item</i>	<i>Key Issues</i>	<i>Scope of Originally Envisaged Remedial Action</i>	<i>Performance Criteria</i>	<i>Works to Date</i>
1	Potential for cross boundary free product migration at various locations along boundary Dissolved phase hydrocarbon migration	1. Monitor 30 'sentinel' wells along northwest and southeast boundaries of North Site for presence of free product. 2. Install permanent product interception trench system along boundary of North Site, if sentinel well data suggests a risk of down-gradient product migration occurring and in any event install a product interception trench to, at a minimum, replace the current sentinel wells prior to redevelopment (300 x 4 metres minimum). Any interception trench must prevent further down-gradient migration of free product and allow recovery of intercepted product.	Continued six-monthly monitoring of free product thickness, and assess potential for further down-gradient migration. All works to be protective of future public health and safety assuming unrestricted recreational access.	Sentinel well installations complete on North Site, and listed in semi-annual monitoring reports.
19	Restoration of original drainage patterns.	Isolate reservoir from site drainage system	-	Not commenced
24	Potential cross boundary free-phase product migration into railway cutting	Monitor 30 sentinel wells for free-phase product on six-monthly basis. Install permanent product interception trench system along boundary of North Site, if sentinel well data suggests a risk of down-gradient product migration occurring and in any event install such a trench to, at a minimum, replace the current sentinel wells prior to redevelopment (500 x 3 metres minimum). Any interception trench must prevent further down-gradient migration of free-phase product and allow recovery of intercepted product.	Install permanent interception feature to prevent free-phase product migration down-gradient and permit recovery of intercepted product.	Sentinel well installation complete. Groundwater monitoring only.

Rap Item	Key Issues	Scope of Originally Envisaged Remedial Action	Performance Criteria	Works to Date
25	Known and or suspected presence of free phase hydrocarbon and chlorinated hydrocarbons. Dissolved hydrocarbon and chlorinated hydrocarbon migration away from areas of product.	Either containment of hydrocarbon and chlorinated hydrocarbon product, vapour and dissolved phase, or; source-reduction solution (of area 30,000m²) to render containment permanently unnecessary, with the following programme elements: 1. Design-level investigations 2. Feasibility tests 3. System implementation and installation 4. Groundwater and air and soil vapour monitoring programme	Permanent maintenance of acceptable risk to agreed controlled waters receptors (River Neath and Crymlyn Bog) to the satisfaction of EA and NPT.	Limited work may be required for the RAP subject to results of long term monitoring. Substantial additional (containment) work likely to be required in the event of development.

In summary, RAP Features 1 and 24 require a series of boreholes, referred to as the sentinel wells, to be monitored for the presence of free phase product, with the installation of product interception and recovery trenches thereafter if necessary; RAP Feature 19 requires the isolation of the North Site Reservoir from the site drainage system; and RAP Feature 25 requires the containment or removal of hydrocarbon and chlorinated hydrocarbon product.

Reference should be made to the conceptual site model drawings reproduced below in **Figures and** which illustrate the proposed RAP works as envisaged in the BP Llandarcy Refinery Remedial Action Plan report (Information Source 2).

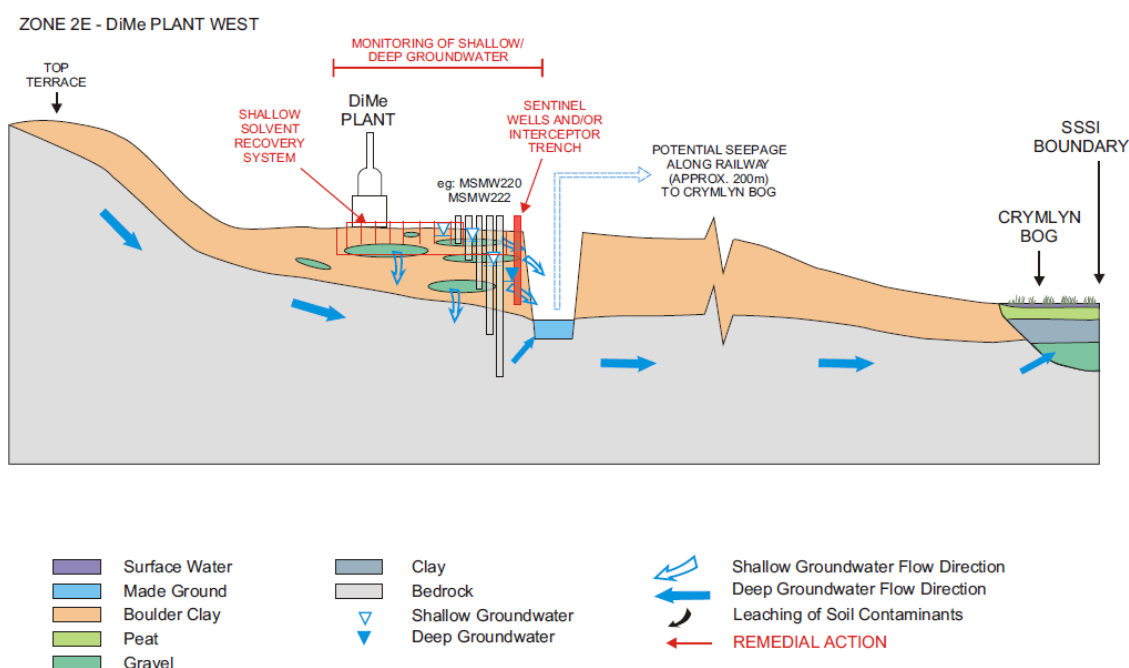


Figure Conceptual Site Model Drawing

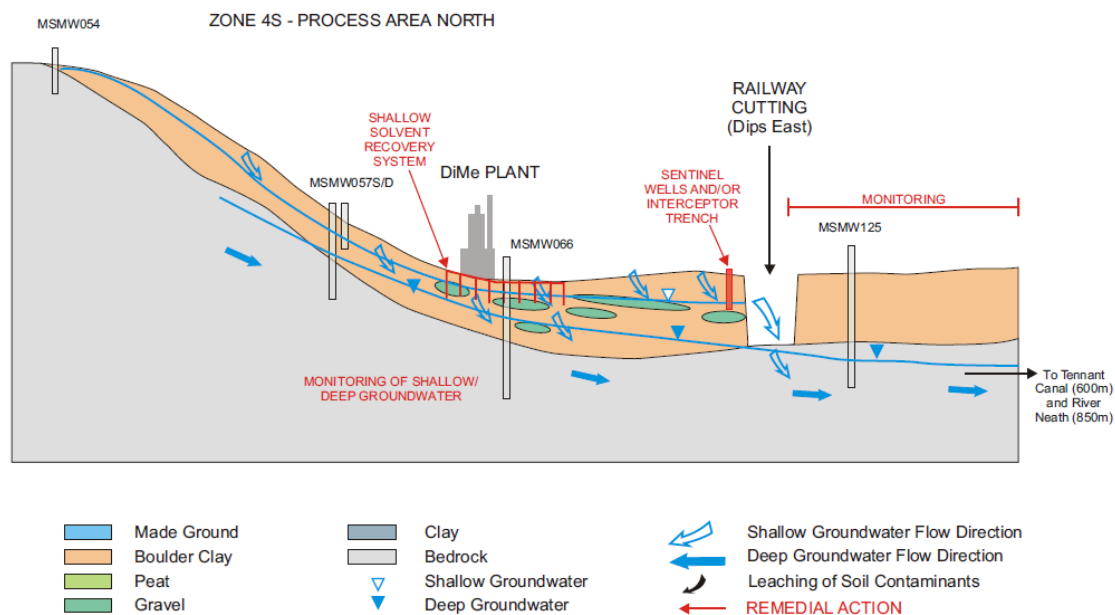


Figure Conceptual Site Model Drawing

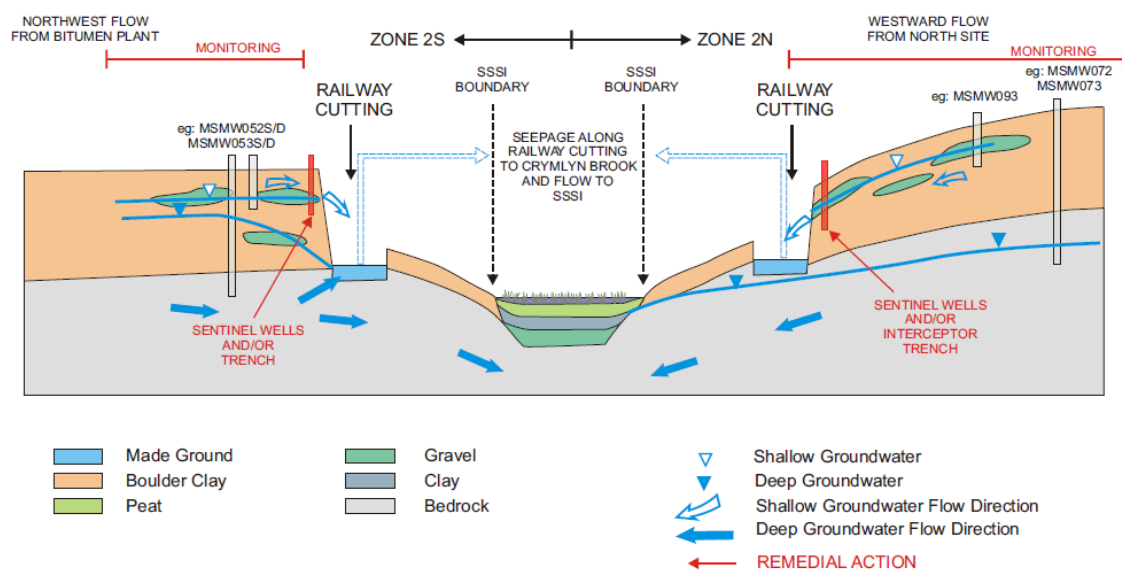


Figure Conceptual Site Model Drawing

Changes to the Scope of the RA or s

The RAP Works were outlined and agreed in principle with the Environment Agency (EA) and the Countryside Council for Wales (CCW) before plans were developed to regenerate the site at the Coed Darcy Urban Village. For this reason, Schedule 7 of the Section 106 Agreement makes provision for alternative approaches to the listed RAP Works provided agreement can be reached with the relevant Regulators.

In particular, Section 2 of Part 2 of Schedule 7 of the Section 106 Agreement sets out the following procedure for implementing a variation to the RAP Works:

- The Developer shall prepare proposals for the variation to the RAP Works that are consistent with the purpose and objectives of the RAP Works 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 variation to the RAP Works has been derived.
- 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 variation to the RAP Works.
- The Developer shall ensure that the RAP Works achieve compliance with any variation to the specification for the RAP Works approved in writing by the appropriate Environmental Authorities.
- No such proposed variation to the RAP Works shall be implemented unless it has been approved in writing by the Environmental Authorities.

In accordance with the above procedure, Atkins, on behalf of the Developer, prepared proposals to vary the RAP requirements in relation to RAP Features 1, 19 and 24. Due consideration was given by NRW, NPTCBC and the Monitor, and a joint letter was prepared confirming that all parties were satisfied that the proposed variations were appropriate. A copy of this letter is provided in **Appendix F**. The rationale for accepting the proposed variations are discussed in Section 3 of this report.

REVIEW OF THE COMPLETION OF THE RAP WORKS

The following sections discuss whether or not in the Monitor's professional opinion the requirements specified in Table 1 of Schedule 7 of the Section 106 Agreement have been satisfactorily completed in accordance with the purpose, objectives and requirements of the Section 106 Agreement.

RAP Features and Sentinel Wells

Monitoring the Sentinel Wells

As specified in Table 1 of Schedule 7 of the Section 106 Agreement (see **Table 1** in this report), RAP Features 1 and 24 require a series of sentinel wells to be monitored for the presence of free phase product to assess the potential for down-gradient product migration and installation of a product interception and recovery trench to replace the sentinel wells.

With reference to **Figure 1** in this report, RAP Features 1 and 24 comprise four lines of sentinel wells, some of which fall within Phase 43. With reference to Atkins' Sentinel Wells RAP Implementation Report (Information Source 28), historical monitoring was undertaken by URS between 1999 and 2003 on behalf of the former refinery operator and further monitoring was then undertaken by Atkins between August 2008 and September 2013. The number of installations sampled varied for each monitoring round due to ongoing remediation works during which some of the boreholes were destroyed. A summary of the observations made during Atkins' monitoring from 2008 to 2013 is presented in **Table 2** below. Reference should be made to the tables presented in **Appendix A** which provides full details of the monitoring undertaken by Atkins. A borehole location plan is also provided in **Appendix B** for ease of reference.

Table Summary of monitoring data from the Sentinel Wells Situated within Phase

Borehole ref.	Number of Monitoring Rounds	Date Last Monitored	Number of Occasions Product Observed	Range of Product Thickness (m) ⁽¹⁾	Notes
RFSW009 / SBH04	1	August 2009	No product observed	N/A	RFSW009 was replaced by SBH04. Hydrocarbon odour was noted at 3.0m when drilling. SBH04 was only monitored on one occasion. No product was observed.
MSMW053	0	N/A	N/A	N/A	No monitoring data presented in Atkins' report.
DSB023	12	October 2011	3	0.01 to 0.03	Monitoring identified small thicknesses of product on 3 out of 12 occasions, with a maximum thickness of 30mm observed in September 2010. No product was observed during the last three monitoring occasions.
DSB021	12	October 2011	5	0.01 to 0.30	Monitoring identified product on 5 out of 12 occasions, with a maximum thickness of 0.3m observed in February 2010. Product thicknesses reduced in the subsequent three monitoring rounds and no product was observed during the last four monitoring occasions.
DSB022	12	October 2011	9	0.01 to 1.08	Monitoring identified product on 9 out of 12 occasions, with a maximum thickness of 1.08m observed in February 2010. Product thicknesses were seen to reduce since March 2010, with 60mm of product observed on the last monitoring occasion in July 2011
DSB024	7	February 2012	4	0.01 to 0.04	Monitoring identified small thicknesses of product on 3 out of 12 occasions, with a maximum thickness of 40mm observed in February 2010. Product thicknesses reduced during the subsequent monitoring.

Borehole ref.	Number of Monitoring Rounds	Date Last Monitored	Number of Occasions Product Observed	Range of Product Thickness (m) ⁽¹⁾	Notes
DSB025	21	August 2013	18	0.005 to 3.54	Monitoring identified product on 18 out of 21 occasions, with a maximum thickness of 3.54m observed in March 2010. Subsequent monitoring indicated reduced product thicknesses, which then increased again in August 2012. A maximum of thickness of 5mm was observed during the last two monitoring occasions.
DSB027	21	August 2013	16	0.001 to 4.70	Monitoring identified product on 16 out of 21 occasions, with a maximum thickness of 4.7m observed in March 2010. Significant thicknesses of product continued to be observed but thicknesses were generally observed to reduce.
RFSW011	7	May 2010	No product observed	N/A	Historically product was observed by URS up to 0.0001m thick up to September 2003. Monitoring on seven occasions since did not record the presence of product.
RFSW012	8	June 2010	No product observed	N/A	Monitoring on eight occasions did not record the presence of product.
DSB030	16	August 2013	14	0.005 to 3.38	Monitoring identified product on 14 out of 16 occasions, with a maximum thickness of 3.38m observed in January 2011. Significant thicknesses of product continued to be observed but thicknesses were generally observed to reduce.
RFSW013	0	N/A	N/A	N/A	No monitoring data presented in Atkins' report.
RFSW014	23	June 2013	2	0.0001 to 0.01	Historically product was observed by URS 0.0001 to 0.04m thick up to September 2003. Monitoring since identified product on 2 out of 23 occasions, with a maximum thickness of 10mm observed in June 2010.

Borehole ref.	Number of Monitoring Rounds	Date Last Monitored	Number of Occasions Product Observed	Range of Product Thickness (m) ⁽¹⁾	Notes
RFSW015 SBH05	0	N/A	N/A	N/A	No monitoring data presented in Atkins' report. RFSW015 was replaced by SBH05. Hydrocarbon odour noted at 2.0m when drilling.
RFSW016	7	June 2013	No product observed	N/A	Monitoring on seven occasions did not record the presence of product.

otes

1. The range of product thickness indicates the minimum and maximum thicknesses recorded for each borehole.

In summary, despite there appearing to have been no monitoring since 2013, given the data presented in Atkins' RAP Implementation Report, coupled with the historical monitoring undertaken by URS, the Monitor is satisfied that sufficient monitoring appears to have been undertaken across the sentinel wells within Phase 43 to develop an understanding of whether or not the proposed product interception trenches are necessary. The need for interception trenches or further remediation is discussed further in section 3.1.2 below.

Installation of Permanent Systems to Intercept and Recover Free-Phase Product

As specified in Table 1 of the Section 106 Agreement (see **Table** in this report), RAP Features 1 and 24 require the installation of permanent product interception trenches if the sentinel well monitoring suggests a risk of down-gradient product migration occurring and in any event the installation of a product interception trench to replace the sentinel wells.

With reference to **Table** above, it can be seen that free-phase product was observed in nine of the fifteen boreholes. These were DSB023, DSB021, DSB022, DSB024, DSB025, DSB027, RFSW011, DSB030 and RFSW014. Of these boreholes, the locations where significant thicknesses of free product were regularly observed were DSB022, DSB025, DSB027 and DSB030. With reference to the notes provided in **Table** above, although product was occasionally observed in the other boreholes, no significant concerns were noted in terms of persistent thicknesses.

Regarding these four boreholes of concern, DSB022 was demolished during the remediation excavation undertaken across Phase 43, further details of which are provided in the RRWCC for Phase 43 ref. 49310747/BRRP00023/Cert 43b. Impacted soils would have been removed from this location during this remediation excavation. The area around boreholes DSB025, DSB027 and DSB030 was subject to further trial pitting from which validation samples were collected. With reference to Atkins' validation report (Information Source 27) the most relevant trial pit is DMV16 from which three validation samples were collected at varying depths. Analysis of the soil samples indicated elevated hydrocarbon concentrations, both Aromatics and Aliphatics, but no RBSL/RTC exceedances were noted. Also the maximum visual/olfactory observation was 3/3 indicating no evidence of free product at this location. Further soil samples from this area (DVP15, DVP20, DVP21, DVP56, DVP58, DVP59, DVP60 and DVP61) were analysed for chlorinated solvents but no RBSL/RTC exceedances were noted. Furthermore, again with reference to **Table** and also the borehole location plan provided in **Appendi**, it can be seen that no significant concerns were noted within the down gradient boreholes, namely RFSW011, RFSW012 and RFSW014.

Atkins' validation report (Information Source 27) also provides details of a series of draw down tests which were undertaken on eight boreholes in 2009 to determine whether or not the product observed represented discrete bodies of trapped product within the well installations or was representative of a wider source in the surrounding soils and groundwater. Atkins reports that the results indicated product rebound within five wells after 30 minutes and within seven wells after 24 hours. Within three wells product thickness was in excess of that initially recorded after 24 hours.

Atkins' validation report also reports that approximately 20 litres of free phase product was removed from the wells between February and July 2012. Following this a series of machine excavated trial pits were undertaken within the vicinity of the boreholes. This identified small volumes of free product within the soils. Atkins concluded that the thicknesses of product that had been observed within the boreholes comprised 'trapped' product within the borehole installations, rather a more widespread source of free product within the surrounding soils and groundwater. Following these investigations, a general turnover of soils was undertaken across the wider area which included the removal of heavily impacted soils where encountered.

In addition to borehole monitoring, URS also undertook a walkover inspection of the adjacent railway cutting in 2003 (Information Source 6) which identified the presence of seeps, odours, vegetative dieback and a number of bedrock outcrops. Soil samples were recovered using a hand auger and a number of water samples were collected from the seepages as well as from a drain at the base of the cutting. The report concluded that there was *"no evidence of severe contamination egress, however closer inspection and soil boring identified a few locations where contamination was present"* and that *"at the time of the visit, no significant discharge of contamination from the rail cutting was entering the stream down gradient of the Wern Andrew separator"*. The Wern Andrew separator lies at the end of the eastern end of the railway cutting to the east of the M4.

Given the above, and with reference to the RRWCC for Phase 43 ref. 49310747/BRRP00023/Cert 43b, the Monitor is satisfied that Phase 43, including the area up-gradient of the sentinel wells, has been adequately remediated to meet the specified requirements for the intended end-use. This has included the removal of oil saturated soils and free product. Therefore, Atkins considers that given the lack of a source of product within the up-gradient area, the proposed interception trenches are not required.

Due consideration has been given by the Monitor, as well as by the regulators Natural Resources Wales (NRW) and NPTCBC, and a joint letter, a copy of which is provided in **Appendix F**, has been prepared confirming that all parties are satisfied that based on the evidence presented by Atkins, the proposed interception trenches are not required.

RA Feature Restoration of Original rainage attrens

RAP Feature 19 requires North Site Reservoir to be isolated from the site drainage system, the reservoir to then be drained and the dam removed to restore the original valley landscape. However, the current masterplan for the Urban Village indicates that the reservoir shall be retained in its current form.

The original rationale for isolating the reservoir from the site drainage system was to avoid the reservoir becoming re-contaminated from potentially impacted storm water discharging into the reservoir. However, given the scope of the remediation works that have been completed across the former refinery, which has reduced the levels of contamination within soils and groundwater, there is considered to be a reduced likelihood of the site drainage system acting as a pathway for contamination migration. To substantiate this, Atkins reports that water samples are regularly collected from the water discharging into and outfalling from the reservoir. In May 2014 Atkins submitted a report to NRW indicating that total petroleum hydrocarbons (TPH) and solvent levels within the water had been below the method detection limit during the previous 12 months.

Therefore, given that there does not appear to be a significant concern regarding the quality of water entering the reservoir, it is no longer considered necessary to sever the drainage connection as per the original RAP proposals.

Again, due consideration was given by the Monitor, NRW and NPTCBC, and a joint letter, a copy of which is provided in **Appendix F**, has been prepared confirming that all parties are satisfied that based on the evidence presented by Atkins, it is not necessary to implement RAP Feature 19.

RA Feature Chlorinated hydrocarbons

RAP Feature 25 requires either the containment of hydrocarbon and chlorinated hydrocarbon product, vapour and dissolved phase; or source-reduction to render containment permanently unnecessary. It is stated that the programme of works should include design-level investigations, feasibility tests, system implementation and installation; and a groundwater, air and soil vapour monitoring programme. With reference to Table 1 of the Section 106 Agreement (see **Table** in this report), it is also noted that limited work may be required for the RAP subject to results of long term monitoring.

Atkins has modelled the risks associated with chlorinated hydrocarbons, as reported in Atkins' DiMe Controlled Waters Risk Assessment (Information Source 24). This report concluded that the impact of 1,2-dichloroethane and dichloromethane on groundwater down gradient of the DiMe area is low. Specifically, the report states:

"The ongoing risks relating to the main contaminants of concern at the DiMe site, the ones that provide the name of the site; 1,2-dichloroethane and dichloromethane, have been found through investigation and risk assessment to be low. This is primarily due to the physical and chemical behaviour of 1,2-dichloroethane and dichloromethane. These are relatively low molecular weight chlorinated hydrocarbons which were discharged by spills and leaks from the DiMe plant in large quantities. The mixture of DiMe solvents is predicted to have behaved as a DNAPL by virtue of their high specific gravity, penetrating the Cohesive Drift and discharging to the groundwater in the bedrock relatively rapidly (c.4 years). The result of these discharges impacted the quality of the groundwater in the bedrock with 1,2-dichloroethane and dichloromethane, up to the time when the plant was closed and decommissioned. The concentrations of 1,2-dichloroethane and dichloromethane subsequently dropped after the site was closed indicating that the main pathway for the DiMe solvent through the Cohesive Drift was likely to be as DNAPL. The residual sources of 1,2-dichloroethane and dichloromethane at the DiMe site distributed through the Cohesive Drift do not appear to present a significant on-going risk to controlled waters."

Given the findings of the Controlled Waters Risk Assessment, coupled with the remediation works that have been undertaken across Phase 43, as reported in Atkins' validation report (Information Source 27), the Monitor is satisfied that no further works are necessary in relation to the remediation of 1,2-dichloroethane and dichloromethane impacted groundwater.

Protection of Future Public Health and Safety

The Section 106 Agreement requires all works to be protective of future public health and safety assuming unrestricted recreational access. Given the scope of the redevelopment remediation works that have been undertaken in addition to the RAP Works, as described in the RRWCC for Phase 43 ref. 49310747/BRRP00023/Cert 43b, it is considered appropriate that unrestricted access should be allowed and no specific measures to protect health and safety, over and above standard practice, are considered necessary.

Consultation with the EA and CC

The Section 106 Agreement requires all works to be completed to the satisfaction of the EA and CCW. Both organisations now form part of Natural Resources Wales.

With reference to the joint letter prepared by NPTCBC, the Monitor and Natural Resources Wales, a copy of which is presented in **Appendix F**, all parties are satisfied that based on the evidence presented by Atkins, the proposed RAP works have either been satisfactorily completed or are no longer required.

CERTIFICATION

A summary of the requirements specified in Table 1 of Schedule 7 of the Section 106 Agreement is provided below in **Table** which aims to confirm whether or not in the Monitor's professional opinion the RAP Works have been satisfactorily completed in accordance with the purpose, objectives and requirements of Schedule 7 of the Section 106 Agreement.

Table Certification Summary

<i>Requirement</i>	<i>Status</i>	<i>Comments</i>
RAP Features 1 and 24: Sentinel wells	Complete	Refer to Section 3.1 of this report.
RAP Feature 19: Restoration of original drainage patterns	Not required	Refer to Section 3.2 of this report.
RAP Feature 25: Chlorinated hydrocarbons	Not required	Refer to Section 3.3 of this report.
All works to be protective of future public health and safety assuming unrestricted recreational access	Complete	Refer to Section 3.4 of this report.
All works to be completed to the satisfaction of the EA and CCW	Complete	Refer to Section 3.5 of this report.

In summary the Monitor is satisfied that the RAP works in relation to Phase 43, varied as described in Section 2.3 of this report, appear to have been satisfactorily completed in general accordance with the purpose, objectives and requirements of Schedule 7 of the Section 106 Agreement.

CONCLUSIONS

RECOMMENDATIONS

This RAPWCS confirms that in the Monitor's professional opinion, on the basis of the information provided within the Information Sources and observations made on site by the Monitor, the RAP Works pertaining to Phase 43 appear to have been satisfactorily completed in general accordance with the purpose, objectives and requirements of Schedule 7 of the Section 106 Agreement.

Furthermore, the Monitor is satisfied that the purpose, objectives and requirements of Schedule 7 of the Section 106 Agreement have been met and 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 covered by Phase 43.

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

***A E I A ECLARATION OF ASE
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ST. MODWEN DEVELOPMENTS LIMITED - a ST. MODWEN company

Registration England 892832

Sir Stanley Clarke House, 7 Ridgeway, Quinton Business Park, Birmingham, B32 1AF

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

25th July 2014

Our ref:

Coed Darcy Limited
Dumfries House
Dumfries Place
Cardiff
CF10 3ZF

Dear Sirs

Coed Darcy
Phase 43 - DiMe
Request for Phase Works Completion Date

We hereby give our written request seeking the declaration of the Phase Works Completion Date for Phase 43 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 43 boundary is shown on the attached Drawing No. 5041216-DIME-DWG-1666.

The "Intended Use" for Phase 43 is presumed as that of Public Open Space comprising playing fields.

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

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