

PORTWAY

REMEDIATION VALIDATION REPORT

FOR WORKS UNDERTAKEN AT
FORMER CONTRACT CHEMICALS, PENRHYN ROAD,
KNOWSLEY, L34 9HY.

CLIENT: GRAFTON GATE INVESTMENTS

Date: 12/05/2026

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1.0 EXECUTIVE SUMMARY

Portway prepared a report to delineate the contaminants of concern within the site based on 10m and 20m grids of testing. This subsequently enabled the development of the Method Statement (MS) setting out the methodology for treating the impacted material. Following the treatment a validation report was produced for submission to the client/regulatory authorities with supporting documentation. The Remediation Validation Report has been produced for submission to the Environment Agency and Local Planning Authority to support the discharge of relevant planning conditions.

Portway Plant Ltd (Portway) was appointed by GMI Construction Group PLC to undertake remediation and enabling works at the Former Contract Chemicals site, Penrhyn Road, Knowsley (L34 9HY), in accordance with the Remediation Strategy and Verification Plan (RSVP) prepared by G&J Consulting (Ref: GJ224-03-R003-RSVP-V1).

All works were undertaken in line with the approved remediation strategy and agreed with the Client and relevant stakeholders. The objective of the works was to remediate soil and groundwater contamination associated with historical chemical site operations, principally relating to 1,2-dichlorobenzene, and to enable the safe redevelopment of the site for commercial end use.

A targeted programme of site investigation, trial pitting (10m and 20m grids), was undertaken to identify, delineate and treat areas of contamination. Identified hotspot areas were excavated and impacted soils were treated within controlled biopile systems to achieve site-specific remedial target values (RTVs). Treated materials were subsequently validated for reuse on site in accordance with the remediation strategy.

A total of 3,691 m³ of impacted soils was excavated and treated. Validation testing confirms that all treated materials meet the required site-specific criteria for reuse.

Groundwater monitoring undertaken before, during and following remediation demonstrates a significant and sustained reduction in contaminant concentrations. At the principal hotspot (GJR03), concentrations of 1,2-dichlorobenzene reduced from a maximum of 93,500 µg/l prior to remediation to below laboratory detection limits (<3 µg/l) following completion of the works, representing a substantial improvement in groundwater quality.

Monitoring of perched water within excavation grid cells/voids and surrounding boreholes indicates no evidence of plume expansion or new contamination sources. The data demonstrates that the remediation has successfully reduced contaminant mass within the soil, resulting in a corresponding improvement in groundwater conditions.

The works have been completed in accordance with the agreed remediation strategy and have successfully achieved the objective of showing betterment to controlled waters and reducing the risks to human health, while facilitating the proposed commercial redevelopment of the site. This report has been prepared to support the discharge of planning conditions and to demonstrate compliance with the approved remediation strategy.

Summary Principal Objectives

Listed below is a brief outline of works undertaken:

- Decommissioning of non-retained boreholes.
- Excavation of known hotspots.
- Removal of any free phase solvents where discovered.
- Dewater excavations as necessary under discharge consent.
- Ex-situ Bioremediation of solvent impacted soils.
- Reuse of appropriate soils after treatment.
- Validation testing during remediation works.
- Groundwater monitoring.

This document should be read in conjunction with the following reports:

- GJ224-DTS-V1
- GJ224-SI-INT-V1_Phase-II_SI
- GJ224-03-R003-RSVP-V1
- GJ224-03-R002-DQRA-V1
- GJ224-06-R001-PRA-V1 piling risk assessment
- PTW 25025-007
- PTW210 CR1 contract chemicals Condition Report

2.0 INTRODUCTION

2.1 Appointment

Portway was appointed by GMI Construction Group PLC to undertake the remediation as outlined within the remediation strategy (RSVP) produced by G&J Consulting.

This document (verification report) has been produced for submission to the Environment Agency and Local Planning Authority as a supporting document to discharge planning conditions.

2.2 Roles and Responsibilities

The project team responsible for the delivery of the remedial works is defined in summary below.

Summary of Roles

Team Member	Role
Graftongate Investments Ltd	Client
GMI Construction Group PLC	Principal Contractor
Portway Plant Ltd	Remediation Contractor
G&J	Client's Consultant

3.0 SITE SETTINGS

3.1 Site Details

Site Address	Former Contract Chemicals, Penrhyn Road, Knowsley. L34 9HY
National Grid Reference	SJ 43032 96683

3.2 Site Description

Overview

The site is surrounded by steel fencing with 2 entrances off Penrhyn Road. The site comprises of approximately 3.5 ha and can be separated into defined areas, all of which were formerly part of the former Contract Chemicals site. The site has the East Lancashire Road to the north and further industrial estates. The whole site is surrounded by mostly industrial properties and some domestic dwellings with major roads leading to open countryside (farmland).

Historically, the entire site was operated by the chemical works, which contained several derelict buildings and a large stockpile of chemical wastes and active chemical processing.

The site was decommissioned with all chemical waste materials being removed from the site for disposal at a permitted facility. The chemical processing plant was formally decommissioned and cleaned prior to being dismantled. The buildings were then demolished with relic wastes being removed, metals were recovered for recycling, and hard surfaced materials were crushed on site to form 6F2 resulting in a stockpile of circa 10,000m³.

Following the demolition process and removal of waste the Environment Agency Permit was surrendered and the COMAH status was also removed as the chemical operations had ceased. A formal document was submitted in order to facilitate the Permit surrender and can be found within appendix D.

This site has been subject to a number of soil and groundwater investigations which revealed that the contaminant of concern was 1,2-Dichlorobenzene. This is the solvent which is subject to remediation to improve soil and groundwater conditions and demonstrate betterment.

The final redevelopment scheme comprises the construction of a new logistics centre, representing a commercial / industrial end use.

A Site Location Plan (Drawing REF PTW25025-001) and a Site Proposed Development Plan (REF PTW25025-002) are presented in appendix A.

Historical Site Setting

The site was largely undeveloped agricultural land/rough ground, until around 1985 when it was first recorded that the development of the current site had commenced. Knowsley Brook was shown to run east to west across the site but was culverted when the site was developed. Since then, the site has seen some development between 1988 and 2003, the most significant being the construction of a building (the Bonner building) in 1997. A survey and plan of the current culvert can be found in appendix A.

The site's history and the wide variety of chemical processes used during its operation resulted in potential contamination sources. The most prominent of these were the main processing areas such as the Surfactant Hall, Bonner building, Diol Plant, Technical Development Centre (TDC) and adjacent tank farms.

An as built drawing was provided by the demolition contractor for reference and is presented in appendix A. (REF PTW25025-003)

Previous Ground Remediation

Ground remediation has been conducted historically following limited documented spillages of chemicals, below is an extract confirming the site works and volumes of material handled in each area.

Spillage Investigations

Entec UK Ltd undertook a site investigation in 2010 in response to an overspill from a trade effluent outflow within the Contract Chemicals site too the distribution warehouse to the west. The scope of the works comprised five hand dug pits excavated to a maximum depth of 0.8mbgl. Four of the pits were dug in areas directly impacted by the spill and one outside used as a 'control' sample. Two samples were taken from each pit and tested for a chemical suite comprising SVOCs, VOCs, alcohols, pH, metals, TPH-CWG and water-soluble sulphate.

The results of the investigation found that there was slightly elevated organic contamination in samples from the spill area, however none of these exceeded Generic Assessment Criteria (GACs) for a commercial land use.

AMEC were commissioned by Contract Chemicals in 2012 to undertake a site investigation after a spillage of 1-bromododecane from an IBC. The spill occurred on the western boundary of the Contract Chemicals site and was observed to have flowed into the adjacent distribution warehouse.

The scope of the works comprised four dynamic boreholes advanced to a maximum depth of 2.3mbgl and six hand dug pits excavated to a maximum depth of 0.7mbgl. Two of the boreholes were installed with gas/groundwater monitoring equipment.

A total of 16 samples were taken during the investigation and were subsequently tested for SVOCs. The samples obtained during the 2012 investigation were compared to adjacent samples from the 2010 investigation, particularly for bromododecane concentrations. The 2012 results identified significantly greater concentrations of bromododecane in shallow soils suggesting the contamination was directly linked to the 2012 spill rather than the 2010 trade effluent outflow spillage. Data collected from subsequent groundwater monitoring indicated that the impact on groundwater quality was limited.

3.3 Geology and Hydrogeology

The site is underlain by Devensian Till in the north and the Shirdley Hill Sand Formation in the south, and then a bedrock consisting of the sandstone of the Chester Formation. A surficial layer of Made Ground is located in areas due to the past uses and development of the site.

The Shirdley Hill Sand Formation is classed as Secondary (A) Aquifer by the Environment Agency (EA), and the Devensian Till deposits as a Secondary (undifferentiated) Aquifer. The underlying Chester Formation is classed as Principal Aquifer. The site is within Zone 3 (total catchment) of a Groundwater Source Protection Zone.

3.4 Hydrology

The nearest watercourse is Knowsley Brook. Historical maps show this running east to west across the site; however, it now flows in a culvert, which plans show to run beneath the western margin of the site.

Evidence suggests it flows beneath the northern and western edges of the site; the culvert location can be seen within the Appendix A (REF PTW25025-004).

3.5 Unexploded Ordnance (UXO)

An explosive threat assessment for this site has not been undertaken – considered to be low to medium risk as the former Knowsley ordnance factory was 3.6km northeast of the site.

4.0 CONTAMINATION STATUS AND FINDINGS OF SITE INVESTIGATIONS

4.1 Contamination Summary

4.1.1 Soil

G&J conducted a number of site investigations and from this the contaminants of concern have been identified within the site. Contamination within the soil was predominantly in the form of organic compounds, most notably 1,2- dichlorobenzene, and to a lesser extent other BTEX compounds.

The highest concentrations were recorded in Made Ground from BH105 (1,2- dichlorobenzene, 512mg/kg) and BH104 (1,2- dichlorobenzene, 41mg/kg) located in the eastern and western parts of the central process area (see exploratory hole plan in Appendix A REF PTW 25025-005).

Lower concentrations of 1,2-dichlorobenzene and other organic compounds were common in locations across the mid to northern half of the site.

4.1.2 Groundwater

Groundwater contamination has been identified within both the shallow deposits and the deeper groundwater associated with the Chester Formation. The most significant impacts are associated with 1,2- dichlorobenzene, which was recorded at its highest concentration in deep groundwater at location GJR03, situated near the centre of the site, where a concentration of up to 62,490 µg/l was reported.

This location also exhibited elevated concentrations of other organic compounds. Away from GJR03 concentrations within the deeper groundwater reduce significantly, with many locations recording much lower levels or non-detectable concentrations.

In contrast, shallow groundwater contamination is more widespread across the site, albeit generally at lower concentrations. Other contaminants, including chlorobenzene, cyanide and bromide, have been identified; however, these are typically localised or present at comparatively low concentrations, with chlorobenzene notably elevated at GJR04 and cyanide and bromide occurring as discrete hotspots.

Overall, the distribution of contamination indicates a principal source area in the central part of the site, with concentrations decreasing with distance, reflecting the effects of dilution, dispersion and natural attenuation.

4.2 Asbestos in Made Ground

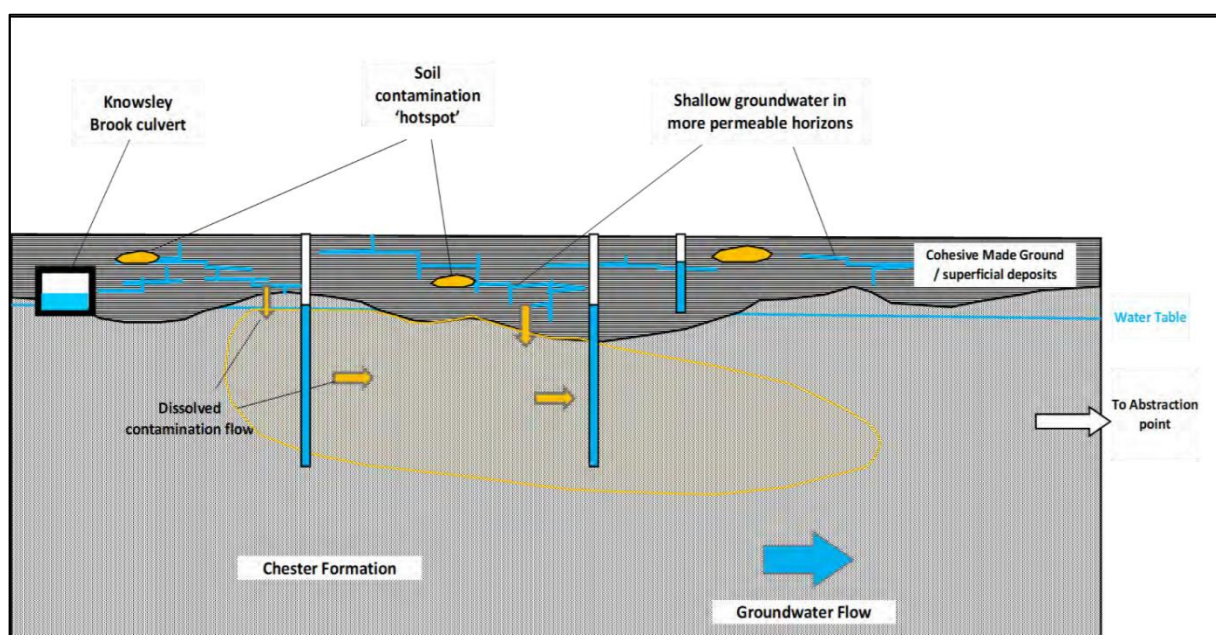
Asbestos was recorded in only one sample (WS103) that was conducted by G&J out of 33 that were tested. Whilst the remedial works were undertaken, a duty of care was implemented under the Control of Asbestos Regulations 2012 (CAR 2012). Further information can be found in section 6.3 of this document.

4.3 Hotspots in the Made Ground

Portway undertook an extensive trial pitting exercise on 10m and 20m grids following the RMS (Remediation Method Statement) section 6.3 produced by G&J (REF GJ224-03-R003-RSVP-V1). This allowed Portway to create a robust remediation plan, showing areas which were subject to ex-situ excavation. This process assists in demonstrating betterment by treating the source.

A plan can be found within Appendix A located under REF PTW25025-006

4.4 Conceptual model



4.5 General Aims and Objectives

The main aims of the remediation methodology are as follows:

- To comply with the requirements of the Local Planning Authority and Environmental Health Department to ensure future users of the site are not put at risk from any chemical contamination arising from its former use(s) or nature of materials present.
- To maximise the reuse of soils on-site and minimise off-site disposal.
- To ensure that the site does not present a significant risk to controlled waters.

5.0 REMEDIAL METHOD STATEMENT

The description of the works below shows the order of the detailed works undertaken on site in line with Portway's Risk & Method Statement. Mobilisation to site commenced on 5th January 2026 with the enabling and intrusive remedial works following directly afterwards. The remedial work was completed on 31st March 2026. The next phase of the earthworks is to be completed by others in accordance with the foundation design.

5.1 Remedial Targets

Below are the targets set out by G&J that were derived within the Design Quantitative Risk Assessment (DQRA). The document also states that the only contaminant of concern identified in the soil is 1,2-dichlorobenzene. The Remediation Strategy and Verification Plan (GJ224-03-R003-RSVP-V1) based on the DQRA did not determine any site-specific remedial target concentrations for groundwater, however stated that as a minimum, there is to be no observed increase in concentrations or expansion of the plume(s), but with an overall aim for betterment. Below is a table denoting the contaminants of concern and target levels for the soil to assist in protecting both human health and controlled waters.

5.1.1 Table 1 - Remedial Targets as produced by G and J consultants.

Substance	Human Health Targets - Commercial GAC (mg/kg)	Controlled Waters Targets (mg/kg)	
		Remedial Target Derived Using Consim	Maximum Recorded Concentration*
1,2-dichlorobenzene	2000	41	-
chlorobenzene	56	-	0.1
1,2,4-trimethylbenzene	42	-	5.7
1,3,5-trimethylbenzene	-	-	1.3
n-propylbenzene	4100	-	0.6
Toluene	56000	-	0.11
Ethylbenzene	5700	-	0.25
p-&m-xylene	5900	-	0.49
o-xylene	6600	-	0.30
Bromoform	760	-	0.9

5.2 Commencement and Site Establishment

- Set up site welfare.
- Establish haul routes and traffic management.
- Protection of the boreholes for monitoring and decommissioning of redundant boreholes.
- The site was surveyed and grid references were assigned in 20m x 20m and 10m x 10m increments as denoted in drawing REF PTW25025-007; (Appendix A).
- Set up the Quarantine/Treatment zone, with an impermeable barrier, protection layer and containment system to prevent cross contamination in line with EA permit.
- Monitoring points for emissions (REF PTW25025-011)

5.3 Set up Water Treatment System & Discharge of Waters

- Discharge of Waters Permit granted. (Copy in appendix D)
- Mobilise and install a water treatment system
- Discharge of perched water from excavations

5.4 Remediation of Contamination Associated with the historic chemical works

- Excavation and treatment of impacted soils within Cell 1, 2, 3 and 4.
 - A plan can be found in Appendix A (REF PTW25025-008)
- Excavation of previously identified hotspots by G&J and Portway's trial pit log.
- Dewater excavations, effluent will pass through a treatment system to the foul sewer under a permit to discharge.
- Validation of WS103 suspected Asbestos Containing Material (ACM).
- Monitoring of the retained boreholes.
- Treatment of impacted soils using bioremediation.
- Testing and Validation on treated soils for reuse onsite.

6.0 DETAILS OF ENABLING & REMEDIAL WORKS

6.1 Commencement on Site

On receiving an official order from the client GMI, Portway began to mobilise plant and equipment to the site to begin site set up on the 5th January 2026.

Once the site was formalised, any boreholes to be retained were surveyed. Concrete rings were placed over the boreholes to secure the integrity of the monitoring point. (Namely GJR01, GJR02, GJR03, GJR04, GJR05 and GJR06) Of the boreholes to be retained for post monitoring purposes, borehole GJR06 has been identified as dry since Portway has commenced monitoring at the end of 2025.

Any boreholes which were not to be retained for post remediation monitoring were decommissioned in line with EA guidance, with the exception of BH103 and GJ203 which were located near to GJR03. These 2 monitoring points were maintained, sampled and tested on a regular basis.

6.2 Trial Pitting on a Grid Formation

A programme of trial pitting was undertaken across the site to support the delineation of contamination and to verify the presence and extent of identified hotspots from the initial site investigation. Trial pits were completed on a 20m × 20m grid across the north and south sections of the site, with a refined 10m × 10m grid implemented within the central band to provide a higher resolution of data where contamination was considered most likely to be present (REF PTW25025-007).

The trial pits enabled visual and olfactory assessment of soils, alongside targeted sampling to confirm ground conditions and contaminant distribution. These works were instrumental in refining the remediation strategy and accurately defining excavation extents within each cell. A photo ionisation detector (PID) was also utilised during the trial pitting works to provide real-time screening of volatile organic compounds and further inform on-site assessment of the contamination. These works were key in refining the delineation of the contamination plume.

6.3 ACM Hotspot

The area within the vicinity of WS103 was recorded as finding fibre bundles within soil in one sample, however no quantification testing was conducted by G&J on 16/11/2021, this was one of the areas to be addressed in Grid Ref D1.

A temporary quarantine area was then set up to enable the excavation of the potential ACM hotspot in the area of WS103. The hotspot was excavated with water suppression in place as per Control of Asbestos Regulations (CAR 2012).

Background air monitoring was in place whilst all excavation works were undertaken. No visible fragments were observed and soil samples taken. The results showed a non-detect for asbestos fibres (Soils results can be found in appendix C and results of the air monitoring can be found in appendix A - REF PTW25025-010).

Further asbestos samples were obtained during the remediation works as an additional precaution to assist in proving that widespread asbestos contamination is not present within the site. These supporting results can be found within the appendix C along with a photograph record and description. All results reported below the level of detection.

6.4 De-Watering Excavations

A water treatment system was established on mobilisation to site. Perched water that had accumulated within the excavations was pumped out and transported via pipework to the treatment system. The water passed through a silt trap, carbon filter for treatment and a water meter to record discharge volumes prior to entering the foul sewer. Testing was undertaken to ensure compliance with statutory requirements ahead of discharge, with a copy of the discharge consent provided in Appendix D. In total, 1,369 m³ of water was treated and discharged during the works.

More information regarding the dewatering, permitted discharge of water and monitoring of the groundwater can be found in section 6.8.

6.5 Removal of areas of concern (Excavation of identified contamination).

The excavation areas were defined as the following cells:

- **Cell 1:** Grids I5.2, I5.1, H5.2–H6.2 and H6.2
- **Cell 2:** Grids F7.2, F7.1, E6.2, E5.2, E5.1 and E4.1
- **Cell 3:** Grids D3.2, D3.1, C3.2 and C4.2
- **Cell 4:** Grids B5.2, C5.1, C5.2, C6.1, C6.2 and C7.2

A drawing highlighting these areas can be located in Appendix A (REF PTW25025-008)

Excavated materials were removed from the areas identified within G&J's Remediation Strategy and Verification Plan (RSVP) and delineated during Portway's trial pitting exercise. In addition to removing soils exceeding the site-specific RTV (Remediation Target Values) within the cells further excavations were undertaken to extend into secondary grids to chase out impacted soils.

The contaminated materials were transported to the designated treatment area, where they were placed in biopiles to initiate the bioremediation process. The material was turned and seeded with suitable bacteria to accelerate the degradation of contaminants. Progress monitoring was carried out on the biopiles throughout the treatment phase to track contaminant reduction. Upon each biopile reaching the site derived RTV's, a final validation test suite comprising five representative samples per biopile was conducted to confirm that treated materials met the site-specific targets.

During excavation works, photographic records were maintained to document the removal process, and operatives were equipped with PID (Photo ionisation Detector) meters to ensure that material was only placed into the treatment area once confirmed to be within the required contamination parameters, maintaining segregation from clean soils and preventing cross-contamination.

During the removal of the targeted material, photographic evidence was taken and can be located within Appendix B.

6.6 Cell-Specific Observations and Verification

Cell One

Cell 1, comprising four 10 m × 10 m grids (I5.2, I5.1, H5.2–H6.2 and H6.2), was excavated to a depth of approximately 2.5 m below existing ground level (Begl) to remove identified areas of contamination. The works generated both contaminated and non-impacted materials, which were segregated in accordance with the Remediation Method Statement. Impacted soils requiring treatment were placed into biopile 1.0 for controlled bioremediation and totalled 399m³, while suitable non-impacted materials were stockpiled separately as overburden Piles 1, 2, and 3 (circa 500m³) ready to back fill the void post validation. This controlled approach ensured effective material tracking, appropriate treatment of contaminated soils, and compliance with the site-specific remediation strategy. Following the excavation process this void was backfilled with suitable materials, because of this no water accumulated within the void hence no samples could be obtained for water testing.

Cell Two

Cell 2, comprising grids F7.2, F7.1, E6.2, E5.2, E5.1 and E4.1, was excavated to an average depth of 2.7 m Begl to address the identified contamination. Grids F6.1 and F6.2 were extended to chase out visually impacted soils. Excavated materials were segregated based on contamination status, with impacted soils directed to bio piles 2.1 (671m³) and 2.2 (622m³) for treatment and suitable materials stockpiled for re-use where appropriate. In total a volume of 1293m³ was treated from cell 2 and validated. Following the excavation process this void was dished to make it safe and water accumulated within the void. After receiving confirmation that the sidewalls and base of the excavation had passed the validation criteria, the area was returned to the client to allow further development works to continue.

Borehole GJR03

The hotspot associated with Borehole GJR03 was located within Cell 2 and identified as a localised area of contamination. This hotspot was originally highlighted within the G&J Environmental Detailed Quantitative Risk Assessment (DQRA) and was subsequently verified by Portway during the trial pit investigation, specifically within Trial Pits F7.1 and F7.2 in the vicinity of GJR03.

The contamination was characterised by elevated concentrations of 1,2-dichlorobenzene with a yellow pigment and pungent odour when sampling the groundwater, which presented a potential risk to controlled waters and therefore represented a key driver for remedial action in accordance with the Remediation Strategy and Verification Plan (RSVP). In line with the RSVP, targeted excavation and soil treatment was undertaken to remove the identified source material and break the pollutant linkage, with excavation in Cell 2 extending to an average depth of 2.7mbgl and groundwater interface. Prior to the removal of borehole GJR03, this monitoring well was decommissioned by filling with bentonite clay pellets. It was necessary to remove this borehole as it was located within a contaminated hotspot.

A secondary monitoring location, GJW201, situated adjacent to GJR03, is currently being utilized to monitor the groundwater regime within the area post-remediation.

Cell Three

Cell 3, comprising grids D3.2, D3.1, C3.2 and C4.2, was excavated to a depth of an average of 2.7 m below ground level to remove identified contamination. Excavated materials were segregated in accordance with the RSVP, with impacted soils directed to bio piles 3.1 (321m³) and 3.2 (292m³).

During validation, two exceedances were identified on the excavation faces, indicating the presence of residual contamination beyond the initial grid limits. As a result of the exceedances the excavation

was extended laterally into D4.1 and D4.2, forming an additional area referred to as Cell 3.1, to ensure complete removal of impacted soils. The additional excavated material generated from this extension was segregated and placed into a newly formed Bio Pile 3.3 (145m³) for further treatment. This approach ensured effective management of materials and compliance with the site-specific remediation criteria. Following the confirmation that the sidewalls and base of the void had been validated, the area was dished to make it safe, ready to be backfilled by others.

Cell Four

Cell 4, comprising grids B5.2, C5.1, C5.2, C6.1, C6.2 and C7.2, was excavated to an average depth of 2.6 m below ground level to address areas of concern identified during the site investigation and trial pitting phase.

Within cell 4, BH104 was identified as an area of concern during the site investigation conducted by G&J and was subsequently targeted during remediation. The borehole was decommissioned before excavation, the impacted soils surrounding the borehole were delineated during the trial pit phase and were successfully excavated and removed as part of the remediation works. Excavated materials were segregated in accordance with the RSVP, with impacted soils directed to bio piles 4.1 (377m³), 4.2 (368m³) and 4.3 (496m³).

During this stage of the remediation, on the 4th March 2026 the local Environmental Health Officer (EHO) attended the site. The purpose of the visit was to provide the EHO with an overview of the remedial works and see the remediation methodology being implemented appropriately and in accordance with relevant guidance and regulatory expectations. The visit also allowed for the opportunity for any feedback or recommendations to be incorporated into the ongoing site activities.

Borehole BH105

BH105 was identified within the RSVP as a potential hotspot, with chemical tests showing 512mg/kg for 1,2 dichlorobenzene. Portway investigated through a targeted trial trench excavation between BH105 and WS110 to locate and delineate the presumed contamination. The location of the trial pit between the borehole and the window sample demonstrated there was no migration of contamination as no RTV exceedances were noted in WS110.

A PID meter was in use during the excavation of the trial pit which did not highlight any major contamination within the area, further chemical testing took place throughout the trial pit with all results returned no exceedances above the site -specific RTVs during excavation, and the surrounding soils were observed to be clean and consistent.

Furthermore, trial pit data did not support the presence of contamination in this location. Based on these findings, it is considered that the original hotspot associated with BH105 was likely the result of a spurious or anomalous laboratory result, rather than representing a genuine source.

The results for this can be found within appendix C, under BH105. With photos found within appendix B.

6.7 Treatment of material

Bioremediation was implemented as the primary remediation technique for the treatment of impacted soils generated during the excavation works. This involved the material being turned to enhance the overall effectiveness of the bioremediation process. Excavated materials were placed into designated bio piles, where they were regularly turned to increase oxygen availability and promote degradation of contaminants.

The introduction of oxygen through mechanical turning was the key driver in reducing contaminant concentrations. Bioremediation measures, including the addition of bacteria, the optimisation of moisture content, pH and microbial activity, were applied to enhance the breakdown of residual contaminants.

The biopiles were actively managed throughout the treatment period, with periodic monitoring and chemical testing undertaken to assess progress. Final validation sampling confirmed that contaminant concentrations were reduced to within the site-specific RTV's, enabling the treated materials to be safely re-used on site in accordance with the remediation strategy.

The location plans of the biopiles can be found in appendix A REF PTW25025-009, while all test results for the biopiles including chemical and asbestos can be found within appendix C.

Below are tables showing the validation results for 1,2 Dichlorobenzene (mg/kg) in the biopiles after treatment:

6.7.1 Table 2 – Bio Pile Validation Results

Bio Pile 1.0				
Bio Pile 1.1	Bio Pile 1.2	Bio Pile 1.3	Bio Pile 1.4	Bio Pile 1.5
4.8mg/kg	9.1mg/kg	14mg/kg	7.6mg/kg	2.4mg/kg

Bio Pile 2.1				
Bio Pile 2.1.1	Bio Pile 2.1.2	Bio Pile 2.1.3	Bio Pile 2.1.4	Bio Pile 2.1.5
20mg/kg	34mg/kg	27mg/kg	15mg/kg	37mg/kg

Bio Pile 2.2				
Bio Pile 2.2.1	Bio Pile 2.2.2	Bio Pile 2.2.3	Bio Pile 2.2.4	Bio Pile 2.2.5
21mg/kg	2mg/kg	2.6mg/kg	0.4mg/kg	26mg/kg

Bio Pile 3.1				
Bio Pile 3.1.1	Bio Pile 3.1.2	Bio Pile 3.1.3	Bio Pile 3.1.4	Bio Pile 3.1.5
33mg/kg	38mg/kg	16mg/kg	31mg/kg	32mg/kg

Bio Pile 3.2				
Bio Pile 3.2.1	Bio Pile 3.2.2	Bio Pile 3.2.3	Bio Pile 3.2.4	Bio Pile 3.2.5
22mg/kg	20mg/kg	33mg/kg	20mg/kg	17mg/kg

Bio Pile 4.1				
Bio Pile 4.1.1	Bio Pile 4.1.2	Bio Pile 4.1.3	Bio Pile 4.1.4	Bio Pile 4.1.5
0.77mg/kg	0.38mg/kg	0.53mg/kg	0.66mg/kg	0.24mg/kg

Bio Pile 4.2				
Bio Pile 4.2.1	Bio Pile 4.2.2	Bio Pile 4.2.3	Bio Pile 4.2.4	Bio Pile 4.2.5
2.7mg/kg	3.5mg/kg	21mg/kg	6.2mg/kg	39mg/kg

Bio Pile 4.3				
Bio Pile 4.3.1	Bio Pile 4.3.2	Bio Pile 4.3.3	Bio Pile 4.3.4	Bio Pile 4.3.5
19mg/kg	33mg/kg	33mg/kg	23mg/kg	36mg/kg

6.8 Water Monitoring

Groundwater monitoring for 1,2 Dichlorobenzene was undertaken prior to works commencing with sampling commencing on 31/07/25 and throughout the duration of the remediation works. This was to assess any potential impact to controlled waters and to track changes in groundwater quality over time. Samples have been obtained every 2 weeks to increase the dataset above the required monthly sampling stated within the RSVP.

Borehole GJR03 and BH103 was removed during the remediation process due to the presence of impacted ground in the surrounding soils grid square references F7.1 and F7.2 as part of the soil remediation in cell 2. In its place, monitoring was continued at GJW201, being the closest available borehole to GJR03. The programme of bi-weekly monitoring commenced on 05/02/2026 showing clear betterment, with concentration reduced to trace levels.

The voids of cells 2,3 and 4 were not backfilled in accordance with the client's request, this allowed perched water to naturally accumulate within the empty voids. These bodies of water were also subjected to sampling and testing. The results produced also showed betterment within the locally accumulated water within the cells and across the site within the monitoring wells, with only trace results being found. (results can be found within appendix C).

The water within these voids was discharged to foul in accordance with the discharge permit issued by the Statutory Water Undertaker to the prescribed conditions. Upon completion of the dewatering exercise the pump/treatment equipment was demobilised, and the discharge permit was surrendered.

The results of the monitoring indicate a progressive improvement in groundwater quality, with contaminant concentrations reducing to trace levels across the site-wide groundwater regime. These findings demonstrate that the remediation works have been effective in mitigating risks to controlled waters and that no ongoing significant contamination source remains.

6.8.1 Table 3 – Perched water results for cells

COC	Cell 1	Cell 2	Cell 3	Cell 4
1,2 dichlorobenzene ug/l	Backfilled	1,550ug/l	3,940ug/l	1,940ug/l
*Cell one was backfilled with site generated material 6F2				

6.8.2 Table 4 - Borehole monitoring period from start of remediation to date:

COC - 1,2 Dichlorobenzene Results							
Location	GJR01	GJR02	GJR03	GJR04	GJR05	GJW201	BH103
17/12/2025	<3ug/l	<3ug/l	93,500ug/l	<3ug/l	<3ug/l	108ug/l	5,920ug/l
07/01/2026	<3ug/l	<3ug/l	21,300ug/l	132ug/l	23.8ug/l	88.5ug/l	5,870ug/l
22/01/2026	<3ug/l	<3ug/l	27,800ug/l	5.5ug/l	<3ug/l	61.3ug/l	1,020ug/l
05/02/2026	<3ug/l	<3ug/l	BH removed	<3ug/l	<3ug/l	13.6ug/l	BH removed
19/02/2026	<3ug/l	<3ug/l	BH removed	<3ug/l	<3ug/l	<3ug/l *	BH removed
05/03/2026	<3ug/l	<3ug/l	BH removed	<3ug/l	<3ug/l	<3ug/l	BH removed
*GJW201 was sampled on 20/02/2026 (not 19/02/2026) with Cell Waters ref26-008862-1							
**GJR03 and BH103 were removed inline with remediation strategy in order to fully remove impacted soils							

In addition to ongoing water monitoring within the site, water samples were obtained from the Knowsley Brook both upstream and downstream of the site on 25/03/2026 after the completion of the remediation works. These results show that the solvent contamination detected within the site is not present within the Knowsley Brook, as this water course passes through the site via a deep culvert. The results and a sample location plan can be found within appendix C.

Add table Knowsley Brook water results

COC - 1,2 Dichlorobenzene Results Knowsley Brook		
Location	Upstream	Downstream
25/03/2025	<3ug/l	<3ug/l

Following the remediation of the site, historic boreholes were located and grouted with bentonite clay pellets to ensure that potential pathways were sealed to further protect the groundwater within the site. A photographic record of this can be found within appendix B, an image of the borehole water sampling can be found as this shows the clean water encountered in borehole GJR01.

6.9 Photographic Record of Works

A complete photographic record of the enabling, remedial works and testing of the site can be found in Appendix B.

7.0 RECORDS OF TESTING

7.1 Chemical Testing

Chemical testing was undertaken across the excavation areas to verify the effectiveness of the remediation works. Validation samples were collected from the base and exposed faces of each excavation on a nominal 10 m grid, ensuring an appropriate number of samples were obtained.

In addition, excavated materials placed within biopiles were subject to periodic chemical testing throughout the treatment process to monitor contaminant degradation. Upon completion of treatment, a final suite of five validation samples were collected from each biopile to confirm compliance with the site-specific RTV's, as per the RSVP.

A copy of a chain of custody form and full test results can be found in appendix C. Stockpile and location plans together with reference details of the location of the biopiles and excavated cells validation sample locations can be found within appendix A.

All testing and validation were undertaken by a UKAS/MCERT accredited laboratory i2.

8.0 CONCLUSION

The remediation works undertaken at the Former Contract Chemicals site have been completed in accordance with the approved Remediation Strategy and Verification Plan, successfully achieving the primary objective of mitigating risks to human health and controlled waters while enabling the proposed commercial end use.

A targeted programme of excavation, ex-situ bioremediation, and validation testing has effectively addressed the identified sources of contamination, particularly those associated with 1,2-dichlorobenzene within the site. The removal of localised hotspot areas and the treatment of impacted soils totalling 3,691m³ have resulted in a clear and demonstrable improvement in overall ground conditions, with validation confirming compliance with the site-specific remedial target values.

Crucially, the improvement in soil conditions has led to a significant positive response within the groundwater regime. Groundwater monitoring undertaken to date indicates a clear trend of betterment, with contaminant concentrations declining to minimal levels across the site. Observations during excavation, including the absence of notable groundwater ingress in previously impacted areas such as GJR03, further support the conclusion that contamination was localised and has been effectively

remediated.

Monitoring of perched water within excavation voids has also demonstrated improved water quality, reinforcing the link between the remediation of soils and the recovery of groundwater conditions across the site.

The post-remediation groundwater monitoring programme remains ongoing to verify the long-term stability of the site and confirm that the observed improvements are sustained. However, the data obtained to date provides strong evidence that the remediation has been effective, with no indication of plume expansion, rebound or any remaining significant contaminant sources.

Overall, the remediation works have resulted in a marked improvement in both soil and groundwater conditions across the site. The findings presented within this report, alongside the ongoing groundwater monitoring programme, indicate that the remediation strategy has been effective in addressing the identified contaminant linkages and reducing potential risks to controlled waters.

The remediation works have successfully achieved compliance with the agreed remediation criteria, with betterment being achieved within the groundwater.

It is recommended that long-term groundwater monitoring be reduced, with a final round of testing to be conducted in June 2026

9.0 APPENDIX

Appendix A

Site Location Plans

Appendix B

Photographic Evidence

Appendix C

Chemical Results

Appendix D

Permits, Licenses

Appendix E

Phase 1 validation report and trial pitting plates