



**BROWNFIELD
SOLUTIONS LTD**

GEO-ENVIRONMENTAL ENGINEERING EXCELLENCE

ANWYL HOMES

Gwernaffield Road, Mold

H1 Risk Assessment Report

JJL/C5984/15880

August 2026

PROJECT QUALITY CONTROL DATA SHEET

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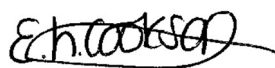
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DRAWINGS

Drawing Number	Rev	Title
NRW-DISHCARGE-LAN-MOLD	P01	Discharge Layout Plan
C5984/02	-	Site Location Plan
C5984/12	-	Approximate Site Catchment Area
C5984/13	-	67009 – Alyn at Rhydymwyn Catchment Area
C5984/14	-	67008 – Alyn at Pont-y-Capel Catchment Area
C5984/15	-	Approximation of Mine Discharges Tunnels Plan
C5984/16	-	Water Sample Location Plan

APPENDICES

Appendix	Title
Appendix A	H1 Risk Assessment Screening Test Methodology
Appendix B	Laboratory Testing Certificates
Appendix C	Discharge Concentrations Assessment
Appendix D	River Hydrographs
Appendix E	H1 Risk Assessment Tests 1-4 Results
Appendix F	Significant Load Test Results
Appendix G	Bio-Met Assessment Results

1.0 INTRODUCTION

1.1 Context

This report describes an H1 Risk Assessment carried out by Brownfield Solutions Limited (BSL) for Anwyl Homes (the Client) as instructed by Daniel Beck for a temporary surface water discharge from a site off Gwernaffield Road, Mold. It has been completed in general accordance with the following guidance:

- Environment Agency guidance - Land Contamination: Risk Management (LCRM) [1]
- Environment Agency guidance – Surface Water Pollution Risk Assessment for Your Environmental Permit [2]

Definitions of terms and acronyms used within this report is presented in Section 7.0.

1.2 Surface Water Discharge

Anwyl Homes require excavations on the site to be variably dewatered, depending on rain and groundwater levels. The details of the discharge are shown in the Natural Resources Wales Discharge Layout Plan produced by Anwyl Homes (NRW-DISHCARGE-LAN-MOLD Rev P01) dated April 2026.

The discharge sequence for pumped water is summarised below:

- Piped into a catchpit lined with hessian/terram liner and 300mm high bunded sides
- Flows through a series of further catchpits, pipes, a weir, and silt mats.
- Flows into an outfall pit with a flow control system.
- Enters into pipe which discharges into an existing manhole.
- Flows from manhole into culverted watercourse under the A541.
- Flows out of culvert and then at surface for approx. 40m, before discharging into the River Alyn.

For the purposes of this assessment the discharge point is taken to be at the River Alyn.

1.3 Previous Reports

The following reports have been produced for the site and should be read in conjunction with this assessment (in date order):

- REFA, Supplementary Investigation Works, ref: MD/17136, issued April 2020.
- REFA, Geo-environmental Investigation Report, ref: 18122/GEIR/B, issued September 2020.
- The Arley Consulting Company Limited, Remediation Strategy for the Proposed Development at Gwernaffield Road, Mold, Flintshire, ref: Report No 19881/1B, issued November 2022.
- BSL, Remediation Strategy Addendum Letter Report, ref: OH/C5984/13961, issued February 2025
- BSL, Fuel Spill Validation Letter, ref: MB/C5984/15695, issued June 2026

1.4 Objectives and Scope

The objectives of this report are to assess the risk associated with the temporary surface water discharge to the River Alyn to support Anwyl Homes in their application for an environmental permit.

The scope of work is to undertake a surface water pollution risk assessment for the proposed discharge in line with Environment Agency (EA) [2]/Natural Resources Wales (NRW) [3] guidance. This includes:

- Review of site-specific information to determine parameters and determinands of concern for screening tests.
- Undertake the Part 3 freshwater screening Tests 1-4 and significant load testing.
- Identify if Part 4 modelling is required.
- Reporting of assessment and findings.

1.5 Limitations

This assessment has been prepared in accordance with the relevant current legislative framework and guidance. BSL is not liable for any subsequent changes in the guidance and legislation.

The findings and opinions conveyed via this report are based on information obtained from a number of sources as detailed within this report, BSL have assumed this information is correct and reliable. Nevertheless, BSL cannot and does not guarantee the authenticity or reliability of the information it has relied upon.

BSL have used reasonable skill, care and diligence for the investigation of the site and the production of this report. There may be other conditions prevailing on the site which are outside the scope of work and have not been highlighted by this assessment and therefore have not been considered by this report. Responsibility cannot be accepted for such site conditions not revealed by the assessment.

This report has been prepared for the sole use and reliance of the Client, Anwyl Homes. No other third parties may rely upon or reproduce the contents of this report without the written permission of Brownfield Solutions Ltd (BSL). If any unauthorised third party comes into possession of this report, they rely on it at their own risk and BSL do not owe them any Duty of Care. This report may not be relied upon by the client or submitted to a third party for their reliance for the purposes of valuation, mortgage, insurance and regulatory approval, until all invoices have been settled in full.

The water samples utilised to estimate the discharge quality were not originally sampled for the purpose of this assessment and therefore do not include all determinands that may be considered based on the conceptual site/ground model. However, Natural Resources Wales has stated that they consider the testing conducted to be sufficient in this instance. Variations in discharge quality cannot be fully accounted for and the data chosen for this assessment has been chosen based on professional judgment to be representative of the discharge water quality.

The groundwater and surface water quality results described are only representative of the dates on which they were recorded, and groundwater levels may vary seasonally (e.g. due to changes in weather).

This assessment has been based on the proposed discharge layout provided. Any subsequent change to the layout may have an impact on the validity of recommendations made within this report. Furthermore, new information, changed practices or new legislation may necessitate revised interpretation of the report after the date of its submission.

The site plans enclosed in this report should not be scaled off. Any site boundary line depicted on plans does not imply legal ownership of land.

Any recommendations made in this report should be confirmed with the Regulatory Authorities prior to implementation to ensure compliance. Please note that whilst every effort has been made to pre-

empt the likely requirements of the Local Authority, Natural Resources Wales, and warranty providers, they may have specific requirements that will need to be discussed and addressed at a later date.

2.0 THE SITE

2.1 Location

The site is located approximately 1km northwest of Mold (Yr Wyddgrug), Flintshire, Wales and spans 10.4 hectares and is bisected by Pool House Lane, which currently connects Gwernaffield Road to Denbigh Road, as shown on the Site Location Plan, drawing ref. C5984/02.

The site consists of two main areas:

- The northern area (approx. 2.1 hectares) comprises a series of agricultural fields partially separated by vegetated soil bunds. The southern part of the site was historically occupied by a mill pond. A gravel pit was located in the far northern area. In 1960, the feed from the pond was cut off at Denbigh Road.
- The southern area (approx. 8.3 hectares) is an agricultural field, enclosed by fences and hedge lines to the south and east, with Pool House Lane adjacent to its northern and western boundary.

The surface water discharge is located in the north of the site adjacent to Denbigh Road. The discharge to the River Alyn is located at approximately Nation Grid Reference (NGR) 323049, 365099.

2.2 Site Setting

Feature	Description
Geology	Artificial Deposits An area of Made Ground is recorded by the BGS directly north of the site associated with the Alyn Works industrial estate and a dismantled railway. Artificial Deposits are not recorded onsite. Superficial Deposits Glaciofluvial Deposits are recorded underlying the majority of the site with some areas of Head and Glacial Till present in the centre of the site. Bedrock Strata Carboniferous age Pennine Lower Coal Measures (mudstone, siltstone, sandstone) in the east and southwest and Etruria Formation (mudstone, sandstone, conglomerate) underlying the rest of the site. The Coal Measures and Etruria Formation are separated by geological faults.
Hydrology	The River Alyn (Afon Alun) is located approximately 55m north of the site flowing southeast.
Hydrogeology	• Glaciofluvial Deposits – Secondary A Aquifer • Pennine Lower Coal Measures – Secondary A Aquifer • Etruria Formation – Secondary A Aquifer • Groundwater levels have been recorded onsite from 0.65m – 3.40m bgl during previously undertaken ground investigations.
Site History	A factory pond with an outfall and sluice was present in the central area with further outflow towards the north to River Alyn, which was noted from 1872 to 1960. A gravel pit was also noted to be present in the north of the site, which was only noted from 1872 to 1899. Since then, the site has not had any significant changes and is now used for agricultural purposes.

3.0 REQUIRED DATA AND INFORMATION FOR THE H1 ASSESSMENT

3.1 Screening Test Methodology

The methodology adopted to assess the potential risk to surface water was in-line with EA guidance [2]. The guidance states that there are four parts to the screening:

1. *"Identify substances released from your site"*
2. *"Gathering and preparing data on your discharge"*
3. *"Screening tests [for discharges to inland freshwaters]"*
4. *"Modelling"*

The following sections detail the steps carried out to fulfil the above stages.

3.2 Part 1: Identify Elevated Determinands Likely to be Present Within the Discharge

The potential determinands within the discharge have been assessed from validation water samples taken as part of verification sampling undertaken by BSL in relation to the Remediation Strategy for the site.

It is noted that the Minimum Reporting Values (MRV), also known as the Limit of Detection (LOD), for a number of determinands (sulphide, Cr (III), Cr (VI), fluoranthene, and benzo(a)pyrene) is greater than the EQS for that determinand.

Natural Resources Wales has agreed (see email dated 02/07/2026, "PAN-033070 - Request for further information") that the available samples are suitable for this assessment in this instance.

3.3 Part 2: Source Surface Water/Groundwater Samples

A plan of the sample locations is presented on Drawing No. C5984/16 at the end of this report. The samples were collected by BSL consultants during remediation validation visits between July and December 2025 and tested at i2 Analytical (UKAS 4041). The laboratory testing certificates are presented in Appendix B. The table below summarises the samples.

Sample Ref.	Sample Date	Laboratory Certificate	Sample Description
W1	23/07/2025	25-039544	Water within offsite interceptor (east of the site) that onsite groundwater passed through.
W2	23/07/2025		Onsite groundwater sample pumped to surface
W3	23/07/2025		Offsite outfall to River Alyn of unknown origin
W01N	14/08/2025	25-043637	Onsite groundwater sample within trench box excavation
W01S	14/08/2025		Onsite groundwater sample within trench box excavation
W201N	08/10/2025	25-054744	Onsite surface water sample from watercourse
W02N	12/11/2025	25-061662	Onsite groundwater sample within pump
W02S	12/11/2025		Onsite groundwater sample within trench box excavation
WS03N	12/12/2025	25-067572	Onsite groundwater sample within pump

Due to the unknown origin of the outfall into the River Alyn (sample W3) this sample has been removed from the dataset as this may not be representative of groundwater onsite. The location of the outfall, to the north of the nearby Alyn Works industrial estate suggests that the water from this outfall may include water collected from within the industrial estate.

3.4 Part 2: Receptor Surface Water Samples

Two samples of water were taken from the River Alyn by BSL on the 23rd July 2026, one upstream and one downstream of the proposed discharge point. The samples were obtained from the nearest safe location to the river utilising a remote sampling method. The location of the sampling points is shown on Drawing No. C5984/16 and on the photographs in Figure 3-1 further below. The laboratory testing certificates are presented in Appendix B. The table below summarises the samples.

Sample Ref.	Sample Date	Laboratory Certificate	Sample Description
SW01	23/07/2026	26-040255	Surface water sample from River Alyn upstream of the discharge point
SW02	23/07/2026		Surface water sample from River Alyn downstream of the discharge point

It is noted that the downstream sample (SW02) was taken approximately 30m downstream of the unknown outfall from the Alyn Works industrial estate as access to the river prior to this point (downstream of the discharge point) was not possible. The outfall was active at the time of the visit with a high flow rate, with some sediment observed within the outfall water. The outfall is located several metres above the river and the volume of water exiting the outfall was sufficient to disturb large amounts of sediment on the riverbed putting it into suspension, turning the river from clear to brown in colour. The downstream sample was taken where visible sediment impact was not present. It is possible that the outfall from the Alyn Works industrial estate may impact water quality in the River Alyn.

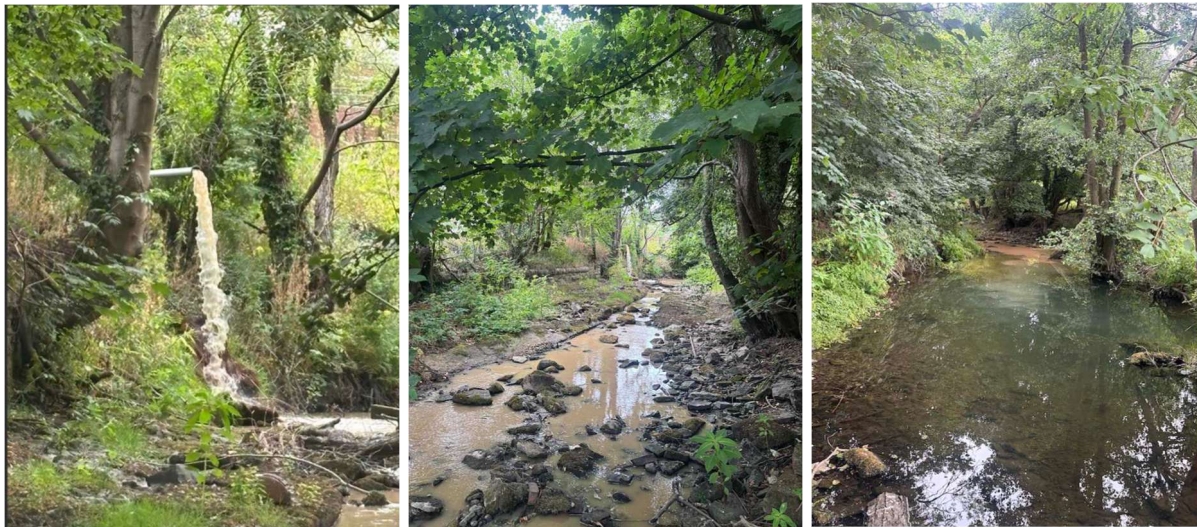


Figure 3-1: *Left - Alyn Works outfall, Middle - Water affected by disturbed sediment, Right - Limit of disturbed sediment*

Due to the possible interference in water quality at the downstream location, only the upstream sample has been utilised for background concentrations within the H1 Risk Assessment (Section 4).

Whilst the number of background samples is significantly less than indicated to be required by the EA guidance, BSL were advised by Steve Bickerton of Natural Resources Wales (NRW) during a Teams meeting on 15th July 2026 that for the purposes of this assessment the samples would be considered practicable by NRW.

3.5 Part 2: Determinands Tested

The determinands tested for in the source and receptor samples are summarised below:

- **Dissolved Metals:** arsenic, boron, cadmium, chromium (total, trivalent, hexavalent), copper, lead, manganese, mercury, nickel, selenium, zinc
- **General Inorganics:** sulphate as SO₄, sulphide, chloride, ammoniacal nitrogen as NH₄⁺, nitrate as N, nitrite as NO₂, nitrate as NO₃
- **Polycyclic Aromatic Hydrocarbons (PAH):** naphthalene, acenaphthylene, acenaphthene, fluorene, phenanthrene, anthracene, fluoranthene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, dibenzo(a,h)anthracene, benzo(g,h,i)perylene
- **Water Parameters:** calcium (dissolved), hardness (total), pH, dissolved organic carbon (DOC)

3.6 Part 2: Required Information on Determinands and Flow Rates

To complete the H1 screening tests the following information is required:

- Predicted concentrations of the identified determinands in the discharge.
- The maximum and average predicted discharge flow rates.
- The corresponding average (mean) background concentration of the determinands in the receiving surface water.
- The Q₉₅ exceedance flow rate of the receiving water.
- Freshwater EQS assessment criteria.

Predicted Discharge Concentrations

Predicted concentrations have been calculated based on representative water samples retrieved from the discharging water across the site and are presented in Appendix C. Maximum, mean, and upper quartile concentrations have been calculated using the dataset.

For initial screening, where a value has been measured at less than the laboratory LOD, a value of half the LOD has been used for calculating statistical values.

Discharge Flow Rate

The discharge flow rate has been approved for a maximum of 15l/s (0.015m³/s). An average flow rate is unknown as the flow is dependent on groundwater levels and rainfall and the number/size of excavations requiring dewatering. For the purposes of this assessment a conservative average discharge flow rate of 10l/s (0.01m³/s) has been assumed.

Background Surface Water Concentrations

Background surface water determinands concentrations have been calculated based on surface water sample taken from the River Alyn upstream of the discharge point in line with the EA guidance.

As a conservative measure for initial screening, where a value has been measured at less than the laboratory LOD, a value of half the EQS has been used. Unless the LOD was less than half the EQS, then the LOD has been used for calculating statistical values.

Surface Water Flow Rates

Flow rates for the River Alyn have been obtained from the National River Flow Archive [4]. Data has been extracted for Station 67009 (Alyn at Rhydymwyn) which is approximately 3.6km upstream of the discharge point and Station 67008 (Alyn at Pont-y-Capel) which is approximately 20.5km downstream of the site. Data from these stations is available from 1969-2024 (67009) and 1965-2024 (67008).

67009 (Alyn at Rhydymwyn)

Natural Resources Wales indicate that the gauge at this station is subject to rapid gravel accumulation and is annually cleared and / or cleared after high flow events and therefore readings of <0.05m flow depth may not be accurate. The River Alyn is also noted to be subject to substantial losses in flow due to large number of swallow holes within the limestone bedrock upstream of the gauging station and through percolation to mine discharge tunnels.

67008 (Alyn at Pont-y-Capel)

Natural Resources Wales indicates that flow at this station is affected by abstractions, small reservoirs and loss of flow to mine drainage tunnels. Some effluent returns are also noted.

Flow rates utilised for this assessment have been taken from between 2020-2024 as this is considered the most representative and partially accounts for recent changes in climate in the UK. The flow data is summarised in the table below and hydrographs of the flow data for each station are presented in Appendix D.

Statistical Parameter	Flow Rate 2020-2024 (m ³ /s)	
	67009 (upstream)	67008 (downstream)
Average	0.66	2.65
Peak	23.94	41.56
Q ₉₅	0.00	0.45
Q ₅₀	0.02	1.34
Q ₅	3.26	9.39

The EA guidance indicates that for a H1 Risk Assessment the Q₉₅ river flow rate should be utilised. However, the nearest station (67009, 3.6km upstream) recorded a Q₉₅ value of 0.00m³/s which is not considered representative of the River Alyn at the point of discharge. It is noted that Station 67009 is indicated by NRW to provide unreliable data below a river depth of 0.05m which may explain the high frequency of 0.00m³/s daily average values.

Observations taken during BSL site visits have indicated there to be flowing water within the river during each visit. During the sampling of the River Alyn on 23rd July 2026 the river was noted to be flowing, the same day as Natural Resources Wales declared that North Wales and the Upper Severn were in a drought status¹. Given that the River Alyn was flowing upstream of the point of discharge during a period of drought it is considered that Station 67009, whilst closer to the site, is not representative of the river at the point of discharge.

As demonstrated in Figure 3-2 below, Station 67009 is located near the boundary where the bedrock geology transitions from limestone to sandstone/shale. NRW state that the River Alyn is known to lose significant flow to limestone swallow holes and flow will be considerably lowered at Station 67009 due to the river course passing through a large area of limestones prior to the station. However, downstream of Station 67009 the River Alyn flows over bedrock strata comprising sandstone (moderately permeable) or shale/mudstone (largely impermeable). Therefore, downstream of Station 67009 the River Alyn has a more consistent flow rate. There are also a number of minor tributaries which merge with the River Alyn between Station 67009 and the discharge location.

¹ <https://naturalresources.wales/about-us/news-and-blogs/news/wildfires-and-record-dry-conditions-trigger-drought-declaration-for-north-wales-and-upper-severn/?lang=en>

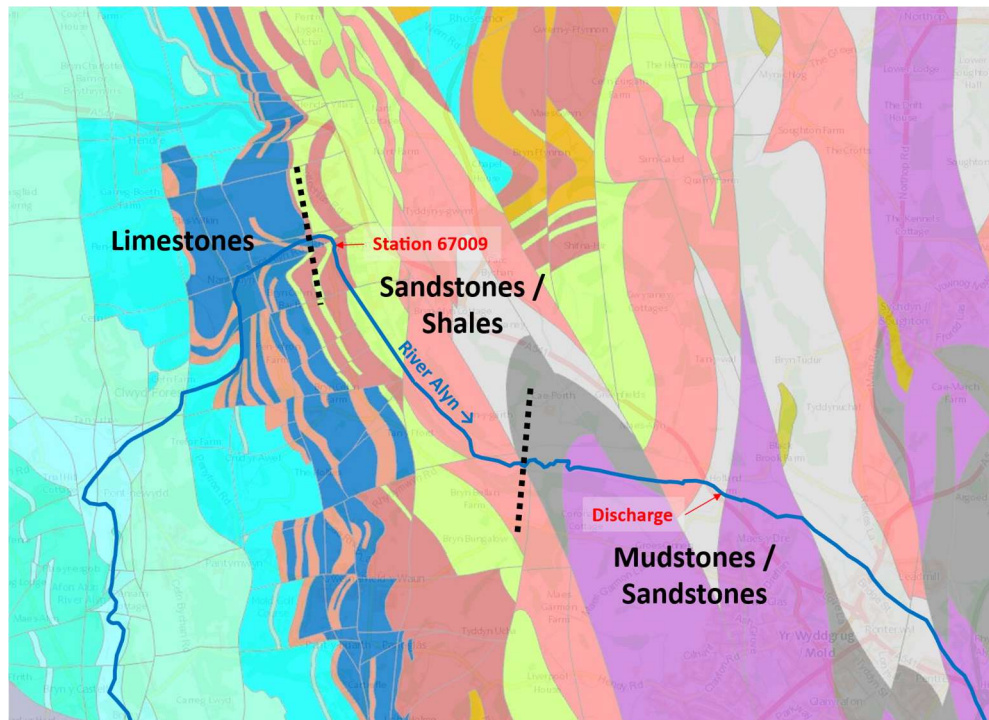


Figure 3-2: Bedrock Geology Underlying the River Alyn

Conversely Station 67008 is located approximately 20.5km downstream of the discharge point, following the confluence of a number of additional tributaries and therefore is likely to be an overestimate of the flow rate.

Therefore, to calculate a representative river flow rate for the discharge location an exercise was undertaken to estimate the percentage contribution to the River Alyn daily average flow rates at station 67008. This assessment considered the following:

- Catchment area of the River Alyn upstream of the discharge point and downstream of Station 67009.
- Catchment area of River Alyn at Station 67008.
- Underlying bedrock geology of the catchments and effects on river flow losses/contributions
- Historic mining features within the catchments

Geology

The bedrock geology of the full 67008 (Pont-y-Capel) catchment broadly comprises:

- **Above Cilcain:** Silurian mudstones with subordinate sandstones
- **Cilcain to Rhydymwyn:** Carboniferous limestones
- **Rhydymwyn to Caergwrle:** Carboniferous sandstone and Pennine Middle Coal Measures
- **Caergwrle:** Small band of Carboniferous limestones southwest of the River Alyn
- **Caergwrle to Gwersyllt:** Carboniferous Pennine Lower Coal Measures
- **Gwersyllt to Pont-y-Capel:** Carboniferous sandstones and mudstones

As discussed previously NRW states that swallow holes within the limestones cause the River Alyn to lose significant volumes of flow. This is supported by the daily river flow data available for Station 67009 which indicates that on approximately 43% of days between 2020-2024 the flow recorded was recorded as 0m³/s (assumed river depth <0.05m).

The BGS indicates groundwater flows through the limestone via fractures and available karst features in a northeasterly direction to discharge to the sea, with swallow holes common. Additionally, where the limestone outcrops it acts as a valuable indirect recharge source for the sandstone aquifers, indicating that the flow lost to swallow holes does not re-enter the river downstream [5].

It is considered that the Silurian mudstones/sandstones in the reaches hydraulically above the limestone, whilst able to contribute to the flow, are likely to lose the flow as it passes through the limestone area. Therefore, these areas are also assumed unlikely to contribute significantly to the recorded daily average river flows.

For the remaining bedrock strata, it is assumed that the contribution to the daily flow average is not significantly reduced due to the geology, including in areas underlain by sandstone, as these are matrix dominated aquifer units rather than the fracture/karst dominated limestone aquifers.

Mining

A review of publicly available geospatial records of recorded mineshafts [6] indicates that areas underlain by limestone in the catchment areas have significant metalliferous mineshafts recorded.

The BGS indicates that the swallow holes predominantly drain into a large network of mining tunnels underlying the region [5] which drain towards the Milwr Sea Tunnel. The tunnel network is indicated to begin close to Loggerheads in the upper reaches of the River Alyn and flows northeast to the River Dee estuary, taking the water captured out of the river catchment. Separate attempts to prevent water from the River Alyn from entering the mines via swallow holes were undertaken in the 1930s but these were largely unsuccessful. The Milwr Sea Tunnel discharges an average of 1.2m³/s [7] which indicates significant drainage, though this includes contributions from the wider karstic aquifer and other rivers/streams as well as the River Alyn (see drawing C5984/15).

Areas underlain by the Pennine Middle/Lower Coal Measures are indicated to have been exploited by coal mining across the area with a number of former collieries noted. It is considered that river flow losses within these coal mining areas are unlikely to be significant due to the methodology of mining (deep shaft mining), the matrix dominated aquifer storage, and the low permeability mudstones present throughout the strata. It is considered that losses of flow to mining are likely to be offset by mine overflow where decommissioned pits are no longer being actively drained.

Flow Rate Effects

It is considered that the combined effects of the geological strata underlying the catchment area and historic mining combine to significantly reduce the River Alyn flow where underlain by Carboniferous limestones.

During drier weather nearly all water within the River Alyn is lost in these areas via the swallow holes. During wetter periods it is considered that the swallow holes are not able to intake the full volume and a portion of the water continues to flow in the river as recorded at Rhydymwyn.

It is not possible to quantify or semi-quantify the proportion of flow entering the swallow holes during wetter periods, as no literature is available regarding this specific loss rate.

For the purposes of this assessment, it has been assumed that the contribution to daily flow averages from limestone areas (and mudstone/sandstone areas hydraulically upstream of limestone areas) is a nominal 20%, proportional to the area underlain. This is considered to be a suitable estimate of the contribution/loss ratio (20:80) for these areas during low flow conditions and in line with the H1 guidance which requires assessment against the Q₉₅ flow rate.

The table below summarises the input parameters for the assessment and the methodology for calculating the catchment areas and geological information quoted as detailed in Appendix D.

Parameter	67008 – Pont-y-Capel	67009 – Rhydymwyn	Discharge Catchment
Drawing Reference	C5984/14	C5984/13	C5984/12
Catchment Area	227.1km ²	77.8km ²	22km ²
Approx % underlain by limestone	23.3%	45%	34.1%
Approx % of likely low contribution	13.7%	55%	11.8%
Total Loss Zone %	37.0%	100%	45.9%
Loss Percentage * (nominal)	80%	80%	80%
Mining Activity	Significant coal mining in areas of Pennine Coal Measures Significant metalliferous mining in limestone regions	Significant metalliferous mining in limestone regions	Significant metalliferous mining in limestone regions
Effective Catchment Area	159.9km ² (70.4%)	15.56km ² (20.0%)	13.9km ² (63.3%)
Q ₉₅ (measured)	0.45m ³ /s	0.000m ³ /s	-
Scaling Ratio	-	9.73%	8.71%
Q ₉₅ (estimated)	-	0.04m ³ /s	0.04m ³ /s

* equivalent to a 20% flow contribution from Loss Zone areas

The effective catchment area is calculated using the below formula:

$$EFC (\%) = 100 - (L_z \times L_{\%})$$

Where:

EFC = Effective Catchment Area (%), as a percentage of the total catchment area

L_z = Loss Zone (%), the percentage area of the catchment where significant losses are likely to occur

L_% = Loss Percentage (% expressed as a decimal), assumed 80% loss of flow

The scaling factor calculated to estimate the Q₉₅ for the Discharge Catchment is calculated as follows:

$$\text{Scaling Ratio (\%)} = \frac{\text{Effective Area of Discharge Catchment}}{\text{Effective Area of Pont-y-Capel Catchment}} = \frac{13.9\text{km}^2}{159.9\text{km}^2} = 8.71\%$$

Data Validation

As an additional check, the assumed contribution factor was independently calibrated against the empirical volume-weighted flow ratio between the two gauges between 2020-2024 (25.02%), giving a discharge catchment Q₉₅ of 0.042 m³/s, closely consistent with the adopted methodology.

However, applying this volumetrically calibrated factor to predict Q₉₅ at Station 67009 (Rhydymwyn) itself yields 0.112m³/s, which is inconsistent with the measured value of 0.00m³/s. This discrepancy is attributed to the volume-weighted ratio being dominated by high-flow events, during which swallow hole capacity is exceeded and proportionally more flow bypasses to downstream reaches as shown in Figure 3-3 below.

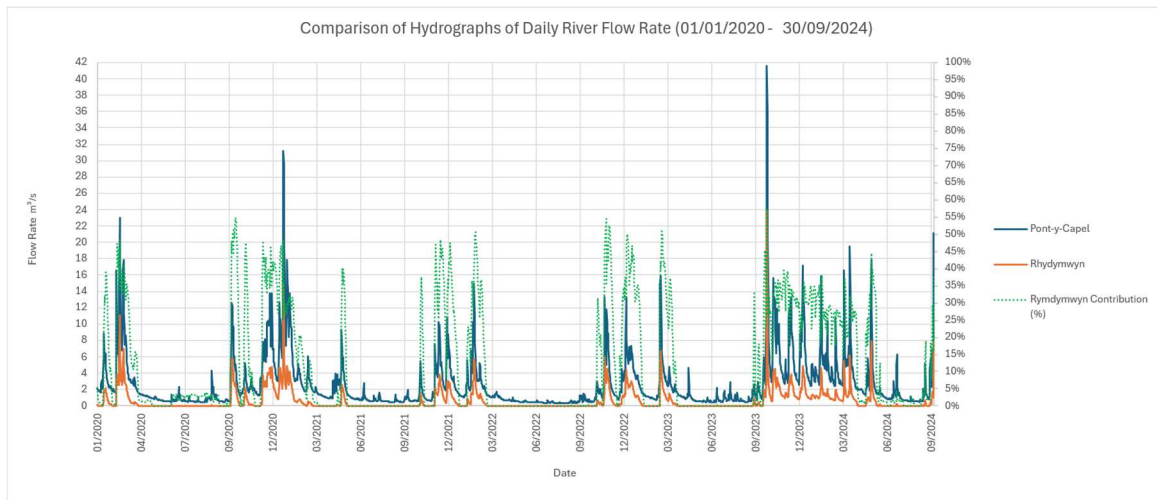


Figure 3-3: Comparison of Flow Station Daily Average Flow Rates

This is consistent with the flow-dependent loss mechanism described earlier in the report of karstic networks and swallow holes. This confirms that the average-flow ratio is not an appropriate calibration basis for a low-flow (Q_{95}) statistic, and supports the adopted nominal 20% contribution factor, which produces a plausible near-zero ($0.04\text{m}^3/\text{s}$) predicted Q_{95} flow at Station 67009 (Rhydymwyn) consistent with known gauge limitations at low water depths.

Assessment Criteria

The freshwater EQS used as assessment criteria as published by the EA [8]. Annual Average (AA) EQS were used where available as a conservative approach, Maximum Allowable Concentrations (MAC) EQS were also screened where available. The cadmium criterium has been set at $0.25\mu\text{g}/\text{l}$ based on site specific receptor surface water hardness of $315\text{mgCaCO}_3/\text{l}$, as presented in Appendix C.

3.7 Part 3: Tests

The H1 freshwater screening tests have been applied and the following details the approach as per the EA, guidance.

The tiered assessment process comprised four tests with an additional test for priority hazardous substances (in relation to significant load calculations), which should be undertaken sequentially. Where failures are not identified at Test 1 of the tests, no further consideration is required.

However, if a failure is identified as part of Test 1, then compounds should be considered for Test 2. Compounds that fail at Test 2 should be considered through Tests 3 and 4, where a failure at either Tests 3 or 4 may require modelling. A failure of the significant load test may suggest control of the compound is required through a numeric emission limit on the permit.

The methodology for the screening tests is detailed in Appendix A.

4.0 H1 RISK ASSESSMENT

The findings of the Part 3: screening tests are included in Appendix E and summarised below.

The below determinands, which were tested for, do not have an associated EQS screening value therefore have not been assessed.

- **Dissolved Metals:** selenium
- **General Inorganics:** chloride, nitrate as N, nitrate as NO₃, nitrite as NO₂
- **Polycyclic Aromatic Hydrocarbons (PAH):** acenaphthene, fluorene, phenanthrene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene*, benzo(k)fluoranthene*, indeno(1,2,3-cd)pyrene*, dibenzo(a,h)anthracene, benzo(g,h,i)perylene*
- **Water Parameters:** calcium (dissolved), hardness (total), dissolved organic carbon (DOC)

** benzo(a)pyrene is considered as a surrogate marker for these PAH compounds [8] and therefore these have not been assessed individually*

4.1 Test 1

The below determinands passed the Test 1 criteria and therefore no further assessment at Test 2 was required.

- **Dissolved Metals:** arsenic, boron, cadmium, chromium (total, trivalent, hexavalent), copper, lead, manganese, mercury, nickel, zinc
- **General Inorganics:** sulphate as SO₄, sulphide
- **Polycyclic Aromatic Hydrocarbons (PAH):** naphthalene, acenaphthylene, anthracene, benzo(a)pyrene
- **Water Parameters:** pH (all values within normal pH range of pH 6-9)

Some inorganics, PAH, and metal compounds also failed the Test 1 screening, however as detailed in Appendix E, were not carried forward to Test 2 on a risk-based approach as these compounds were not detected above the LOD in groundwater or surface water in the data sources assessed.

The following determinands exceeded the Test 1 criteria and therefore required further assessment at Test 2.

Determinand	Fails Test 1
Inorganics	
Ammoniacal Nitrogen as NH ₄ ⁺	Yes
PAH	
Fluoranthene	Yes
Metals	
Cadmium	Yes
Copper	Yes
Lead	Yes
Mercury	Yes
Nickel	Yes
Zinc	Yes

4.2 Test 2

The following determinands exceeded the Test 2 criteria and therefore required further assessment at Test 3.

Determinand	Fails Test 2
Inorganics	
Ammoniacal Nitrogen as NH ₄ ⁺	No
PAH	
Fluoranthene	Yes
Metals	
Cadmium	No
Copper	Yes
Lead	Yes
Mercury	Yes
Nickel	Yes
Zinc	Yes

Ammoniacal nitrogen and cadmium both passed Test 2 and therefore no further assessment of these determinands is required.

4.3 Test 3

The following determinands fail the Test 3 criteria as shown below and therefore require modelling.

Determinand	Fails Test 3
PAH	
Fluoranthene	No
Metals	
Copper	Yes
Lead	No
Mercury	No
Nickel	No
Zinc	Yes

Copper and zinc fail Test 3 and therefore require Part 4 modelling.

All determinands which have failed Test 2 are also required to go through Test 4 in line with the EA guidance.

4.4 Test 4

The following determinands fail the Test 4 criteria for either the Annual Average (AA) EQS or the Maximum Allowable Concentration (MAC) EQS as shown below and therefore require modelling.

Determinand	Fails Test 4	
	AA EQS	MAC EQS
PAH		
Fluoranthene	Yes	No
Metals		
Copper	Yes	N/A
Lead	No	No
Mercury	No	No
Nickel	No	No
Zinc	No	N/A

Fluoranthene and copper fail Test 4 and therefore require Part 4 modelling.

4.5 Significant Load Test

The significant load test has been carried out for cadmium, mercury, and fluoranthene as the Priority Hazardous Substances (PHSs) [8] that fail Test 1. As a conservative approach it has been assumed that the discharge will be active year-round (365 days).

The significant load test indicates that the three determinands tested do not exceed the calculated significant load limit, as shown in Appendix F.

Cadmium passed Test 2 and mercury passed Tests 3 and 4 and therefore further assessment is not required.

Fluoranthene fails Test 4 and therefore further assessment is required in Part 4 modelling.

5.0 DISCUSSION

The results of the Parts 1-3 H1 risk assessment show that bioavailable metals copper and zinc failed at Test 3, and copper and PAH fluoranthene failed Test 4 and therefore Part 4 modelling is required in accordance with the guidance [2]. It is understood that Natural Resources Wales undertake Part 4 modelling.

5.1 Bioavailable Metals

Whilst copper and zinc fail Test 3 (and copper Test 4) it is considered highly likely that when bioavailability is accounted for in Part 4 modelling, these metals will no longer be considered to pose a significant risk of deterioration of the watercourse quality.

A preliminary assessment of bioavailability has been undertaken utilising the Bio-Met Bioavailability Tool (v. 6.0) [9] in accordance with the user manual [10]. This assessment tool calculates bioavailability factors (BioF) and Local HC5 values for bioavailable metals based on site-specific information for three water quality parameters: pH, dissolved organic carbon (DOC) concentration, and calcium (Ca) concentration.

- The HC5 value is derived from ecotoxicological data (from a species sensitivity distribution) which aims to protect at least 95% of the species expressed as dissolved metal concentration.
- The BioF is the metal bioavailability at a specific site, relative to the bioavailability under “sensitive conditions” (conditions of high bioavailability).

Prior to utilising the tool, a check was made to ensure that the parameters of the upstream River Alyn sample (SW01) were within the validated range for the model.

Determinand	Validated Range		SW01		Within Validated Range?	
	pH	Ca (mg/l)	pH	Ca (mg/l)	pH	Ca
Copper	6.0 – 8.5	3.1 – 129	7.8	110	Yes	Yes
Zinc	5.5 – 8.5	0.8 – 160			Yes	Yes

Once it had been validated that the sample fell within the range the parameters were input and the assessment run. The results are presented in Appendix G and summarised in the table below.

Determinand	Input Parameters				Results	
	pH	DOC	Ca (mg/l)	Hardness (mg/l)	BioF	Local HC5 (µg/l)
Copper	7.8	2.6	110	315	0.10	9.84
Zinc					0.17	62.35

As shown by the assessment the BioF for both metals is low indicating limited bioavailability is predicted. The Local HC5 values for both metals show an increase in value compared to standard bioavailable AA EQS for copper (1µg/l) and zinc (14.8µg/l: 10.9µg/l + background concentration of 3.9µg/l [8]).

A secondary illustrative undertaking of the Part 3 screening tests for copper and zinc, taking into account the bioavailability by utilising the Local HC5 value in place of the AA EQS, indicates that copper and zinc fail Tests 1 and 2, but pass Tests 3 and 4.

5.2 Fluoranthene

It is considered that whilst fluoranthene fails Test 4 for the AA EQS, it is unlikely to pose a significant risk to the River Alyn water quality based on the below points:

-
- Only 1/8 of the discharge quality samples recorded fluoranthene above the LOD.
 - The Limit of Detection (LOD) available for the samples tested ($<0.01\mu\text{g/l}$) is approximately 1.6 times the EQS for fluoranthene ($0.0063\mu\text{g/l}$), which increases the average concentration used in the assessment.
 - The background concentration ($0.03\mu\text{g/l}$) is three times the maximum recorded concentration in the proposed discharge water ($0.01\mu\text{g/l}$) and approximately 5 times the EQS ($0.0063\mu\text{g/l}$) indicating existing (minor) impact to the River Alyn from fluoranthene upstream of, and unrelated to, the discharge.
 - Fluoranthene passes both Test 3 and Test 4 MAC EQS.
-

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

The results of the Part 3 screening tests indicate that bioavailable metals copper and zinc failed at Test 3, and copper PAH fluoranthene failed Test 4 and therefore Part 4 modelling is required in accordance with the guidance [2].

However, based on an initial assessment of the bioavailability of copper and zinc within the River Alyn indicates that the bioavailability of these metals is likely to be low. An illustrative undertaking of the Part 3 screening tests using the Local HC5 in place of the AA EQS for copper and zinc indicates it is unlikely that these metals will pose a significant risk of causing deterioration of the water quality.

Furthermore, a limited number of proposed discharge water samples (1/8) recorded fluoranthene above the LOD, and elevated concentrations of fluoranthene were recorded within the River Alyn compared to the EQS and discharge. Based on this, it is considered that fluoranthene will not pose a significant risk of causing deterioration of the water quality.

6.2 Recommendations

BSL consider that it is satisfactory to undertake temporary discharge of groundwater from the development site to the River Alyn as risks are low associated with the available sample data.

It is recommended that limited confirmatory site visits, including visual assessments and chemical testing of water in the catchpit is undertaken during the discharge works to confirm risks to the River Alyn.

Natural Resources Wales should be consulted regarding the results of this H1 Risk Assessment to confirm agreement of the recommendations required.

7.0 ABBREVIATIONS AND DEFINITIONS

GLOSSARY	
Term / Abbreviation	Definition
AST	Above Ground Storage Tank.
B(a)P	Benzo (a) Pyrene.
BGS	British Geological Survey.
BRE	Building Research Establishment.
BS	British Standard.
BSL	Brownfield Solutions Ltd.
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes.
CBR	California Bearing Ratio (used in pavement/highways design).
CAR 2012	Control of Asbestos Regulations (2012).
CBCB	Cheshire Brine Compensation Board.
CBCD	Cheshire Brine Compensation District.
CBR	California Bearing Ratio.
CIEH	Chartered Institute of Environmental Health.
CIRIA	Construction Industry Research Association.
CL:AIRE	Contaminated Land: Applications in Real Environments.
CLEA	Contaminated Land Exposure Assessment.
CLO	Contaminated Land Officer.
COMAH	Control of Major Accident Hazards.
Contamination	Presence of a substance which is in, on or under land, and which has the potential to cause significant harm or to cause significant pollution of controlled water. There is no assumption in this definition that harm results from the presence of the contamination. Naturally enhanced concentrations of harmful substances can fall within this definition of contamination. Contamination may relate to soils, surface water, groundwater or ground gas.
Controlled Waters	Inland freshwater (any lake, pond or watercourse above the freshwater limit), water contained in underground strata and any coastal water between the limit of highest tide or the freshwater line to the three-mile limit of territorial waters.
CPT	Cone Penetration Test.
CSM	Conceptual Site Model. A schematic hypothesis of the nature and sources of contamination, potential migration pathways (including description of the ground and groundwater) and potential receptors, developed on the basis of the information from the preliminary investigation and refined during subsequent phases of investigation and which is an essential part of the risk assessment process. The conceptual site model is initially derived from the information obtained by the preliminary investigation (i.e. the Phase I Geo-Environmental Assessment). This conceptual model is used to focus subsequent investigations, where these are considered to be necessary, in order to meet the objectives of the investigations and the risk assessment. The results of intrusive investigations can provide additional data that can be used to further refine the conceptual site model.
DCP	Dynamic Cone Penetrometer.
DNAPL	Dense Non-Aqueous Phase Liquid.
DoWCoP	Definition of Waste Code of Practice.
DWS	Drinking Water Standard.
EA	Environment Agency.

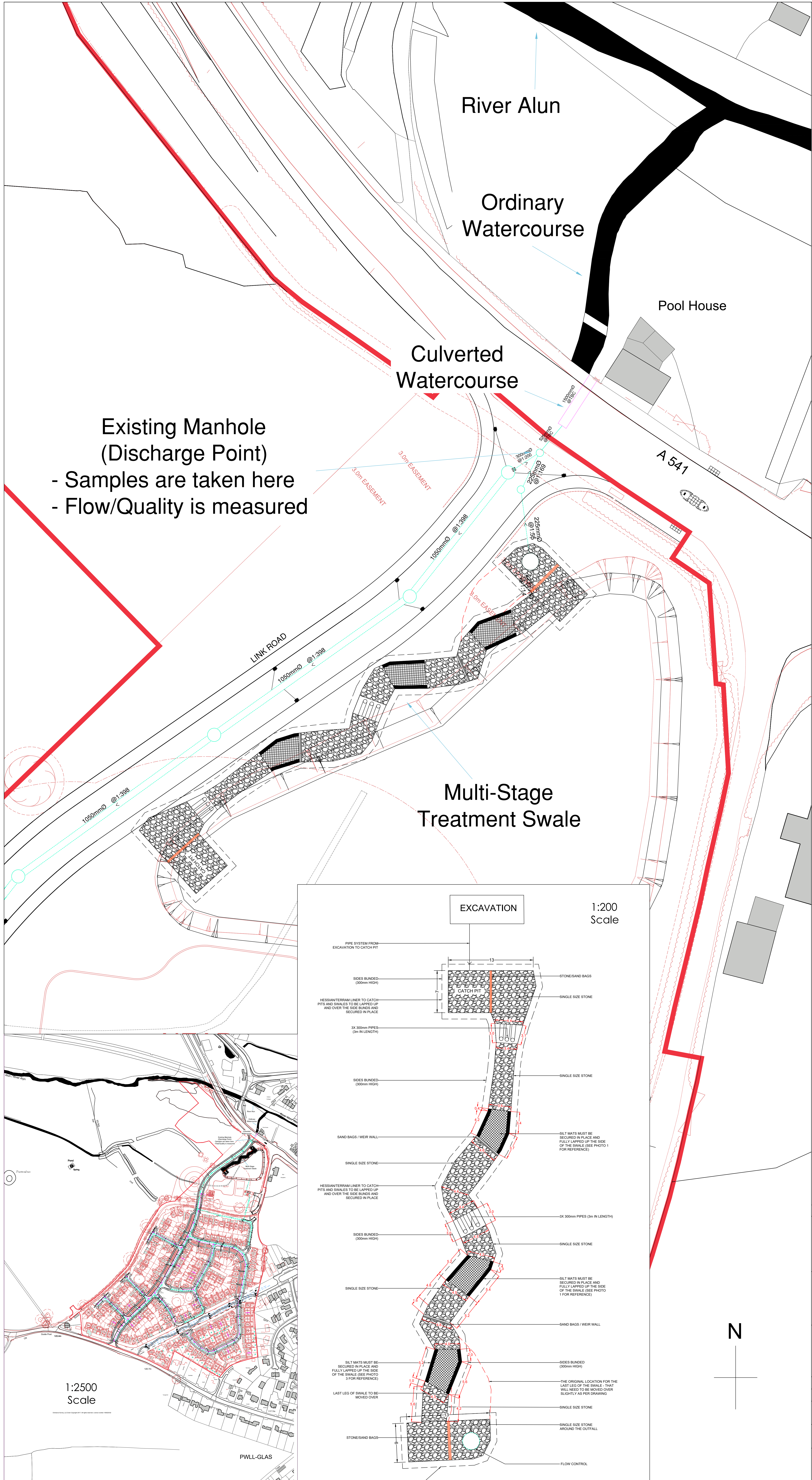
GLOSSARY	
Term / Abbreviation	Definition
EHO	Environmental Health Officer.
EQS	Environmental Quality Standard.
GAC	Generic Assessment Criteria.
GDR	Geotechnical Design Report.
GFR	Geotechnical Feedback Report.
GIR	Ground Investigation Report.
GSV	Gas Screening Value.
Harm	Adverse effect on the health of living organisms, or other interference with ecological systems of which they form part, and, in the case of human health, including property/structures and water supply pipelines.
Hazard	Inherently dangerous quality of a substance, procedure or event.
HDPE	High Density Polyethylene.
HSV	Hand Shear Vane.
K	Modulus of Subgrade Reaction.
LCRM	Land Contamination: Risk Management (EA guidance).
LNAPL	Light Non-Aqueous Phase Liquid (petrol, diesel, kerosene).
LOD	Limit of Detection (for particular method adopted).
MMP	Materials Management Plan.
Mv	Modulus of Volume of Compressibility.
ND	Not Detected.
NHBC	National House Building Council.
NR	Not Recorded.
OS	Ordnance Survey.
PAH	Polycyclic Aromatic Hydrocarbon.
Pathway	Mechanism or route by which a contaminant comes into contact with, or otherwise affects, a receptor.
PCB	Poly-Chlorinated Biphenyl.
PCSM	Preliminary Conceptual Site Model.
pH	Scale used to specify how acidic or basic a water-based solution is.
PHC	Petroleum Hydrocarbons.
PID	Photo Ionisation Detector.
PNEC	Predicted No-Effect Concentration.
Precision	Level of agreement within a series of measurements of a parameter.
PSD	Particle Size Distribution.
PVC	Polyvinyl Chloride.
Receptor	Human health, living organisms, ecological systems, controlled waters (surface waters and groundwater within aquifers), atmosphere, structures and utilities that could potentially be adversely affected by contaminant(s).
Risk	Probability of the occurrence, magnitude and consequences of an unwanted adverse effect on a receptor.
Risk Assessment	Process of establishing, to the extent possible, the existence, nature and significance of risk.
Sampling	Methods and techniques used to obtain a representative sample of the material under investigation.
SOM	Soil Organic Matter.
Source	Location from which contamination is, or was, derived. This could possibly be the location of the highest soil, groundwater or gas concentration of the contaminant(s).
SPT	Standard Penetration Test.

GLOSSARY	
Term / Abbreviation	Definition
SVOCs	Semi Volatile Organic Compounds.
TOC	Total Organic Carbon.
TPH CWG	Total Petroleum Hydrocarbon (Criteria Working Group).
TVOCs	Total volatile organic compounds.
UCS	Unconfined Compressive Strength.
Uncertainty	Parameter, associated with the result of a measurement that characterises the dispersion of the values that could reasonably be attributed to the measurement.
UST	Underground Storage Tank.
UXO	Unexploded Ordnance.
VCCs	Vibro Concrete Columns.
VSCs	Vibro Stone Columns
VOCs	Volatile Organic Compounds.
WAC	Waste Assessment Criteria.
WFD (in waste context)	Waste Framework Directive.
WFD (in water context)	Water Framework Directive.
Units	Definition
°	Degrees
Φ	Phi angle (in degrees)
g/l	Grams per Litre
Km	Kilometres
kPa	Kilo Pascal (Equivalent to kN/m ²)
kN/m ² /mm	Kilo Newton per metered squared per millimeter
kN/m ²	Kilo Newtons per metre squared
kPa	Kilo Pascal (Equivalent to kN/m ²)
l/hr	Litres per hour
MJ/kg	Mega joule per kilogram
MN	Mega Newton
M ² /MN	Mega Newton per metre squared
M	Metres
m bgl	Metres Below Ground Level
m OD	Metres Ordnance Datum (sea level)
µg/l	Micrograms per Litre (parts per billion)
µm	Micrometre
mb	Millibars (atmospheric pressure)
mg/kg	Milligrams per kilogram (parts per million)
mg/m ³	Milligram per metre cubed
mm	Millimetre
ppb	Parts Per Billion
Ppm	Parts Per Million

8.0 REFERENCES

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DRAWINGS



NOTES

1.

All dimensions to be checked on site before commencing any works.

2.

Do not scale from this drawing. Use figured dimensions only.

3.

This drawing to be read in conjunction with all relevant architectural, civil, structural, mechanical, and utility drawings and specifications.

4.

All works to comply with current Building Regulations (England and Wales) and all other statutory requirements.

5.

Construction materials and workmanship shall comply with relevant British Standards and Codes of Practice.

6.

Any discrepancies to be reported to the designer/developer immediately.

7.

Levels and setting out to be confirmed prior to excavation or foundation works.

8.

Existing services to be located and protected during construction. Anwyl do not accept any responsibility for the accuracy of this or any other drawings which indicate the position and/or depth of services/apparatus.

9.

Contractor to ensure site safety measures are in accordance with Health and Safety regulations and Construction (Design & Management) regulations 2015.

10.

All operations should be carried out in accordance with the general health and safety policy of Anwyl Homes and all relevant health and safety legislation.

11.

Foundation details are subject to approval by Building Control and Structural Engineer based on site investigation.

12.

For legal site boundary see deeds plans in possession of Developer.

13.

All dimensions shown are in metres unless indicated otherwise.

14.

If in doubt about anything highlighted on this drawing, contact Anwyl for clarification.

Rev: - | Date: - | Details: - | By: -

Revision history

Developer:

ANWYL

thoughtful homes

Project title:

GWERNAFFIELD ROAD
DOL DERWEN, MOLD

Drawing title:

NATURAL RESOURCES WALES
DISCHARGE LAYOUT PLAN

Scale: 1:200 for the original size of A0

Drawn by: DB | Checked by: - | Passed by: - | Date: 22.04.26

Drawing status:

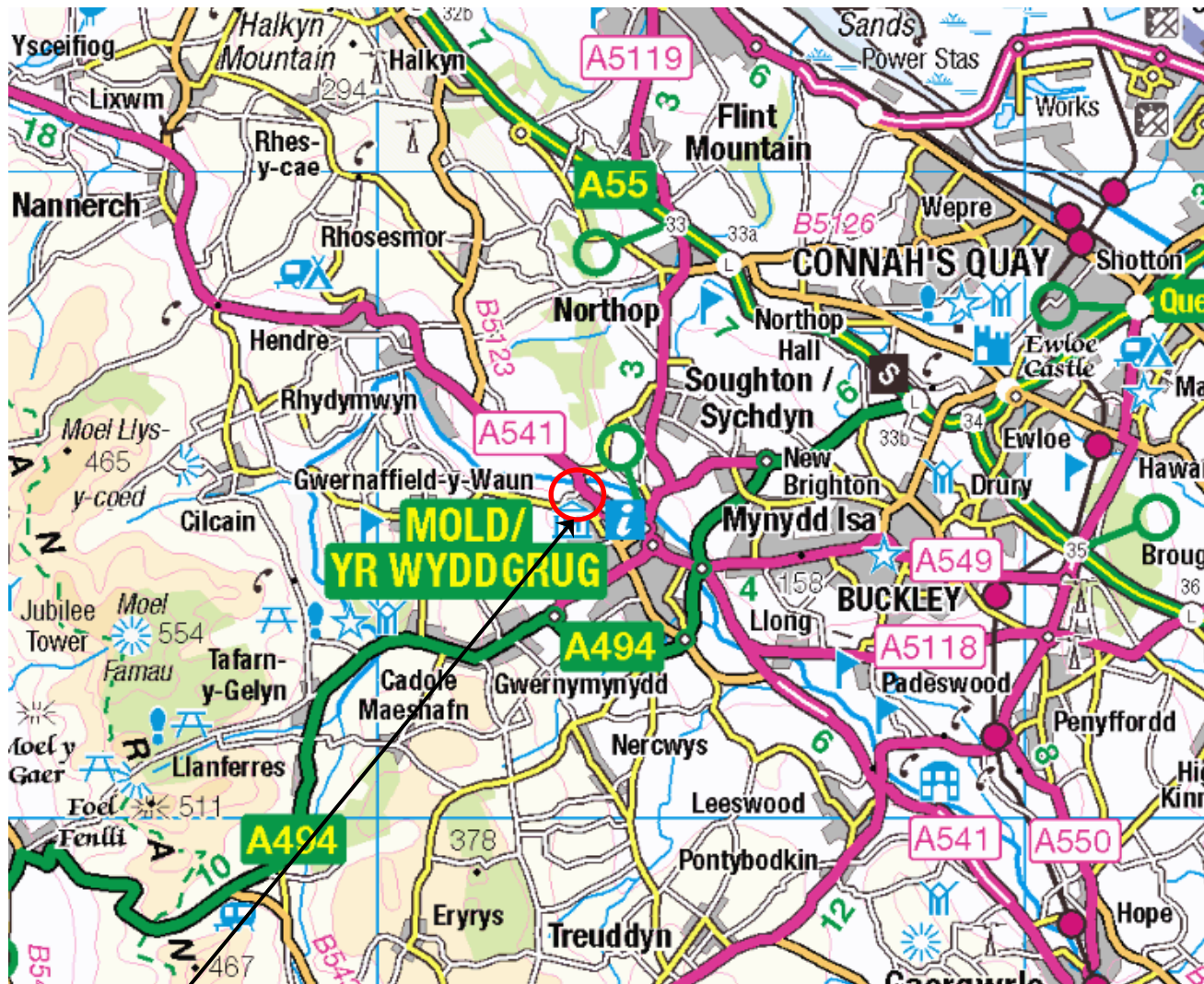
For Information

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Drawing No: NRW-DISCHARGE-PLAN-MOLD

Revision: P01

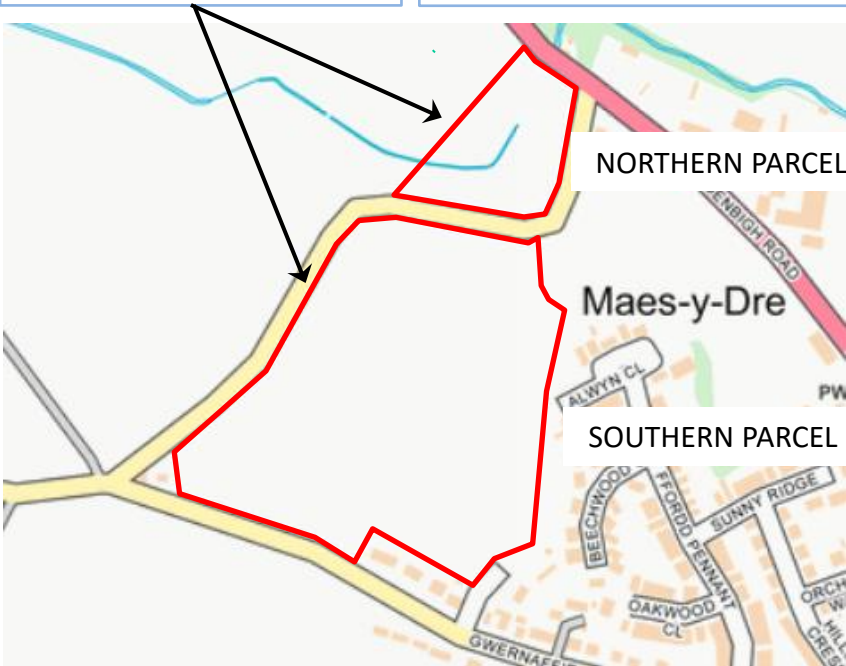
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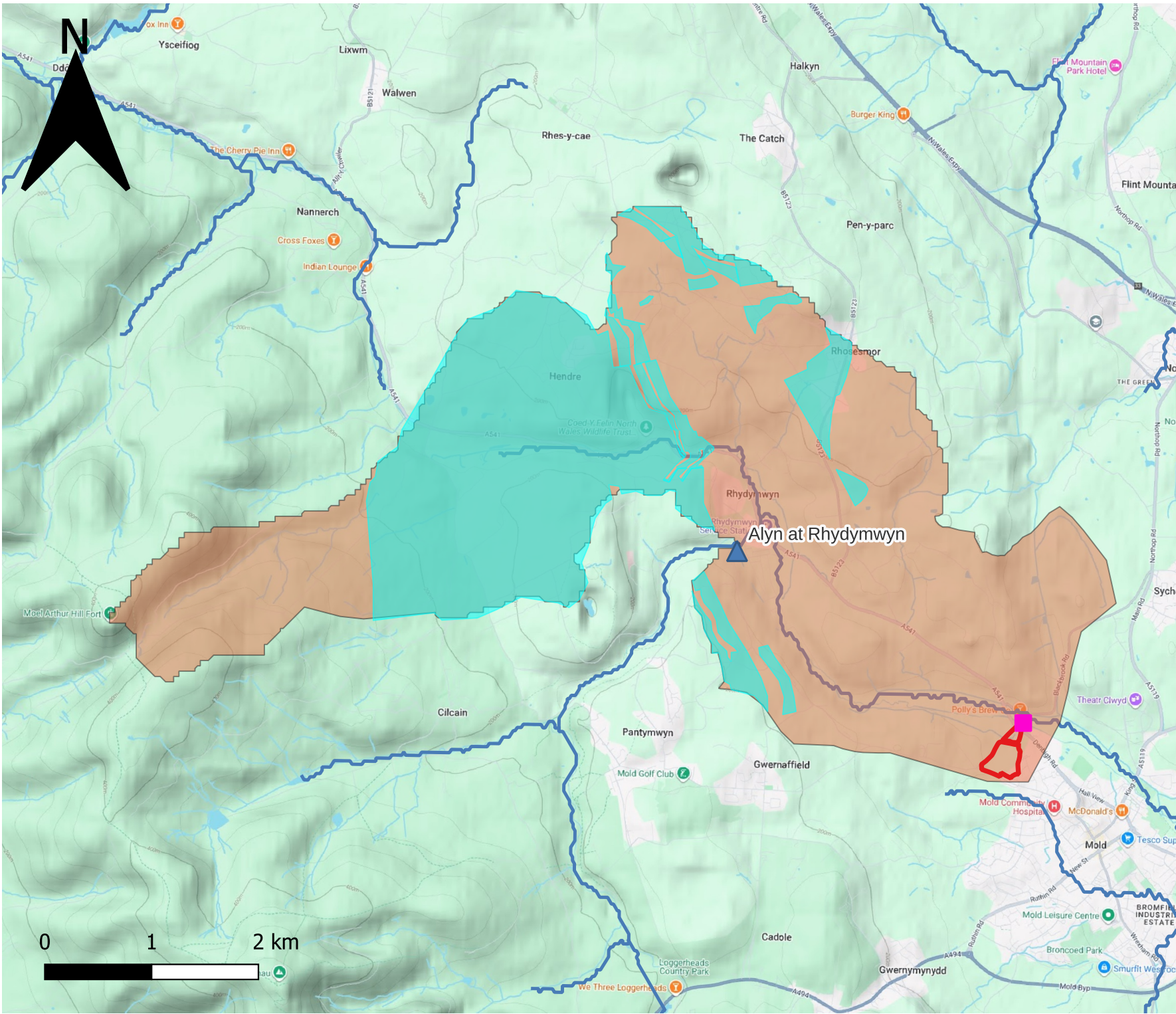
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NEAREST POSTCODE: CH7 1BP

SITE ENTRANCE WHAT3WORDS:
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 BROWNFIELD SOLUTIONS LTD GEO-ENVIRONMENTAL ENGINEERING EXCELLENCE				
CLIENT		ANWYL HOMES		
PROJECT TITLE		GWERNAFFIELD ROAD, MOLD		
DRAWING TITLE		SITE LOCATION PLAN (WHOLE SITE)		
DRAWING No.	REVISION	SCALE	DATE	
C5984/02	-	NTS	06/05/25	
DRAWN BY		CHECKED BY		
SD		TM		



KEY

- APPROXIMATE SITE BOUNDARY
- DISCHARGE POINT
- FLOW STATIONS
- APPROXIMATE LIMESTONE BEDROCK AREA WITHIN CATCHMENT AREA
- SURFACE WATERCOURSES
- ESTIMATED SITE CATCHMENT AREA

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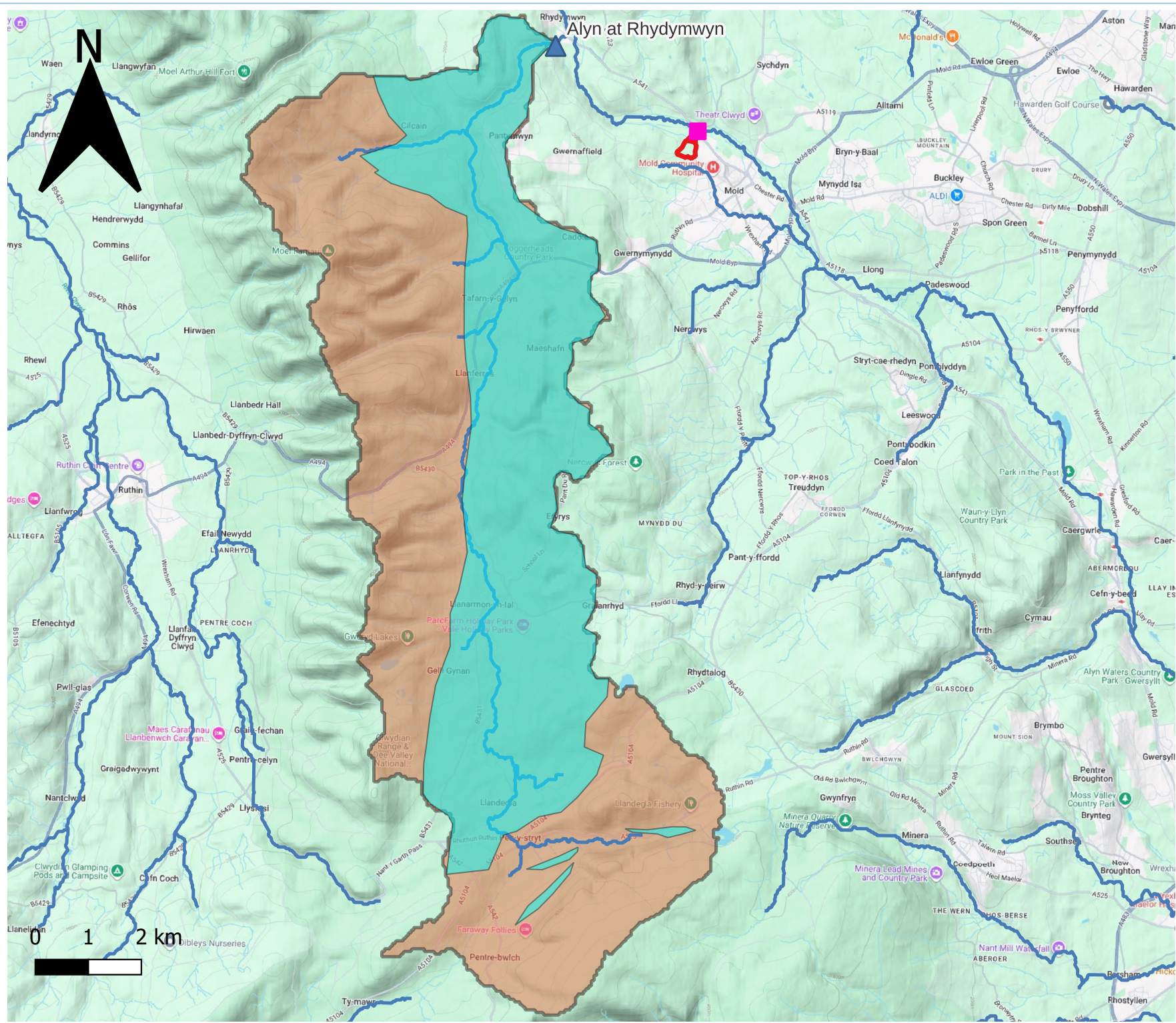
PROJECT TITLE

GWERNAFFIELD ROAD, MOLD

DRAWING TITLE

APPROXIMATE SITE CATCHMENT AREA

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MP	JJL		



KEY

- APPROXIMATE SITE BOUNDARY
- DRAINAGE OUTFLOW
- FLOW STATIONS
- APPROXIMATE LIMESTONE BEDROCK AREA WITHIN CATCHMENT AREA
- SURFACE WATERCOURSES
- 67009 - ALYN AT RHYDYMWYN CATCHMENT

- NOTES
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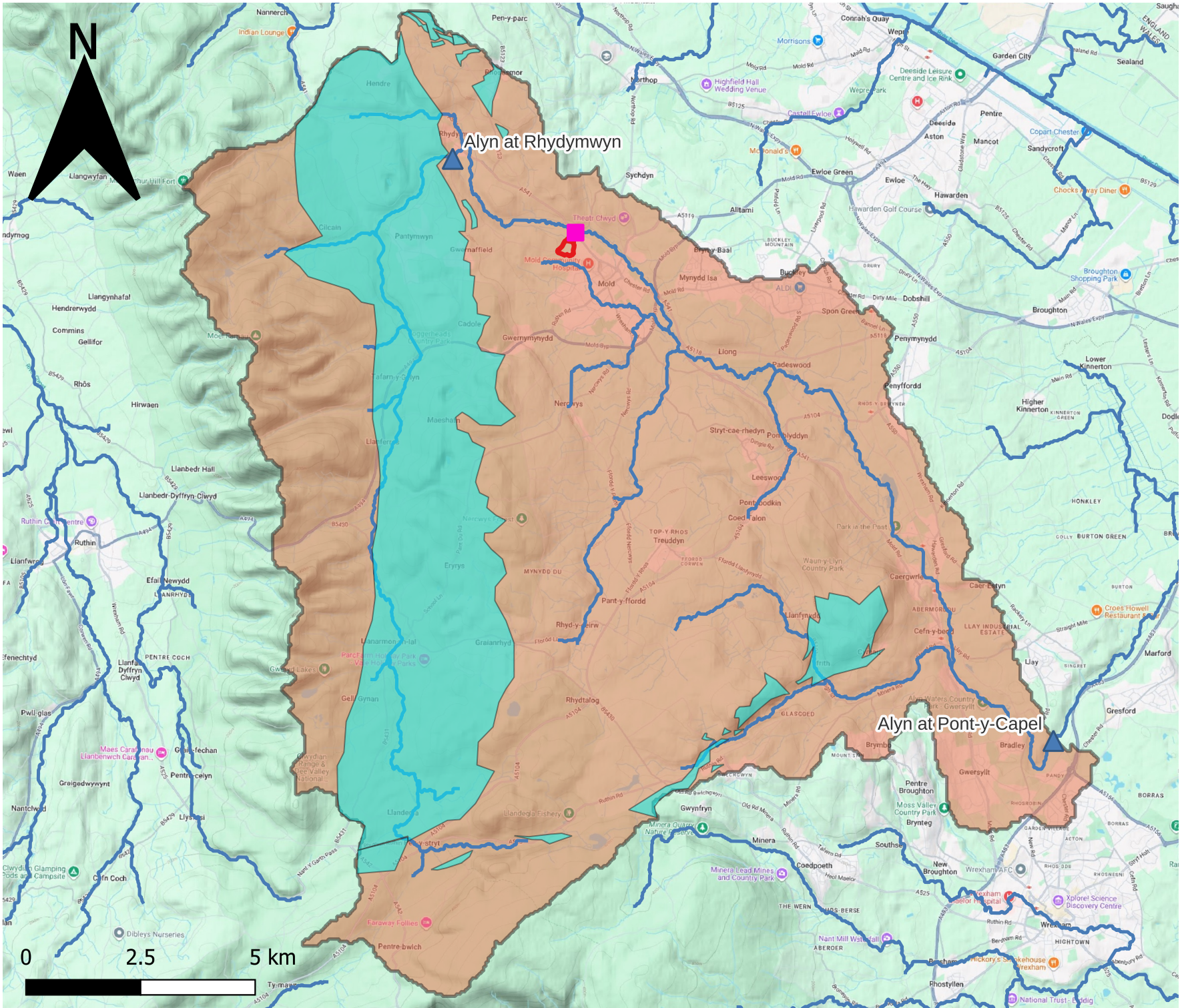


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PROJECT TITLE
GWERNAFFIELD ROAD, MOLD

DRAWING TITLE
67009 - ALYN AT RHYDYMWYN CATCHMENT AREA

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MP	JJL		



KEY

- APPROXIMATE SITE BOUNDARY
- DRAINAGE OUTFLOW
- FLOW STATIONS
- SURFACE WATERCOURSES
- APPROXIMATE LIMESTONE BEDROCK AREA WITHIN CATCHMENT AREA
- 67008 - ALYN AT PONT-Y-CAPEL CATCHMENT

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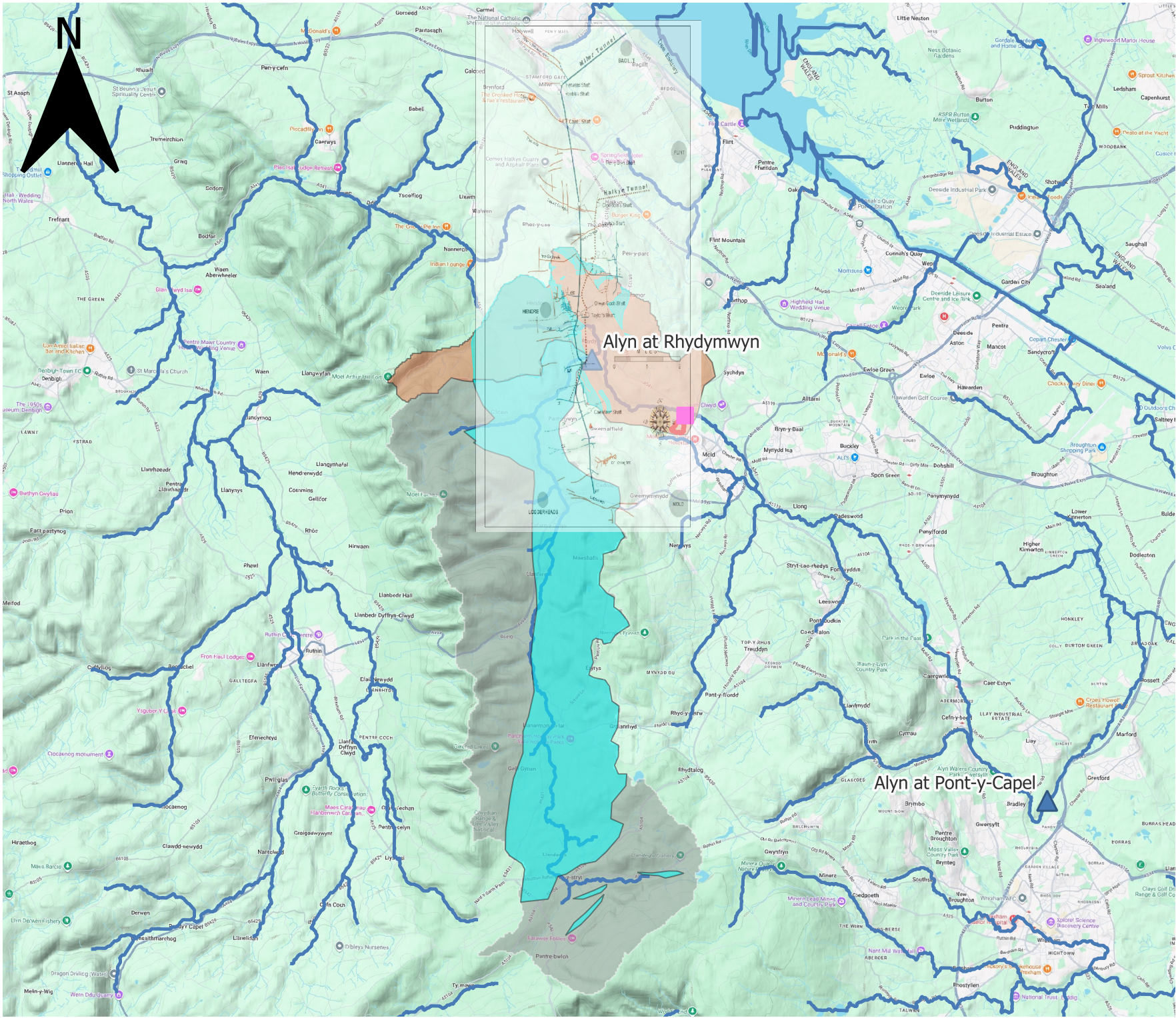


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PROJECT TITLE
GWERNAFFIELD ROAD, MOLD

DRAWING TITLE
67008 - ALYN AT PONT-Y-CAPEL CATCHMENT AREA

DRAWING No. C5984/14	REVISION -	SCALE 1:110000	DATE 31/07/2026
DRAWN BY MP	CHECKED BY JJL		



KEY

- APPROXIMATE SITE BOUNDARY
- DISCHARGE POINT
- FLOW STATIONS
- APPROXIMATE LIMESTONE BEDROCK AREA WITHIN CATCHMENT AREAS
- ESTIMATED SITE CATCHMENT
- 67009 - ALYN AT RHYDYMWM CATCHMENT AREA
- SURFACE WATERCOURSES

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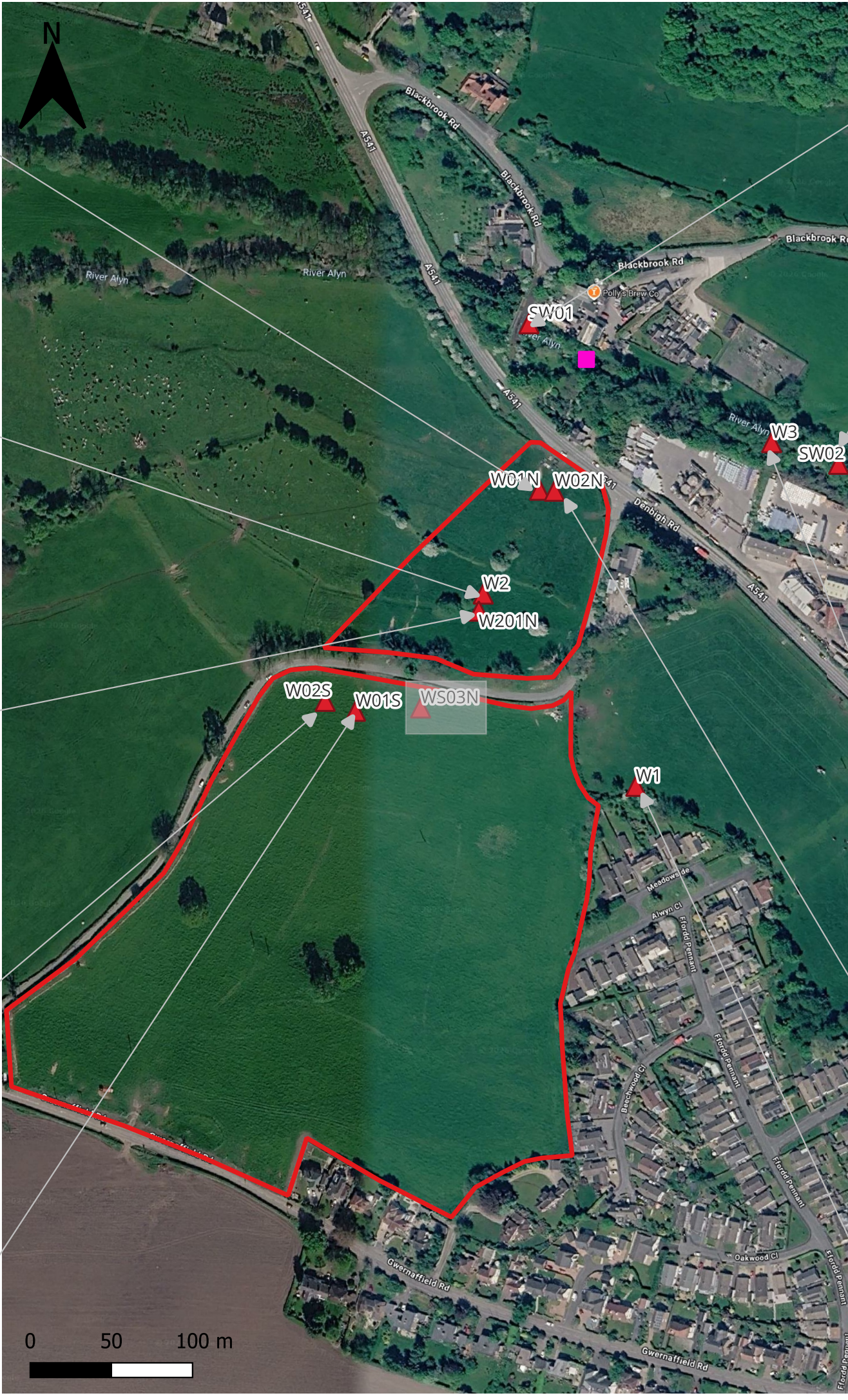


CLIENT
ANWYL HOMES

PROJECT TITLE
GWERNAFFIELD ROAD, MOLD

DRAWING TITLE
APPROXIMATION OF MINE DISCHARGES TUNNELS PLAN

DRAWING No.	REVISION	SCALE	DATE
C5984/15	-	1:145000	03/08/2026
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KEY

APPROXIMATE SITE BOUNDARY

SAMPLING LOCATIONS

DRAINAGE OUTFLOW

NO PHOTOGRAPH

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SOLUTIONS

CLIENT

ANWYL HOMES

PROJECT TITLE

GWERNAFFIELD ROAD, MOLD

DRAWING TITLE

WATER SAMPLING LOCATIONS

DRAWING No.	REVISION	SCALE	DATE
C5984/16	-	1:3000	05/08/2026

DRAWN BY	CHECKED BY
MP	JJL

APPENDIX A

H1 Risk Assessment Screening Test Methodology

H1 Assessment – Stage 1 - Screening Test Methodology

Test 1:

Comparison of predicted concentrations of the potential determinands selected in Section 4.5 from the groundwater discharge against 10% of EQS. Predicted concentrations are based on the average of the data as presented in Appendix D and E. Where potential pollutants have been recorded below the LOD, they have considered to be at a concentration equal to half the LOD.

Following Test 1 some determinands that were recorded below LOD fail the initial screening but have not been carried forward to Test 2 based on a risk-based approach to the likelihood of the pollutant being present (if detected below the LOD) and its reported properties.

Test 2:

For those compounds which exceed 10% of the EQS (fail Test 1), a dilution assessment was undertaken. Test 2 comprises calculation of the Process Contribution (PC – the concentration of a discharged chemical in the water after it has been diluted) with subsequent comparison to 4% of the EQS. The calculation for the derivation of process contribution is presented below:

$$PC = (EFR \times RC) / (EFR + RFR)$$

Where:

PC = Process Contribution

EFR = Effluent Flow Rate (maximum and average calculated values)

RC = Release concentration of the pollutant in the discharge (average calculated values)

RFR = River flow rate (calculated 95% exceedance of receiving streams)

Test 3:

Where the PC was more than 4% of the EQS, Test 3 was conducted. This comprised calculation of the Predicted Environmental Concentration (PEC – which is the summation of the process contribution and Background Concentrations of the pollutant within the receiving streams). If the difference between the PEC and Background Concentration (BC) is greater than 10% of the EQS, modelling by the EA is required. For pollutants where the difference between the PEC and BC is less than 10% of the EQS, Test 4 is applied.

Test 4:

Where the PC was more than 4% of the EQS, Test 4 was also conducted.

Check whether PEC is higher than the EQS. For determinands with MAC EQS compare PEC with EQS for maximum values. If PEC is greater than the EQS Stage 2 modelling is required.

Screening Test “Priority Hazardous Pollutants”:

An additional level of screening is required for priority hazardous pollutants for freshwaters. This encompasses assessment as to whether the annual limit of priority hazardous pollutants in the discharge is more than the significant load limits, as set out

within the guidance. The significant load is calculated by multiplying the average discharge concentration by the average flow, to produce a result in kg/year. Where an exceedance of the significant load limit is identified, the significant load Test needs to be re-applied using “cleaned-up data”. Data clean-up comprises a check as to whether a minimum number of the samples exceed the Minimum Reporting Value (MRV).

APPENDIX B

Laboratory Testing Certificates

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Analytical Report Number : 25-039544

Project / Site name:	Gwarnaffield Road, Mold	Samples received on:	24/07/2025
Your job number:	C5984	Samples instructed on/ Analysis started on:	24/07/2025
Your order number:	C5984 5647 MB	Analysis completed by:	31/07/2025
Report Issue Number:	1	Report issued on:	31/07/2025
Samples Analysed:	3 water samples		



Signed:

Trevor Hill
Customer Service
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting
air	- once the analysis is complete

Excel copies of reports are only valid when accompanied by this PDF certificate.

Retention period for records and reports is minimum 6 years from the date of issue of the final report.
Some records may be kept for longer according to other legal/best practice requirements.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 25-039544
Project / Site name: Gwarnaffield Road, Mold

Your Order No: C5984 5647 MB

Lab Sample Number				626419	626420	626421
Sample Reference				W1	W2	W3
Sample Number				None Supplied	None Supplied	None Supplied
Water Matrix				Other water	Other water	Other water
Depth (m)				None Supplied	None Supplied	None Supplied
Date Sampled				23/07/2025	23/07/2025	23/07/2025
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Water Analysis)	Units	Test Limit of detection	Test Accreditation Status			

General Inorganics

pH (L099)	pH Units	N/A	NONE	7.5	7.4	7.6
Electrical Conductivity at 20°C	µS/cm	10	NONE	170	65	150
Sulphate as SO ₄	mg/l	0.045	NONE	52.1	36.8	43.1
Sulphide	µg/l	5	NONE	< 5.0	< 5.0	< 5.0
Chloride	mg/l	0.15	NONE	34	29	89
Ammoniacal Nitrogen as NH ₄ ⁺	µg/l	15	NONE	37	16	38
Dissolved Organic Carbon (DOC)	mg/l	0.1	NONE	2.33	2.41	1.58
Nitrate as N	mg/l	0.01	NONE	14.4	20.9	10.3
Nitrate as NO ₃	mg/l	0.05	NONE	63.9	92.6	45.8
Nitrite as NO ₂	µg/l	5	NONE	350	23	39
Hardness - Total	mgCaCO ₃ /l	1	NONE	341	380	364

Speciated PAHs

Naphthalene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01
Acenaphthylene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01
Acenaphthene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01
Fluorene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01
Phenanthrene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01
Anthracene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01
Pyrene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01
Chrysene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01

Total PAH

Total EPA-16 PAHs	µg/l	0.16	NONE	< 0.16	< 0.16	< 0.16
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Analytical Report Number: 25-039544
Project / Site name: Gwarnaffield Road, Mold

Your Order No: C5984 5647 MB

Lab Sample Number				626419	626420	626421
Sample Reference				W1	W2	W3
Sample Number				None Supplied	None Supplied	None Supplied
Water Matrix				Other water	Other water	Other water
Depth (m)				None Supplied	None Supplied	None Supplied
Date Sampled				23/07/2025	23/07/2025	23/07/2025
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Water Analysis)	Units	Test Limit of detection	Test Accreditation Status			

Heavy Metals / Metalloids

Arsenic (dissolved)	µg/l	0.15	NONE	0.33	0.22	0.22
Cadmium (dissolved)	µg/l	0.02	NONE	< 0.02	0.12	< 0.02
Chromium (dissolved)	µg/l	0.2	NONE	1.4	0.5	0.3
Copper (dissolved)	µg/l	0.5	NONE	3.9	4.4	4
Lead (dissolved)	µg/l	0.2	NONE	< 0.2	2.6	< 0.2
Manganese (dissolved)	µg/l	0.05	NONE	12	2.6	6.5
Mercury (dissolved)	µg/l	0.05	NONE	0.06	< 0.05	< 0.05
Nickel (dissolved)	µg/l	0.5	NONE	3.2	< 0.5	0.7
Selenium (dissolved)	µg/l	0.6	NONE	1.5	3	1.4
Zinc (dissolved)	µg/l	0.5	NONE	72	32	11

Boron (dissolved)	µg/l	10	NONE	39	28	37
Calcium (dissolved)	mg/l	0.012	NONE	120	140	130
Chromium (hexavalent)	µg/l	5	NONE	< 5.0	< 5.0	< 5.0
Chromium (III)	µg/l	5	NONE	< 5.0	< 5.0	< 5.0

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number : 25-039544

Project / Site name: Gwarnaffield Road, Mold

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters Heating/Cooling (PrW) DI Process Water (DI PrW)

Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in water by ICP-MS (dissolved)	Determination of metals in water by acidification followed by ICP-MS. Accredited matrices: SW, PW, GW, except B - SW, GW, Hg - SW, PW, Al - SW, PW	In-house method based on USEPA Method 6020 & 200.8 for the determination of trace elements in water by ICP-MS	L012B	W	NONE
Sulphide in water	Determination of sulphide in water by ion selective electrode	In-house method	L029-PL	W	NONE
Electrical Conductivity at 20°C in water	Determination of electrical conductivity in water by electrochemical measurement. Accredited matrices: SW, PW, GW, FSE	In-house method	L031B	W	NONE
Dissolved Organic Carbon in water	Determination of dissolved organic carbon in water by TOC/DOC NDIR Analyser. Accredited matrices: SW, PW, GW, FSE, LL	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037B	W	NONE
Metals in water by ICP-OES (dissolved)	Determination of metals in water by acidification followed by ICP-OES. Accredited matrices: SW, PW, GW, FSE, LL; PrW, DI PrW (Al, Cu, Fe, Zn)	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L039B	W	NONE
Total Hardness of water	Determination of total hardness of water by calculation from calcium and magnesium. Accredited matrices: SW, PW, GW, FSE, LL	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L045B	W	NONE
Nitrate as N in water	Determination of nitrate by reaction with sodium salicylate followed by colorimetry. Accredited matrices: SW, PW, GW, FSE, LL	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L078-PL	W	NONE
Nitrate in water	Determination of nitrate by reaction with sodium salicylate followed by colorimetry. Accredited matrices: SW, PW, GW, FSE, LL	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L078-PL	W	NONE
Chromium(III) in water	In-house method by calculation from total Cr and Cr(VI)	In-house method by calculation	L080-PL	W	NONE
Hexavalent chromium in water	Determination of hexavalent chromium in water by acidification, addition of 1,5-diphenylcarbazide, followed by colorimetry. Accredited matrices: SW, PW, GW, FSE, LL	In-house method by continuous flow analyser	L080-PL	W	NONE
Chloride in water	Determination of chloride in water by colorimetry using discrete analyser. Accredited matrices: SW, PW, GW, FSE, LL	In-house based on MEWAM Method ISBN 0117516260	L082B	W	NONE
Ammonium as NH ₄ in water	Determination of ammonium/ammonia/ammoniacal nitrogen by the colorimetric salicylate/nitroprusside method using discrete analyser. Accredited matrices: SW, PW, GW, FSE, LL	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082B	W	NONE
Nitrite in water	Determination of nitrite in water by addition of sulphanilamide and NED followed by colorimetry using discrete analyser. Accredited matrices: SW, PW, GW, FSE, LL	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082B	W	NONE
pH of water at 20°C (automated)	Determination of pH of water by electrochemical measurement. Accredited matrices: SW, PW, GW, FSE, LL	In-house method	L099-PL	W	NONE
Speciated PAHs and/or Semi-volatile organic compounds in water	Determination of semi-volatile organic compounds (including PAHs) in water by extraction in dichloromethane followed by GC-MS. Accredited matrices (PAHs): SW, PW, GW	In-house method based on USEPA 8270	L102B	W	NONE

Analytical Report Number : 25-039544

Project / Site name: Gwarnaffield Road, Mold

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters Heating/Cooling (PrW) DI Process Water (DI PrW)

Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Sulphate in water	Determination of sulphate in water after filtration by acidification followed by ICP-OES. Accredited matrices: SW, PW, GW, PrW, DI PrW, FSE, LL	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L039B	W	NONE

For method numbers ending in 'UK' or 'A' analysis have been carried out in our laboratory in the United Kingdom (Watford).

For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).

For method numbers ending in 'PL' or 'B' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Quality control parameter failure associated with individual result applies to calculated sum of individuals.

The result for sum should be interpreted with caution

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Analytical Report Number : 25-043637

Project / Site name:	Gwernaffield Road, Mold	Samples received on:	15/08/2025
Your job number:	C5984	Samples instructed on/ Analysis started on:	15/08/2025
Your order number:	6769	Analysis completed by:	23/08/2025
Report Issue Number:	1	Report issued on:	25/08/2025
Samples Analysed:	3 soil samples - 2 water samples		



Signed:

Rafał Szczepańczyk
Technical Reviewer
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting
air	- once the analysis is complete

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Some records may be kept for longer according to other legal/best practice requirements.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 25-043637
 Project / Site name: Gwernaffield Road, Mold
 Your Order No: 6769

Lab Sample Number	649574	649575	649576
Sample Reference	TS.SP01.S1	TS.SP01.S2	TS.SP01.S3
Sample Number	None Supplied	None Supplied	None Supplied
Water Matrix	N/A	N/A	N/A
Depth (m)	None Supplied	None Supplied	None Supplied
Date Sampled	14/08/2025	14/08/2025	14/08/2025
Time Taken	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status

Stone Content	%	0.1	NONE	< 0.1	< 0.1	38
Moisture Content	%	0.01	NONE	3.5	2.6	1.8
Total mass of sample received	kg	0.1	NONE	1.2	1.1	1.2

Asbestos

Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	PDO	PDO	PDO
Analysis completed	N/A	N/A	N/A	21/08/2025	21/08/2025	21/08/2025

General Inorganics

pH (L099)	pH Units	N/A	MCERTS	7.1	7.4	7.1
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	32	35	27
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	15.9	17.6	13.4
Organic Matter (automated)	%	0.1	MCERTS	7	6.4	6.7

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	0.09	0.07
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	0.09	0.14	0.12
Pyrene	mg/kg	0.05	MCERTS	0.08	0.16	0.11
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	0.08	0.06
Chrysene	mg/kg	0.05	MCERTS	< 0.05	0.12	0.08
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	0.13	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	0.06	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.1	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	< 0.80	0.87	< 0.80
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Analytical Report Number: 25-043637
Project / Site name: Gwernaffield Road, Mold
Your Order No: 6769

Lab Sample Number	649574			649575	649576
Sample Reference	TS.SP01.S1			TS.SP01.S2	TS.SP01.S3
Sample Number	None Supplied			None Supplied	None Supplied
Water Matrix	N/A			N/A	N/A
Depth (m)	None Supplied			None Supplied	None Supplied
Date Sampled	14/08/2025			14/08/2025	14/08/2025
Time Taken	None Supplied			None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status		

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	12	11	11
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.5	0.4	0.3
Chromium (hexavalent)	mg/kg	1.8	MCERTS	U/S ^{*U/S g}	U/S ^{*U/S g}	U/S ^{*U/S g}
Chromium (III)	mg/kg	1	NONE	U/S	U/S	U/S
Chromium (VI) by IC	mg/kg	1.8	NONE	< 1.80	< 1.80	< 1.80
Chromium (III) by IC	mg/kg	1	NONE	23	22	27
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	23	22	27
Copper (aqua regia extractable)	mg/kg	1	MCERTS	36	34	33
Lead (aqua regia extractable)	mg/kg	1	MCERTS	190	150	160
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	23	23	27
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	1.4	1.1	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	140	110	120

Petroleum Hydrocarbons

TPHCWG - Aliphatic >EC5 - EC6 _{HS_1D_AL}	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010
TPHCWG - Aliphatic >EC5 - EC10 _{HS_1D_AL}	mg/kg	1	NONE	< 1.0	< 1.0	< 1.0
TPHCWG - Aliphatic >EC6 - EC8 _{HS_1D_AL}	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010
TPHCWG - Aliphatic >EC8 - EC10 _{HS_1D_AL}	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010
TPHCWG - Aliphatic >EC10 - EC12 _{EH_CU_1D_AL}	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
TPHCWG - Aliphatic >EC10 - EC16 _{EH_CU_1D_AL}	mg/kg	3	NONE	< 3.0	< 3.0	< 3.0
TPHCWG - Aliphatic >EC12 - EC16 _{EH_CU_1D_AL}	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0
TPHCWG - Aliphatic >EC16 - EC21 _{EH_CU_1D_AL}	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0
TPHCWG - Aliphatic >EC16 - EC35 _{EH_CU_1D_AL}	mg/kg	10	MCERTS	< 10	< 10	< 10
TPHCWG - Aliphatic >EC16 - EC40 _{EH_CU_1D_AL}	mg/kg	10	NONE	< 10	< 10	< 10
TPHCWG - Aliphatic >EC21 - EC35 _{EH_CU_1D_AL}	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0
TPHCWG - Aliphatic >EC35 - EC40 _{EH_CU_1D_AL}	mg/kg	10	NONE	< 10	< 10	< 10
TPHCWG - Aliphatic >EC5 - EC35 _{EH_CU+HS_1D_AL}	mg/kg	10	NONE	< 10	< 10	< 10
TPHCWG - Aliphatic >EC5 - EC40 _{EH_CU+HS_1D_AL}	mg/kg	10	NONE	< 10	< 10	< 10

TPHCWG - Aromatic >EC5 - EC7 _{HS_1D_AR}	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010
TPHCWG - Aromatic >EC5 - EC10 _{HS_1D_AR}	mg/kg	1	NONE	< 1.0	< 1.0	< 1.0
TPHCWG - Aromatic >EC7 - EC8 _{HS_1D_AR}	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010
TPHCWG - Aromatic >EC8 - EC10 _{HS_1D_AR}	mg/kg	0.02	MCERTS	< 0.020	< 0.020	< 0.020
TPHCWG - Aromatic >EC10 - EC12 _{EH_CU_1D_AR}	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
TPHCWG - Aromatic >EC10 - EC16 _{EH_CU_1D_AR}	mg/kg	3	NONE	< 3.0	< 3.0	< 3.0
TPHCWG - Aromatic >EC12 - EC16 _{EH_CU_1D_AR}	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0
TPHCWG - Aromatic >EC16 - EC21 _{EH_CU_1D_AR}	mg/kg	10	MCERTS	< 10	< 10	< 10
TPHCWG - Aromatic >EC16 - EC40 _{EH_CU_1D_AR}	mg/kg	10	NONE	< 10	< 10	< 10
TPHCWG - Aromatic >EC21 - EC35 _{EH_CU_1D_AR}	mg/kg	10	MCERTS	< 10	< 10	< 10
TPHCWG - Aromatic >EC35 - EC40 _{EH_CU_1D_AR}	mg/kg	10	NONE	< 10	< 10	< 10
TPHCWG - Aromatic >EC5 - EC35 _{EH_CU+HS_1D_AR}	mg/kg	10	NONE	< 10	< 10	< 10
TPHCWG - Aromatic >EC5 - EC40 _{EH_CU+HS_1D_AR}	mg/kg	10	NONE	< 10	< 10	< 10

TPH Total >EC5 - EC40 _{EH_CU+HS_1D_TOTAL}	mg/kg	10	NONE	< 10	< 10	< 10
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Analytical Report Number: 25-043637
 Project / Site name: Gwernaffield Road, Mold
 Your Order No: 6769

Lab Sample Number				649574	649575	649576
Sample Reference				TS.SP01.S1	TS.SP01.S2	TS.SP01.S3
Sample Number				None Supplied	None Supplied	None Supplied
Water Matrix				N/A	N/A	N/A
Depth (m)				None Supplied	None Supplied	None Supplied
Date Sampled				14/08/2025	14/08/2025	14/08/2025
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status			

VOCs

MTBE (Methyl Tertiary Butyl Ether)	mg/kg	0.005	MCERTS	< 0.005	< 0.005	< 0.005
Benzene	mg/kg	0.005	MCERTS	< 0.005	< 0.005	< 0.005
Toluene	mg/kg	0.005	MCERTS	< 0.005	< 0.005	< 0.005
Ethylbenzene	mg/kg	0.005	MCERTS	< 0.005	< 0.005	< 0.005
p & m-xylene	mg/kg	0.008	MCERTS	< 0.008	< 0.008	< 0.008
o-Xylene	mg/kg	0.005	MCERTS	< 0.005	< 0.005	< 0.005
Total BTEX	mg/kg	0.01	NONE	< 0.010	< 0.010	< 0.010

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number: 25-043637
Project / Site name: Gwernaffield Road, Mold

Your Order No: 6769

Lab Sample Number				649572	649573
Sample Reference				W01N	W01S
Sample Number				None Supplied	None Supplied
Water Matrix				Other water	Other water
Depth (m)				None Supplied	None Supplied
Date Sampled				14/08/2025	14/08/2025
Time Taken				None Supplied	None Supplied
Analytical Parameter (Water Analysis)	Units	Test Limit of detection	Test Accreditation Status		

General Inorganics

pH (L099)	pH Units	N/A	NONE	7.6	7.6
Electrical Conductivity at 20°C	µS/cm	10	NONE	720	580
Sulphate as SO ₄	mg/l	0.045	NONE	40.9	47
Sulphide	µg/l	5	NONE	< 5.0	< 5.0
Chloride	mg/l	0.15	NONE	31	31
Ammoniacal Nitrogen as NH ₄ ⁺	µg/l	15	NONE	28	150
Dissolved Organic Carbon (DOC)	mg/l	0.1	NONE	2.01	2.33
Nitrate as N	mg/l	0.01	NONE	19.7	11
Nitrate as NO ₃	mg/l	0.05	NONE	87.1	48.6
Nitrite as NO ₂	µg/l	5	NONE	430	2200
Hardness - Total	mgCaCO ₃ /l	1	NONE	373	286

Speciated PAHs

Naphthalene	µg/l	0.01	NONE	< 0.01	< 0.01
Acenaphthylene	µg/l	0.01	NONE	< 0.01	< 0.01
Acenaphthene	µg/l	0.01	NONE	< 0.01	< 0.01
Fluorene	µg/l	0.01	NONE	< 0.01	< 0.01
Phenanthrene	µg/l	0.01	NONE	< 0.01	< 0.01
Anthracene	µg/l	0.01	NONE	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	NONE	< 0.01	< 0.01
Pyrene	µg/l	0.01	NONE	< 0.01	< 0.01
Benzo(a)anthracene	µg/l	0.01	NONE	< 0.01	< 0.01
Chrysene	µg/l	0.01	NONE	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	NONE	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	NONE	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	0.01	NONE	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	NONE	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	NONE	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01	NONE	< 0.01	< 0.01

Total PAH

Total EPA-16 PAHs	µg/l	0.16	NONE	< 0.16	< 0.16
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Heavy Metals / Metalloids

Arsenic (dissolved)	µg/l	0.15	NONE	0.41	0.41
Cadmium (dissolved)	µg/l	0.02	NONE	0.04	< 0.02
Chromium (dissolved)	µg/l	0.2	NONE	0.4	0.6
Copper (dissolved)	µg/l	0.5	NONE	3.3	2.9
Lead (dissolved)	µg/l	0.2	NONE	< 0.2	< 0.2
Manganese (dissolved)	µg/l	0.05	NONE	13	15
Mercury (dissolved)	µg/l	0.05	NONE	< 0.05	< 0.05
Nickel (dissolved)	µg/l	0.5	NONE	2.6	2.1
Selenium (dissolved)	µg/l	0.6	NONE	2.3	2.8
Zinc (dissolved)	µg/l	0.5	NONE	13	2.9



Analytical Report Number: 25-043637
Project / Site name: Gwernaffield Road, Mold

Your Order No: 6769

Lab Sample Number				649572	649573
Sample Reference				W01N	W01S
Sample Number				None Supplied	None Supplied
Water Matrix				Other water	Other water
Depth (m)				None Supplied	None Supplied
Date Sampled				14/08/2025	14/08/2025
Time Taken				None Supplied	None Supplied
Analytical Parameter (Water Analysis)	Units	Test Limit of detection	Test Accreditation Status		

Boron (dissolved)	µg/l	10	NONE	38	51
Calcium (dissolved)	mg/l	0.012	NONE	130	100
Chromium (hexavalent)	µg/l	5	NONE	< 5.0	< 5.0
Chromium (III)	µg/l	5	NONE	< 5.0	< 5.0

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number : 25-043637

Project / Site name: Gwernaffield Road, Mold

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
649574	TS.SP01.S1	None Supplied	None Supplied	Brown sand with gravel
649575	TS.SP01.S2	None Supplied	None Supplied	Brown sand with gravel and vegetation
649576	TS.SP01.S3	None Supplied	None Supplied	Brown sand with stones and vegetation

Analytical Report Number : 25-043637

Project / Site name: Gwernaffield Road, Mold

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters Heating/Cooling (PrW) DI Process Water (DI PrW)

Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in water by ICP-MS (dissolved)	Determination of metals in water by acidification followed by ICP-MS. Accredited matrices: SW, PW, GW, except B - SW, GW, Hg - SW, PW, Al - SW, PW	In-house method based on USEPA Method 6020 & 200.8 for the determination of trace elements in water by ICP-MS	L012B	W	NONE
Sulphide in water	Determination of sulphide in water by ion selective electrode	In-house method	L029-PL	W	NONE
Electrical Conductivity at 20°C in water	Determination of electrical conductivity in water by electrochemical measurement. Accredited matrices: SW, PW, GW, FSE	In-house method	L031B	W	NONE
Dissolved Organic Carbon in water	Determination of dissolved organic carbon in water by TOC/DOC NDIR Analyser. Accredited matrices: SW, PW, GW, FSE, LL	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037B	W	NONE
Metals in water by ICP-OES (dissolved)	Determination of metals in water by acidification followed by ICP-OES. Accredited matrices: SW, PW, GW, FSE, LL; PrW, DI PrW (Al, Cu, Fe, Zn)	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L039B	W	NONE
Total Hardness of water	Determination of total hardness of water by calculation from calcium and magnesium. Accredited matrices: SW, PW, GW, FSE, LL	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L045B	W	NONE
Nitrate as N in water	Determination of nitrate by reaction with sodium salicylate followed by colorimetry. Accredited matrices: SW, PW, GW, FSE, LL	In-house method based on Examination of Water and Wastewater & Polish Standard Method PN-82/C-04579.08	L078-PL	W	NONE
Nitrate in water	Determination of nitrate by reaction with sodium salicylate followed by colorimetry. Accredited matrices: SW, PW, GW, FSE, LL	In-house method based on Examination of Water and Wastewater & Polish Standard Method PN-82/C-04579.08	L078-PL	W	NONE
Chromium(III) in water	In-house method by calculation from total Cr and Cr(VI)	In-house method by calculation	L080-PL	W	NONE
Hexavalent chromium in water	Determination of hexavalent chromium in water by acidification, addition of 1,5-diphenylcarbazide, followed by colorimetry. Accredited matrices: SW, PW, GW, FSE, LL	In-house method by continuous flow analyser	L080-PL	W	NONE
Chloride in water	Determination of chloride in water by colorimetry using discrete analyser. Accredited matrices: SW, PW, GW, FSE, LL	In-house based on MEWAM Method ISBN 0117516260	L082B	W	NONE
Ammonium as NH ₄ in water	Determination of ammonium/ammonia/ammoniacal nitrogen by the colorimetric salicylate/nitroprusside method using discrete analyser. Accredited matrices: SW, PW, GW, FSE, LL	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082B	W	NONE
Nitrite in water	Determination of nitrite in water by addition of sulphanilamide and NED followed by colorimetry using discrete analyser. Accredited matrices: SW, PW, GW, FSE, LL	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082B	W	NONE
pH of water at 20°C (automated)	Determination of pH of water by electrochemical measurement. Accredited matrices: SW, PW, GW, FSE, LL	In-house method	L099-PL	W	NONE
Speciated PAHs and/or Semi-volatile organic compounds in water	Determination of semi-volatile organic compounds (including PAHs) in water by extraction in dichloromethane followed by GC-MS. Accredited matrices (PAHs): SW, PW, GW	In-house method based on USEPA 8270	L102B	W	NONE
Sulphate in water	Determination of sulphate in water after filtration by acidification followed by ICP-OES. Accredited matrices: SW, PW, GW, PrW, DI PrW, FSE, LL	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L039B	W	NONE

Analytical Report Number : 25-043637

Project / Site name: Gwernaffield Road, Mold

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters Heating/Cooling (PrW) DI Process Water (DI PrW)

Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in Soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques	In-house method based on HSG 248, 2021	A001B	D	ISO 17025
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method)	In-house method	L009B	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight	In-house method based on British Standard Methods and MCERTS requirements.	L019B	D	NONE
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L038B	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Sulphate, water soluble, in soil (16hr extraction)	In-house method	L038B	D	MCERTS
BTEX and/or Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS	In-house method based on USEPA 8260	L073B	W	MCERTS
Cr(VI) in soils by Ion chromatography	Determination of hexavalent chromium in alkaline soil extract by use of ion chromatography with spectrophotometric detection	In-house method	L130B	W	NONE
Speciated PAHs and/or Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds (including PAH) in soil by extraction in dichloromethane and hexane followed by GC-MS	In-house method based on USEPA 8270	L064B	D	MCERTS
Total petroleum hydrocarbons with carbon banding by GC-FID in soil	Determination of total petroleum hydrocarbons in soil by GC-FID with carbon banding aliphatic and aromatic	In-house method	L076B	D	MCERTS
Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil (Summed Bands)	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS with carbon banding aliphatic and aromatic (Summed Bands).	Calculation	L076B/L088-PL	D/W	NONE
Chromium III in soil	In-house method by calculation from total Cr and Cr VI	In-house method by calculation	L080-PL/L130B	W	NONE
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in NaOH and addition of 1,5 diphenylcarbazide followed by colorimetry	In-house method	L080-PL	W	MCERTS
Total petroleum hydrocarbons with carbon banding by HS-GC/MS in soil	Determination of total petroleum hydrocarbons in soil by HS-GC/MS with carbon banding aliphatic and aromatic	In-house method	L088-PL	W	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement	In-house method	L099-PL	D	MCERTS

Analytical Report Number : 25-043637

Project / Site name: Gwernaffield Road, Mold

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters Heating/Cooling (PrW) DI Process Water (DI PrW)

Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Soil Descriptions	Textural classification	In-house method	L019B	W	NONE

For method numbers ending in 'UK' or 'A' analysis have been carried out in our laboratory in the United Kingdom (Watford).

For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).

For method numbers ending in 'PL' or 'B' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Quality control parameter failure associated with individual result applies to calculated sum of individuals.

The result for sum should be interpreted with caution

*U/S g- Unsuitable for analysis due to high colour intensity.

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Analytical Report Number : 25-054774

Project / Site name:	Gwernaffield Road Mold	Samples received on:	09/10/2025
Your job number:	C5984	Samples instructed on/ Analysis started on:	09/10/2025
Your order number:	6940	Analysis completed by:	16/10/2025
Report Issue Number:	1	Report issued on:	16/10/2025
Samples Analysed:	3 soil samples - 1 water sample		



Signed:

Trevor Hill
Customer Service
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting
air	- once the analysis is complete

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Retention period for records and reports is minimum 6 years from the date of issue of the final report.
Some records may be kept for longer according to other legal/best practice requirements.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 25-054774
Project / Site name: Gwernaffield Road Mold
Your Order No: 6940

Lab Sample Number	711138	711139	711140
Sample Reference	SS.SP04.S1	SS.SP04.S2	SS.SP04.S3
Sample Number	None Supplied	None Supplied	None Supplied
Water Matrix	N/A	N/A	N/A
Depth (m)	None Supplied	None Supplied	None Supplied
Date Sampled	08/10/2025	08/10/2025	08/10/2025
Time Taken	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status

Stone Content	%	0.1	NONE	20	< 0.1	16.4
Moisture Content	%	0.01	NONE	4.8	8	5.2
Total mass of sample received	kg	0.1	NONE	1.3	0.9	1.3

Asbestos

Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	MJN	MJN	MJN
Analysis completed	N/A	N/A	N/A	15/10/2025	15/10/2025	15/10/2025

General Inorganics

pH (L099)	pH Units	N/A	MCERTS	7.8	7.8	7.8
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	21	14	18
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	10.6	6.85	8.9
Organic Matter (automated)	%	0.1	MCERTS	1.4	1.4	1.7

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	< 0.80	< 0.80	< 0.80
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Analytical Report Number: 25-054774
Project / Site name: Gwernaffield Road Mold
Your Order No: 6940

Lab Sample Number	711138	711139	711140
Sample Reference	SS.SP04.S1	SS.SP04.S2	SS.SP04.S3
Sample Number	None Supplied	None Supplied	None Supplied
Water Matrix	N/A	N/A	N/A
Depth (m)	None Supplied	None Supplied	None Supplied
Date Sampled	08/10/2025	08/10/2025	08/10/2025
Time Taken	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	11	9.8	11
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.3	0.2	0.3
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	< 1.8
Chromium (III)	mg/kg	1	NONE	28	28	28
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	28	28	28
Copper (aqua regia extractable)	mg/kg	1	MCERTS	26	29	32
Lead (aqua regia extractable)	mg/kg	1	MCERTS	58	52	63
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	35	35	36
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	84	78	87

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number: 25-054774
Project / Site name: Gwernaffield Road Mold

Your Order No: 6940

Lab Sample Number				711141
Sample Reference				W201N
Sample Number				None Supplied
Water Matrix				Other water
Depth (m)				None Supplied
Date Sampled				08/10/2025
Time Taken				None Supplied
Analytical Parameter (Water Analysis)	Units	Test Limit of detection	Test Accreditation Status	

General Inorganics

pH (L099)	pH Units	N/A	NONE	7.2
Electrical Conductivity at 20°C	µS/cm	10	NONE	760
Sulphate as SO ₄	mg/l	0.045	NONE	34.7
Sulphide	µg/l	5	NONE	< 5.0
Chloride	mg/l	0.15	NONE	32
Ammoniacal Nitrogen as NH ₄ ⁺	µg/l	15	NONE	15
Dissolved Organic Carbon (DOC)	mg/l	0.1	NONE	1.74
Nitrate as N	mg/l	0.01	NONE	19.6
Nitrate as NO ₃	mg/l	0.05	NONE	86.8
Nitrite as NO ₂	µg/l	5	NONE	< 5.0
Hardness - Total	mgCaCO ₃ /l	1	NONE	415

Speciated PAHs

Naphthalene	µg/l	0.01	NONE	< 0.01
Acenaphthylene	µg/l	0.01	NONE	< 0.01
Acenaphthene	µg/l	0.01	NONE	< 0.01
Fluorene	µg/l	0.01	NONE	< 0.01
Phenanthrene	µg/l	0.01	NONE	< 0.01
Anthracene	µg/l	0.01	NONE	< 0.01
Fluoranthene	µg/l	0.01	NONE	< 0.01
Pyrene	µg/l	0.01	NONE	< 0.01
Benzo(a)anthracene	µg/l	0.01	NONE	< 0.01
Chrysene	µg/l	0.01	NONE	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	NONE	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	NONE	< 0.01
Benzo(a)pyrene	µg/l	0.01	NONE	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	NONE	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	NONE	< 0.01
Benzo(ghi)perylene	µg/l	0.01	NONE	< 0.01

Total PAH

Total EPA-16 PAHs	µg/l	0.16	NONE	< 0.16
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Heavy Metals / Metalloids

Arsenic (dissolved)	µg/l	0.15	NONE	0.18
Cadmium (dissolved)	µg/l	0.02	NONE	0.02
Chromium (dissolved)	µg/l	0.2	NONE	0.4
Copper (dissolved)	µg/l	0.5	NONE	7.4
Lead (dissolved)	µg/l	0.2	NONE	0.5
Manganese (dissolved)	µg/l	0.05	NONE	3.3
Mercury (dissolved)	µg/l	0.05	NONE	< 0.05
Nickel (dissolved)	µg/l	0.5	NONE	0.6
Selenium (dissolved)	µg/l	0.6	NONE	2
Zinc (dissolved)	µg/l	0.5	NONE	31



Analytical Report Number: 25-054774
 Project / Site name: Gwernaffield Road Mold

Your Order No: 6940

Lab Sample Number				711141
Sample Reference				W201N
Sample Number				None Supplied
Water Matrix				Other water
Depth (m)				None Supplied
Date Sampled				08/10/2025
Time Taken				None Supplied
Analytical Parameter (Water Analysis)	Units	Test Limit of detection	Test Accreditation Status	

Boron (dissolved)	µg/l	10	NONE	31
Calcium (dissolved)	mg/l	0.012	NONE	150
Chromium (hexavalent)	µg/l	5	NONE	< 5.0
Chromium (III)	µg/l	5	NONE	< 5.0

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number : 25-054774

Project / Site name: Gwernaffield Road Mold

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
711138	SS.SP04.S1	None Supplied	None Supplied	Brown sandy loam with vegetation and stones
711139	SS.SP04.S2	None Supplied	None Supplied	Brown sand with gravel
711140	SS.SP04.S3	None Supplied	None Supplied	Brown loam and sand with vegetation and stones

Analytical Report Number : 25-054774

Project / Site name: Gwernaffield Road Mold

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters Heating/Cooling (PrW) DI Process Water (DI PrW)

Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in Soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques	In-house method based on HSG 248, 2021	A001B	D	ISO 17025
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method)	In-house method	L009B	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight	In-house method based on British Standard Methods and MCERTS requirements.	L019B	D	NONE
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L038B	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Sulphate, water soluble, in soil (16hr extraction)	In-house method	L038B	D	MCERTS
Speciated PAHs and/or Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds (including PAH) in soil by extraction in dichloromethane and hexane followed by GC-MS	In-house method based on USEPA 8270	L064B	D	MCERTS
Chromium III in soil	In-house method by calculation from total Cr and Cr VI	In-house method by calculation	L080-PL/L130B	W	NONE
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in NaOH and addition of 1,5 diphenylcarbazide followed by colorimetry	In-house method	L080-PL	W	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement	In-house method	L099-PL	D	MCERTS
Soil Descriptions	Textural classification	In-house method	L019B	W	NONE
Metals in water by ICP-MS (dissolved)	Determination of metals in water by acidification followed by ICP-MS. Accredited matrices: SW, PW, GW, except B - SW, GW, Hg - SW, PW, Al - SW, PW	In-house method based on USEPA Method 6020 & 200.8 for the determination of trace elements in water by ICP-MS	L012B	W	NONE
Sulphide in water	Determination of sulphide in water by ion selective electrode	In-house method	L029-PL	W	NONE
Electrical Conductivity at 20°C in water	Determination of electrical conductivity in water by electrochemical measurement. Accredited matrices: SW, PW, GW, FSE	In-house method	L031B	W	NONE
Dissolved Organic Carbon in water	Determination of dissolved organic carbon in water by TOC/DOC NDIR Analyser. Accredited matrices: SW, PW, GW, FSE, LL	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037B	W	NONE
Metals in water by ICP-OES (dissolved)	Determination of metals in water by acidification followed by ICP-OES. Accredited matrices: SW, PW, GW, FSE, LL; PrW, DI PrW (Al, Cu, Fe, Zn)	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L039B	W	NONE

Analytical Report Number : 25-054774

Project / Site name: Gwernaffield Road Mold

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters Heating/Cooling (PrW) DI Process Water (DI PrW)

Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Total Hardness of water	Determination of total hardness of water by calculation from calcium and magnesium. Accredited matrices: SW, PW, GW, FSE, LL	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L045B	W	NONE
Nitrate as N in water	Determination of nitrate by reaction with sodium salicylate followed by colorimetry. Accredited matrices: SW, PW, GW, FSE, LL	In-house method based on Examination of Water and Wastewater & Polish Standard Method PN-82/C-04579.08	L078-PL	W	NONE
Nitrate in water	Determination of nitrate by reaction with sodium salicylate followed by colorimetry. Accredited matrices: SW, PW, GW, FSE, LL	In-house method based on Examination of Water and Wastewater & Polish Standard Method PN-82/C-04579.08	L078-PL	W	NONE
Chromium(III) in water	In-house method by calculation from total Cr and Cr(VI)	In-house method by calculation	L080-PL	W	NONE
Hexavalent chromium in water	Determination of hexavalent chromium in water by acidification, addition of 1,5-diphenylcarbazide, followed by colorimetry. Accredited matrices: SW, PW, GW, FSE, LL	In-house method by continuous flow analyser	L080-PL	W	NONE
Chloride in water	Determination of chloride in water by colorimetry using discrete analyser. Accredited matrices: SW, PW, GW, FSE, LL	In-house based on MEWAM Method ISBN 0117516260	L082B	W	NONE
Ammonium as NH ₄ in water	Determination of ammonium/ammonia/ammoniacal nitrogen by the colorimetric salicylate/nitroprusside method using discrete analyser. Accredited matrices: SW, PW, GW, FSE, LL	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082B	W	NONE
Nitrite in water	Determination of nitrite in water by addition of sulphanilamide and NED followed by colorimetry using discrete analyser. Accredited matrices: SW, PW, GW, FSE, LL	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082B	W	NONE
pH of water at 20°C (automated)	Determination of pH of water by electrochemical measurement. Accredited matrices: SW, PW, GW, FSE, LL	In-house method	L099-PL	W	NONE
Speciated PAHs and/or Semi-volatile organic compounds in water	Determination of semi-volatile organic compounds (including PAHs) in water by extraction in dichloromethane followed by GC-MS. Accredited matrices (PAHs): SW, PW, GW	In-house method based on USEPA 8270	L102B	W	NONE
Sulphate in water	Determination of sulphate in water after filtration by acidification followed by ICP-OES. Accredited matrices: SW, PW, GW, PrW, DI PrW, FSE, LL	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L039B	W	NONE

For method numbers ending in 'UK' or 'A' analysis have been carried out in our laboratory in the United Kingdom (Watford).

For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).

For method numbers ending in 'PL' or 'B' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30°C.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Quality control parameter failure associated with individual result applies to calculated sum of individuals.

The result for sum should be interpreted with caution

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Analytical Report Number : 25-061662

Project / Site name:	Gwenaffield Road Mold	Samples received on:	13/11/2025
Your job number:	C5984	Samples instructed on/ Analysis started on:	13/11/2025
Your order number:	C5984 7084 M8	Analysis completed by:	20/11/2025
Report Issue Number:	1	Report issued on:	21/11/2025
Samples Analysed:	2 water samples		



Signed:

Anna Goc
PL Head of Reporting Team
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting
air	- once the analysis is complete

Excel copies of reports are only valid when accompanied by this PDF certificate.

Retention period for records and reports is minimum 6 years from the date of issue of the final report.
Some records may be kept for longer according to other legal/best practice requirements.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 25-061662
Project / Site name: Gwenaffield Road Mold

Your Order No: C5984 7084 M8

Lab Sample Number	748931	748932
Sample Reference	W02 N	W02 S
Sample Number	None Supplied	None Supplied
Water Matrix	Other water	Other water
Depth (m)	None Supplied	None Supplied
Date Sampled	12/11/2025	12/11/2025
Time Taken	None Supplied	None Supplied
Analytical Parameter (Water Analysis)	Units	Test Limit of detection
		Test Accreditation Status

General Inorganics

pH (L099)	pH Units	N/A	NONE	7.4	7.5
Electrical Conductivity at 20°C	µS/cm	10	NONE	710	730
Sulphate as SO ₄	mg/l	0.045	NONE	35.5	28
Sulphide	µg/l	5	NONE	< 5.0	< 5.0
Chloride	mg/l	0.15	NONE	36	35
Ammoniacal Nitrogen as NH ₄ ⁺	µg/l	15	NONE	< 15	< 15
Dissolved Organic Carbon (DOC)	mg/l	0.1	NONE	2.19	1.48
Nitrate as N	mg/l	0.01	NONE	11.9	14.4
Nitrate as NO ₃	mg/l	0.05	NONE	52.5	64
Nitrite as NO ₂	µg/l	5	NONE	84	< 5.0
Hardness - Total	mgCaCO ₃ /l	1	NONE	385	396

Speciated PAHs

Naphthalene	µg/l	0.01	NONE	< 0.01	< 0.01
Acenaphthylene	µg/l	0.01	NONE	< 0.01	< 0.01
Acenaphthene	µg/l	0.01	NONE	< 0.01	< 0.01
Fluorene	µg/l	0.01	NONE	< 0.01	< 0.01
Phenanthrene	µg/l	0.01	NONE	< 0.01	< 0.01
Anthracene	µg/l	0.01	NONE	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	NONE	< 0.01	< 0.01
Pyrene	µg/l	0.01	NONE	< 0.01	< 0.01
Benzo(a)anthracene	µg/l	0.01	NONE	< 0.01	< 0.01
Chrysene	µg/l	0.01	NONE	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	NONE	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	NONE	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	0.01	NONE	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	NONE	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	NONE	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01	NONE	< 0.01	< 0.01

Total PAH

Total EPA-16 PAHs	µg/l	0.16	NONE	< 0.16	< 0.16
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Heavy Metals / Metalloids

Arsenic (dissolved)	µg/l	0.15	NONE	0.31	< 0.15
Cadmium (dissolved)	µg/l	0.02	NONE	0.03	< 0.02
Chromium (dissolved)	µg/l	0.2	NONE	1	0.5
Copper (dissolved)	µg/l	0.5	NONE	1.7	2.2
Lead (dissolved)	µg/l	0.2	NONE	1.5	< 0.2
Manganese (dissolved)	µg/l	0.05	NONE	14	1.7
Mercury (dissolved)	µg/l	0.05	NONE	< 0.05	< 0.05
Nickel (dissolved)	µg/l	0.5	NONE	1.1	< 0.5
Selenium (dissolved)	µg/l	0.6	NONE	0.9	0.7
Zinc (dissolved)	µg/l	0.5	NONE	19	1.1

Analytical Report Number: 25-061662
Project / Site name: Gwenaffield Road Mold

Your Order No: C5984 7084 M8

Lab Sample Number				748931	748932
Sample Reference				W02 N	W02 S
Sample Number				None Supplied	None Supplied
Water Matrix				Other water	Other water
Depth (m)				None Supplied	None Supplied
Date Sampled				12/11/2025	12/11/2025
Time Taken				None Supplied	None Supplied
Analytical Parameter (Water Analysis)				Units	Test Limit of detection
				Test Accreditation Status	

Boron (dissolved)	µg/l	10	NONE	43	39
Calcium (dissolved)	mg/l	0.012	NONE	140	150
Chromium (hexavalent)	µg/l	5	NONE	< 5.0	< 5.0
Chromium (III)	µg/l	5	NONE	< 5.0	< 5.0

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number : 25-061662

Project / Site name: Gwenaffield Road Mold

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters Heating/Cooling (PrW) DI Process Water (DI PrW)

Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in water by ICP-MS (dissolved)	Determination of metals in water by acidification followed by ICP-MS. Accredited matrices: SW, PW, GW, except B - SW, GW, Hg - SW, PW, Al - SW, PW	In-house method based on USEPA Method 6020 & 200.8 for the determination of trace elements in water by ICP-MS	L012B	W	NONE
Sulphide in water	Determination of sulphide in water by ion selective electrode	In-house method	L029-PL	W	NONE
Electrical Conductivity at 20°C in water	Determination of electrical conductivity in water by electrochemical measurement. Accredited matrices: SW, PW, GW, FSE	In-house method	L031B	W	NONE
Dissolved Organic Carbon in water	Determination of dissolved organic carbon in water by TOC/DOC NDIR Analyser. Accredited matrices: SW, PW, GW, FSE, LL	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037B	W	NONE
Metals in water by ICP-OES (dissolved)	Determination of metals in water by acidification followed by ICP-OES. Accredited matrices: SW, PW, GW, FSE, LL; PrW, DI PrW (Al, Cu, Fe, Zn)	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L039B	W	NONE
Total Hardness of water	Determination of total hardness of water by calculation from calcium and magnesium. Accredited matrices: SW, PW, GW, FSE, LL	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L045B	W	NONE
Nitrate as N in water	Determination of nitrate by reaction with sodium salicylate followed by colorimetry. Accredited matrices: SW, PW, GW, FSE, LL	In-house method based on Examination of Water and Wastewater & Polish Standard Method PN-82/C-04579.08	L078-PL	W	NONE
Nitrate in water	Determination of nitrate by reaction with sodium salicylate followed by colorimetry. Accredited matrices: SW, PW, GW, FSE, LL	In-house method based on Examination of Water and Wastewater & Polish Standard Method PN-82/C-04579.08	L078-PL	W	NONE
Chromium(III) in water	In-house method by calculation from total Cr and Cr(VI)	In-house method by calculation	L080-PL	W	NONE
Hexavalent chromium in water	Determination of hexavalent chromium in water by acidification, addition of 1,5-diphenylcarbazide, followed by colorimetry. Accredited matrices: SW, PW, GW, FSE, LL	In-house method by continuous flow analyser	L080-PL	W	NONE
Chloride in water	Determination of chloride in water by colorimetry using discrete analyser. Accredited matrices: SW, PW, GW, FSE, LL	In-house based on MEWAM Method ISBN 0117516260	L082B	W	NONE
Ammonium as NH4 in water	Determination of ammonium/ammonia/ammoniacal nitrogen by the colorimetric salicylate/nitroprusside method using discrete analyser. Accredited matrices: SW, PW, GW, FSE, LL	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082B	W	NONE
Nitrite in water	Determination of nitrite in water by addition of sulphanilamide and NED followed by colorimetry using discrete analyser. Accredited matrices: SW, PW, GW, FSE, LL	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082B	W	NONE
pH of water at 20°C (automated)	Determination of pH of water by electrochemical measurement. Accredited matrices: SW, PW, GW, FSE, LL	In-house method	L099-PL	W	NONE
Speciated PAHs and/or Semi-volatile organic compounds in water	Determination of semi-volatile organic compounds (including PAHs) in water by extraction in dichloromethane followed by GC-MS. Accredited matrices (PAHs): SW, PW, GW	In-house method based on USEPA 8270	L102B	W	NONE

Analytical Report Number : 25-061662

Project / Site name: Gwenaffield Road Mold

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters Heating/Cooling (PrW) DI Process Water (DI PrW)

Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Sulphate in water	Determination of sulphate in water after filtration by acidification followed by ICP-OES. Accredited matrices: SW, PW, GW, PrW, DI PrW, FSE, LL	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L039B	W	NONE

For method numbers ending in 'UK' or 'A' analysis have been carried out in our laboratory in the United Kingdom (Watford).

For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).

For method numbers ending in 'PL' or 'B' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Quality control parameter failure associated with individual result applies to calculated sum of individuals.

The result for sum should be interpreted with caution

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Analytical Report Number : 25-067572

Project / Site name:	Gwernaffield Road Mold	Samples received on:	15/12/2025
Your job number:	C5984	Samples instructed on/ Analysis started on:	15/12/2025
Your order number:	SM 7175 C5984	Analysis completed by:	18/12/2025
Report Issue Number:	1	Report issued on:	18/12/2025
Samples Analysed:	1 water sample		



Signed:

Anna Goc
PL Head of Reporting Team
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting
air	- once the analysis is complete

Excel copies of reports are only valid when accompanied by this PDF certificate.

Retention period for records and reports is minimum 6 years from the date of issue of the final report.
Some records may be kept for longer according to other legal/best practice requirements.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 25-067572
Project / Site name: Gwernaffield Road Mold

Your Order No: SM 7175 C5984

Lab Sample Number	782583			
Sample Reference	Mold Tank			
Sample Number	WS03 N			
Water Matrix	Other water			
Depth (m)	None Supplied			
Date Sampled	12/12/2025			
Time Taken	None Supplied			
Analytical Parameter (Water Analysis)	Units	Test Limit of detection	Test Accreditation Status	

General Inorganics

pH (L099)	pH Units	N/A	NONE	7.8
Electrical Conductivity at 20°C	µS/cm	10	NONE	610
Sulphate as SO ₄	mg/l	0.045	NONE	32.5
Sulphide	µg/l	5	NONE	< 5.0
Chloride	mg/l	0.15	NONE	37
Ammoniacal Nitrogen as NH ₄ ⁺	µg/l	15	NONE	< 15
Dissolved Organic Carbon (DOC)	mg/l	0.1	NONE	1.07
Nitrate as N	mg/l	0.01	NONE	11.1
Nitrate as NO ₃	mg/l	0.05	NONE	49
Nitrite as NO ₂	µg/l	5	NONE	12
Hardness - Total	mgCaCO ₃ /l	1	NONE	326

Speciated PAHs

Naphthalene	µg/l	0.01	NONE	< 0.01
Acenaphthylene	µg/l	0.01	NONE	< 0.01
Acenaphthene	µg/l	0.01	NONE	< 0.01
Fluorene	µg/l	0.01	NONE	< 0.01
Phenanthrene	µg/l	0.01	NONE	< 0.01
Anthracene	µg/l	0.01	NONE	< 0.01
Fluoranthene	µg/l	0.01	NONE	0.01
Pyrene	µg/l	0.01	NONE	0.02
Benzo(a)anthracene	µg/l	0.01	NONE	< 0.01
Chrysene	µg/l	0.01	NONE	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	NONE	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	NONE	< 0.01
Benzo(a)pyrene	µg/l	0.01	NONE	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	NONE	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	NONE	< 0.01
Benzo(ghi)perylene	µg/l	0.01	NONE	< 0.01

Total PAH

Total EPA-16 PAHs	µg/l	0.16	NONE	< 0.16
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Heavy Metals / Metalloids

Arsenic (dissolved)	µg/l	0.15	NONE	0.19
Cadmium (dissolved)	µg/l	0.02	NONE	< 0.02
Chromium (dissolved)	µg/l	0.2	NONE	0.3
Copper (dissolved)	µg/l	0.5	NONE	2.2
Lead (dissolved)	µg/l	0.2	NONE	0.7
Manganese (dissolved)	µg/l	0.05	NONE	2.1
Mercury (dissolved)	µg/l	0.05	NONE	< 0.05
Nickel (dissolved)	µg/l	0.5	NONE	< 0.5
Selenium (dissolved)	µg/l	0.6	NONE	0.7
Zinc (dissolved)	µg/l	0.5	NONE	1.7

Analytical Report Number: 25-067572
Project / Site name: Gwernaffield Road Mold

Your Order No: SM 7175 C5984

Lab Sample Number				782583
Sample Reference				Mold Tank
Sample Number				WS03 N
Water Matrix				Other water
Depth (m)				None Supplied
Date Sampled				12/12/2025
Time Taken				None Supplied
Analytical Parameter (Water Analysis)	Units	Test Limit of detection	Test Accreditation Status	

Boron (dissolved)	µg/l	10	NONE	41
Calcium (dissolved)	mg/l	0.012	NONE	120
Chromium (hexavalent)	µg/l	5	NONE	< 5.0
Chromium (III)	µg/l	5	NONE	< 5.0

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number : 25-067572

Project / Site name: Gwernaffield Road Mold

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters Heating/Cooling (PrW) DI Process Water (DI PrW)

Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in water by ICP-MS (dissolved)	Determination of metals in water by acidification followed by ICP-MS. Accredited matrices: SW, PW, GW, except B - SW, GW, Hg - SW, PW, Al - SW, PW	In-house method based on USEPA Method 6020 & 200.8 for the determination of trace elements in water by ICP-MS	L012B	W	NONE
Sulphide in water	Determination of sulphide in water by ion selective electrode	In-house method	L029-PL	W	NONE
Electrical Conductivity at 20°C in water	Determination of electrical conductivity in water by electrochemical measurement. Accredited matrices: SW, PW, GW, FSE	In-house method	L031B	W	NONE
Dissolved Organic Carbon in water	Determination of dissolved organic carbon in water by TOC/DOC NDIR Analyser. Accredited matrices: SW, PW, GW, FSE, LL	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037B	W	NONE
Metals in water by ICP-OES (dissolved)	Determination of metals in water by acidification followed by ICP-OES. Accredited matrices: SW, PW, GW, FSE, LL; PrW, DI PrW (Al, Cu, Fe, Zn)	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L039B	W	NONE
Total Hardness of water	Determination of total hardness of water by calculation from calcium and magnesium. Accredited matrices: SW, PW, GW, FSE, LL	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L045B	W	NONE
Nitrate as N in water	Determination of nitrate by reaction with sodium salicylate followed by colorimetry. Accredited matrices: SW, PW, GW, FSE, LL	In-house method based on Examination of Water and Wastewater & Polish Standard Method PN-82/C-04579.08	L078-PL	W	NONE
Nitrate in water	Determination of nitrate by reaction with sodium salicylate followed by colorimetry. Accredited matrices: SW, PW, GW, FSE, LL	In-house method based on Examination of Water and Wastewater & Polish Standard Method PN-82/C-04579.08	L078-PL	W	NONE
Chromium(III) in water	In-house method by calculation from total Cr and Cr(VI)	In-house method by calculation	L080-PL	W	NONE
Hexavalent chromium in water	Determination of hexavalent chromium in water by acidification, addition of 1,5-diphenylcarbazide, followed by colorimetry. Accredited matrices: SW, PW, GW, FSE, LL	In-house method by continuous flow analyser	L080-PL	W	NONE
Chloride in water	Determination of chloride in water by colorimetry using discrete analyser. Accredited matrices: SW, PW, GW, FSE, LL	In-house based on MEWAM Method ISBN 0117516260	L082B	W	NONE
Ammonium as NH ₄ in water	Determination of ammonium/ammonia/ammoniacal nitrogen by the colorimetric salicylate/nitroprusside method using discrete analyser. Accredited matrices: SW, PW, GW, FSE, LL	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082B	W	NONE
Nitrite in water	Determination of nitrite in water by addition of sulphanilamide and NED followed by colorimetry using discrete analyser. Accredited matrices: SW, PW, GW, FSE, LL	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082B	W	NONE
pH of water at 20°C (automated)	Determination of pH of water by electrochemical measurement. Accredited matrices: SW, PW, GW, FSE, LL	In-house method	L099-PL	W	NONE
Speciated PAHs and/or Semi-volatile organic compounds in water	Determination of semi-volatile organic compounds (including PAHs) in water by extraction in dichloromethane followed by GC-MS. Accredited matrices (PAHs): SW, PW, GW	In-house method based on USEPA 8270	L102B	W	NONE

Analytical Report Number : 25-067572

Project / Site name: Gwernaffield Road Mold

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters Heating/Cooling (PrW) DI Process Water (DI PrW)

Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Sulphate in water	Determination of sulphate in water after filtration by acidification followed by ICP-OES. Accredited matrices: SW, PW, GW, PrW, DI PrW, FSE, LL	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L039B	W	NONE

For method numbers ending in 'UK' or 'A' analysis have been carried out in our laboratory in the United Kingdom (Watford).

For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).

For method numbers ending in 'PL' or 'B' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Quality control parameter failure associated with individual result applies to calculated sum of individuals.

The result for sum should be interpreted with caution

Analytical Report Number : 25-067572**Project / Site name: Gwernaffield Road Mold**

This deviation report indicates the sample and test deviations that apply to the samples submitted for analysis. Please note that the associated result(s) may be unreliable and should be interpreted with care.

Key: a - No sampling date b - Incorrect container/Insufficient material provided c - Holding time d - Headspace e - Temperature

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
Mold Tank	WS03 N	W	782583	c	Ammonium as NH4 in water	L082B	c
Mold Tank	WS03 N	W	782583	c	Electrical Conductivity at 20°C in water	L031B	c
Mold Tank	WS03 N	W	782583	c	Nitrite in water	L082B	c
Mold Tank	WS03 N	W	782583	c	pH of water at 20°C (automated)	L099-PL	c



4041

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Analytical Report Number : 26-040255

Project / Site name:	Mold	Samples received on:	24/07/2026
Your job number:	C5984	Samples instructed on/ Analysis started on:	24/07/2026
Your order number:		Analysis completed by:	04/08/2026
Report Issue Number:	1	Report issued on:	04/08/2026
Samples Analysed:	2 water samples		

Signed:

Rachel Chappell
Key Account Manager
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting
air	- once the analysis is complete

Excel copies of reports are only valid when accompanied by this PDF certificate.

Retention period for records and reports is minimum 6 years from the date of issue of the final report.
Some records may be kept for longer according to other legal/best practice requirements.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.



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Analytical Report Number: 26-040255

Project / Site name: Mold

Lab Sample Number				994450	994451
Sample Reference				SW01	SW02
Sample Number				None Supplied	None Supplied
Water Matrix				Surface water	Surface water
Depth (m)				None Supplied	None Supplied
Date Sampled				23/07/2026	23/07/2026
Time Taken				1200	1230
Analytical Parameter (Water Analysis)	Units	Test Limit of detection	Test Accreditation Status		

General Inorganics

pH (L099)	pH Units	N/A	ISO 17025	7.8	7.8
Electrical Conductivity at 20°C	µS/cm	10	ISO 17025	550	610
Sulphate as SO ₄	mg/l	0.045	ISO 17025	22.6	29.5
Sulphide	µg/l	5	NONE	< 5.0	< 5.0
Chloride	mg/l	0.15	ISO 17025	36	44
Ammoniacal Nitrogen as NH ₄ ⁺	µg/l	15	ISO 17025	89	50
Dissolved Organic Carbon (DOC)	mg/l	0.1	ISO 17025	2.6	2.17
Nitrate as N	mg/l	0.01	ISO 17025	3.36	6.93
Nitrate as NO ₃	mg/l	0.05	ISO 17025	14.9	30.7
Nitrite as NO ₂	µg/l	5	ISO 17025	120	100
Hardness - Total	mgCaCO ₃ /l	1	ISO 17025	315	332

Speciated PAHs

Naphthalene	µg/l	0.01	ISO 17025	0.15	< 0.01
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Acenaphthene	µg/l	0.01	ISO 17025	0.03	0.03
Fluorene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Phenanthrene	µg/l	0.01	ISO 17025	0.02	0.02
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	ISO 17025	0.03	< 0.01
Pyrene	µg/l	0.01	ISO 17025	0.02	< 0.01
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01

Total PAH

Total EPA-16 PAHs	µg/l	0.16	ISO 17025	0.25	< 0.16
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Heavy Metals / Metalloids

Arsenic (dissolved)	µg/l	0.15	ISO 17025	0.48	0.59
Cadmium (dissolved)	µg/l	0.02	ISO 17025	0.04	0.02
Chromium (dissolved)	µg/l	0.2	ISO 17025	0.4	0.4
Copper (dissolved)	µg/l	0.5	ISO 17025	2.3	2
Lead (dissolved)	µg/l	0.2	ISO 17025	0.4	0.2
Manganese (dissolved)	µg/l	0.05	ISO 17025	1.2	2.8
Mercury (dissolved)	µg/l	0.05	ISO 17025	< 0.05	< 0.05
Nickel (dissolved)	µg/l	0.5	ISO 17025	< 0.5	< 0.5
Selenium (dissolved)	µg/l	0.6	ISO 17025	< 0.6	< 0.6
Zinc (dissolved)	µg/l	0.5	ISO 17025	3.9	1.8



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Analytical Report Number: 26-040255

Project / Site name: Mold

Lab Sample Number				994450	994451
Sample Reference				SW01	SW02
Sample Number				None Supplied	None Supplied
Water Matrix				Surface water	Surface water
Depth (m)				None Supplied	None Supplied
Date Sampled				23/07/2026	23/07/2026
Time Taken				1200	1230
Analytical Parameter (Water Analysis)				Units	Test Limit of detection
				Test Accreditation Status	

Boron (dissolved)	µg/l	10	ISO 17025	34	30
Calcium (dissolved)	mg/l	0.012	ISO 17025	110	120
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0	< 5.0
Chromium (III)	µg/l	5	NONE	< 5.0	< 5.0

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected



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Analytical Report Number : 26-040255**Project / Site name: Mold****Water matrix abbreviations:****Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters Heating/Cooling (PrW) DI Process Water (DI PrW)****Final Sewage Effluent (FSE) Landfill Leachate (LL)**

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in water by ICP-MS (dissolved)	Determination of metals in water by acidification followed by ICP-MS. Accredited matrices: SW, PW, GW, except B - SW, GW, Hg - SW, PW, Al - SW, PW	In-house method based on USEPA Method 6020 & 200.8 for the determination of trace elements in water by ICP-MS	L012B	W	ISO 17025
Sulphide in water	Determination of sulphide in water by ion selective electrode	In-house method	L029-PL	W	NONE
Electrical Conductivity at 20°C in water	Determination of electrical conductivity in water by electrochemical measurement. Accredited matrices: SW, PW, GW, FSE	In-house method	L031B	W	ISO 17025
Dissolved Organic Carbon in water	Determination of dissolved organic carbon in water by TOC/DOC NDIR Analyser. Accredited matrices: SW, PW, GW, FSE, LL	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037B	W	ISO 17025
Metals in water by ICP-OES (dissolved)	Determination of metals in water by acidification followed by ICP-OES. Accredited matrices: SW, PW, GW, FSE, LL; PrW, DI PrW (Al, Cu, Fe, Zn)	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L039B	W	ISO 17025
Total Hardness of water	Determination of total hardness of water by calculation from calcium and magnesium. Accredited matrices: SW, PW, GW, FSE, LL	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L045B	W	ISO 17025
Nitrate as N in water	Determination of nitrate by reaction with sodium salicylate followed by colorimetry. Accredited matrices: SW, PW, GW, FSE, LL	In-house method based on Examination of Water and Wastewater & Polish Standard Method PN-82/C-04579.08	L078-PL	W	ISO 17025
Nitrate in water	Determination of nitrate by reaction with sodium salicylate followed by colorimetry. Accredited matrices: SW, PW, GW, FSE, LL	In-house method based on Examination of Water and Wastewater & Polish Standard Method PN-82/C-04579.08	L078-PL	W	ISO 17025
Chromium(III) in water	In-house method by calculation from total Cr and Cr(VI)	In-house method by calculation	L080-PL	W	NONE
Hexavalent chromium in water	Determination of hexavalent chromium in water by acidification, addition of 1,5-diphenylcarbazide, followed by colorimetry. Accredited matrices: SW, PW, GW, FSE, LL	In-house method by continuous flow analyser	L080-PL	W	ISO 17025
Chloride in water	Determination of chloride in water by colorimetry using discrete analyser. Accredited matrices: SW, PW, GW, FSE, LL	In-house based on MEWAM Method ISBN 0117516260	L082B	W	ISO 17025
Ammonium as NH ₄ in water	Determination of ammonium/ammonia/ammoniacal nitrogen by the colorimetric salicylate/nitroprusside method using discrete analyser. Accredited matrices: SW, PW, GW, FSE, LL	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082B	W	ISO 17025
Nitrite in water	Determination of nitrite in water by addition of sulphanilamide and NED followed by colorimetry using discrete analyser. Accredited matrices: SW, PW, GW, FSE, LL	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082B	W	ISO 17025
pH of water at 20°C (automated)	Determination of pH of water by electrochemical measurement. Accredited matrices: SW, PW, GW, FSE, LL	In-house method	L099-PL	W	ISO 17025
Speciated PAHs and/or Semi-volatile organic compounds in water	Determination of semi-volatile organic compounds (including PAHs) in water by extraction in dichloromethane followed by GC-MS. Accredited matrices (PAHs): SW, PW, GW	In-house method based on USEPA 8270	L102B	W	ISO 17025



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Analytical Report Number : 26-040255

Project / Site name: Mold

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters Heating/Cooling (PrW) DI Process Water (DI PrW)

Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Sulphate in water	Determination of sulphate in water after filtration by acidification followed by ICP-OES. Accredited matrices: SW, PW, GW, PrW, DI PrW, FSE, LL	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L039B	W	ISO 17025

For method numbers ending in 'UK' or 'A' analysis have been carried out in our laboratory in the United Kingdom (Watford).

For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).

For method numbers ending in 'PL' or 'B' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30°C.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Where coal tar is reported as "indicative/not indicative", PAH source attribution has been assessed using the ratio of parent PAHs to alkylated PAHs to indicate a likely pyrogenic (coal tar-related) or petrogenic (bitumen-related) origin. This assessment is independent of total residue and/or benzo(a)pyrene concentrations and is provided for indicative purposes only; it represents a single line of evidence and does not, in isolation, constitute confirmation or classification as hazardous under WM3 guidance.

Quality control parameter failure associated with individual result applies to calculated sum of individuals.

The result for sum should be interpreted with caution

APPENDIX C

Discharge Concentrations Assessment

Discharge Concentrations / Test 1

			Sample	W1	W2	W01N	W01S	W201N	W02N	W02S	W03 N												
ChemName	Units	AA EQS	Date	23/07/2025	23/07/2025	14/08/2025	14/08/2025	08/10/2025	12/11/2025	12/11/2025	12/12/2025	Detect?	Count Detects	Count Tests	Count <LOD	Standard Deviation	Average	Upper Quartile	Max	Max>EQS?	Max>10% EQS?	Average >10%EQS?	Count >EQS
General Inorganics																							
pH (L099)	pH	No EQS	6-9	7.5	7.4	7.6	7.6	7.2	7.4	7.5	7.8	Yes	8	8	0	0.18	7.5	7.6	7.8	No	No EQS	No EQS	0
Electrical Conductivity at 20°C	µS/cm	No EQS		170	65	720	580	760	710	730	610	Yes	8	8	0	271.17	543	723	760	No	No EQS	No EQS	0
Sulphate as SO ₄	µg/l	400000		52100	36800	40900	47000	34700	35500	28000	32500	Yes	8	8	0	7,887.77	38,438	42,425	52,100	No	Yes	No	0
Sulphide	µg/l	0.25		< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	No	0	8	8	0.00	0.00	0.00	0.00	No	No	No	0
Sulphide - Half LOD	µg/l	0.25		2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	Yes	8	8	0	0.00	2.5	2.5	2.5	Yes	Yes	Yes	8
Chloride	µg/l	No EQS		34000	29000	31000	31000	32000	36000	35000	37000	Yes	8	8	0	2,799.87	33,125	35,250	37,000	No	No EQS	No EQS	0
Ammoniacal Nitrogen as NH ₄ ⁺	µg/l	300		37	16	28	150	15	< 15	< 15	< 15	Yes	5	8	3	57.08	49	37	150	No	Yes	Yes	0
Ammoniacal Nitrogen as NH ₄ ⁺ - Half LOD	µg/l	300		37	16	28	150	15	8	8	8	Yes	8	8	0	48.24	34	30	150	No	Yes	Yes	0
Dissolved Organic Carbon (DOC)	µg/l	No EQS		2330	2410	2010	2330	1740	2190	1480	1070	Yes	8	8	0	478.21	1,945	2,330	2,410	No	No EQS	No EQS	0
Nitrate as N	µg/l	No EQS		14400	20900	19700	11000	19600	11900	14400	11100	Yes	8	8	0	4,114.00	15,375	19,625	20,900	No	No EQS	No EQS	0
Nitrate as NO ₃	µg/l	No EQS		63900	92600	87100	48600	86800	52500	64000	49000	Yes	8	8	0	18,259.24	68,063	86,875	92,600	No	No EQS	No EQS	0
Nitrite as NO ₂	µg/l	No EQS		350	23	430	2200	< 5	84	< 5	12	Yes	6	8	2	843.15	517	410	2,200	No	No EQS	No EQS	0
Hardness - Total	µgCaCO ₃ /l	No EQS		341000	380000	373000	286000	415000	385000	396000	326000	Yes	8	8	0	42,168.88	362,750	387,750	415,000	No	No EQS	No EQS	0
Polycyclic Aromatic Hydrocarbons (PAH)																							
Naphthalene	µg/l	2		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	No	0	8	8	0.000	0.000	0.000	0.000	No	No	No	0
Naphthalene - Half LOD	µg/l	2		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	Yes	8	8	0	0.000	0.005	0.005	0.005	No	No	No	0
Acenaphthylene	µg/l	5.8		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	No	0	8	8	0.000	0.000	0.000	0.000	No	No	No	0
Acenaphthylene - Half LOD	µg/l	5.8		0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	Yes	8	8	0	0.000	0.005	0.005	0.005	No	No	No	0
Acenaphthene	µg/l	No EQS		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	No	0	8	8	0.000	0.000	0.000	0.000	No	No EQS	No EQS	0
Fluorene	µg/l	No EQS		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	No	0	8	8	0.000	0.000	0.000	0.000	No	No EQS	No EQS	0
Phenanthrene	µg/l	No EQS		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	No	0	8	8	0.000	0.000	0.000	0.000	No	No EQS	No EQS	0
Anthracene	µg/l	0.1		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	No	0	8	8	0.000	0.000	0.000	0.000	No	No	No	0
Anthracene - Half LOD	µg/l	0.1		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	Yes	8	8	0	0.000	0.005	0.005	0.005	No	No	No	0
Fluoranthene	µg/l	0.0063		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01	Yes	1	8	7	0.000	0.010	0.010	0.010	Yes	Yes	Yes	1
Fluoranthene - Half LOD	µg/l	0.0063		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.010	Yes	8	8	0	0.002	0.006	0.005	0.010	Yes	Yes	Yes	1
Pyrene	µg/l	No EQS		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.02	Yes	1	8	7	0.000	0.020	0.020	0.020	No	No EQS	No EQS	0
Benzo(a)anthracene	µg/l	No EQS		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	No	0	8	8	0.000	0.000	0.000	0.000	No	No EQS	No EQS	0
Chrysene	µg/l	No EQS		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	No	0	8	8	0.000	0.000	0.000	0.000	No	No EQS	No EQS	0
Benzo(b)fluoranthene	µg/l	No EQS		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	No	0	8	8	0.000	0.000	0.000	0.000	No	No EQS	No EQS	0
Benzo(k)fluoranthene	µg/l	No EQS		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	No	0	8	8	0.000	0.000	0.000	0.000	No	No EQS	No EQS	0
Benzo(a)pyrene	µg/l	0.0017		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	No	0	8	8	0.000	0.000	0.000	0.000	No	No	No	0
Benzo(a)pyrene - Half LOD	µg/l	0.0017		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	Yes	8	8	0	0.000	0.005	0.005	0.005	Yes	Yes	Yes	8
Indeno(1,2,3-cd)pyrene	µg/l	No EQS		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	No	0	8	8	0.000	0.000	0.000	0.000	No	No EQS	No EQS	0
Dibenz(a,h)anthracene	µg/l	No EQS		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	No	0	8	8	0.000	0.000	0.000	0.000	No	No EQS	No EQS	0
Benzo(ghi)perylene	µg/l	No EQS		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	No	0	8	8	0.000	0.000	0.000	0.000	No	No EQS	No EQS	0
Metals																							
Arsenic (dissolved)	µg/l	50		0.33	0.22	0.41	0.41	0.18	0.31	< 0.15	0.19	Yes	7	8	1	0.10	0.29	0.37	0.41	No	No	No	0
Arsenic - Half LOD	µg/l	50		0.33	0.22	0.41	0.41	0.18	0.31	0.08	0.19	Yes	8	8	0	0.12	0.27	0.35	0.41	No	No	No	0
Cadmium (dissolved)	µg/l	0.25		< 0.02	0.12	0.04	< 0.02	0.02	0.03	< 0.02	< 0.02	Yes	4	8	4	0.05	0.05	0.06	0.12	No	Yes	Yes	0
Cadmium - Half LOD	µg/l	0.25		0.01	0.12	0.04	0.01	0.02	0.03	0.01	0.01	Yes	8	8	0	0.04	0.03	0.03	0.12	No	Yes	Yes	0
Chromium (dissolved)	µg/l	No EQS		1.4	0.5	0.4	0.6	0.4	1.0	0.5	0.3	Yes	8	8	0	0.37	0.64	0.70	1.40	No	No EQS	No EQS	0
Copper (dissolved)	µg/l	1		3.9	4.4	3.3	2.9	7.4	1.7	2.2	2.2	Yes	8	8	0	1.82	3.50	4.03	7.40	Yes	Yes	Yes	8
Lead (dissolved)	µg/l	1.2		< 0.2	2.6	< 0.2	< 0.2	0.5	1.5	< 0.2	0.7	Yes	4	8	4	0.95	1.33	1.78	2.60	Yes	Yes	Yes	2
Lead - Half LOD	µg/l	1.2		0.1	2.6	0.1	0.1	0.5	1.5	0.1	0.7	Yes	8	8	0	0.90	0.71	0.90	2.60	Yes	Yes	Yes	2
Manganese (dissolved)	µg/l	123		12.0	2.6	13.0	15.0	3.3	14.0	1.7	2.1	Yes	8	8	0	6.00	7.96	13.25	15.00	No	Yes	No	0
Mercury (dissolved)	µg/l	0.07		0.06	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	Yes	1	8	7	0.00	0.06	0.06	0.06	No	Yes	Yes	0
Mercury - Half LOD	µg/l	0.07		0.060	0.025	0.025	0.025	0.025	0.025	0.025	0.025	Yes	8	8	0	0.012	0.029	0.025	0.060	No	Yes	Yes	0
Nickel (dissolved)	µg/l	4		3.20	< 0.5	2.60	2.10																

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APPENDIX D

Catchment Area Geological/Hydrological Assessment Methodology and River Hydrographs

CATCHMENT AREA GEOLOGICAL/HYDROLOGICAL ASSESSMENT METHODOLOGY

The catchment area for the site was created using QGIS. A digital elevation model (DEM), 30m resolution, was downloaded from European Space Agency [1], a topographic map from Google Maps (n.d.) [2], a stream network from Whitebox Workflows [3], catchment data and flow station locations from National River Flow Archive and UK Centre for Ecology & Hydrology [4], and geological data from British Geological Survey [5].

All the data mentioned above was loaded into QGIS [6]. The catchment data was used to help define the catchments around the stream data. The catchment for the site was then modified using the stream data and the topography data to create a more realistic catchment manually digitising against contour mapping informed by the stream network. Polygons of the limestones were created by hand using BGS data as these are noted by Natural Resources Wales to cause significant losses of flow to the River Alyn via swallow holes.

Areas of non-limestone bedrock located hydraulically upstream of, and draining through, a significant area of limestone (i.e. excluding thin bands) were also classified as low contribution. This is as flow generated in these areas is considered likely to be lost to swallow holes as it passes through the downstream limestone reach before reaching the point of interest. Polygons of these areas were created using the same methodology as the limestone areas.

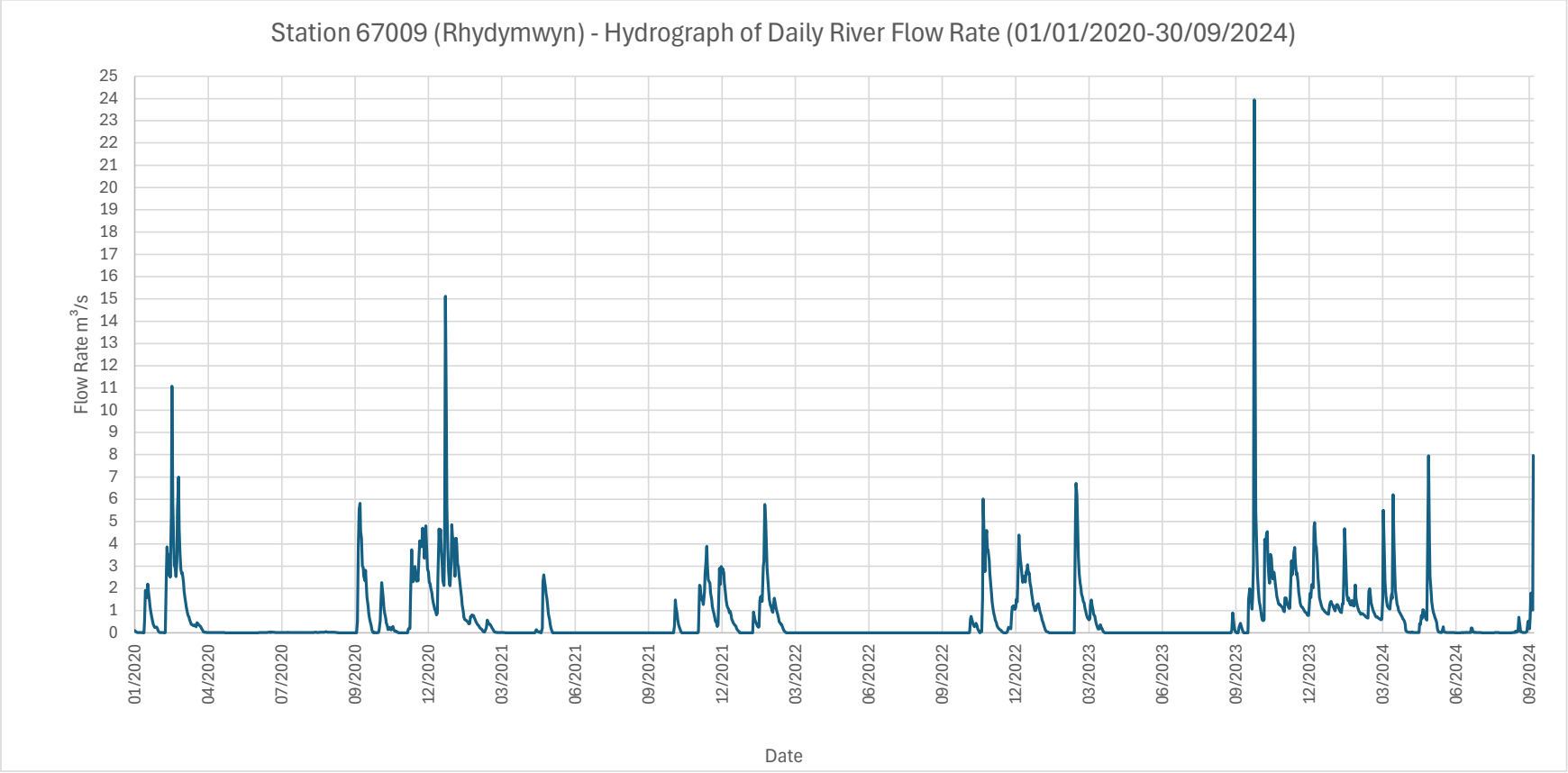
The geometry tool was used on all polygons to calculate the area in m². This was then converted to km² and then calculated as a percentage of the catchment area.

REFERENCES

- [1] European Space Agency (2024). Copernicus Global Digital Elevation Model. Distributed by OpenTopography. <https://doi.org/10.5069/G9028PQB>. (Accessed: 30/07/2026)
- [2] Google Maps (n.d.) Topographic Map. Available at: <https://maps.google.co.uk/?ie=UTF8&ll=53.065048,-4.058933&spn=0.081491,0.222988&t=p&z=13> (Accessed: 30/07/2026)
- [3] Whitebox Workflows for GIS (2026) Vectorised Stream Network. Generated using OpenTopography Hydrologic Terrain Analysis Products from the DEM referenced in [1] (accessed 30/07/2026)
- [4] National River Flow Archive and UK Centre for Ecology & Hydrology (2026) Search Data. Available at: [NRFA station catchment information for 67008 - Alyn at Pont-y-Capel](#) / [NRFA station catchment information for 67009 - Alyn at Rhydymwyn](#) (accessed 30/07/2026).
- [5] British Geological Survey (2026) BGS Geology 50k. Available at: [BGS Geology 50K - British Geological Survey](#) (accessed 30/07/2026).
- [6] QGIS Version 3.44.14, including the following plug-ins:
 - QuickMapServices
 - Advanced Digitizing Toolbar
 - Layer Styling

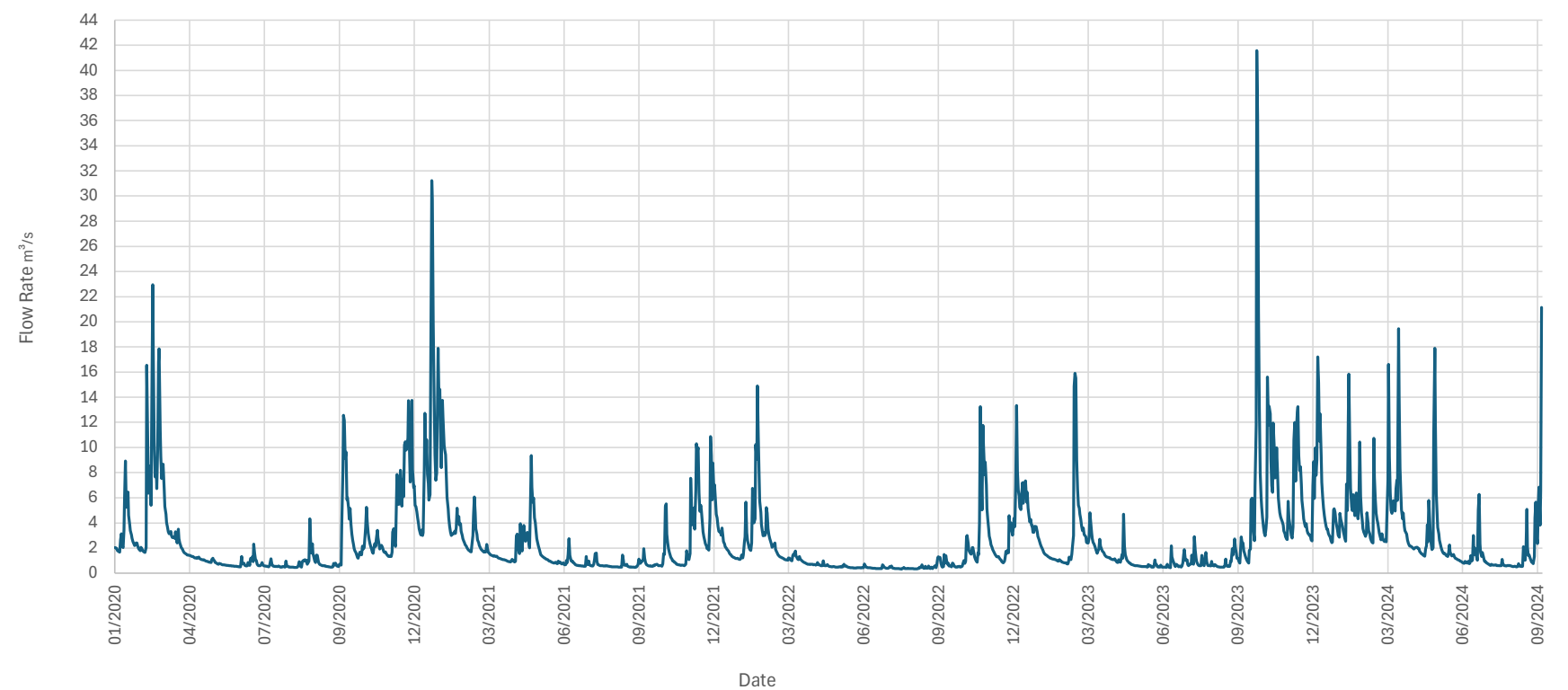
MAXIMUM FLOW RATE	23.94 m ³ /s
AVERAGE FLOW RATE	0.66 m ³ /s
95TH PERCENTILE FLOW RATE	0.00 m ³ /s
5TH PERCENTILE FLOW RATE	3.26 m ³ /s
50TH PERCENTILE FLOW RATE	0.02 m ³ /s

Station 67009 (Rhydymwyn) - Hydrograph of Daily River Flow Rate (01/01/2020-30/09/2024)

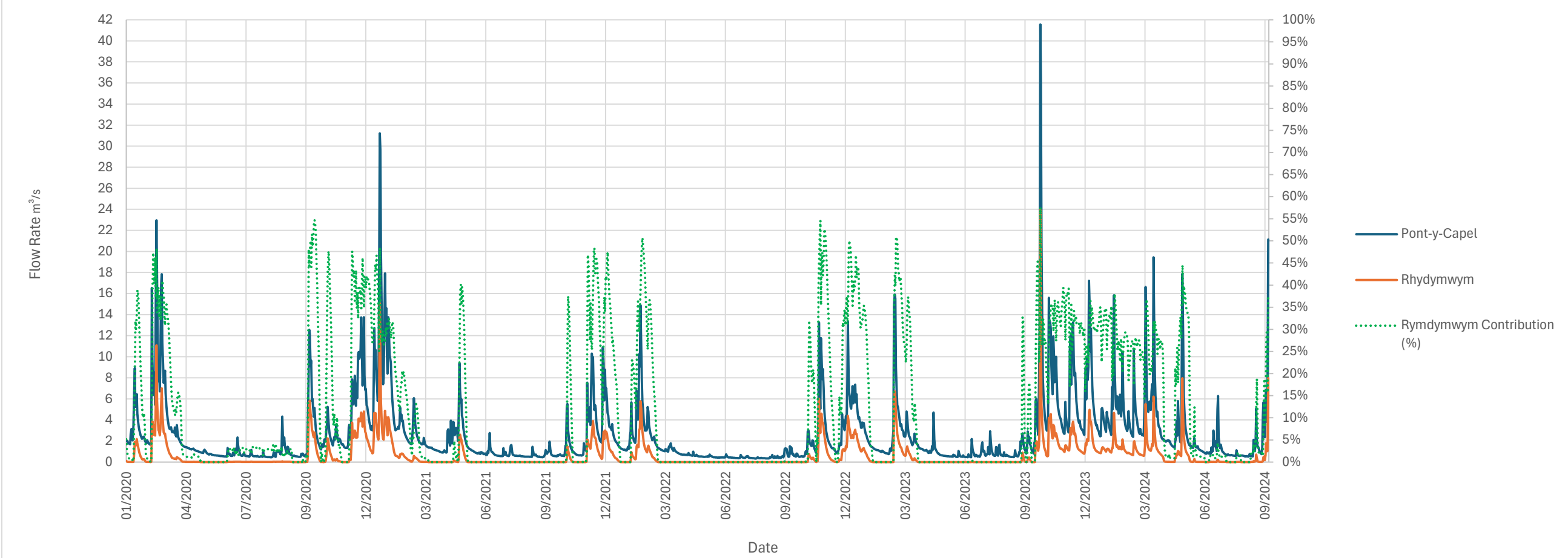


MAXIMUM FLOW RATE	41.56 m ³ /s
AVERAGE FLOW RATE	2.65 m ³ /s
95TH PERCENTILE FLOW RATE	0.45 m ³ /s
5TH PERCENTILE FLOW RATE	9.39 m ³ /s
50TH PERCENTILE FLOW RATE	1.34 m ³ /s

Station 67008 (Pont-y-Capel) - Hydrograph of Daily River Flow Rate (01/01/2020-30/09/2024)



Comparison of Hydrographs of Daily River Flow Rate (01/01/2020 - 30/09/2024)



APPENDIX E

H1 Risk Assessment Tests 1-4 Results

Discharge Concentrations / Test 1

			Sample	W1	W2	W01N	W01S	W201N	W02N	W02S	W03 N												
ChemName	Units	AA EQS	Date	23/07/2025	23/07/2025	14/08/2025	14/08/2025	08/10/2025	12/11/2025	12/11/2025	12/12/2025	Detect?	Count Detects	Count Tests	Count <LOD	Standard Deviation	Average	Upper Quartile	Max	Max>EQS?	Max>10% EQS?	Average >10%EQS?	Count >EQS
General Inorganics																							
pH (L099)	pH	No EQS	6-9	7.5	7.4	7.6	7.6	7.2	7.4	7.5	7.8	Yes	8	8	0	0.18	7.5	7.6	7.8	No	No EQS	No EQS	0
Electrical Conductivity at 20°C	µS/cm	No EQS		170	65	720	580	760	710	730	610	Yes	8	8	0	271.17	543	723	760	No	No EQS	No EQS	0
Sulphate as SO ₄	µg/l	400000		52100	36800	40900	47000	34700	35500	28000	32500	Yes	8	8	0	7,887.77	38,438	42,425	52,100	No	Yes	No	0
Sulphide	µg/l	0.25		< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	No	0	8	8	0.00	0.00	0.00	0.00	No	No	No	0
Sulphide - Half LOD	µg/l	0.25		2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	Yes	8	8	0	0.00	2.5	2.5	2.5	Yes	Yes	Yes	8
Chloride	µg/l	No EQS		34000	29000	31000	31000	32000	36000	35000	37000	Yes	8	8	0	2,799.87	33,125	35,250	37,000	No	No EQS	No EQS	0
Ammoniacal Nitrogen as NH ₄ ⁺	µg/l	300		37	16	28	150	15	< 15	< 15	< 15	Yes	5	8	3	57.08	49	37	150	No	Yes	Yes	0
Ammoniacal Nitrogen as NH ₄ ⁺ - Half LOD	µg/l	300		37	16	28	150	15	8	8	8	Yes	8	8	0	48.24	34	30	150	No	Yes	Yes	0
Dissolved Organic Carbon (DOC)	µg/l	No EQS		2330	2410	2010	2330	1740	2190	1480	1070	Yes	8	8	0	478.21	1,945	2,330	2,410	No	No EQS	No EQS	0
Nitrate as N	µg/l	No EQS		14400	20900	19700	11000	19600	11900	14400	11100	Yes	8	8	0	4,114.00	15,375	19,625	20,900	No	No EQS	No EQS	0
Nitrate as NO ₃	µg/l	No EQS		63900	92600	87100	48600	86800	52500	64000	49000	Yes	8	8	0	18,259.24	68,063	86,875	92,600	No	No EQS	No EQS	0
Nitrite as NO ₂	µg/l	No EQS		350	23	430	2200	< 5	84	< 5	12	Yes	6	8	2	843.15	517	410	2,200	No	No EQS	No EQS	0
Hardness - Total	µgCaCO ₃ /l	No EQS		341000	380000	373000	286000	415000	385000	396000	326000	Yes	8	8	0	42,168.88	362,750	387,750	415,000	No	No EQS	No EQS	0
Polycyclic Aromatic Hydrocarbons (PAH)																							
Naphthalene	µg/l	2		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	No	0	8	8	0.000	0.000	0.000	0.000	No	No	No	0
Naphthalene - Half LOD	µg/l	2		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	Yes	8	8	0	0.000	0.005	0.005	0.005	No	No	No	0
Acenaphthylene	µg/l	5.8		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	No	0	8	8	0.000	0.000	0.000	0.000	No	No	No	0
Acenaphthylene - Half LOD	µg/l	5.8		0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	Yes	8	8	0	0.000	0.005	0.005	0.005	No	No	No	0
Acenaphthene	µg/l	No EQS		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	No	0	8	8	0.000	0.000	0.000	0.000	No	No EQS	No EQS	0
Fluorene	µg/l	No EQS		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	No	0	8	8	0.000	0.000	0.000	0.000	No	No EQS	No EQS	0
Phenanthrene	µg/l	No EQS		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	No	0	8	8	0.000	0.000	0.000	0.000	No	No EQS	No EQS	0
Anthracene	µg/l	0.1		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	No	0	8	8	0.000	0.000	0.000	0.000	No	No	No	0
Anthracene - Half LOD	µg/l	0.1		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	Yes	8	8	0	0.000	0.005	0.005	0.005	No	No	No	0
Fluoranthene	µg/l	0.0063		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01	Yes	1	8	7	0.000	0.010	0.010	0.010	Yes	Yes	Yes	1
Fluoranthene - Half LOD	µg/l	0.0063		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.010	Yes	8	8	0	0.002	0.006	0.005	0.010	Yes	Yes	Yes	1
Pyrene	µg/l	No EQS		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.02	Yes	1	8	7	0.000	0.020	0.020	0.020	No	No EQS	No EQS	0
Benzo(a)anthracene	µg/l	No EQS		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	No	0	8	8	0.000	0.000	0.000	0.000	No	No EQS	No EQS	0
Chrysene	µg/l	No EQS		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	No	0	8	8	0.000	0.000	0.000	0.000	No	No EQS	No EQS	0
Benzo(b)fluoranthene	µg/l	No EQS		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	No	0	8	8	0.000	0.000	0.000	0.000	No	No EQS	No EQS	0
Benzo(k)fluoranthene	µg/l	No EQS		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	No	0	8	8	0.000	0.000	0.000	0.000	No	No EQS	No EQS	0
Benzo(a)pyrene	µg/l	0.0017		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	No	0	8	8	0.000	0.000	0.000	0.000	No	No	No	0
Benzo(a)pyrene - Half LOD	µg/l	0.0017		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	Yes	8	8	0	0.000	0.005	0.005	0.005	Yes	Yes	Yes	8
Indeno(1,2,3-cd)pyrene	µg/l	No EQS		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	No	0	8	8	0.000	0.000	0.000	0.000	No	No EQS	No EQS	0
Dibenz(a,h)anthracene	µg/l	No EQS		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	No	0	8	8	0.000	0.000	0.000	0.000	No	No EQS	No EQS	0
Benzo(ghi)perylene	µg/l	No EQS		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	No	0	8	8	0.000	0.000	0.000	0.000	No	No EQS	No EQS	0
Metals																							
Arsenic (dissolved)	µg/l	50		0.33	0.22	0.41	0.41	0.18	0.31	< 0.15	0.19	Yes	7	8	1	0.10	0.29	0.37	0.41	No	No	No	0
Arsenic - Half LOD	µg/l	50		0.33	0.22	0.41	0.41	0.18	0.31	0.08	0.19	Yes	8	8	0	0.12	0.27	0.35	0.41	No	No	No	0
Cadmium (dissolved)	µg/l	0.25		< 0.02	0.12	0.04	< 0.02	0.02	0.03	< 0.02	< 0.02	Yes	4	8	4	0.05	0.05	0.06	0.12	No	Yes	Yes	0
Cadmium - Half LOD	µg/l	0.25		0.01	0.12	0.04	0.01	0.02	0.03	0.01	0.01	Yes	8	8	0	0.04	0.03	0.03	0.12	No	Yes	Yes	0
Chromium (dissolved)	µg/l	No EQS		1.4	0.5	0.4	0.6	0.4	1.0	0.5	0.3	Yes	8	8	0	0.37	0.64	0.70	1.40	No	No EQS	No EQS	0
Copper (dissolved)	µg/l	1		3.9	4.4	3.3	2.9	7.4	1.7	2.2	2.2	Yes	8	8	0	1.82	3.50	4.03	7.40	Yes	Yes	Yes	8
Lead (dissolved)	µg/l	1.2		< 0.2	2.6	< 0.2	< 0.2	0.5	1.5	< 0.2	0.7	Yes	4	8	4	0.95	1.33	1.78	2.60	Yes	Yes	Yes	2
Lead - Half LOD	µg/l	1.2		0.1	2.6	0.1	0.1	0.5	1.5	0.1	0.7	Yes	8	8	0	0.90	0.71	0.90	2.60	Yes	Yes	Yes	2
Manganese (dissolved)	µg/l	123		12.0	2.6	13.0	15.0	3.3	14.0	1.7	2.1	Yes	8	8	0	6.00	7.96	13.25	15.00	No	Yes	No	0
Mercury (dissolved)	µg/l	0.07		0.06	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	Yes	1	8	7	0.00	0.06	0.06	0.06	No	Yes	Yes	0
Mercury - Half LOD	µg/l	0.07		0.060	0.025	0.025	0.025	0.025	0.025	0.025	0.025	Yes	8	8	0	0.012	0.029	0.025	0.060	No	Yes	Yes	0
Nickel (dissolved)	µg/l	4		3.20	< 0.5	2.60	2.10																

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Test 1 - Summary

Chemical Group	Determinand	Units	EQS (AA)	Average Concentration of Determinand (RC)	Is RC >10% EQS?	Progress to Test 2?	Rationale for Not Moving to Test 2
General Inorganics	Sulphate as SO ₄	µg/l	400,000	38,438	No	No	Passes Test 1 - not taken forward to Test 2
	Sulphide	µg/l	0.25	2.50	Yes	No	Recorded as <LOD in all locations. No significant source identified.
	Ammoniacal Nitrogen as NH ₄ ⁺	µg/l	300	34	Yes	Yes	N/A - Taken forward to Test 2
PAH	Naphthalene	µg/l	2	0.005	No	No	Passes Test 1 - not taken forward to Test 2
	Acenaphthylene	µg/l	5.8	0.005	No	No	Passes Test 1 - not taken forward to Test 2
	Anthracene	µg/l	0.1	0.005	No	No	Passes Test 1 - not taken forward to Test 2
	Fluoranthene	µg/l	0.0063	0.006	Yes	Yes	N/A - Taken forward to Test 2
	Benzo(a)pyrene	µg/l	0.0017	0.005	Yes	No	Recorded as <LOD in all locations. No significant source identified.
Metals	Arsenic	µg/l	50	0.27	No	No	Passes Test 1 - not taken forward to Test 2
	Boron	µg/l	2,000	38.75	No	No	Passes Test 1 - not taken forward to Test 2
	Cadmium	µg/l	0.25	0.03	Yes	Yes	N/A - Taken forward to Test 2
	Chromium III	µg/l	4.7	2.50	Yes	No	Recorded as <LOD in all locations.
	Chromium VI	µg/l	3.4	2.50	Yes	No	Average concentration of Total Chromium (dissolved) is 0.64µg/l, below the EQS
	Copper	µg/l	1	3.50	Yes	Yes	N/A - Taken forward to Test 2
	Lead	µg/l	1.2	0.71	Yes	Yes	N/A - Taken forward to Test 2
	Manganese	µg/l	123	7.96	No	No	Passes Test 1 - not taken forward to Test 2
	Mercury	µg/l	0.07	0.03	Yes	Yes	N/A - Taken forward to Test 2
	Nickel	µg/l	4	1.29	Yes	Yes	N/A - Taken forward to Test 2
	Zinc ¹	µg/l	14.80	21.59	Yes	Yes	N/A - Taken forward to Test 2
Other	pH	pH units	6-9	7.50	N/A	N/A	All results within range of pH 7.2-7.8

	Bioavailable metal
	MAC EQS only

¹ AA EQS = 10.9 (bioavailable) + background concentration

Produced By	Checked By
JJL	MP/LC

Background Data - River Alyn

			Location	Upstream of Discharge	Downstream of Discharge	Statistics											
			Sample	SW01	SW02												
ChemName	Unit	AA EQS	Date	23/07/2026	23/07/2026	Detect?	Count Detects	Count Tests	Count <LOD	Standard Deviation	Average	Upper Quartile	Max	Max>EQS?	Max>10% EQS?	Average >10%EQS?	Count >EQS
General Inorganics																	
pH (L099)	pH	No EQS	6-9	7.8	7.8	Yes	2	2	0	0.00	7.80	7.80	7.80	No	No EQS	No EQS	0
Electrical Conductivity at 20°C	µS/cm	No EQS		550	610	Yes	2	2	0	42.43	580	595	610	No	No EQS	No EQS	0
Sulphate as SO ₄	µg/l	400000		22600	29500	Yes	2	2	0	4,879.04	26,050	27,775	29,500	No	No	No	0
Sulphide	µg/l	0.25		< 5	< 5	No	0	2	2	0.00	0.00	0.00	0.00	No	No	No	0
Sulphide - LOD or half EQS	µg/l	0.25		0.125	0.125	Yes	2	2	0	0.00	0.125	0.125	0.125	No	Yes	Yes	0
Chloride	µg/l	No EQS		36000	44000	Yes	2	2	0	5,656.85	40,000	42,000	44,000	No	No EQS	No EQS	0
Ammoniacal Nitrogen as NH ₄ ⁺	µg/l	300		89	50	Yes	2	2	0	27.58	69.5	79	89	No	Yes	Yes	0
Dissolved Organic Carbon (DOC)	µg/l	No EQS		2600	2170	Yes	2	2	0	304	2,385	2,492.5	2,600	No	No EQS	No EQS	0
Nitrate as N	µg/l	No EQS		3360	6930	Yes	2	2	0	2,524	5,145	6,037.5	6,930	No	No EQS	No EQS	0
Nitrate as NO ₃	µg/l	No EQS		14900	30700	Yes	2	2	0	11,172	22,800	26,750	30,700	No	No EQS	No EQS	0
Nitrite as NO ₂	µg/l	No EQS		120	100	Yes	2	2	0	14.14	110	115	120	No	No EQS	No EQS	0
Hardness - Total	ugCaCO3/l	No EQS		315000	332000	Yes	2	2	0	12,021	323,500	327,750	332,000	No	No EQS	No EQS	0
Polycyclic Aromatic Hydrocarbons (PAH)																	
Naphthalene	µg/l	2		0.15	< 0.01	Yes	1	2	1	0.000	0.150	0.150	0.150	No	No	No	0
Naphthalene - LOD or half EQS	µg/l	2		0.15	0.01	Yes	2	2	0	0.099	0.080	0.115	0.150	No	No	No	0
Acenaphthylene	µg/l	5.8		< 0.01	< 0.01	No	0	2	2	0.000	0.000	0.000	0.00000	No	No	No	0
Acenaphthylene - LOD or half EQS	µg/l	5.8		0.01	0.01	Yes	2	2	0	0.000	0.010	0.010	0.010	No	No	No	0
Acenaphthene	µg/l	No EQS		0.03	0.03	Yes	2	2	0	0.000	0.030	0.030	0.030	No	No EQS	No EQS	0
Fluorene	µg/l	No EQS		< 0.01	< 0.01	No	0	2	2	0.000	0.000	0.000	0.000	No	No EQS	No EQS	0
Phenanthrene	µg/l	No EQS		0.02	0.02	Yes	2	2	0	0.000	0.020	0.020	0.020	No	No EQS	No EQS	0
Anthracene	µg/l	0.1		< 0.01	< 0.01	No	0	2	2	0.000	0.000	0.000	0.000	No	No	No	0
Anthracene - LOD or half EQS	µg/l	0.1		0.01	0.01	Yes	2	2	0	0.000	0.010	0.010	0.010	No	No	No	0
Fluoranthene	µg/l	0.0063		0.03	< 0.01	Yes	1	2	1	0.0000	0.0300	0.0300	0.0300	Yes	Yes	Yes	1
Fluoranthene - LOD or half EQS	µg/l	0.0063		0.0300	0.0032	Yes	2	2	0	0.0190	0.0166	0.0233	0.0300	Yes	Yes	Yes	1
Pyrene	µg/l	No EQS		0.02	< 0.01	Yes	1	2	1	0.000	0.020	0.020	0.020	No	No EQS	No EQS	0
Benzo(a)anthracene	µg/l	No EQS		< 0.01	< 0.01	No	0	2	2	0.000	0.000	0.000	0.000	No	No EQS	No EQS	0
Chrysene	µg/l	No EQS		< 0.01	< 0.01	No	0	2	2	0.000	0.000	0.000	0.000	No	No EQS	No EQS	0
Benzo(b)fluoranthene	µg/l	No EQS		< 0.01	< 0.01	No	0	2	2	0.000	0.000	0.000	0.000	No	No EQS	No EQS	0
Benzo(k)fluoranthene	µg/l	No EQS		< 0.01	< 0.01	No	0	2	2	0.000	0.000	0.000	0.000	No	No EQS	No EQS	0
Benzo(a)pyrene	µg/l	0.0017		< 0.01	< 0.01	No	0	2	2	0.00000	0.00000	0.00000	0.00000	No	No	No	0
Benzo(a)pyrene - LOD or half EQS	µg/l	0.0017		0.00085	0.00085	Yes	2	2	0	0.00000	0.00085	0.00085	0.00085	No	Yes	Yes	0
Indeno(1,2,3-cd)pyrene	µg/l	No EQS		< 0.01	< 0.01	No	0	2	2	0.000	0.000	0.000	0.000	No	No EQS	No EQS	0
Dibenz(a,h)anthracene	µg/l	No EQS		< 0.01	< 0.01	No	0	2	2	0.000	0.000	0.000	0.000	No	No EQS	No EQS	0
Benzo(ghi)perylene	µg/l	No EQS		< 0.01	< 0.01	No	0	2	2	0.000	0.000	0.000	0.000	No	No EQS	No EQS	0
Metals																	
Arsenic (dissolved)	µg/l	50		0.48	0.59	Yes	2	2	0	0.08	0.54	0.56	0.59	No	No	No	0
Cadmium (dissolved)	µg/l	0.25		0.04	0.02	Yes	2	2	0	0.01	0.03	0.04	0.04	No	Yes	Yes	0
Chromium (dissolved)	µg/l	No EQS		0.4	0.4	Yes	2	2	0	0.00	0.40	0.40	0.40	No	No EQS	No EQS	0
Copper (dissolved)	µg/l	1		2.3	2.0	Yes	2	2	0	0.21	2.15	2.23	2.30	Yes	Yes	Yes	2
Lead (dissolved)	µg/l	1.2		0.4	0.2	Yes	2	2	0	0.14	0.30	0.35	0.40	No	Yes	Yes	0
Manganese (dissolved)	µg/l	123		1.2	2.8	Yes	2	2	0	1.13	2.00	2.40	2.80	No	No	No	0
Mercury (dissolved)	µg/l	0.07		< 0.05	< 0.05	No	0	2	2	0.00	0.00	0.00	0.00	No	No	No	0
Mercury - LOD or half EQS	µg/l	0.07		0.035	0.035	Yes	2	2	0	0.00	0.035	0.035	0.035	No	Yes	Yes	0
Nickel (dissolved)	µg/l	4		< 0.5	< 0.5	No	0	2	2	0.00	0.00	0.00	0.00	No	No	No	0
Nickel - LOD or half EQS	µg/l	4		0.50	0.50	Yes	2	2	0	0.00	0.50	0.50	0.50	No	Yes	Yes	0
Selenium (dissolved)	µg/l	No EQS		< 0.6	< 0.6	No	0	2	2	0.00	0.00	0.00	0.00	No	No EQS	No EQS	0
Zinc (dissolved)	µg/l	14.80		3.90	1.80	Yes	2	2	0	1.48	2.85	3.38	3.90	No	Yes	Yes	0
Boron (dissolved)	µg/l	2000		34.00	30.00	Yes	2	2	0	2.83	32	33	34	No	No	No	0
Calcium (dissolved)	µg/l	No EQS		110000.00	120000.00	Yes	2	2	0	7,071	115,000	117,500	120,000	No	No EQS	No EQS	0
Chromium (hexavalent)	µg/l	3.4		< 5.0	< 5.0	No	0	2	2	0.00	0.00	0.00	0.00	No	No	No	0
Chromium (hexavalent) - LOD or half EQS	µg/l	3.4		1.70	1.70	Yes	2	2	0	0.00	1.70	1.70	1.70	No	Yes	Yes	0
Chromium (III)	µg/l	4.7		< 5.0	< 5.0	No	0	2	2	0.00	0.00	0.00	0.00	No	No	No	0
Chromium (III) - LOD or half EQS	µg/l	4.7		2.35	2.35	Yes	2	2	0	0.00	2.35	2.35	2.35	No	Yes	Yes	0

Produced By	Checked By
JJL	MP/LC

Tests 2-4

Chemical Group	Determinand	Discharge Concentration of Determinand (RC)		EQS		Flow Rate Data			Test 2				Test 3						Test 4	
						Effluent Flow Rate (EFR)		Q ₉₅ River Flow Rate (RFR)	4% of EQS	Process Contribution (PC)		Average PC > 4% EQS?	Background Concentration (BC)	Predicted Environmental Concentration (PEC)		Average PEC - BC	10% of EQS	PEC - BC > 10% EQS?	Average PEC > AA EQS?	Maximum PEC > MAC EQS?
						(m³/s)				(µg/l)				(µg/l)						
		Average	Max	AA	MAC	Average	Max	(m³/s)	(µg/l)	Average	Max		(µg/l)	Average	Max	(µg/l)	(µg/l)			
Inorganics	Ammoniacal Nitrogen as NH ₄ ⁺	34	150	300	-	0.01	0.015	0.04	12	6.713	40.909	No	-	-	-	-	-	-	-	-
PAH	Fluoranthene	0.006	0.010	0.0063	0.12	0.01	0.015	0.04	0.000252	0.0011	0.0027	Yes	0.03	0.025	0.025	-0.005	0.001	No	Yes	No
Metals	Cadmium	0.03	0.12	0.25	-	0.01	0.015	0.04	0.01	0.0063	0.0327	No	-	-	-	-	-	-	-	-
	Copper	3.50	7.40	1	-	0.01	0.015	0.04	0.04	0.700	2.018	Yes	2.3	2.540	3.691	0.240	0.100	Yes	Yes	N/A
	Lead	0.71	2.60	1.2	14	0.01	0.015	0.04	0.048	0.143	0.709	Yes	0.4	0.463	1.000	0.062	0.120	No	No	No
	Mercury ¹	0.03	0.06	-	0.07	0.01	0.015	0.04	0.0028	0.006	0.016	Yes	0.035	0.034	0.042	-0.001	0.007	No	No	No
	Nickel	1.29	3.20	4	34	0.01	0.015	0.04	0.16	0.259	0.873	Yes	0.50	0.659	1.236	0.159	0.400	No	No	No
	Zinc ²	21.59	72.00	14.80	-	0.01	0.015	0.04	0.592	4.318	19.636	Yes	3.90	7.438	22.473	3.538	1.480	Yes	No	N/A

Bioavailable metal

1 No AA EQS available - comparisons to MAC EQS only

2 AA EQS = 10.9 (bioavailable) + background concentration

Produced By	Checked By
JJL	MP/LC

APPENDIX F

Significant Load Test Results

Significant Load Test

Determinand	Average RC		Average EFR		Number of Discharge Days Per Annum	Calculated Significant Load	Significant Load Limit	Calculated Load > Load Limit?
	(µg/l)	(kg/l)	(m ³ /s)	(l/d)				
Cadmium	0.031250	3.13E-11	0.01	864,000	365	0.00986	5	No
Mercury	0.029375	2.94E-11	0.01	864,000	365	0.00926	1	No
Fluoranthene	0.005625	5.63E-12	0.01	864,000	365	0.00177	5	No

Produced By	Checked By
JJL	MP/LC

APPENDIX G

Bio-Met Assessment Results

INPUT (MONITORING) DATA				Optional Input; Required for bioavailable metal concentration and RCR	Optional Input; Required for bioavailable metal concentration and RCR	Required	Required	At least One Required		RESULTS (Copper) with EQSbioav = 1 µg/L								RESULTS (Zinc) with EQSbioav = 10.9 µg/L					
ID	Sample Name	Sample Number	Date	Measured Copper Conc (dissolved) [µg/L]	Measured Zinc Conc (dissolved) [µg/L]	pH	DOC [mg/L]	Ca [mg/L]	Hardness (mg/l)	Local HC5 (dissolved) [µg/L]	BioF	Bioavailable Copper Conc [µg/L]	RCR	Warnings	Guidance	Local HC5 (dissolved) [µg/L]	BioF	Bioavailable Zinc Conc (µg/L)	RCR	Warnings	Guidance	All metals - DOC flag	
1	SW01	1	23/07/2026			7.80	2.60	110.0	315.00	9.84	0.10					62.35	0.17						
2	Discharge	2	-			7.50	1.95	129.0	362.75	8.52	0.12					89.98	0.12						

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