6 Water

6.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) addresses the magnitude of potential impacts to, and the significance of effects on, surface water and/or the groundwater receptors from the Proposed Project. It considers groundwater levels, flow regime, groundwater and surface water quality and surface water flow.

The Proposed Project is the restoration of disused quarry lands using clean soil and stone. The Application Site (also referred to as 'Site') includes a disused quarry void and associated historical working areas. It also includes a private access road that connects the disused quarry to the public road network, and agricultural lands to the east that road where it is proposed to locate the temporary facilities required to manage the importation of clean soil and stone required for the Proposed Project.

All lands within the Application Site and EIA Boundary are within the ownership of the Applicant, Bison Quarries Ltd (BQL).

This EIAR is submitted in support of an application under Section 37L of the Planning and Development Act 2000, as amended.

The following assessment was prepared by Kit Pannell (BSc, MSc). Kit is a hydrogeologist with over 11 years' experience, with focus on regulatory reporting within the mining industry.

The assessment was reviewed by Richard Thompson (BSc Geo, PGeo, EurGeol). Richard is Associate Director and a chartered geologist with over 17 years of experience, has specialist expertise in hydrogeology.

6.1.1 Technical Scope

The technical scope of this assessment is to consider the potential impacts and effects of the Proposed Project on the water environment that can be reasonably foreseen as consequences of the normal construction phase and restoration phase of the Proposed Project. The assessment considers the potential sources of change resulting from Proposed Project activities detailed in the project description (Chapter 2) on hydrological (surface water) receptors and hydrogeological (groundwater) receptors.

The assessment also considers the potential effects on people (including health) as a result of predicted changes to water quality, and the potential secondary effects of changes in land quality on water quality. As such, it draws on the assessment presented in Chapter 5 (Land, Geology and Soils). Secondary effects on ecology or biodiversity as a result of changes in water quality are considered in Chapter 4 (Ecology and Biodiversity).

6.1.2 Geographical and Temporal Scope

The geographical study area for the assessment covers the Proposed Project area and a buffer zone that extends to 1 km from the EIA Boundary (see Figure 6-1). This study area allows for the identification of nearby off-site water features that may be affected by changes associated with the Proposed Development.

The temporal scope of the assessment covers the 10-year construction phase. This comprises enabling works required to install the temporary site facilities and entrance/internal private access road upgrades required for the Proposed Project.

A restoration phase largely comprising aftercare and maintenance activities, broadly following the construction phase infilling works, has been scoped out of this assessment, due to the nature of the works to be carried out in the project phase and the short-term nature of the phase having limited potential to impact sensitive water receptors.

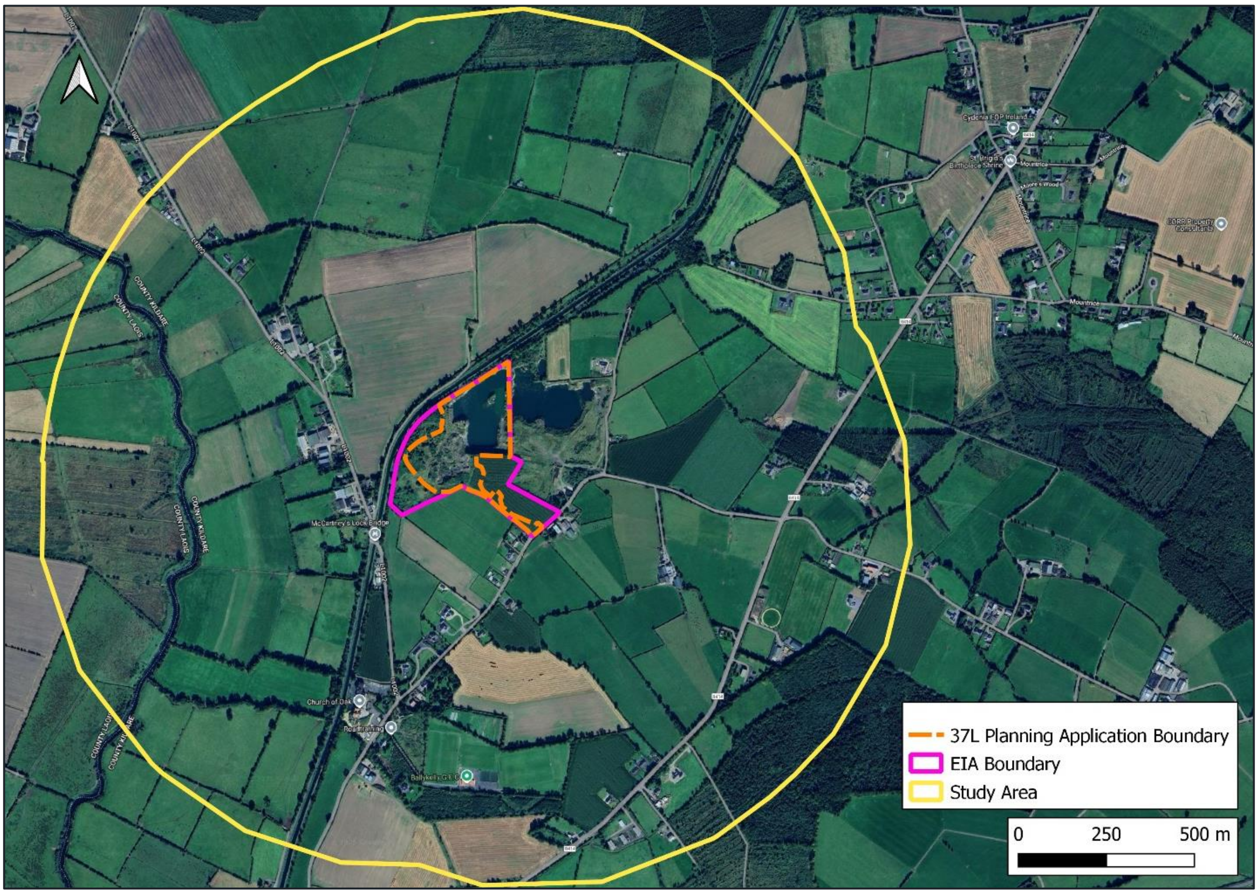

Figure 6-1 - Application Site (indicated by the 37L Planning Application Boundary in the figure key) and EIA Boundary overlain on Google Satellite Imagery

6.1.3 Project Description Summary

The Proposed Project consists of the restoration of lands through the import of approximately 720,000 tonnes clean soil and stone as by-product (non-waste) from development sites to infill a disused historical quarry and raise ground levels to tie in with ground levels of surrounding land.

Restoration of the lands will be to agricultural grassland, an artificial waterbody, and a hedgerow habitat with the lands returned to their pre-extraction agricultural use.

The proposed duration of infilling is 10 years depending on market conditions for the anticipated acceptance of clean soil and stone, and a further 3 years for the completion of final restoration activities.

The Application Site is located in the townland of Coolsickin or Quinsborough, Co Kildare. The Application Site is accessed by a privately-owned access road connecting to a local road (L7049).

The following temporary facilities will be installed and maintained during the life of the Proposed Project:

- office and fully serviced welfare facilities;
- weighbridge and associated portacabin;
- closed-system wheel wash;
- 6 no. parking bays;
- 2 no. waste inspection bays and 1 no. bunded waste quarantine area;
- hardstanding area (vehicle movement and storage);
- surface water drainage infrastructure from hard standing and discharge to ground, including 2 no. interceptors and 2 no. soakaways;
- Security features, including security gates and fencing; and,
- Power supply. It is intended that approval will be sought for a connection to the ESB Network for the office and fully serviced welfare facilities. Diesel generators will be used to power mobile lighting, if required.

The Proposed Project site entrance and private access road will be upgraded and realigned. These will be retained following to completion of the Proposed Project.

A full project description in provided in Chapter 2 of this EIAR.

6.2 Policy and Legislation Context

This section addresses the legislation and guidance that has been considered when preparing this chapter, and key policy context relevant to the water environment that has guided the focus of the assessment. The overarching EIAR legislation under which this assessment is required is addressed separately in Chapter 1 (Introduction, Scope and Methodology).

6.2.1 Legislation

This assessment has been made with cognisance to relevant legislation, including but not limited to:

- The Local Government (Water Pollution) Act 1977 (as amended) and associated Statutory Instrument Regulations made under that Act outline the general prohibition of entry of polluting matter to water, the requirement to licence both trade and sewage effluent discharges, licencing of water abstractions, controlling discharges to aquifers, and notification of accidental damages.
- The European Union (EU) Water Framework Directive (WFD) (2000/60/EC) is the European legislation that establishes a framework for the protection of groundwater and surface water, including the establishment of river basin districts, the requirement to prevent further deterioration by preventing or limiting inputs of pollutants into groundwater, reducing pollution, and promoting sustainable water use. The Groundwater Daughter Directive (GWDD) (2006/118/EC) sits beneath the WFD and relates to water protection and management. It establishes measures to prevent and control groundwater pollution, including criteria for assessing good chemical status and identifying trends.
- The WFD and GWDD have been transposed into Irish law by means of many Regulations. These Regulations cover governance, the shape of the WFD characterisation, monitoring, and status assessment programmes in terms of assigning responsibilities for the monitoring of different water categories, determining the quality elements and undertaking the characterisation and classification assessments. They include, but are not limited to, the following:
  - European Communities (Water Policy) Regulations 2003 and its subsequent amendments;
  - European Communities Environmental Objectives (Surface Waters) Regulations, 2009 and its subsequent amendments;
  - European Communities Environmental Objectives (Groundwater) Regulations, 2010 and its subsequent amendments; and
  - European Communities (Technical Specifications for the Chemical Analysis and Monitoring of Water Status) Regulations 2011.

Many of these regulations contain threshold values or environmental quality standards which, when exceeded, can reflect a degradation in water quality. A degradation in water quality can be reflective of negative effects caused by a project or development, but it should be noted that a poor water quality can be naturally occurring due to the environmental setting or from upgradient sources.

The EU Directive on the Assessment and Management of Flood Risks (2007/60/EC) is transposed into Irish law by the European Communities (Assessment and Management of Flood Risks) Regulations 2010 and its subsequent amendment. The aim of the legislation is to reduce the adverse consequences of flooding on human health and the environment, and it outlines the requirements for flood risk assessments to be completed as part of the planning process.

6.2.2 Relevant Policies and Plans

The Kildare County Development Plan (CDP) 2023–2029 is the strategy document for County Kildare which covers the temporal scope of this assessment period. The key policies and objectives of this plan are listed in Section 2.9.4 of the Project Description (Chapter 2).

6.2.3 Relevant Guidance

Guidance relating to the EIA process that has been used to guide the assessment of potential impacts to the water environment and the identification of relevant mitigation includes:

- Relevant European Commission guidance – Guidance on the Preparation of the Environmental Impact Assessment Report (2017).
- EPA Guidelines on the Information to be Contained in Environmental Impact Assessment Reports, Environmental Protection Agency (May 2022).
- Institute of Geologists of Ireland (IGI) Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements (April 2013).
- CIRIA C532: Control of water pollution from construction sites. Guidance for consultants and contractors (2001).
- CIRIA Environmental good practice on site guide (First Edition 1999).
- The EPA guidelines on Environmental Management in the Extractive Industry (Non-Scheduled Minerals) (2006), for a more environmentally sustainable quarry & pit industrial sector, greater protection for the environment and human health.
- The CIRIA guidance Publication C532 Control of water pollution from construction sites: guidance for consultants and contractors (2001), which provides advice on environmental good practice for the control of water pollution arising from construction activities.

6.3 Assessment Methodology and Significance Criteria

This section presents the method used to assess the impacts and effects of the Proposed Project on the water environment and to secondary human health receptors from changes to the water environment. It establishes the stages of the assessment, and the qualitative criteria used to assess impact magnitude and determine the level of effect significance.

6.3.1 Qualitative Assessment Method

The assessment of potential effects has been undertaken using the qualitative assessment method outlined below. The assessment is supported by the available baseline condition information and recent monitoring and survey data collected. The assessment follows a staged approach with a summary of the stages involved below:

1) Confirm baseline conditions – determine baseline and develop conceptual site model by consideration of available records and data sets, site reports and published information.
2) Confirm the key receptors and their value/importance.
3) Qualitatively characterise the magnitude of impacts on the receptors – describe what potential changes could occur to each receptor as a result of the Proposed Project, identify source-pathway receptor linkages, and assign the magnitudes of impact. This stage considers embedded design mitigation, good practice in construction environment management and pollution prevention.
4) Determine the initial effect significance of each potential impact on each sensitive receptor.
5) Consider the need for additional mitigation, if it is considered necessary to reduce the initial magnitude of the impact and associated effect significance further.
6) Assess the residual impact magnitude and residual effect significance after all mitigation is applied.
7) Identify any monitoring that may be required to measure the success of the remedial measures.

Stages 1 and 2 have been completed using published literature, guidance, and available information specific to the Proposed Project, which is presented in Chapter 2 of this EIAR. For the identification of receptor value/importance that completes Stage 2 and the description of impact magnitude (Stage 3), a common framework of assessment criteria and terminology has been used based on the EPA's draft Guidelines on the Information to be Contained in EIARs (EPA, 2022), along with modifications based on the additional guidance outlined in Section 6.2.3, such as those by the NRA and IGI. The descriptions for sensitivity of receptors are provided in Table 6-1 and the descriptions for magnitude of impact are provided in Table 6-2.

The potential for an impact to occur at a receptor has been determined using the understanding of the baseline environment and its properties and consideration of whether there is a feasible linkage between a source of impact and each receptor (i.e. a conceptual site model).

Table 6-1 – Environmental Value (Sensitivity) and Descriptions

Value (sensitivity) of Receptor / Resource	**Typical Description**
High	High importance and rarity, national scale, and limited potential for substitution. For example: ▪ Global/European/National designation.

Value (sensitivity) of Receptor / Resource	**Typical Description**
	▪ Human health. ▪ WFD river designation of ‘High’ and in hydraulic connectivity with the Site. ▪ Regionally important aquifer with multiple wellfields. ▪ Inner source protection area for a regional resource. ▪ Regionally important potable water source supplying >2500 homes (surface water or aquifer). ▪ Floodplain protecting more than 50 residential or commercial properties or nationally important infrastructure (e.g. motorways/national roads) from flooding.
Medium	Medium or high importance and rarity, regional scale, limited potential for substitution. For example: ▪ Regionally important sites. ▪ Regionally important aquifer. ▪ WFD river designation of ‘Good’ or ‘Moderate’” and in hydraulic connectivity with the Site. ▪ Outer source protection area for a regional resource. ▪ Locally important potable water source supplying >1000 homes (surface water or aquifer). ▪ Floodplain protecting between 6 and 50 residential or commercial properties or regionally important infrastructure (e.g. regional roads) from flooding.
Low	Low or medium importance and rarity, local scale. For example: ▪ Locally important aquifer. ▪ WFD river designation of ‘Poor’ or ‘Bad’ and in hydraulic connectivity with the Site. ▪ Outer source protection area for a local resource. ▪ Local potable water source supplying >50 homes (surface water or aquifer). ▪ Floodplain protecting between 2 and 5 residential or commercial properties or locally important infrastructure (e.g. local roads) from flooding.
Negligible	Very low importance and rarity, local scale. For example: ▪ Environmental equilibrium is stable and is resilient to impacts that are greater than natural fluctuations, without detriment to its present character. ▪ Poorly productive aquifer. ▪ Any WFD river quality designation not in hydraulic connectivity with the Site.

Value (sensitivity) of Receptor / Resource	Typical Description
	▪ Local potable water source supplying <50 homes (surface water or aquifer). ▪ Floodplain protecting up to 1 residential or commercial properties from flooding.

Table 6-2 – Magnitude of Impact and Typical Descriptions

Magnitude of impact (change)		Typical description
High	Adverse	▪ Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements. ▪ Significant harm to human health - death, disease, serious injury, genetic mutation, birth defects or the impairment of reproductive functions. ▪ Significant harm to buildings/infrastructure/plant - Structural failure, substantial damage or substantial interference with any right of occupation. ▪ Significant pollution of the water environment, as defined by: ▪ A breach of, or failure to meet any statutory quality standard for the water environment at an appropriate pollution assessment point. ▪ A breach of, or a failure to meet, any operational standard adopted by EPA for the protection of the water environment. ▪ Pollution results in an increase in treatment required for an existing drinking water supply. ▪ Pollution results in an increased level of treatment required of water abstracted for industrial purposes. ▪ Pollution results in deterioration in the status of a water body, failure to meet good status objectives defined by the Water Framework Directive, or failure of a protected drinking water area to meet its objectives as defined by the Water Framework Directive. ▪ There is a significant and sustained upwards trend in concentration of pollutants in groundwater being affected by the land in question. ▪ There is a material and adverse impact on the economic, social and/or amenity use associated with a particular water environment.
	Beneficial	▪ Large scale or major improvement of resource quality; extensive restoration; major improvement of attribute quality.

Magnitude of impact (change)		Typical description
Medium	Adverse	▪ Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements.
	Beneficial	▪ Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality.
Low	Adverse	▪ Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements.
	Beneficial	▪ Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring.
Negligible	Adverse	▪ Very minor loss or alteration to one or more characteristics, features or elements.
	Beneficial	▪ Very minor benefit to or positive addition of one or more characteristics, features or elements.

The assessment of magnitude of impact considers whether the change that causes the impact is positive or negative, and whether the impact is direct or indirect, short, medium or long-term, temporary or permanent, and if it is reversible.

For the purposes of this assessment, a direct impact is one that occurs as a direct result of the Proposed Project and was likely to occur at or near the Proposed Project itself. Indirect impacts (or secondary/tertiary impacts) are those where a direct impact on one receptor has another knock-on impact on one or more other related receptor(s) (e.g. the Proposed Project results in a change in groundwater quality, which then has an indirect impact on surface water quality and/or users of the water, such as human health or ecology). Indirect impacts can occur within the study area or away from the Proposed Project.

For the purposes of this assessment, the following definitions of duration have been used:

- Temporary – impact likely to last less than 2 year without intervention.
- Short term – impact likely to last 2 to 10 years without intervention.
- Medium term – impact likely to last 10 to 15 years without intervention.
- Long term – impact likely to last 15 to 60 years without intervention.
- Permanent – impact likely to last over 60 years without intervention.

An irreversible impact is defined as a change to the baseline that would not reverse itself naturally. Such impacts will usually be long-term and irreversible, such as the changes to the groundwater flow regimes caused by changes to the properties of the subsurface. A reversible impact is defined as a change to the baseline conditions that would reverse naturally once the source of the impact is exhausted or has stopped. For example, impacts to groundwater quality from contamination may only last if the source of the impacts is present. If it is removed, groundwater quality may naturally improve or could be remediated.

6.3.2 Significance Criteria

The approach followed to derive effects significance from receptor value and magnitude of impacts (Stage 4) is shown in Table 6-3. A description of the significance categories used is provided in Table 6-4.

Table 6-3 – Significance Matrix

	Magnitude of Impact (Degree of Change)				
Environmental Value (Sensitivity)		**Negligible**	**Low**	**Medium**	**High**
	High	Slight	Slight or moderate	Moderate or large	Profound
	Medium	Imperceptible or slight	Slight or moderate	Moderate	Large or profound
	Low	Imperceptible	Slight	Slight	Slight or moderate
	Negligible	Imperceptible	Imperceptible or slight	Imperceptible or slight	Slight

Table 6-4 – Significance Categories and Typical Descriptions

Significance Category	**Typical Description**
Profound	An effect which obliterates sensitive characteristics.
Large	An effect which, by its character, magnitude, duration or intensity alters a significant proportion of a sensitive aspect of the environment.
Moderate	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.

Significance Category	Typical Description
Imperceptible	An effect capable of measurement but without significant consequences.

Residual adverse effects of ‘large’ or ‘profound’ significance are considered to be ‘significant’ for the purposes of this assessment.

If required following the assessment of the level of effect significance, mitigation measures may be presented that will be used to avoid, prevent, or reduce the magnitude of the impact (Stage 5). The significance of the effect considering the mitigation is then assessed (Stage 6) to give the residual effect significance. Any monitoring that will be required to measure the success of the mitigation is included in section 6.10 (Stage 7).

The effects of the activities at the Site are also considered cumulatively, with those that could foreseeably have resulted from other known developments that have occurred in the assessment study area (see Chapter 15 Interactions).

6.4 Baseline Conditions

6.4.1 Site Topography

The Site is located approximately 6.6 km west of Red Hill, which reaches 194 m elevation. The land therefore rises to the east and drops to the northwest, towards the Figile River and its tributary. The regional shaded topography is shown in Figure 6-2 with respect to the rivers.

The topography within the site's vicinity (excluding the quarried areas) drops from ca. 80 mAOD in the east (near the Site access) to ca. 69 mAOD in the west (near the Grand Canal—Barrow Line).

The present-day topography includes the quarry void, which has been allowed to fill with water post-cessation of mining in 2006. The quarry void is understood to be ca. 15 m deep (below natural ground surface).

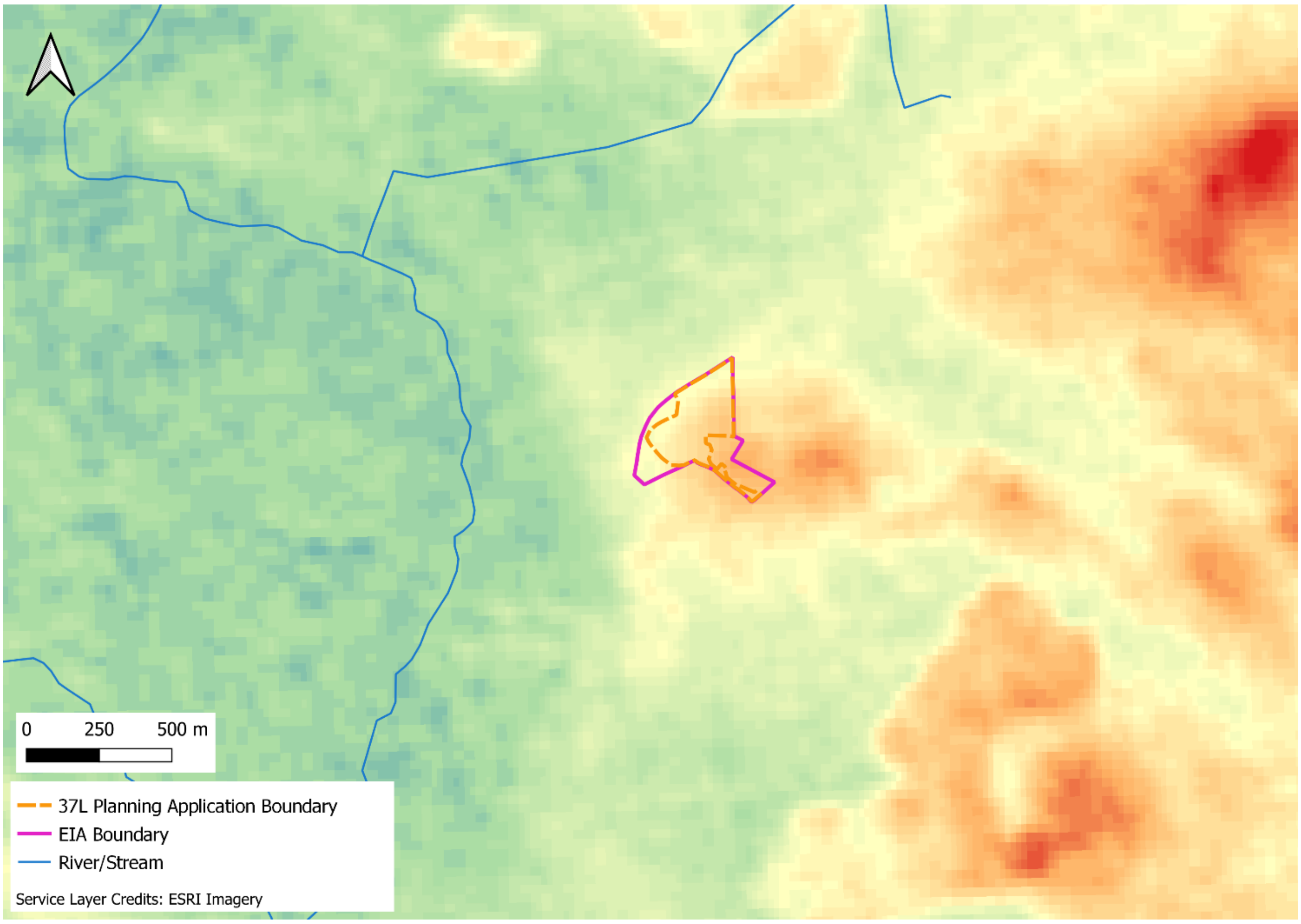

Figure 6-2 - Regional Topography and River Network (shaded from low (blue) to high (red) topography)

6.4.2 Land Use, Soils and Geology

The baseline information with respect to land use, soils and geology is presented Chapter 2 (Project Description) and Chapter 5 (Land, Geology and Soils).

The GSI Quaternary Sediments (1:50,000 scale) indicates that the subsoils underlying the Site are composed of gravels derived from limestones and till derived from limestones.

The GSI Bedrock Geology (1:50,000 scale) indicates that the Site is underlain by the Carboniferous Allenwood Formation, which consists of pale grey, generally massive shelf limestones and their dolomitised equivalents.

The Site is mainly bound by agricultural lands. The agricultural land use, both historically and currently, is not known to have included specific contaminative activities. Depending on the use and its volume for fertilisers and pesticides, some changes in land quality and related diffuse pollution into the existing water environment might be expected.

6.4.3 Rainfall and Climate Data

Figure 6-3 below presents rainfall data recorded at the ATHY (Chanterlands) meteorological station (number 6414), which is located ca. 20 km south of the Site, for the period July 1993 to February 2025 (Met Eireann, 2025). From the long-term averages, the wettest months of the year are shown to be between October and January, with the driest months between March and June.

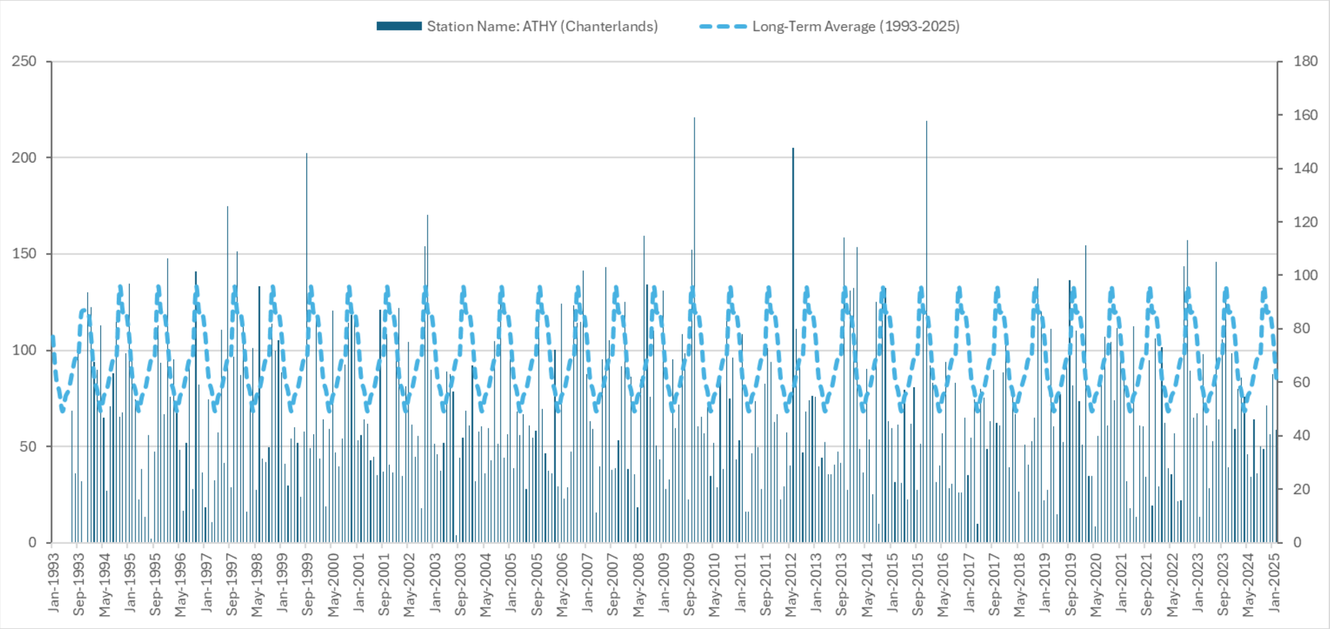

Figure 6-3 - Monthly Rainfall Graph 1993 – 2025 recorded at ATHY (Chanterlands)

6.4.4 Surface Water – Hydrology

The Site is located in the WFD Bagenalstown Upper Groundwater body (which is generally described as regionally important). The WFD designations has the Site situated within the WFD Barrow Catchment and WFD SubCatchment of Barrow_SC_040. The WFD designations has the site situated within the WFD River Sub-Basin Figile_080. There is a river sub basin divide to the southeast of the Site as depicted in Figure 6-4, with the River Sub-Basin Barrow_090 to the southeast of this divide.

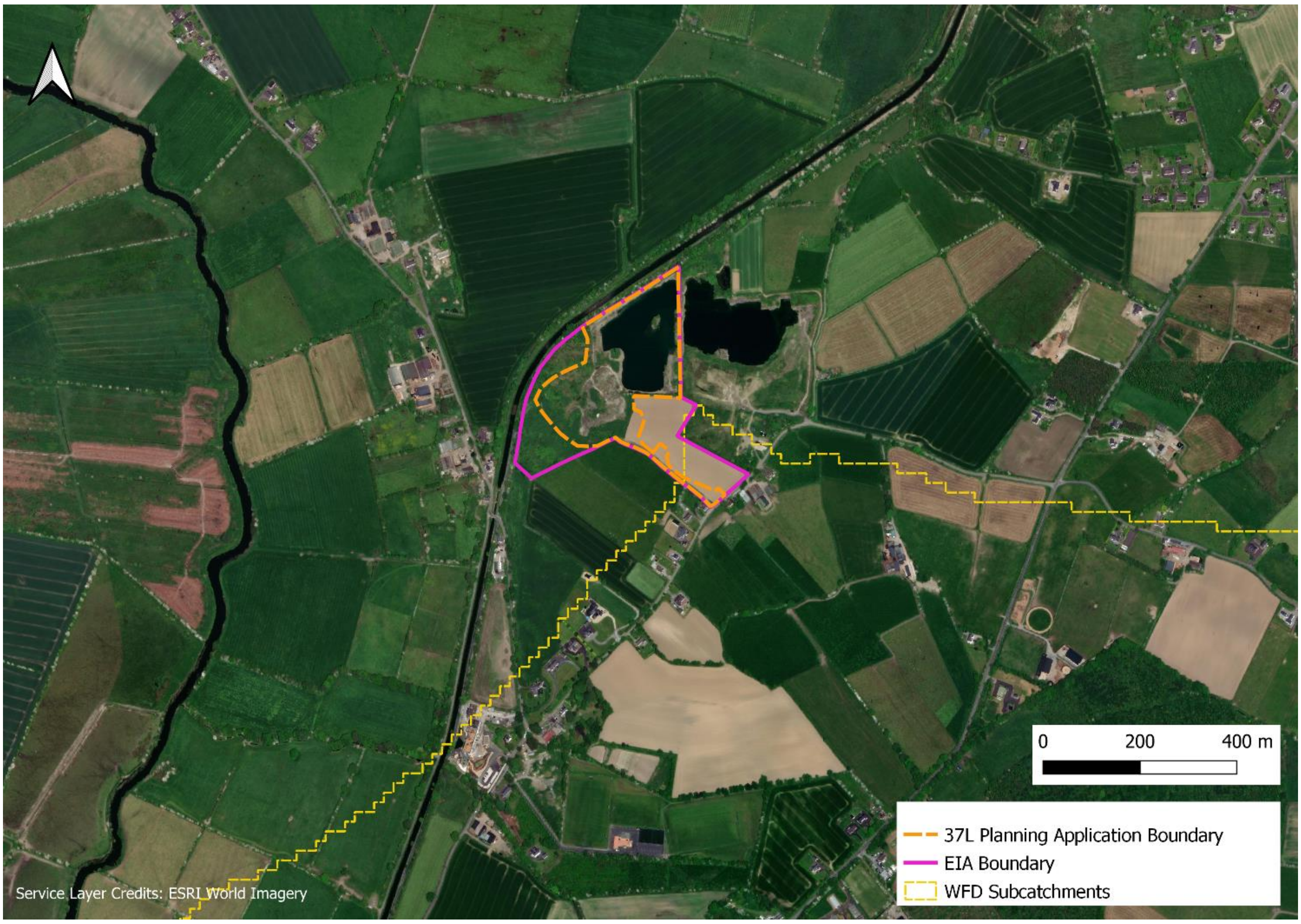

Figure 6-4 - WFD River Sub Basin Divide Across the Site (EPA, 2025)

The surface water network and Special Area of Conservation (SAC) located to the west of the Site is shown in Figure 6-5.

The closest surface water feature to the Site is the Grand Canal[1], which runs adjacent to the northwest boundary and is designated as a pNHA (see Chapter 4 Ecology and Biodiversity). The Grand Canal is constructed above ground level, with the top of the embankment at approximately 5 m above original ground level. The Grand Canal Barrow Line is likely to be lined by a low permeability layer and have negligible influence on the groundwater level. Surface water from the canal may leak into the ground and percolate into the groundwater table through defects in the liner, but is generally considered to be hydraulically disconnected from the underlying groundwater body.

Further west of the Site (ca. 0.5 km) is the River Figile, which flows from north to south. Directly north of the Site (ca. 0.8 km) is a tributary (Ummeras Beg) of the River Figile. Although not displayed by the WFD, there is also a small stream (Old Grange) ca. 0.6 km to

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[1] This section of Grand Canal and associated pathway are part of the Barrow Line of the Grand Canal, and the Barrow Way National Waymarked Trail.

the south of the Site which is culverted beneath the Grand Canal, which is labelled in Figure 6-5.

Further southwest of the Site (ca. 1.6 km) is the River Barrow and River Nore SAC (Site Code: 2162), which starts at the confluence of the River Figile and River Barrow.

It is likely that any surface water flows within the vicinity of the Site will have flowed towards the northwest, towards the Grand Canal, under baseline conditions, based on the catchment divide in Figure 6-7 and the topography shown in Figure 6-2.

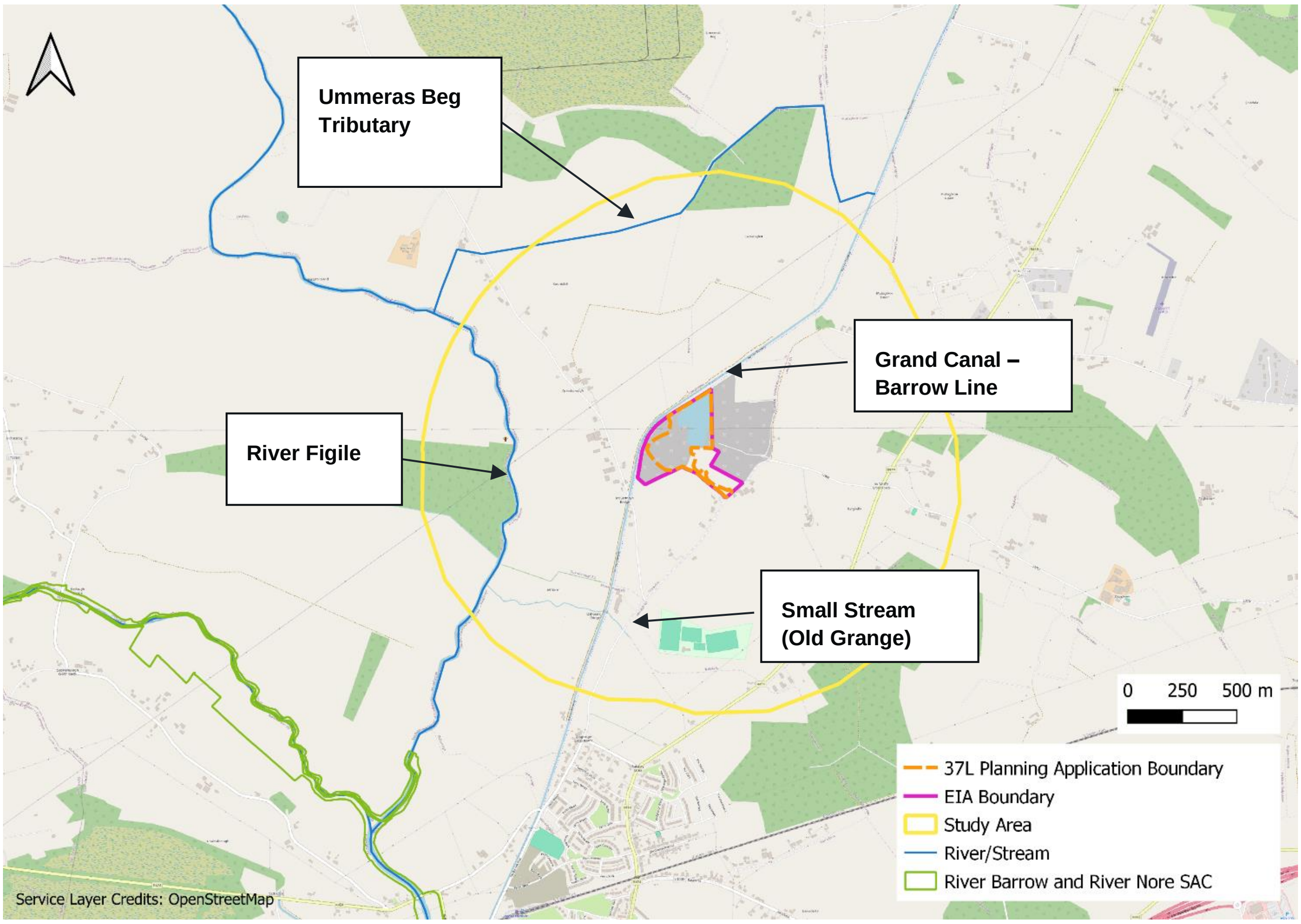

Figure 6-5 - River Network and SACs in the Vicinity of the Site (EPA, 2025)

It is likely that any surface water flows within the vicinity of the Site will flow towards the northwest, towards the River Figile. This is based on the river catchment divide in Figure 6-5 and the topography shown in Figure 6-2. Any run-off from the Site would likely be absorbed by a dense hedgerow / treeline and a strip of grassland which separates the Site from the Grand Canal, or infiltrate to ground through the superficial sands and gravels, prior to reaching the Canal in any significant quantity. The Grand Canal was constructed above ground level, with the top of the embankment at approximately 5 m above original ground level.

The baseline WFD Status and River Quality (Q) Values of surface water features in the vicinity of the Site, as assigned by the EPA, are shown in Figure 6-6 and summarised in Table 6-5. The WFD Status for rivers falls between ‘Poor’ to ‘Good’ and the Q Value for stations are ‘Q 3-4 – Moderate’ for locations upstream and downstream of the Site.

Figure 6-6 - WFD Status and River Q Value in Surface Water Features Close to Site (EPA, 2025)

Table 6-5 - Summary of WFD Status (2016-2021) and River Q Value in Surface Water Features Close to Site (EPA, 2025)

River Name	WFD Status (2016-2021)	Station Name	River Q Value
Figile	Good	FIGILE - 1 km u/s Barrow R confl	3-4 - Moderate (2006)
Barrow	Poor	Pass Br	3-4 - Moderate (2023)

River Name	WFD Status (2016-2021)	Station Name	River Q Value
Barrow	Poor	Ford S of Trascan	3-4 - Moderate (2023)
Slate	Moderate	River Br	3-4 - Moderate (2023)

Site Surface Water Quality

Samples were collected and analysed from the monitoring point labelled SW01 within the quarry waterbody[2] (Figure 6-7), from March to August 2024.

Figure 6-7 - Surface Water Quality Monitoring

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[2] The waterbody term will be used here within throughout the chapter to reference the collected waters within the quarry void.

Full laboratory results are presented in Appendix 6B (Table 6B-1 to Table 6B-6) and graphed for some key analytes in Appendix 6C. The laboratory certificates for the results are included in Appendix 6D.

The laboratory results for the waterbody (SW01) were screened against GTV (2016) and AA-EQS (2019) thresholds. There are no exceedances in the guideline thresholds for SW01, indicating that the surface water is of good quality and is not connected to any ongoing source of pollution. There are some fluctuations in Nitrate concentrations over the duration of sampling, rising to 22.8 mg/L. These fluctuations are no larger than those seen in groundwater concentrations as presented in the tables in Appendix 6B and discussed in Section 6.4.5.

6.4.5 Groundwater – Hydrogeology

Based on a review of borehole logs (Appendix 6A) and published information, it is understood that one main hydrogeological unit underlies the Site; the permeable limestone of the Allenwood Formation – Regionally important Aquifer – Karstified (diffuse) - RKd. The GSI aquifer designation (GSI, 2025) for bedrock aquifers underlying the Site and the sand and gravel aquifer to the southwest of the Site, is shown in Figure 6-8 below. The Site is also located in the Bagenalstown Upper groundwater body (waterbody code IE_SE_G_153) comprised of the following four catchments: 07 Boyne, 14 Barrow, 15 Nore, 25A Lower Shannon. The 2016 - 2021 WFD groundwater status of the Bagenalstown Upper groundwater body (waterbody code IE_SE_G_153) is ‘Good’.

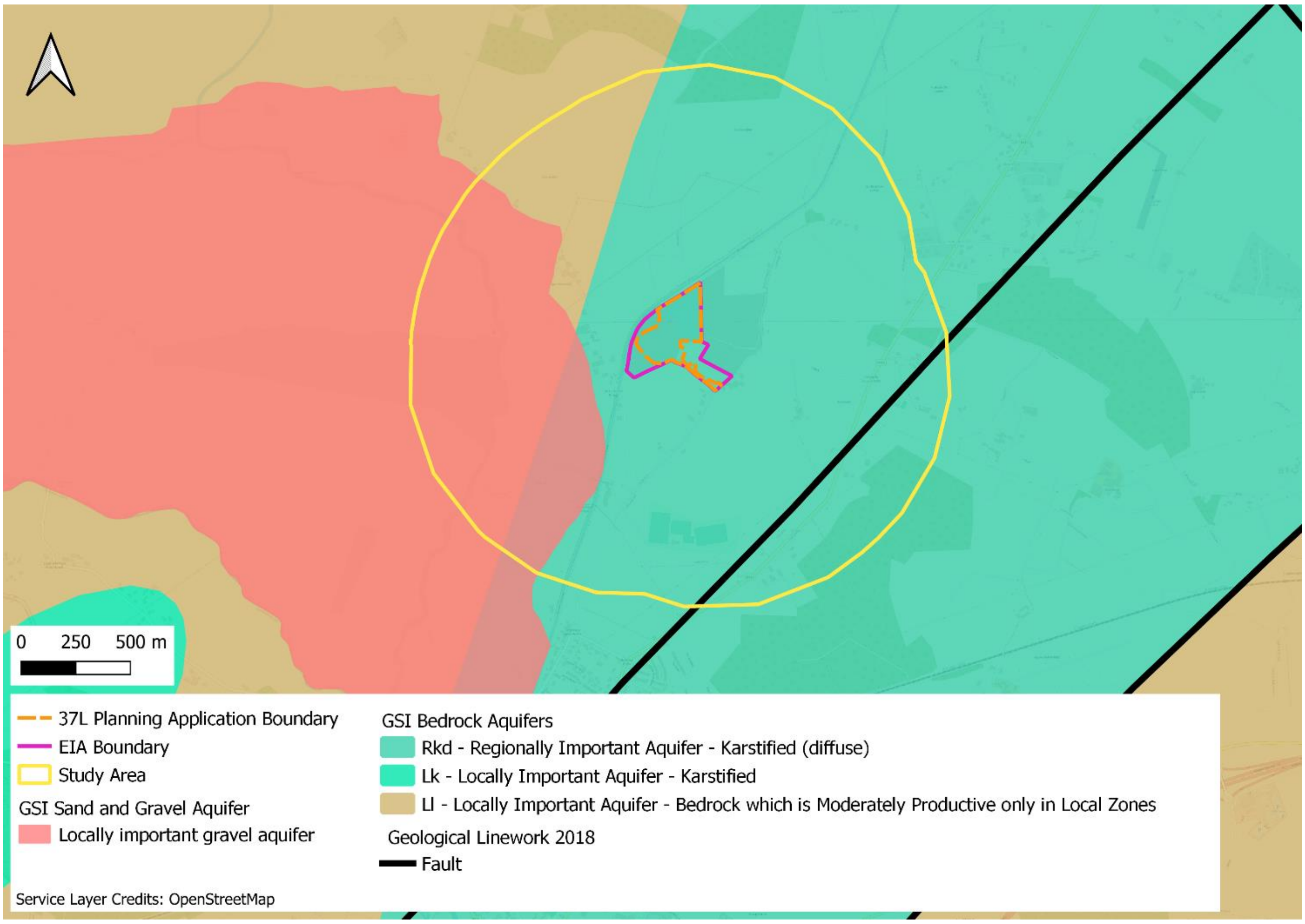


Figure 6-8 - Aquifer Designation Map (GSI, 2025)

6.4.5.1 Sand and Gravel Aquifer

Sand and gravel are reported in the borehole logs across the Site. However, this is not mapped as part of the Monasterevin gravel aquifer west of the site shown in Figure 6-8. It is possible that a higher fines/clay content in the sand and gravel beneath the Site result in lower permeabilities of the unit. Due to the heterogeneity of the aquifer material, perched groundwater bodies are likely to exist where lenses of sand, clay and gravels units are present.

6.4.5.2 Bedrock Aquifer

Bedrock underlying the Site (Allenwood Formation) is classified as a ‘Rkd’ regionally important aquifer – karstified (diffuse), which is described as “significant source of groundwater” where flow is more diffuse, storage is higher and there are many high yielding wells.

6.4.5.3 Groundwater Vulnerability

Groundwater Vulnerability (DELG/EPA/GSI, 1999) defines how easily groundwater may be contaminated by human activities. According to the GSI Spatial Resources online mapping tool (GSI, 2025) the majority of the Site is classified as ‘Extreme’ (Figure 6-9). This

‘Extreme’ classification is appropriate given the ‘regionally important aquifer’ classification and the elevated ground to the southeast of the Site, where bedrock is closer to the surface.

The lower topographies in the northwest of the Site are characterised as having ‘High’ vulnerability, associated with a thickening sequence of superficial deposits, which offer increased protection, towards the River Figile.

The groundwater vulnerability classification is based on baseline conditions and has not taken into account the current presence of bedrock currently at the surface within the quarry void. Groundwater vulnerability may be higher in areas of exposed bedrock due to direct recharge into the aquifer.

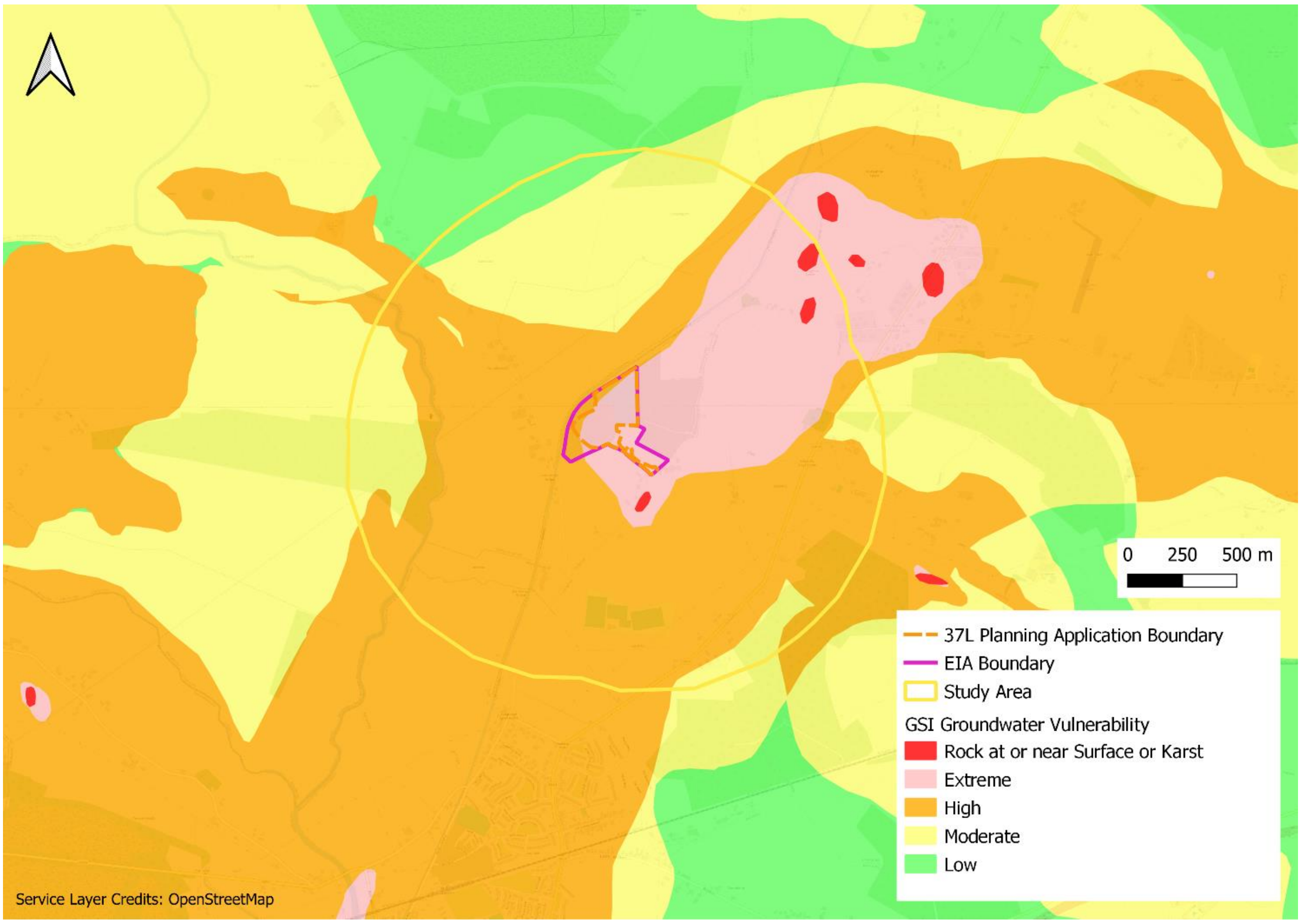


Figure 6-9 - Groundwater Vulnerability Map (GSI, 2025)

6.4.5.4 Groundwater Recharge

The groundwater recharge map for the Site is presented in Figure 6-10. The highest GSI recharge range of 351-400 mm/a applies to the area of mapped gravels derived from limestones beneath the Site. GSI mapping (2025) indicates an effective rainfall of approximately 429 mm/a across the Site. There is, therefore, the potential that the superficial deposits of sands and gravels can accept all the effective rainfall, with there being very little rainfall run-off. The ability for the bedrock limestone to accept the local rainfall may be lower due to it consisting of an interconnected network of fractures, which may not always persist to the top of the unit.

The groundwater recharge classification is based on baseline conditions and has not taken into account the presence of bedrock at the surface within the quarry void, from historical extraction.

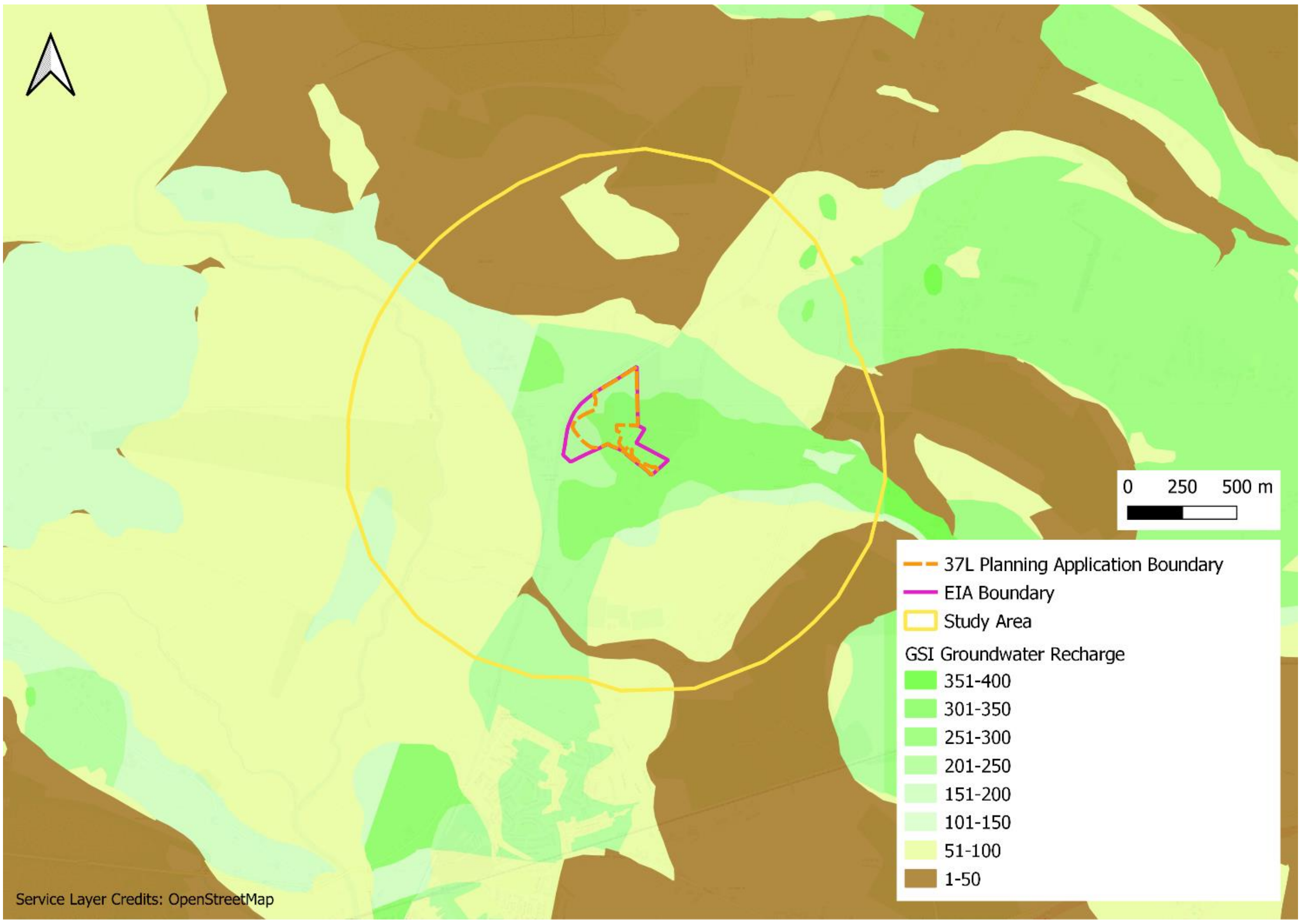


Figure 6-10 - Groundwater Recharge Map (GSI, 2023)

6.4.5.5 Karst Features

A review of GSI karst database indicates no recorded karst features within 500 m of the site.

6.4.5.6 Wells and Springs

A review of GSI Wells and Springs database indicates 10 no. records are located within 1 km of the Site and is detailed in Table 6-6 below and in Figure 6-11.

Table 6-6 – Wells and Springs within 1km of the Site

Well Unique ID	Source Type and Date of Drilling	Source Name and Owner	Depth of hole (m)	Depth to Bedrock (m)	Source Yield (m^3/day)	Distance and Direction from Site

12497	Borehole / 1966	Irish Malt Exports	54.9	8.5	196.39	On-Site*
12496	Borehole / 1966	Irish Malt Exports	32.6	9.8	272.76	On-Site*
12498	Borehole / 1966	Irish Malt Exports	54.9	8.2	120.01	On-Site*
12500	Borehole / 1962	W/KLD 1133 / N/A	7	-	27.28	160 m S
12756	Borehole / 1899	Monasterevin Ballykelly PWS	30.5	12	680	700 m SE
12860	Borehole / 2000	WW1 / Kildare County Council	91.4	9.1	1,891	730 m SE
12703	Borehole / 2001	MW5 / Kildare County Council	30	6.1	10.9	790 m SE
12501	Borehole / 1965	W/KLD 1135 / N/A	9.1	-	27.28	900 m SE
12754	Borehole / 1899	ABSTRACTION PT. NO. 9 / Kildare County Council (Decommissioned)	30.5	12	N/A	900 m SE
12707	Borehole / 2000	WW6 / Kildare County Council	98.4	13.5	Not listed	965 m SE
* Location accuracy is listed to be within 2km.						

The 3 no. wells on the Site listed with the source name of Irish Malt Exports are not expected to be located on the Site as per the site walkovers and are considered to be off-site.

A review of the planning application portal indicated that 2 no. wells were located at Ballykelly Mills in a Kildare County Council planning application document dated 08 April 2019 for a redevelopment of an existing whiskey distillery located approximately500m south/southwest of the Site.

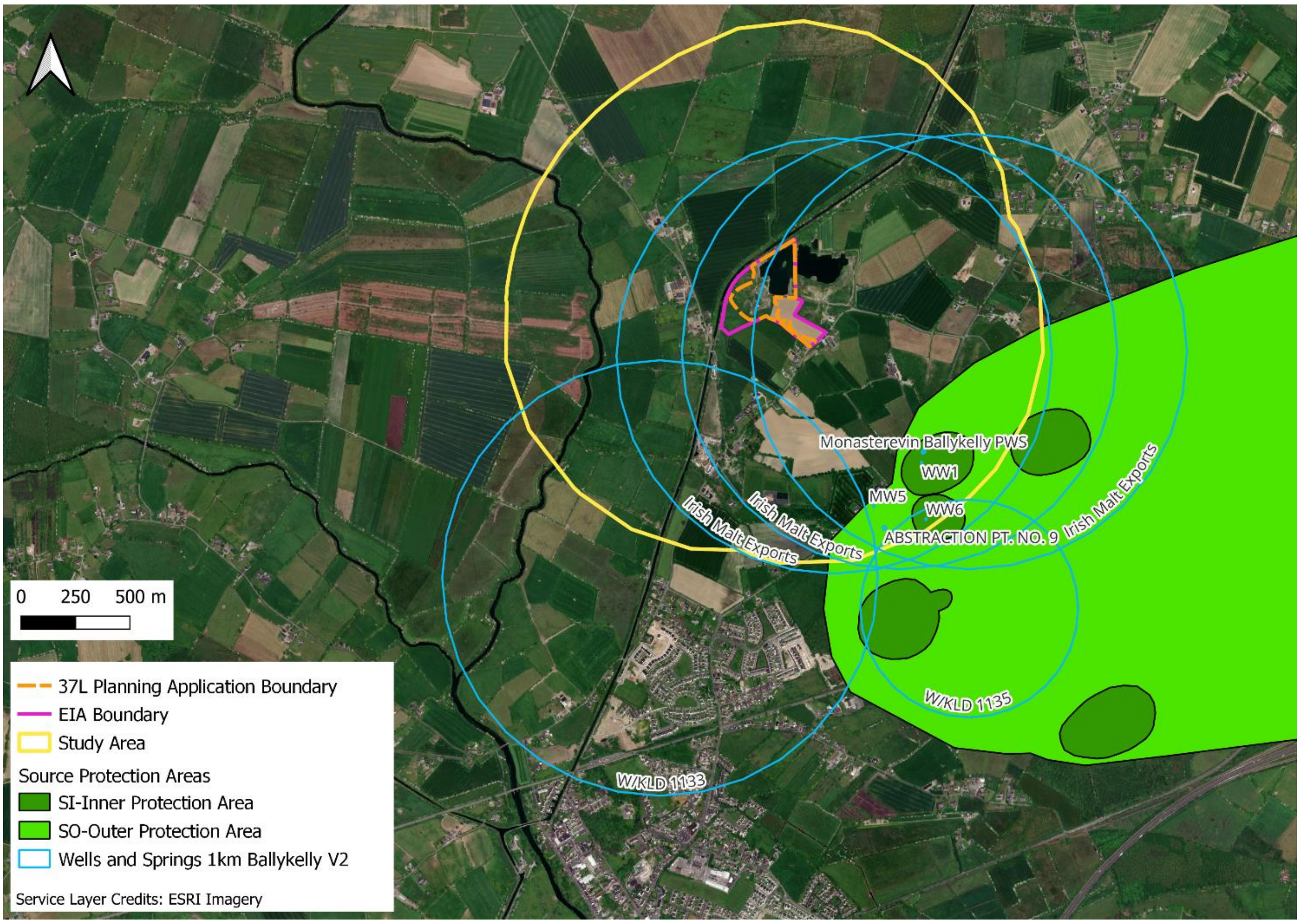


Figure 6-11 – Wells and Springs within 1km of the site

6.4.5.7 Groundwater Level and Quality Investigations

There are four monitoring wells available for water level and quality measurements. The locations of the existing monitoring wells are presented in Figure 6-12, with details on construction and lithology are provided in Table 6-7, where available. The borehole logs are provided in Appendix 6A.

The depth of the water strikes for available monitoring wells (BH2 and BH4) show that the main aquifer beneath the Site is within the limestone bedrock, rather than the superficial sand and gravels. This supports the aquifer designation in Figure 6-8, where the main sand and gravels aquifer is absent beneath the Site footprint.

Figure 6-12 - Monitoring Well Locations (including Surface Water Monitoring)

Table 6-7 – Monitoring Well Construction and Lithology

Monitoring Well ID	Installed Depth (m)	Measured Well Depth Range (m)	Ground Level (mAOD)	First Water Strike Depth (m)	Screened Interval (m) and screened lithology
BH1	19.5	18.21 to 18.31	68.75	Not recorded	16.5 to 19.5 (Dark Grey Limestone)
BH2	15.4	15.47 to 15.49	68.68	13 (55.68 mAOD) (in Dark Grey Limestone)	12.4 to 15.4 (Dark Grey Limestone)
BH3	12	11.62 to 11.96	72.08	Not recorded	11.5 to 12 (Light Grey Limestone)

Monitoring Well ID	Installed Depth (m)	Measured Well Depth Range (m)	Ground Level (mAOD)	First Water Strike Depth (m)	Screened Interval (m) and screened lithology
BH4	17	16.8 to 17.05	70.24	11.4 (58.84 mAOD) (in Light Grey Limestone)	14 to 17 (Light Grey Limestone)

Groundwater Elevations

Manual groundwater elevations in Metres Above Ordnance Datum (mAOD) are displayed in Figure 6-13 alongside monthly rainfall totals, for the monitoring wells shown in Figure 6-12.

The water levels appear to be seasonal, with groundwater highs in March and April 2024 and a decline in water levels during drier summer months between May and August 2024. The greatest water level fluctuations (1.48 m and 1.31 m) are seen in BH3 and BH4 and show a similar trend. The smallest fluctuations are seen in BH2 of 0.61 m. Although the fluctuations differ, the monitoring wells all show a similar trend, indicating that they are installed into the same aquifer. The highest groundwater elevation of 64.35 mAOD (4.57 mbgl) was recorded in BH2 in March 2023, following install of the monitoring well.

It is possible that abstractions in the region are currently influencing the water levels in the monitoring bores. The Site is not located within and SI – Inner Protection Zone or SO – Outer Protection Zone. BH4 is the closest monitoring well to an inner Source Protection Area (SPA) of the Monasterevin Public Water Supply (PWS), located ca. 890 m to the southeast. It is, therefore, possible that the larger fluctuations in BH3 and BH4 are due to them being closer to the abstractions. Further discussion on nearby abstractions is provided in Section 6.4.5.8.

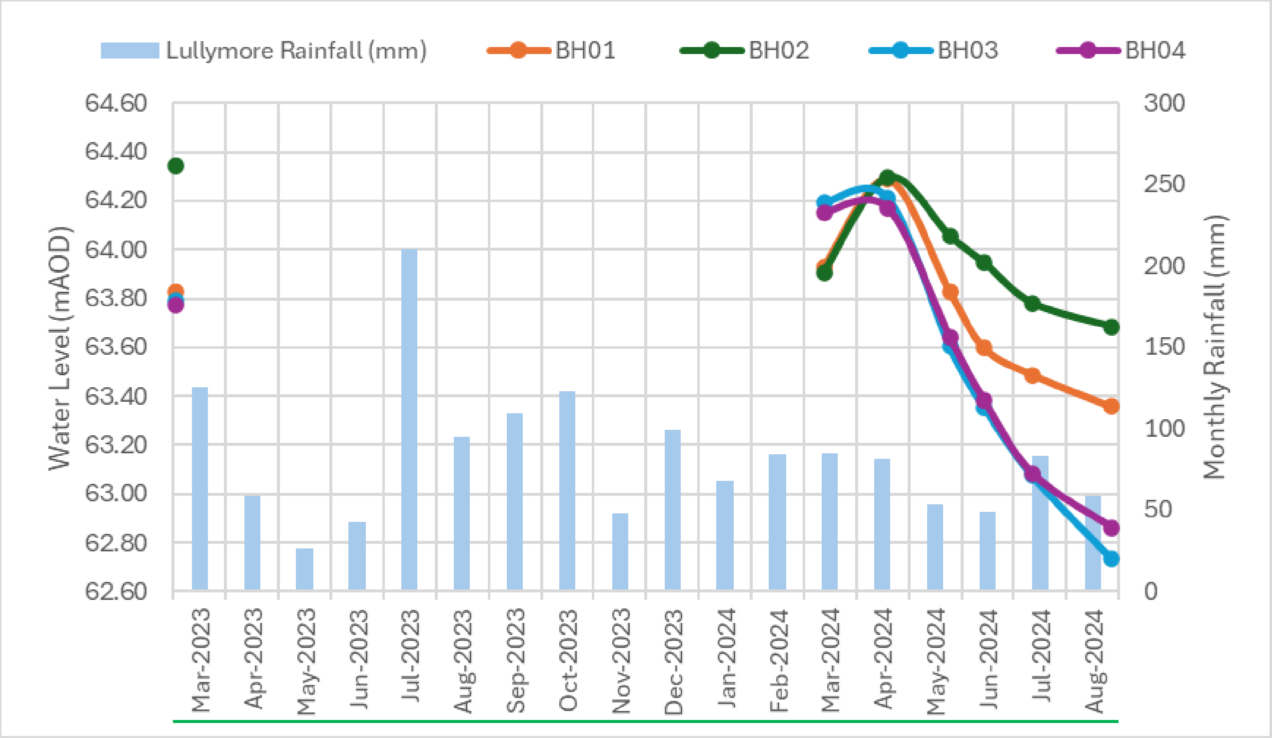


Figure 6-13 - Groundwater Level and Monthly Rainfall Monitoring Data

The groundwater contours are presented in Figure 6-14. The groundwater contours show that there is a flow to the southeast, which supports the potential impact of the Monasterevin PWS abstractions to the groundwater levels beneath the Site. The groundwater elevation falls from 63.8 mAOD to the northwest, between BH2 and the Grand Canal, to 63 mAOD, to the southeast of the Site, just beyond BH3 and BH4. This change of 0.8 m suggests a slight gradient across the Site.

The groundwater contours indicate a flow direction (to the southeast), that is at odds to the topography (to the northwest) and location of the River Figile (to the west). As discussed previously, it is possible that the water levels beneath the Site are responding to abstractions to the southeast Figure 6-11, although impact is slight. The highest yield is stated at 1,891 m^3/d from WW1, which is 730m southeast of Site. It is likely that the observed gradient beneath the Site is from abstractions at this Site.

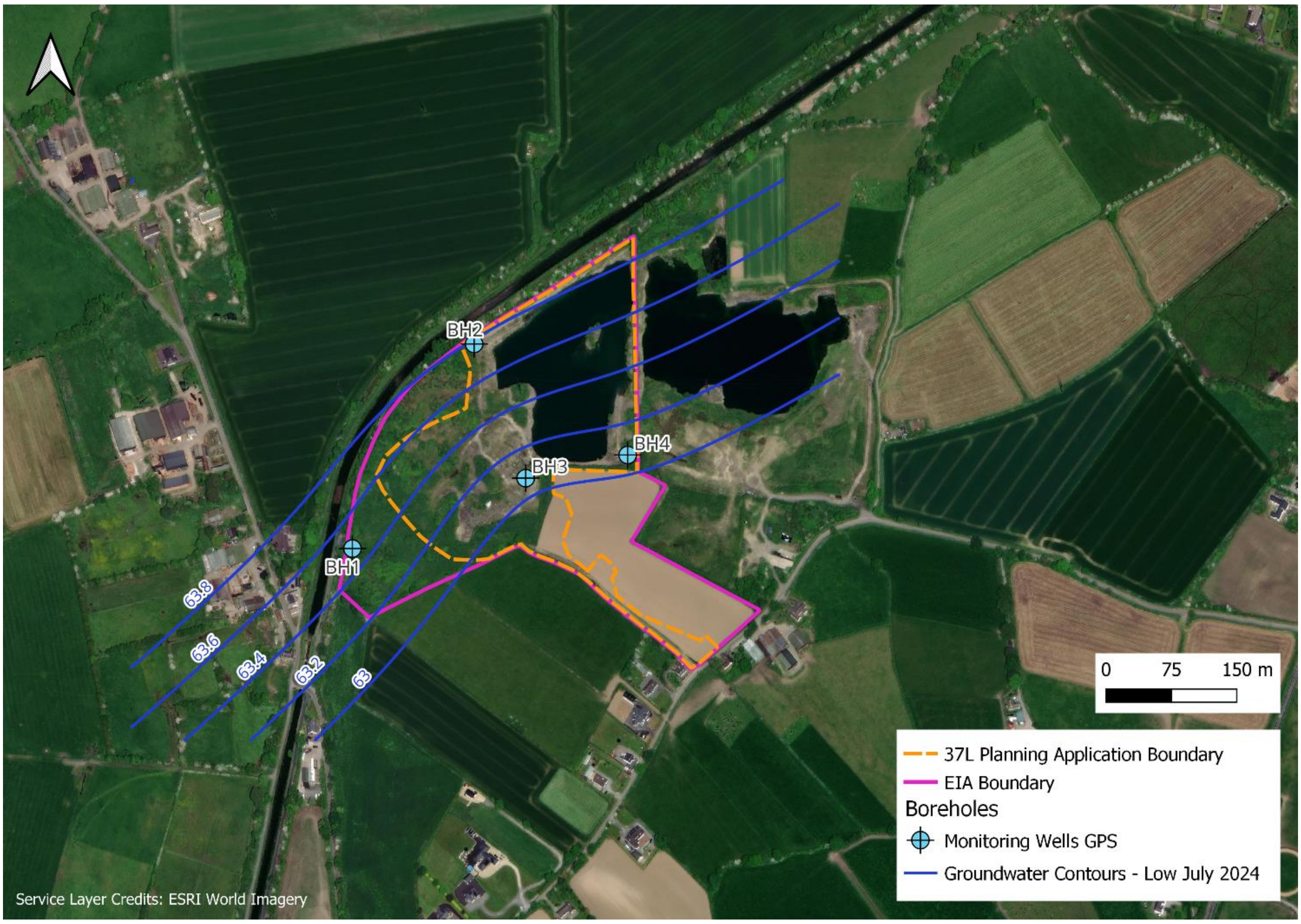


Figure 6-14 - Groundwater Contours August 2024 (Low) with aerial

Groundwater Flooding

There are no areas of groundwater flooding probability shown on the Geological Surveys of Ireland's Groundwater flooding probability maps (GSI, 2022). Water levels within the monitoring wells consistently show water levels >5 m below ground surface. With the understanding that the quarry waterbody is well connected to the groundwater, there is no indication of flooding from the waterbody itself.

Groundwater Quality

The four groundwater monitoring wells (Figure 6-12) have been used to monitor groundwater quality across the Site over a period of six months, from March to August 2024.

A summary of laboratory results with reference to GTV and AA-EQS threshold values is presented in Table 6-8. Full laboratory results are presented in Appendix 6B from Table 6B-1 to Table 6B-6, with comparison to relevant threshold values. A number of key analytes are shown graphically in Appendix 6C to represent any trends over the six months of monitoring. The laboratory certificates for the results are included in Appendix 6D.

The AA-EQS threshold for Total Dissolved Chromium III (4.7 µg/l) was exceeded on one occasion in BH1 and BH2 and on three occasions in BH3. Note that the limit of detection (LOD) for Total Dissolved Chromium III is 6 µg/l, therefore, the values of 7 µg/l are marginally above the LOD. The value of 7 µg/l for BH1 in May 2024 is a duplicate an initial measurement of <6 µg/l (Appendix 6B – Table 6B-3). Similarly, the value of 41 µg/l for BH3 in July 2024 had a subsequent duplicate reading measurement of <6 µg/l (Appendix 6B – Table 6B-5). Total Dissolved Chromium III is a less toxic form of Chromium than Total Dissolved Chromium VI and naturally occurs in rocks and soil and can leach into groundwater.

Both the GTV and AA-EQS thresholds for Nitrate as NO_3 (37.5 mg/l and 50 mg/l, respectively) were exceeded in BH1 in May 2024 (79.6 mg/l) and June 2024 (58.2 mg/l). The GTV threshold was then also exceeded in BH1 in April 2024 (44.7 mg/l). BH1 is the only monitoring well to have Nitrate exceed the thresholds. BH1 is located close to the agricultural farmland to the south of the Site. This indicates that the elevated nitrate in the groundwater may be caused by off-Site activities, such as effluent and fertiliser application to agricultural land.

Table 6-8 – Summary of Recent (2024) Groundwater Screening Exceedances

Analyte	**Units**	**GTV**	**AA-EQS**	**BH1**			**BH2**	**BH3**	
Date				**Apr-24**	**May-24**	**Jun-24**	**Aug-24**	**Jul-24**	**Aug-24**
Total Dissolved Chromium III	µg/l	**-**	**4.7**	-	**7***	-	**7**	**41***	**7**
Nitrate as NO_3	mg/l	**37.5**	**50**	**44.7**	**79.6**	**58.2**	**-**	-	-

*Indicates that the value has been measured twice, and the corresponding duplicate is below the AA-EQS

6.4.5.8 Designated Sites

On a regional scale, GSI mapping (2025) indicates that there are no groundwater SPAs within the Site boundary. There is, however, an outer (SO) and inner (SI) source protection area is located within the 1 km study area, as shown in Figure 6-15. This SPA relates to the Monasterevin PWS.

There is information which indicates the Monasterevin PWS initially consisted of at least two abstraction points (Ballykelly Bore and Spring) targeting the Allenwood Formation aquifer, as referenced in a report from 2002 (Kildare County Council, 2002). However, the pumping information, abstraction volumes, groundwater flow direction, zone of influence and locations of the abstractions are unknown.

In 2001, there was a plan to upgrade the water supply with a combined output estimated at 4 Megalitres/day (K. T. Cullen & Co, 2001) from 4 wells. A review of the EPA abstractions database (December 2024) indicates Monasterevin wellfield's abstractions were registered in 2020, and they targeted the Bagenalstown Upper aquifer, rather than the Allenwood Formation aquifer, and have a maximum daily abstraction licence of 3.3 Ml/d from 10 wells. The location of these wells and whether they stopped abstracting from the older wells (Ballykelly Bore and Spring) is unknown. Kildare County Council wells WW1 and WW6 fall within the two inner protection areas closest to Site (Figure 6-11). It is therefore possible that the inner protection area relates to these wells.

It is likely that groundwater will have initially flowed to the west, following the fall in topography towards the River Figile, then with the onset of significant abstraction(s), the hydraulic gradient has switched towards the south-east.

The River Barrow and River Nore SAC is also represented in Figure 6-15 and is approximately 1.6 km from the Site boundary. It is possible that a hydraulic connection exists between the groundwater beneath the Site (within the bedrock aquifer) and the River Figile west of the Site. This section of the River Figile is, however, within the mapped sand and gravels aquifer (see Figure 6-8). It is therefore, likely that the River Figile receives more groundwater contribution from the sand and gravels aquifer than from the underlying, moderately productive (LI) bedrock aquifer mapped in Figure 6-8.

Any significant connection between the Site groundwater and the SAC downstream of River Figile is, therefore, unlikely. With the potential onset of abstraction(s), it is further less likely that a significant hydraulic connection exists between the Site and the SAC, as there has been the inferred reversal of the groundwater flow.

The Old Grange is culverted beneath the Grand Canal at N 63088 12311 and therefore, is no potential hydrological connection between the Grand Canal and the River Barrow and River Nore SAC. A wider review of the area found the closest connection between the Grand Canal and this SAC is 25 km downstream at SF 65573 55024 in Athy, Co. Kildare.

Figure 6-15 - Source Protection Areas (SPA) near Site and River Barrow and River Nore SAC (GSI, 2023)

6.5 Selection of Sensitive Receptors

Taking account of the above and the receptor classification method described in Section 6.3, the receptors carried forward in this assessment and their assigned importance are presented in Table 6-9. The Grand Canal – pNHA is not considered here as there is no hydraulic connectivity from the Site, as elevated and up hydraulic gradient.

Table 6-9 – Water Sensitive Receptors

Receptor	Importance and Reasoning	Sensitivity
Surface Water – Quality and availability	The River Figile is ca. 0.5 km west of the Site, with tributaries located north and south (Old Grange) of the Site. It is unlikely, however, that there is a connection between the rainfall run-off from Site.	Low

Receptor	Importance and Reasoning	Sensitivity
Groundwater - Quality and availability	Water quality analysis does not indicate any groundwater pollution. The bedrock aquifer is highly productive. The Proposed Project would reduce the potential for a contaminant pathway with the reduction of a direct surface water to groundwater linkage with the additional of infilled material.	Low
Abstractions within 1km of Site	There are 10 no. abstractions listed in Table 6-6 within 1km of the Site. These wells abstract up to 3,225 m^3/d from 9no. locations. One well has been decommissioned, 2n o. wells have a total well depth of less than 10 m, and 7 no. wells are deeper than 30 m and all encountered bedrock.	High
River Barrow and River Nore SAC	The River Barrow and River Nore SAC is classified as a European designated site. The SAC is ca. 2 km downstream of the Site within the River Figile. A ny hydraulic connectivity between the Site and the SAC would be through groundwater. This is negligible given the change in groundwater flow direction in response to PWS (or above) abstractions. The contribution of groundwater to the River Figile is also likely to be minimal, with further dilution before the downstream SAC. It is unlikely that there is groundwater connectivity beneath the Site and the Old Grange stream, considering the likely groundwater flow directions based on topography and catchment divides.	Negligible
Flooding – changes in presence and impacts of water flows on infrastructure immediately adjacent and downstream of the Site.	Possibility of water level rising above surface with filling of material. The groundwater table is ~5m below ground level and linked to the water level in the waterbody. The high productivity of the bedrock aquifer means that it will respond quickly to changes in volume in the waterbody and disperse quickly.	Low
Human Health	Workers during operation or public coming into contact with contaminated water. Unlikely to be any highly toxic substances used in on-Site operations.	High

6.6 Do Nothing Scenario

Should the Proposed Project not proceed, it is considered that the future baseline conditions in relation to the hydrological and hydrogeological environment (quality and availability of both surface water and groundwater receptors) would not change. A detailed list is provided below:

- The site has limited hydraulic connectivity to surface water bodies and connectivity to rainfall run-off, including the adjacent Grand Canal.
- There is no known groundwater pollution in the karstic bedrock aquifer (Rkd) under the Site.
- Groundwater quality is unlikely to change and will continue to exhibit exceedances in Total Dissolved Chromium III and Nitrate as NO_3 and will continue to exceed the GTV and AA EQS.
- The bedrock aquifer is considered to be highly productive, and local abstractions do not significantly impact the groundwater body, as evidenced by the groundwater table being within 5 m of the surface beneath the Site. The pit void being open potentially increases the recharge from rainfall to the bedrock aquifer.
- Baseflow from groundwater to the River Figile is considered to be negligible and may be ephemeral during periods of increased rainfall (i.e. winter months November to February).
- The 2016 - 2021 WFD groundwater status of the Bagenalstown Upper groundwater body (waterbody code IE_SE_G_153) is ‘Good’ and unlikely to change following the current baseline and trend observed in during monitoring and sampling.

6.7 Characteristics of the Proposed Project

A detailed description of the Proposed Project is described in Chapter 2 (Project Description). Key elements that could present sources of impact to the water environment include the importation of materials, fuel/oil storage and use, use of a wheel wash, surface drainage systems, and the use and maintenance of welfare facilities.

6.7.1 Embedded Mitigation

To avoid the potential impacts to the water environment during activities at the Site, embedded design and commonly undertaken industry best practice mitigation measures are in place, which include:

- No deep excavation is required. Only shallow topsoil stripping and land raise. No dewatering of excavations will be required.
- Imported material will be certified as ‘clean’ and visual inspections will be undertaken as it is delivered to Site to ensure that there is no contaminant material. Stockpiles of material will be evaluated and monitored and kept stable to minimise erosion.

- Any materials that are deemed to be unacceptable for recovery at the facility on the basis of a visual inspection will be rejected and will be directed away from the Site, to an appropriate disposal facility.
- The fill material selected has similar hydraulic parameters consistent with the in-situ site geology and hydrogeology to minimise potential impact.
- Refuelling takes place on hardstanding in a designated area of the Site and any site plants are well maintained to prevent uncontained releases of hydrocarbons to the ground.
- Dust Suppression – water will be sourced from the waterbody on-Site, to dampen tracks and reduce dust particles and related issues.
- All plant and machinery utilised at the site is and will continue to be regularly serviced and maintained.
- Plant and vehicle parking is located away from sensitive receptors (quarry void/waterbody) and placed in a designated area to minimise risk of potential spillages and leakages.
- There are no significant quantities of hydrocarbons stored onsite, and all plant is re-fuelled from a visiting fuel-truck or off-Site.
- Implementation and use of a wheelwash. The wheelwash is a contained recycling system and will be maintained appropriately to avoid discharges of wash water. The final design of the wheel wash will be agreed with local authority.
- Runoff – runoff from across the Site and paved roads will be diverted via an interceptor to a soakaway.
- Drinking water will be supplied as bottled water. Welfare facilities will be serviced as required and will not require mains supply.

6.8 Potential Effects

The main potential impacts and associated effects that are considered and assessed relate to:

- Surface water (quarry pit) contamination from sediment loading during construction into the adjacent waterbody. Potentially heightened during the infilling stage of the quarry pit due to the risk of overspill.
- Importing of material during construction that could be unsuitable and could lead to leaching of contamination to the land and then into groundwater and surface water downgradient of the Proposed Project.
- Events during works phase that might impact land quality (e.g. leaks and spills from machinery or parked plant/vehicles) that could have a feasible pathway to groundwater and surface watercourses that are downgradient of the Proposed Project. Drainage at the Proposed Project may create preferential pathways.
- Direct recharge from the quarry pit into the groundwater body may be reduced when the fill material is introduced.

6.9 Evaluation of Potential Effects

Using the methodology set out in Section 6.3 and the potential effects detailed above, an evaluation and assessment of the potential effects on the identified sensitive receptors is presented in Table 6-10. This evaluation of potential effects takes embedded mitigation into consideration. The magnitudes associated with the potential future impacts at the Site are assigned either **Negligible** or **Low** following review of the baseline conditions and the assessment criteria.

Combined with the sensitivities of the identified receptors, the potential adverse effects caused by the Site are no greater than Slight and therefore **Not Significant.**

Table 6-10 - Evaluation of Initial Impacts, Effect Significance and Embedded Mitigation Measures

Receptor	**Sensitivity**	**Source of Impact/Assessment of Magnitude/*Embedded Mitigation Measures***	**Impact Magnitude (taking embedded mitigation into consideration)**	**Level of Effect Post Mitigation Measures**
Surface Water – Quality	Low	Import of potentially contaminated construction materials leading to change in groundwater quality that may support surface water. *All material will be inspected and quarantined prior to use in infilling of void*	Negligible (adverse)	Imperceptible
		Leaks and spills from plant/vehicles that may have pathway through groundwater to surface water. *An interceptor will be installed prior to reaching soakaway. Limited connectivity between groundwater and surface water in area.*	Negligible (adverse)	Imperceptible
		Sediment loading of adjacent waterbody with filling of quarry void. *The water level will be allowed to stabilise with addition of material. Water level is already 5m below ground level so reduced risk of spillage.*	Low	Slight
Groundwater - Quality	Low	Import of potentially contaminated construction materials leading to change in groundwater quality. *All material will be*	Negligible (adverse)	Imperceptible

Receptor	Sensitivity	Source of Impact/Assessment of Magnitude/*Embedded Mitigation Measures*	Impact Magnitude (taking embedded mitigation into consideration)	Level of Effect Post Mitigation Measures
		inspected and quarantined prior to use in infilling of void		
		Leaks and spills from plant/vehicles that may have pathway to groundwater. *An interceptor will be installed prior to reaching soakaway.*	Negligible (adverse)	Imperceptible
Groundwater - Availability	Low	Direct recharge from the quarry pit into the groundwater body may be reduced when the fill material is introduced. *Fill material used will be sized to match that of the bedrock aquifer and allow recharge.*	Negligible (adverse)	Imperceptible
Abstractions within 1km – Groundwater Availability	High	Direct recharge from the quarry pit into the bedrock groundwater body may be reduced when the fill material is introduced. *Fill material used will be sized to match that of the bedrock aquifer and allow recharge.*	Low	Slight (lower designation selected based on embedded design)
River Barrow and River Nore SAC - Quality	Negligible	Import of potentially contaminated construction materials leading to change in groundwater quality that may support SAC via River Figile. *All material will be inspected and quarantined prior to use in infilling of void*	Negligible (adverse)	Imperceptible

Receptor	**Sensitivity**	**Source of Impact/Assessment of Magnitude/*Embedded Mitigation Measures***	**Impact Magnitude (taking embedded mitigation into consideration)**	**Level of Effect Post Mitigation Measures**
		Leaks and spills from plant/vehicles that may have pathway through groundwater to SAC via River Figile. *An interceptor will be installed prior to reaching soakaway. Limited connectivity between groundwater and River Figile.*	Negligible (adverse)	Imperceptible
Flooding – impacts of water flows on infrastructure immediately adjacent and downstream of the Site.	Low	Possibility of water level rising above surface with filling of material or increased surface run-off. *The groundwater table is ~5m below ground level and linked to the water level in the waterbody. The high productivity of the bedrock aquifer means that it will respond quickly to changes in volume in the waterbody and disperse quickly.*	Low	Slight
Human Health	High	Contact with contaminated water caused by unmanaged spillage of fuels Site plant or vehicles. *Any leaks likely to be minor.*	Negligible (adverse)	Slight

6.10 Mitigation Measures and Monitoring

Additional mitigation and/or management is intended to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment. The initial assessment of potential effects (taking into account embedded mitigation) has not identified any significant adverse effects (i.e. those that have been evaluated as 'large' or 'profound').

The groundwater monitoring dataset used for this assessment is limited and does not include a full winter and summer period. Therefore, maximum groundwater levels during peak rainfall and recharge have not been identified. The following monitoring is proposed:

- Groundwater level monitoring at the onsite boreholes (BH1, BH2, BH3 and BH4) for at least 1 month prior to enabling works, using pressure transducers (data logger and barometric pressure logger).
- Groundwater quality monitoring at the onsite boreholes (BH1, BH2, BH3 and BH4) for at least 1 month prior to enabling works
- Discrete monthly manual groundwater level measurements at onsite boreholes. To assist in logger calibration and then check impact on water levels with construction.
- Quarterly sampling of surface water within the collected waters within the quarry void is recommended for construction phase to capture seasonal fluctuations in chemical concentration. Check for any changes which may be linked to the project construction.
- Quarterly sampling of groundwater is recommended for construction phase to capture seasonal fluctuations in chemical concentration. Check for any changes which may be linked to the project construction.
- The water monitoring programme will be agreed with the Environmental Health Officer (EHO).

6.11 Residual Effects

The assessment concludes that the Proposed Project will not give rise to significant adverse effects on the water environment at or surrounding the Site. There are no further mitigation measures required at this stage.

6.12 Cumulative Effects

Assuming other developments in the area have incorporated widely adopted good design, practice and mitigation measures it is considered that there have been no significant cumulative effects of the Proposed Project.

6.13 Difficulties Encountered

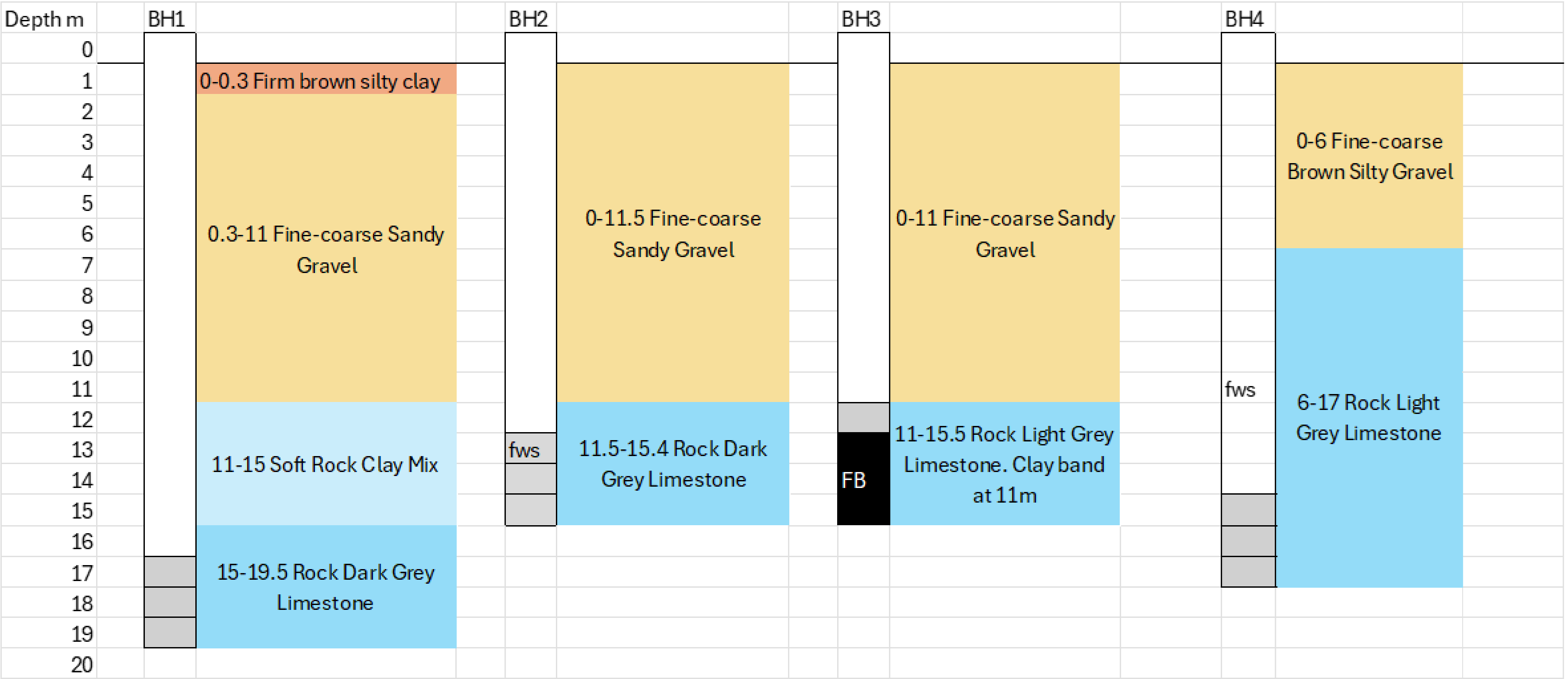
There was a large amount of sediment sat in the base of the monitoring wells prior to 2024 sampling round, following drilling and install in 2023. This resulted in initially high readings for non-dissolved analytes, when well purging techniques were used. Repeated purging helped clear the monitoring wells of sediment to some extent. In the August 2024 sampling round, passive sampling techniques were used, which significantly reduced the disturbance of the water column.

6.14 References

- Environmental Protection Agency, 2022, EPA Guidelines on the Information to be Contained in Environmental Impact Assessment Reports
- Environmental Efficiency, 2008, Response to Clarification of Further Information Request for Panning Reference 06/2729
- K. T. Cullen & Co. Ltd, 2001, Source Protection Plan Monasterevin Wellfield Co. Kildare
- EPA online map viewer (EPA, 2023) [Accessed: May 2025]
- GSI online map viewer (GSI, 2023) [Accessed: May 2025]
- Kildare County Council, December 2002, Kildare Groundwater Protection Scheme. Volume I.

Appendix 6A

Borelogs


Depth m
BH1
BH2
BH3
BH4
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
0-0.3 Firm brown silty clay
0.3-11 Fine-coarse Sandy Gravel
11-15 Soft Rock Clay Mix
15-19.5 Rock Dark Grey Limestone
0-11.5 Fine-coarse Sandy Gravel
fws
11.5-15.4 Rock Dark Grey Limestone
0-11 Fine-coarse Sandy Gravel
FB
11-15.5 Rock Light Grey Limestone. Clay band at 11m
0-6 Fine-coarse Brown Silty Gravel
fws
6-17 Rock Light Grey Limestone

Appendix 6B

Laboratory Results

Public

Table 6B-1 - Laboratory Results – March 2024

Parameter	**Units**	**GTV** [1]	**EQS 2019** [2]	**BH1**	**BH2**	**BH3**	**BH4**	**SW01**
Dissolved Arsenic	ug/l	7.5	50	<2.5	<2.5	<2.5	<2.5	<2.5
Dissolved Barium	ug/l		100	47	68	23	22	26
Dissolved Beryllium	ug/l			<0.5	<0.5	<0.5	<0.5	<0.5
Dissolved Boron	ug/l		2000	61	<12	27	28	22
Dissolved Cadmium	ug/l		3	<0.5	<0.5	<0.5	<0.5	<0.5
Dissolved Calcium	mg/l			145.7	108.9	76.2	96.5	48.7
Total Dissolved Chromium	ug/l	37.5	30	<1.5	<1.5	<1.5	2.3	<1.5
Dissolved Copper	ug/l		30	<7	<7	<7	<7	<7
Total Dissolved Iron	ug/l		1000					
Dissolved Lead	ug/l	7.5	10	<5	<5	<5	<5	<5
Dissolved Magnesium	mg/l			12	16.1	5.1	9.3	10.4

Parameter	**Units**	**GTV [1]**	**EQS 2019 [2]**	**BH1**	**BH2**	**BH3**	**BH4**	**SW01**
Dissolved Manganese	ug/l		300	<2	<2	<2	<2	<2
Dissolved Mercury	ug/l	0.75	1	<1	<1	<1	<1	<1
Dissolved Nickel	ug/l		50	2	<2	<2	<2	<2
Dissolved Potassium	mg/l			15.4	2	1.7	0.8	2.2
Dissolved Selenium	ug/l			<3	<3	<3	<3	<3
Dissolved Sodium	mg/l			8.6	8.4	5	7.9	9
Dissolved Vanadium	ug/l			<1.5	<1.5	<1.5	<1.5	<1.5
Dissolved Zinc	ug/l	75	100	4	<3	3	<3	<3
Total Chromium	ug/l			91.5	80	100.3	130.6	<1.5
Total Iron	ug/l			109247	95803	111426	130244	<20
MTBE	ug/l	10		<5	<5	<5	<5	<5
Benzene	ug/l		10	<5	<5	<5	<5	<5
Toluene	ug/l	525	74	<5	<5	<5	<5	<5

Parameter	**Units**	**GTV** [1]	**EQS 2019** [2]	**BH1**	**BH2**	**BH3**	**BH4**	**SW01**
Ethylbenzene	ug/l			<5	<5	<5	<5	<5
m/p-Xylene	ug/l		30	<5	<5	<5	<5	<5
o-Xylene	ug/l		30	<5	<5	<5	<5	<5
Aliphatics								
>C5-C6 (HS_1D_AL)	ug/l			<10	<10	<10	<10	<10
>C6-C8 (HS_1D_AL)	ug/l			<10	<10	<10	<10	<10
>C8-C10 (HS_1D_AL)	ug/l			<10	<10	<10	<10	<10
>C10-C12 (EH_CU_1D_AL)	ug/l			<5	<5	<5	<5	<5
>C12-C16 (EH_CU_1D_AL)	ug/l			<10	<10	<10	<10	<10
>C16-C21 (EH_CU_1D_AL)	ug/l			<10	<10	<10	<10	<10
>C21-C35 (EH_CU_1D_AL)	ug/l			<10	<10	<10	<10	<10
Total aliphatics C5-35 (EH_CU+HS_1D_AL)	ug/l			<10	<10	<10	<10	<10

Parameter	**Units**	**GTV [1]**	**EQS 2019 [2]**	**BH1**	**BH2**	**BH3**	**BH4**	**SW01**
Aromatics								
>C5-EC7 (HS_1D_AR)	ug/l			<10	<10	<10	<10	<10
>EC7-EC8 (HS_1D_AR)	ug/l			<10	<10	<10	<10	<10
>EC8-EC10 (HS_1D_AR)	ug/l			<10	<10	<10	<10	<10
>EC10-EC12 (EH_CU_1D_AR)	ug/l			<5	<5	<5	<5	<5
>EC12-EC16 (EH_CU_1D_AR)	ug/l			<10	<10	<10	<10	<10
>EC16-EC21 (EH_CU_1D_AR)	ug/l			<10	<10	<10	<10	<10
>EC21-EC35 (EH_CU_1D_AR)	ug/l			<10	<10	<10	<10	<10
Total aromatics C5-35 (EH_CU+HS_1D_AR)	ug/l			<10	<10	<10	<10	<10
Total aliphatics and aromatics (C5-35) (EH_CU+HS_1D_Total)	ug/l			<10	<10	<10	<10	<10
Sulphate as SO4	mg/l	187.5	200	15.1	35.3	7.1	22.4	21.5
Chloride	mg/l	187.5	250	15.3	19.6	9.9	14.8	19.4

Parameter	Units	GTV [1]	EQS 2019 [2]	BH1	BH2	BH3	BH4	SW01
Nitrate as NO3	mg/l	37.5	50	16.2	2	19.5	28.9	2.1
Nitrite as NO2	mg/l	0.375	0.2	<0.02	<0.02	<0.02	<0.02	<0.02
Ortho Phosphate as PO4	mg/l			<0.06	<0.06	<0.06	<0.06	<0.06
Ammoniacal Nitrogen as N	mg/l			0.03	0.1	0.36	0.04	<0.03
Hexavalent Chromium	ug/l	7.5	3.4	<6	<6	<6	<6	<6
Total Dissolved Chromium III	ug/l		4.7	<6	<6	<6	<6	<6
Total Alkalinity as CaCO3	mg/l			5062	966	340	1622	142
COD (Settled)	mg/l			13	21	20	11	<7
Total Suspended Solids	mg/l		50	12376	2748	2328	5486	<10

1 Groundwater Regulations 2010 (S.I. No. 9 of 2010) and amendment S.I. No. 366/2016.

2 AA-EQS - European Communities Environmental Objectives (Surface Waters) Regulations 2009 (S.I. No. 272/2009 including amendments S.I. No. 327/2012, S.I. No. 386/2015 and S.I. No. 77/2019)

Table 6B-2 - Laboratory Results – April 2024

Parameter	**Units**	**GTV [1]**	**EQS 2019 [2]**	**BH1**	**BH2**	**BH3**	**BH4**	**SW01**
Dissolved Arsenic	ug/l	7.5	50	<2.5	<2.5	<2.5	<2.5	<2.5
Dissolved Barium	ug/l		100	80	81	18	21	26
Dissolved Beryllium	ug/l			<0.5	<0.5	<0.5	<0.5	<0.5
Dissolved Boron	ug/l		2000	61	<12	24	27	15
Dissolved Cadmium	ug/l		3	<0.5	<0.5	<0.5	<0.5	<0.5
Dissolved Calcium	mg/l			140.7	122.8	59.8	96	48.4
Total Dissolved Chromium	ug/l	37.5	30	<1.5	<1.5	<1.5	<1.5	<1.5
Dissolved Copper	ug/l		30	<7	<7	<7	<7	<7
Total Dissolved Iron	ug/l		1000	<20	<20	<20	<20	<20
Dissolved Lead	ug/l	7.5	10	<5	<5	<5	<5	<5
Dissolved Magnesium	mg/l			12.3	17.2	4.1	9.3	10.1

Parameter	**Units**	**GTV** [1]	**EQS 2019** [2]	**BH1**	**BH2**	**BH3**	**BH4**	**SW01**
Dissolved Manganese	ug/l			2	31	<2	<2	<2
Dissolved Mercury	ug/l	0.75	1	<1	<1	<1	<1	<1
Dissolved Nickel	ug/l		50	4	<2	<2	<2	<2
Dissolved Potassium	mg/l			35.1	2	1.2	0.7	2.1
Dissolved Selenium	ug/l			<3	<3	<3	<3	<3
Dissolved Sodium	mg/l			9.1	11.3	3.9	6.8	8.3
Dissolved Vanadium	ug/l			<1.5	<1.5	<1.5	<1.5	<1.5
Dissolved Zinc	ug/l	75	100	6	4	4	<3	3
Total Chromium	ug/l			6.9	<1.5	6.7	<1.5	<1.5
Total Iron	ug/l			3653	384	2691	95	<20
MTBE	ug/l	10		<5	<5	<5	<5	<5
Benzene	ug/l		10	<5	<5	<5	<5	<5
Toluene	ug/l	525	74	<5	<5	<5	<5	<5

Parameter	**Units**	**GTV [1]**	**EQS 2019 [2]**	**BH1**	**BH2**	**BH3**	**BH4**	**SW01**
Ethylbenzene	ug/l			<5	<5	<5	<5	<5
m/p-Xylene	ug/l		30	<5	<5	<5	<5	<5
o-Xylene	ug/l		30	<5	<5	<5	<5	<5
Aliphatics								
>C5-C6 (HS_1D_AL)	ug/l			<10	<10	<10	<10	<10
>C6-C8 (HS_1D_AL)	ug/l			<10	<10	<10	<10	<10
>C8-C10 (HS_1D_AL)	ug/l			<10	<10	<10	<10	<10
>C10-C12 (EH_CU_1D_AL)	ug/l			<5	<5	<5	<5	<5
>C12-C16 (EH_CU_1D_AL)	ug/l			<10	<10	<10	<10	<10
>C16-C21 (EH_CU_1D_AL)	ug/l			<10	<10	<10	<10	<10
>C21-C35 (EH_CU_1D_AL)	ug/l			<10	<10	<10	<10	<10
Total aliphatics C5-35 (EH_CU+HS_1D_AL)	ug/l			<10	<10	<10	<10	<10

Parameter	Units	GTV [1]	EQS 2019 [2]	BH1	BH2	BH3	BH4	SW01
Aromatics								
>C5-EC7 (HS_1D_AR)	ug/l			<10	<10	<10	<10	<10
>EC7-EC8 (HS_1D_AR)	ug/l			<10	<10	<10	<10	<10
>EC8-EC10 (HS_1D_AR)	ug/l			<10	<10	<10	<10	<10
>EC10-EC12 (EH_CU_1D_AR)	ug/l			<5	<5	<5	<5	<5
>EC12-EC16 (EH_CU_1D_AR)	ug/l			<10	<10	<10	<10	<10
>EC16-EC21 (EH_CU_1D_AR)	ug/l			<10	<10	<10	<10	<10
>EC21-EC35 (EH_CU_1D_AR)	ug/l			<10	<10	<10	<10	<10
Total aromatics C5-35 (EH_CU+HS_1D_AR)	ug/l			<10	<10	<10	<10	<10
Total aliphatics and aromatics (C5-35) (EH_CU+HS_1D_Total)	ug/l			<10	<10	<10	<10	<10
Sulphate as SO4	mg/l	187.5	200	23.1	58.3	4.9	22	21.7
Chloride	mg/l	187.5	250	16.4	21.2	6.7	10.7	19.8

Parameter	**Units**	**GTV [1]**	**EQS 2019 [2]**	**BH1**	**BH2**	**BH3**	**BH4**	**SW01**
Nitrate as NO3	mg/l	37.5	50	44.7	7	12.4	22.8	2
Nitrite as NO2	mg/l	0.375	0.2	<0.02	<0.02	<0.02	<0.02	<0.02
Ortho Phosphate as PO4	mg/l			0.22	<0.06	<0.06	<0.06	<0.06
Ammoniacal Nitrogen as N	mg/l			0.04	0.18	0.03	<0.03	<0.03
Hexavalent Chromium	ug/l	7.5	3.4	<6	<6	<6	<6	<6
Total Dissolved Chromium III	ug/l		4.7	<6	<6	<6	<6	<6
Total Alkalinity as CaCO3	mg/l			868	544	206	950	148
COD (Settled)	mg/l			13	9	<7	10	10
Total Suspended Solids	mg/l		50	2562	842	830	2802	<10

1 Groundwater Regulations 2010 (S.I. No. 9 of 2010) and amendment S.I. No. 366/2016.

2 AA-EQS - European Communities Environmental Objectives (Surface Waters) Regulations 2009 (S.I. No. 272/2009 including amendments S.I. No. 327/2012, S.I. No. 386/2015 and S.I. No. 77/2019)

Table 6B-3 - Laboratory Results – May 2024

Parameter	Units	GTV [1]	EQS 2019 [2]	BH1	BH1 Dup	BH2	BH3	BH4	SW01
Dissolved Arsenic	ug/l	7.5	50	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
Dissolved Barium	ug/l		100	108	94	83	13	14	19
Dissolved Beryllium	ug/l			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dissolved Boron	ug/l		2000	84	85	18	22	21	20
Dissolved Cadmium	ug/l		3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dissolved Calcium	mg/l			132.8	134.9	107.4	55.2	84.9	43.8
Total Dissolved Chromium	ug/l	37.5	30	<1.5	6.8	<1.5	<1.5	<1.5	<1.5
Dissolved Copper	ug/l		30	<7	7	<7	<7	<7	<7
Total Dissolved Iron	ug/l		1000	<20	<20	<20	<20	<20	<20
Dissolved Lead	ug/l	7.5	10	<5	<5	<5	<5	<5	<5
Dissolved Magnesium	mg/l			15.4	15.6	15.2	4	8.5	9.6

Parameter	Units	GTV[1]	EQS 2019[2]	BH1	BH1 Dup	BH2	BH3	BH4	SW01
Dissolved Manganese	ug/l		300	31	<2	97	<2	<2	<2
Dissolved Mercury	ug/l	0.75	1	<1	<1	<1	<1	<1	<1
Dissolved Nickel	ug/l		50	11	6	<2	<2	<2	<2
Dissolved Potassium	mg/l			70.1	71.7	1.8	1	0.6	2
Dissolved Selenium	ug/l			<3	<3	<3	<3	<3	<3
Dissolved Sodium	mg/l			12.9	13.5	10	4	6.9	8.3
Dissolved Vanadium	ug/l			<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
Dissolved Zinc	ug/l	75	100	7	5	4	<3	<3	<3
Total Chromium	ug/l			12.8	13.1	6.3	30	204.6	<1.5
Total Iron	ug/l			7627	2985	3175	24461	204054	<20
MTBE	ug/l	10		<5	<5	<5	<5	<5	<5
Benzene	ug/l		10	<5	<5	<5	<5	<5	<5
Toluene	ug/l	525	74	<5	<5	<5	<5	<5	<5

Parameter	**Units**	**GTV [1]**	**EQS 2019 [2]**	**BH1**	**BH1 Dup**	**BH2**	**BH3**	**BH4**	**SW01**
Ethylbenzene	ug/l			<5	<5	<5	<5	<5	<5
m/p-Xylene	ug/l		30	<5	<5	<5	<5	<5	<5
o-Xylene	ug/l		30	<5	<5	<5	<5	<5	<5
Aliphatics									
>C5-C6 (HS_1D_AL)	ug/l			<10	<10	<10	<10	<10	<10
>C6-C8 (HS_1D_AL)	ug/l			<10	<10	<10	<10	<10	<10
>C8-C10 (HS_1D_AL)	ug/l			<10	<10	<10	<10	<10	<10
>C10-C12 (EH_CU_1D_AL)	ug/l			<5	<5	<5	<5	<5	<5
>C12-C16 (EH_CU_1D_AL)	ug/l			<10	<10	<10	<10	<10	<10
>C16-C21 (EH_CU_1D_AL)	ug/l			<10	<10	<10	<10	<10	<10
>C21-C35 (EH_CU_1D_AL)	ug/l			<10	<10	<10	<10	<10	<10
Total aliphatics C5-35 (EH_CU+HS_1D_AL)	ug/l			<10	<10	<10	<10	<10	<10

Parameter	**Units**	**GTV** [1]	**EQS 2019** [2]	**BH1**	**BH1 Dup**	**BH2**	**BH3**	**BH4**	**SW01**
Aromatics									
>C5-EC7 (HS_1D_AR)	ug/l			<10	<10	<10	<10	<10	<10
>EC7-EC8 (HS_1D_AR)	ug/l			<10	<10	<10	<10	<10	<10
>EC8-EC10 (HS_1D_AR)	ug/l			<10	<10	<10	<10	<10	<10
>EC10-EC12 (EH_CU_1D_AR)	ug/l			<5	<5	<5	<5	<5	<5
>EC12-EC16 (EH_CU_1D_AR)	ug/l			<10	<10	<10	<10	<10	<10
>EC16-EC21 (EH_CU_1D_AR)	ug/l			<10	<10	<10	<10	<10	<10
>EC21-EC35 (EH_CU_1D_AR)	ug/l			<10	<10	<10	<10	<10	<10
Total aromatics C5-35 (EH_CU+HS_1D_AR)	ug/l			<10	<10	<10	<10	<10	<10
Total aliphatics and aromatics (C5-35) (EH_CU+HS_1D_Total)	ug/l			<10	<10	<10	<10	<10	<10
Sulphate as SO4	mg/l	187.5	200	91.4	82	28.9	3.9	23.9	21
Chloride	mg/l	187.5	250	28.1	25.1	21.5	5.8	13.5	19.4

Parameter	**Units**	**GTV** [1]	**EQS 2019** [2]	**BH1**	**BH1 Dup**	**BH2**	**BH3**	**BH4**	**SW01**
Nitrate as NO3	mg/l	37.5	50	79.6	79	2.3	8.2	29	1.6
Nitrite as NO2	mg/l	0.375	0.2	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Ortho Phosphate as PO4	mg/l			0.41	0.6	<0.06	<0.06	<0.06	<0.06
Ammoniacal Nitrogen as N	mg/l			0.16	0.17	<0.03	0.03	0.03	<0.03
Hexavalent Chromium	ug/l	7.5	3.4	<6	<6	<6	<6	<6	<6
Total Dissolved Chromium III	ug/l		4.7	<6	7	<6	<6	<6	<6
Total Alkalinity as CaCO3	mg/l			1464	1046	388	238	2390	148
COD (Settled)	mg/l			<7	9	<7	<7	<7	9
Total Suspended Solids	mg/l		50	3406	2884	348	1866	6800	<10

1 Groundwater Regulations 2010 (S.I. No. 9 of 2010) and amendment S.I. No. 366/2016.

2 AA-EQS - European Communities Environmental Objectives (Surface Waters) Regulations 2009 (S.I. No. 272/2009 including amendments S.I. No. 327/2012, S.I. No. 386/2015 and S.I. No. 77/2019)

Table 6B-4 - Laboratory Results – June 2024

Parameter	Units	GTV [1]	EQS 2019 [2]	BH1	BH2	BH3	BH4	SW01
Dissolved Arsenic	ug/l	7.5	50	3.6	4	<2.5	3.1	<2.5
Dissolved Barium	ug/l		100	97	79	10	22	22
Dissolved Beryllium	ug/l			<0.5	<0.5	<0.5	<0.5	<0.5
Dissolved Boron	ug/l		2000	75	<12	23	24	15
Dissolved Cadmium	ug/l		3	<0.5	<0.5	<0.5	<0.5	<0.5
Dissolved Calcium	mg/l			126.8	105.7	50.3	100.4	46.4
Total Dissolved Chromium	ug/l	37.5	30	<1.5	<1.5	<1.5	<1.5	<1.5
Dissolved Copper	ug/l		30	<7	<7	<7	<7	<7
Total Dissolved Iron	ug/l		1000	<20	<20	<20	<20	<20
Dissolved Lead	ug/l	7.5	10	<5	<5	<5	<5	<5
Dissolved Magnesium	mg/l			15	15.8	3.7	10.1	10.5

Parameter	**Units**	**GTV [1]**	**EQS 2019 [2]**	**BH1**	**BH2**	**BH3**	**BH4**	**SW01**
Dissolved Manganese	ug/l		300	<2	167	<2	<2	<2
Dissolved Mercury	ug/l	0.75	1	<1	<1	<1	<1	<1
Dissolved Nickel	ug/l		50	6	3	<2	<2	<2
Dissolved Potassium	mg/l			61.3	1.8	0.8	0.7	2.1
Dissolved Selenium	ug/l			<3	<3	<3	<3	<3
Dissolved Sodium	mg/l			12.1	9.5	3.5	7.3	8.2
Dissolved Vanadium	ug/l			<1.5	<1.5	<1.5	<1.5	<1.5
Dissolved Zinc	ug/l	75	100	5	<3	<3	<3	4
Total Chromium	ug/l			14.2	6.5	13.2	64.7	<1.5
Total Iron	ug/l			12057	3214	5516	49276	53
MTBE	ug/l	10		<5	<5	<5	<5	<5
Benzene	ug/l		10	<5	<5	<5	<5	<5
Toluene	ug/l	525	74	<5	<5	<5	<5	<5

Parameter	**Units**	**GTV [1]**	**EQS 2019 [2]**	**BH1**	**BH2**	**BH3**	**BH4**	**SW01**
Ethylbenzene	ug/l			<5	<5	<5	<5	<5
m/p-Xylene	ug/l		30	<5	<5	<5	<5	<5
o-Xylene	ug/l		30	<5	<5	<5	<5	<5
Aliphatics								
>C5-C6 (HS_1D_AL)	ug/l			<10	<10	<10	<10	<10
>C6-C8 (HS_1D_AL)	ug/l			<10	<10	<10	<10	<10
>C8-C10 (HS_1D_AL)	ug/l			<10	<10	<10	<10	<10
>C10-C12 (EH_CU_1D_AL)	ug/l			<5	<5	<5	<5	<5
>C12-C16 (EH_CU_1D_AL)	ug/l			<10	<10	<10	<10	<10
>C16-C21 (EH_CU_1D_AL)	ug/l			<10	<10	<10	<10	<10
>C21-C35 (EH_CU_1D_AL)	ug/l			<10	<10	<10	<10	<10
Total aliphatics C5-35 (EH_CU+HS_1D_AL)	ug/l			<10	<10	<10	<10	<10

Parameter	Units	GTV [1]	EQS 2019 [2]	BH1	BH2	BH3	BH4	SW01
Aromatics								
>C5-EC7 (HS_1D_AR)	ug/l			<10	<10	<10	<10	<10
>EC7-EC8 (HS_1D_AR)	ug/l			<10	<10	<10	<10	<10
>EC8-EC10 (HS_1D_AR)	ug/l			<10	<10	<10	<10	<10
>EC10-EC12 (EH_CU_1D_AR)	ug/l			<5	<5	<5	<5	<5
>EC12-EC16 (EH_CU_1D_AR)	ug/l			<10	<10	<10	<10	<10
>EC16-EC21 (EH_CU_1D_AR)	ug/l			<10	<10	<10	<10	<10
>EC21-EC35 (EH_CU_1D_AR)	ug/l			<10	<10	<10	<10	<10
Total aromatics C5-35 (EH_CU+HS_1D_AR)	ug/l			<10	<10	<10	<10	<10
Total aliphatics and aromatics (C5-35) (EH_CU+HS_1D_Total)	ug/l			<10	<10	<10	<10	<10
Sulphate as SO4	mg/l	187.5	200	72.5	22.3	3.2	27.9	21.7
Chloride	mg/l	187.5	250	24.9	21.6	4.6	16	19.6

Parameter	Units	GTV [1]	EQS 2019 [2]	BH1	BH2	BH3	BH4	SW01
Nitrate as NO3	mg/l	37.5	50	58.2	0.4	4.7	32.7	0.9
Nitrite as NO2	mg/l	0.375	0.2	<0.02	<0.02	<0.02	<0.02	<0.02
Ortho Phosphate as PO4	mg/l			0.41	<0.06	<0.06	<0.06	<0.06
Ammoniacal Nitrogen as N	mg/l			0.06	0.09	<0.03	0.03	0.05
Hexavalent Chromium	ug/l	7.5	3.4	<6	<6	<6	<6	<6
Total Dissolved Chromium III	ug/l		4.7	<6	<6	<6	<6	<6
Total Alkalinity as CaCO3	mg/l			1446	482	214	1138	140
COD (Settled)	mg/l			12	<7	<7	<7	<7
Total Suspended Solids	mg/l		50	3351	820	1273	3145	15

1 Groundwater Regulations 2010 (S.I. No. 9 of 2010) and amendment S.I. No. 366/2016.

2 AA-EQS - European Communities Environmental Objectives (Surface Waters) Regulations 2009 (S.I. No. 272/2009 including amendments S.I. No. 327/2012, S.I. No. 386/2015 and S.I. No. 77/2019)

Table 6B-5 - Laboratory Results – July 2024

Parameter	Units	GTV [1]	EQS 2019 [2]	BH1	BH2	BH3	BH3 Dup	BH4	SW01
Dissolved Arsenic	ug/l	7.5	50	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
Dissolved Barium	ug/l		100	70	70	14	16	27	27
Dissolved Beryllium	ug/l			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dissolved Boron	ug/l		2000	51	<12	16	25	28	21
Dissolved Cadmium	ug/l		3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dissolved Calcium	mg/l			127.6	96.4	53	52.9	101.6	44.4
Total Dissolved Chromium	ug/l	37.5	30	<1.5	5	<1.5	<1.5	6	<1.5
Dissolved Copper	ug/l		30	<7	<7	<7	<7	<7	<7
Total Dissolved Iron	ug/l		1000	<20	<20	<20	<20	<20	<20
Dissolved Lead	ug/l	7.5	10	<5	<5	<5	<5	<5	<5
Dissolved Magnesium	mg/l			10.9	12.7	3.7	3.8	9.7	9.9

Parameter	**Units**	**GTV [1]**	**EQS 2019 [2]**	**BH1**	**BH2**	**BH3**	**BH3 Dup**	**BH4**	**SW01**
Dissolved Manganese	ug/l		300	4	74	22	23	<2	4
Dissolved Mercury	ug/l	0.75	1	<1	<1	<1	<1	<1	<1
Dissolved Nickel	ug/l		50	2	<2	<2	<2	<2	<2
Dissolved Potassium	mg/l			35.8	1.8	0.8	0.8	0.8	2
Dissolved Selenium	ug/l			<3	<3	<3	<3	<3	<3
Dissolved Sodium	mg/l			8.7	9.2	4.2	4.2	7.7	8.2
Dissolved Vanadium	ug/l			<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
Dissolved Zinc	ug/l	75	100	5	5	3	5	8	<3
Total Chromium	ug/l			33	33.3	43.5	54.7	107.6	<1.5
Total Iron	ug/l			39152	28726	38875	52187	115584	25
MTBE	ug/l	10		<5	<5	<5	<5	<5	<5
Benzene	ug/l		10	<5	<5	<5	<5	<5	<5
Toluene	ug/l	525	74	<5	<5	<5	<5	<5	<5

Parameter	**Units**	**GTV [1]**	**EQS 2019 [2]**	**BH1**	**BH2**	**BH3**	**BH3 Dup**	**BH4**	**SW01**
Ethylbenzene	ug/l			<5	<5	<5	<5	<5	<5
m/p-Xylene	ug/l		30	<5	<5	<5	<5	<5	<5
o-Xylene	ug/l		30	<5	<5	<5	<5	<5	<5
Aliphatics									
>C5-C6 (HS_1D_AL)	ug/l			<10	<10	<10	<10	<10	<10
>C6-C8 (HS_1D_AL)	ug/l			<10	<10	<10	<10	<10	<10
>C8-C10 (HS_1D_AL)	ug/l			<10	<10	<10	<10	<10	<10
>C10-C12 (EH_CU_1D_AL)	ug/l			<5	<5	<5	<5	<5	<5
>C12-C16 (EH_CU_1D_AL)	ug/l			<10	<10	<10	<10	<10	<10
>C16-C21 (EH_CU_1D_AL)	ug/l			<10	<10	<10	<10	<10	<10
>C21-C35 (EH_CU_1D_AL)	ug/l			<10	<10	<10	<10	<10	<10
Total aliphatics C5-35 (EH_CU+HS_1D_AL)	ug/l			<10	<10	<10	<10	<10	<10

Parameter	**Units**	**GTV [1]**	**EQS 2019 [2]**	**BH1**	**BH2**	**BH3**	**BH3 Dup**	**BH4**	**SW01**
Aromatics									
>C5-EC7 (HS_1D_AR)	ug/l			<10	<10	<10	<10	<10	<10
>EC7-EC8 (HS_1D_AR)	ug/l			<10	<10	<10	<10	<10	<10
>EC8-EC10 (HS_1D_AR)	ug/l			<10	<10	<10	<10	<10	<10
>EC10-EC12 (EH_CU_1D_AR)	ug/l			<5	<5	<5	<5	<5	<5
>EC12-EC16 (EH_CU_1D_AR)	ug/l			<10	<10	<10	<10	<10	<10
>EC16-EC21 (EH_CU_1D_AR)	ug/l			<10	<10	<10	<10	<10	<10
>EC21-EC35 (EH_CU_1D_AR)	ug/l			<10	<10	<10	<10	<10	<10
Total aromatics C5-35 (EH_CU+HS_1D_AR)	ug/l			<10	<10	<10	<10	<10	<10
Total aliphatics and aromatics (C5-35) (EH_CU+HS_1D_Total)	ug/l			<10	<10	<10	<10	<10	<10
Sulphate as SO4	mg/l	187.5	200	29.9	20	3.7	3.9	26.1	20.3
Chloride	mg/l	187.5	250	13.1	20.9	5.1	5.4	15.3	19.4

Parameter	**Units**	**GTV** [1]	**EQS 2019** [2]	**BH1**	**BH2**	**BH3**	**BH3 Dup**	**BH4**	**SW01**
Nitrate as NO3	mg/l	37.5	50	32.5	0.3	5.8	6	33.4	0.7
Nitrite as NO2	mg/l	0.375	0.2	<0.02	0.03	<0.02	<0.02	<0.02	<0.02
Ortho Phosphate as PO4	mg/l			0.2	<0.06	<0.06	<0.06	<0.06	<0.06
Ammoniacal Nitrogen as N	mg/l			0.34	0.05	<0.03	<0.03	0.03	<0.03
Hexavalent Chromium	ug/l	7.5	3.4	<6	<6	41	<6	<6	<6
Total Dissolved Chromium III	ug/l		4.7	<6	<6	<6	<6	6	<6
Total Alkalinity as CaCO3	mg/l			764	500	208	254	1200	136
COD (Settled)	mg/l			10	<7	<7	<7	<7	21
Total Suspended Solids	mg/l		50	1447	828	828	1027	3074	<10

1 Groundwater Regulations 2010 (S.I. No. 9 of 2010) and amendment S.I. No. 366/2016.

2 AA-EQS - European Communities Environmental Objectives (Surface Waters) Regulations 2009 (S.I. No. 272/2009 including amendments S.I. No. 327/2012, S.I. No. 386/2015 and S.I. No. 77/2019)

Table 6B-6 - Laboratory Results – August 2024

Parameter	Units	GTV [1]	EQS 2019 [2]	BH1	BH2	BH3	BH4	SW01
Dissolved Arsenic	ug/l	7.5	50	5.4	<2.5	<2.5	<2.5	<2.5
Dissolved Barium	ug/l		100	85	63	8	18	23
Dissolved Beryllium	ug/l			<0.5	<0.5	<0.5	<0.5	<0.5
Dissolved Boron	ug/l		2000	55	17	17	19	13
Dissolved Cadmium	ug/l		3	<0.5	<0.5	<0.5	<0.5	<0.5
Dissolved Calcium	mg/l			121.3	96.1	42.5	89.1	42.6
Total Dissolved Chromium	ug/l	37.5	30	4.6	6.6	6.9	<1.5	<1.5
Dissolved Copper	ug/l		30	<7	<7	<7	<7	<7
Total Dissolved Iron	ug/l		1000	<20	<20	<20	<20	<20
Dissolved Lead	ug/l	7.5	10	<5	<5	<5	<5	<5
Dissolved Magnesium	mg/l			10.9	12.5	3.1	8.1	10.1

Parameter	**Units**	**GTV [1]**	**EQS 2019 [2]**	**BH1**	**BH2**	**BH3**	**BH4**	**SW01**
Dissolved Manganese	ug/l		300	40	<2	22	<2	27
Dissolved Mercury	ug/l	0.75	1	<1	<1	<1	<1	<1
Dissolved Nickel	ug/l		50	4	<2	<2	<2	<2
Dissolved Potassium	mg/l			31.4	2	0.7	0.6	2.1
Dissolved Selenium	ug/l			<3	<3	<3	<3	<3
Dissolved Sodium	mg/l			8.9	9.3	4.5	7.1	8.4
Dissolved Vanadium	ug/l			<1.5	<1.5	<1.5	<1.5	<1.5
Dissolved Zinc	ug/l	75	100	26	9	11	13	<3
Total Chromium	ug/l			<1.5	<1.5	35.9	<1.5	<1.5
Total Iron	ug/l			1018	536	25033	198	26
MTBE	ug/l	10		<5	<5	<5	<5	<5
Benzene	ug/l		10	<5	<5	<5	<5	<5
Toluene	ug/l	525	74	<5	<5	<5	<5	<5

Parameter	**Units**	**GTV** [1]	**EQS 2019** [2]	**BH1**	**BH2**	**BH3**	**BH4**	**SW01**
Ethylbenzene	ug/l			<5	<5	<5	<5	<5
m/p-Xylene	ug/l		30	<5	<5	<5	<5	<5
o-Xylene	ug/l		30	<5	<5	<5	<5	<5
Aliphatics								
>C5-C6 (HS_1D_AL)	ug/l			<10	<10	<10	<10	<10
>C6-C8 (HS_1D_AL)	ug/l			<10	<10	<10	<10	<10
>C8-C10 (HS_1D_AL)	ug/l			<10	<10	<10	<10	<10
>C10-C12 (EH_CU_1D_AL)	ug/l			<5	<5	<5	<5	<5
>C12-C16 (EH_CU_1D_AL)	ug/l			<10	<10	<10	<10	<10
>C16-C21 (EH_CU_1D_AL)	ug/l			<10	<10	<10	<10	<10
>C21-C35 (EH_CU_1D_AL)	ug/l			<10	<10	<10	<10	<10
Total aliphatics C5-35 (EH_CU+HS_1D_AL)	ug/l			<10	<10	<10	<10	<10

Parameter	Units	GTV [1]	EQS 2019 [2]	BH1	BH2	BH3	BH4	SW01
Aromatics								
>C5-EC7 (HS_1D_AR)	ug/l			<10	<10	<10	<10	<10
>EC7-EC8 (HS_1D_AR)	ug/l			<10	<10	<10	<10	<10
>EC8-EC10 (HS_1D_AR)	ug/l			<10	<10	<10	<10	<10
>EC10-EC12 (EH_CU_1D_AR)	ug/l			<5	<5	<5	<5	<5
>EC12-EC16 (EH_CU_1D_AR)	ug/l			<10	<10	<10	<10	<10
>EC16-EC21 (EH_CU_1D_AR)	ug/l			<10	<10	<10	<10	<10
>EC21-EC35 (EH_CU_1D_AR)	ug/l			<10	<10	<10	<10	<10
Total aromatics C5-35 (EH_CU+HS_1D_AR)	ug/l			<10	<10	<10	<10	<10
Total aliphatics and aromatics (C5-35) (EH_CU+HS_1D_Total)	ug/l			<10	<10	<10	<10	<10
Sulphate as SO4	mg/l	187.5	200	23.3	19.1	2.5	19.5	20.4
Chloride	mg/l	187.5	250	14.2	20.1	3.8	15	19.1

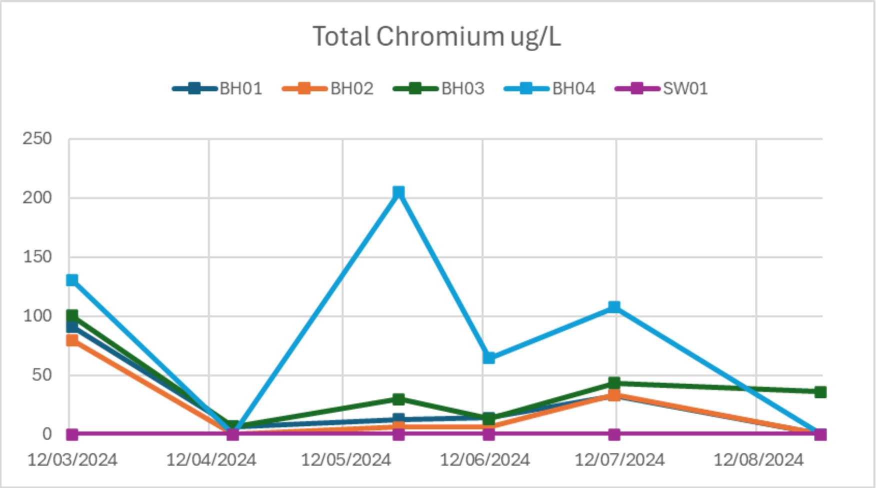
Parameter	**Units**	**GTV [1]**	**EQS 2019 [2]**	**BH1**	**BH2**	**BH3**	**BH4**	**SW01**
Nitrate as NO3	mg/l	37.5	50	27.2	0.9	3.8	21.5	0.5
Nitrite as NO2	mg/l	0.375	0.2	0.16	<0.02	<0.02	<0.02	<0.02
Ortho Phosphate as PO4	mg/l			0.27	0.09	0.08	0.08	0.07
Ammoniacal Nitrogen as N	mg/l			0.16	<0.03	0.03	<0.03	<0.03
Hexavalent Chromium	ug/l	7.5	3.4	<6	<6	<6	<6	<6
Total Dissolved Chromium III	ug/l		4.7	<6	7	7	<6	<6
Total Alkalinity as CaCO3	mg/l			352	258	160	208	122
COD (Settled)	mg/l			14	18	<7	21	25
Total Suspended Solids	mg/l		50	55	24	548	15	<10

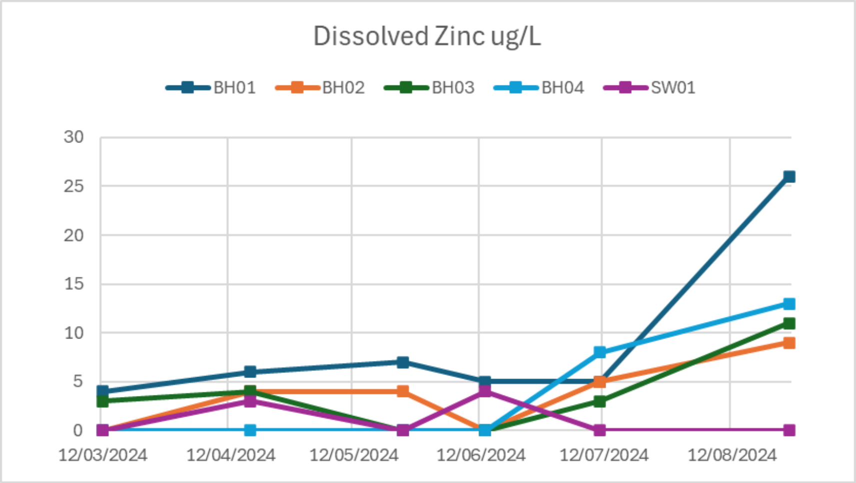
[1] Groundwater Regulations 2010 (S.I. No. 9 of 2010) and amendment S.I. No. 366/2016.

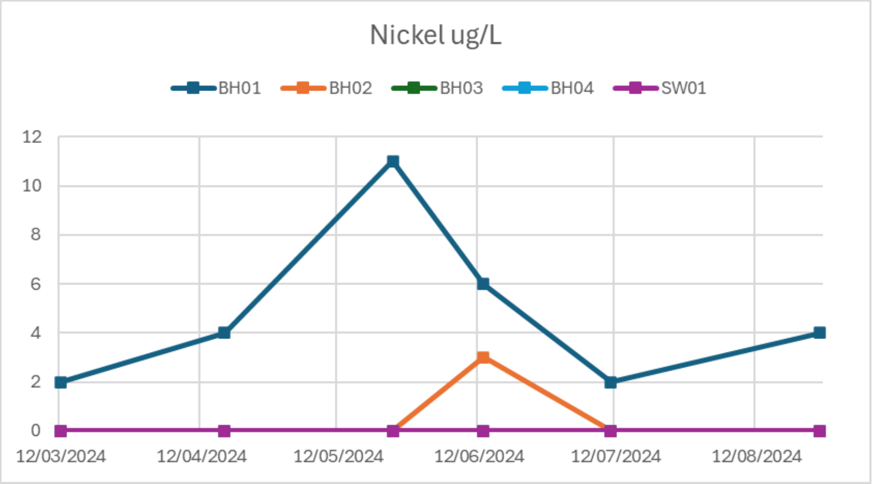
[2] AA-EQS - European Communities Environmental Objectives (Surface Waters) Regulations 2009 (S.I. No. 272/2009 including amendments S.I. No. 327/2012, S.I. No. 386/2015 and S.I. No. 77/2019)

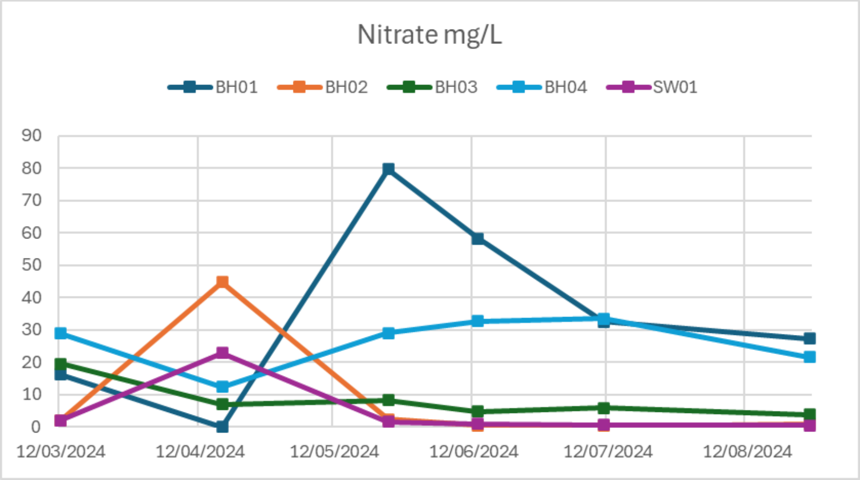
Appendix 6C

Water Quality Graphs


Total Chromium ug/L
BH01
BH02
BH03
BH04
SW01
250
200
150
100
50
0
12/03/2024
12/04/2024
12/05/2024
12/06/2024
12/07/2024
12/08/2024


Dissolved Zinc ug/L
BH01
BH02
BH03
BH04
SW01
30
25
20
15
10
5
0
12/03/2024
12/04/2024
12/05/2024
12/06/2024
12/07/2024
12/08/2024


Nickel ug/L
BH01
BH02
BH03
BH04
SW01
12
10
8
6
4
2
0
12/03/2024
12/04/2024
12/05/2024
12/06/2024
12/07/2024
12/08/2024


Nitrate mg/L
BH01
BH02
BH03
BH04
SW01
90
80
70
60
50
40
30
20
10
0
12/03/2024
12/04/2024
12/05/2024
12/06/2024
12/07/2024
12/08/2024

Appendix 6D

Laboratory Water Quality Certificates

element

Element Materials Technology
Unit 3 Deeside Point
Zone 3
Deeside Industrial Park
Deeside
CH5 2UA

P: +44 (0) 1244 833780
F: +44 (0) 1244 833781

W: www.element.com

WSP Environmental
Town Centre House
Dublin Road
Naas
Co Kildare
Ireland

UKAS TESTING 4225

bsi ISO 14001 Environmental Management CERTIFIED

Attention :	John Moran
Date :	26th March, 2024
Your reference :	400000205
Our reference :	Test Report 24/4542 Batch 1
Location :	Ballykelly
Date samples received :	14th March, 2024
Status :	Final Report
Issue :	202403260917

Five samples were received for analysis on 14th March, 2024 of which five were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

The greenhouse gas emissions generated (in Carbon – Co2e) to obtain the results in this report are estimated as:

Scope 1&2 emissions - 9.846 kg of CO2

Scope 1&2&3 emissions - 23.27 kg of CO2

Authorised By:

Paul Boden BSc

Senior Project Manager

Client Name: WSP Environmental
Reference: 400000205
Location: Ballykelly
Contact: John Moran
EMT Job No: 24/4542

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
H=H_2SO_4, Z=ZnAc, N=NaOH, HN=HN0$_3$

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	1-5	6-10	11-15	16-20	21-26	LOD/LOR	Units	Method No.
Sample ID	BH01	BH02	BH03	BH04	SW01			
Depth								
COC No / misc								
Containers	V H P G	V H P G	V H P G	V H P G	V H HN P G			
Sample Date	12/03/2024	12/03/2024	12/03/2024	12/03/2024	12/03/2024			
Sample Type	Ground Water	Ground Water	Ground Water	Ground Water	Surface Water			
Batch Number	1	1	1	1	1			
Date of Receipt	14/03/2024	14/03/2024	14/03/2024	14/03/2024	14/03/2024			
Dissolved Arsenic#	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	ug/l	TM30/PM14
Dissolved Barium#	47	68	23	22	26	<3	ug/l	TM30/PM14
Dissolved Beryllium	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	TM30/PM14
Dissolved Boron	61	<12	27	28	22	<12	ug/l	TM30/PM14
Dissolved Cadmium#	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	TM30/PM14
Dissolved Calcium#	145.7	108.9	76.2	96.5	48.7	<0.2	mg/l	TM30/PM14
Total Dissolved Chromium#	<1.5	<1.5	<1.5	2.3	<1.5	<1.5	ug/l	TM30/PM14
Dissolved Copper#	<7	<7	<7	<7	<7	<7	ug/l	TM30/PM14
Dissolved Lead#	<5	<5	<5	<5	<5	<5	ug/l	TM30/PM14
Dissolved Magnesium#	12.0	16.1	5.1	9.3	10.4	<0.1	mg/l	TM30/PM14
Dissolved Manganese#	<2	<2	<2	<2	<2	<2	ug/l	TM30/PM14
Dissolved Mercury#	<1	<1	<1	<1	<1	<1	ug/l	TM30/PM14
Dissolved Nickel#	2	<2	<2	<2	<2	<2	ug/l	TM30/PM14
Dissolved Potassium#	15.4	2.0	1.7	0.8	2.2	<0.1	mg/l	TM30/PM14
Dissolved Selenium#	<3	<3	<3	<3	<3	<3	ug/l	TM30/PM14
Dissolved Sodium#	8.6	8.4	5.0	7.9	9.0	<0.1	mg/l	TM30/PM14
Dissolved Vanadium#	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	ug/l	TM30/PM14
Dissolved Zinc#	4	<3	3	<3	<3	<3	ug/l	TM30/PM14
Total Chromium	91.5	80.0	100.3	130.6	<1.5	<1.5	ug/l	TM30/PM14
Total Iron	109247$_{AA}$	95803$_{AA}$	111426$_{AA}$	130244$_{AA}$	<20	<20	ug/l	TM30/PM14
MTBE#	<5	<5	<5	<5	<5	<5	ug/l	TM36/PM12
Benzene#	<5	<5	<5	<5	<5	<5	ug/l	TM36/PM12
Toluene#	<5	<5	<5	<5	<5	<5	ug/l	TM36/PM12
Ethylbenzene#	<5	<5	<5	<5	<5	<5	ug/l	TM36/PM12
m/p-Xylene#	<5	<5	<5	<5	<5	<5	ug/l	TM36/PM12
o-Xylene#	<5	<5	<5	<5	<5	<5	ug/l	TM36/PM12
TPH CWG								
Aliphatics								
>C5-C6 (HS_1D_AL)#	<10	<10	<10	<10	<10	<10	ug/l	TM36/PM12
>C6-C8 (HS_1D_AL)#	<10	<10	<10	<10	<10	<10	ug/l	TM36/PM12
>C8-C10 (HS_1D_AL)#	<10	<10	<10	<10	<10	<10	ug/l	TM36/PM12
>C10-C12 (EH_CU_1D_AL)#	<5	<5	<5	<5	<5	<5	ug/l	TM5/PM16/PM30
>C12-C16 (EH_CU_1D_AL)#	<10	<10	<10	<10	<10	<10	ug/l	TM5/PM16/PM30
>C16-C21 (EH_CU_1D_AL)#	<10	<10	<10	<10	<10	<10	ug/l	TM5/PM16/PM30
>C21-C35 (EH_CU_1D_AL)#	<10	<10	<10	<10	<10	<10	ug/l	TM5/PM16/PM30
Total aliphatics C5-35 (EH_CU+HS_1D_AL)#	<10	<10	<10	<10	<10	<10	ug/l	TM5/TM36/PM12/PM16/PM30

Client Name: WSP Environmental
Reference: 400000205
Location: Ballykelly
Contact: John Moran
EMT Job No: 24/4542

Report : **Liquid**

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
H=H_2SO_4, Z=ZnAc, N=NaOH, HN=$HN0_3$

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	1-5	6-10	11-15	16-20	21-26					LOD/LOR	Units	Method No.
Sample ID	BH01	BH02	BH03	BH04	SW01							
Depth												
COC No / misc												
Containers	V H P G	V H P G	V H P G	V H P G	V H HN P G							
Sample Date	12/03/2024	12/03/2024	12/03/2024	12/03/2024	12/03/2024							
Sample Type	Ground Water	Ground Water	Ground Water	Ground Water	Surface Water							
Batch Number	1	1	1	1	1							
Date of Receipt	14/03/2024	14/03/2024	14/03/2024	14/03/2024	14/03/2024							
TPH CWG												
Aromatics												
>C5-EC7 (HS_1D_AR)#	<10	<10	<10	<10	<10					<10	ug/l	TM36/PM12
>EC7-EC8 (HS_1D_AR)#	<10	<10	<10	<10	<10					<10	ug/l	TM36/PM12
>EC8-EC10 (HS_1D_AR)#	<10	<10	<10	<10	<10					<10	ug/l	TM36/PM12
>EC10-EC12 (EH_CU_1D_AR)#	<5	<5	<5	<5	<5					<5	ug/l	TM5/PM16/PM30
>EC12-EC16 (EH_CU_1D_AR)#	<10	<10	<10	<10	<10					<10	ug/l	TM5/PM16/PM30
>EC16-EC21 (EH_CU_1D_AR)#	<10	<10	<10	<10	<10					<10	ug/l	TM5/PM16/PM30
>EC21-EC35 (EH_CU_1D_AR)#	<10	<10	<10	<10	<10					<10	ug/l	TM5/PM16/PM30
Total aromatics C5-35 (EH_CU+HS_1D_AR)#	<10	<10	<10	<10	<10					<10	ug/l	TM5/TM36/PM12/PM16/PM30
Total aliphatics and aromatics(C5-35) (EH_CU+HS_1D_Total)#	<10	<10	<10	<10	<10					<10	ug/l	TM5/TM36/PM12/PM16/PM30
Sulphate as SO4#	15.1	35.3	7.1	22.4	21.5					<0.5	mg/l	TM38/PM0
Chloride#	15.3	19.6	9.9	14.8	19.4					<0.3	mg/l	TM38/PM0
Nitrate as NO3#	16.2	2.0	19.5	28.9	2.1					<0.2	mg/l	TM38/PM0
Nitrite as NO2#	<0.02	<0.02	<0.02	<0.02	<0.02					<0.02	mg/l	TM38/PM0
Ortho Phosphate as PO4#	<0.06	<0.06	<0.06	<0.06	<0.06					<0.06	mg/l	TM38/PM0
Ammoniacal Nitrogen as N#	0.03	0.10	0.36	0.04	<0.03					<0.03	mg/l	TM38/PM0
Hexavalent Chromium	<6	<6	<6	<6	<6					<6	ug/l	TM38/PM0
Total Dissolved Chromium III	<6	<6	<6	<6	<6					<6	ug/l	TM0/PM0
Total Alkalinity as CaCO3#	5062	966	340	1622	142					<1	mg/l	TM75/PM0
COD (Settled)#	13	21	20	11	<7					<7	mg/l	TM57/PM0
Total Suspended Solids#	12376	2748	2328	5486	<10					<10	mg/l	TM37/PM0

Client Name: WSP Environmental
Reference: 400000205
Location: Ballykelly
Contact: John Moran

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 24/4542						

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating. Only analyses which are accredited are recorded as deviating if set criteria are not met.

It is a requirement under ISO 17025 that we inform clients if samples are deviating i.e. outside what is expected. A deviating sample indicates that the sample 'may' be compromised but not necessarily will be compromised. The result is still accredited and our analytical reports will still show accreditation on the relevant analytes.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 24/4542

SOILS and ASH

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. Asbestos samples are retained for 6 months.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C. Ash samples are dried at 37°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

STACK EMISSIONS

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation for Dioxins and Furans and Dioxin like PCBs has been performed on XAD-2 Resin, only samples which use this resin will be within our MCERTS scope.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a requirement of our Accreditation Body for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.
Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.
Laboratory records are kept for a period of no less than 6 years.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

Customer Provided Information

Sample ID and depth is information provided by the customer.

Age of Diesel

The age of release estimation is based on the nC17/pristane ratio only as prescribed by Christensen and Larsen (1993) and Kaplan, Galperin, Alimi et al., (1996).
Age estimation should be treated with caution as it can be influenced by site specific factors of which the laboratory are not aware.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above quantitative calibration range. The result should be considered the minimum value and is indicative only. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range
AA	x10 Dilution

HWOL ACRONYMS AND OPERATORS USED

HS	Headspace Analysis.
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent.
CU	Clean-up - e.g. by florisil, silica gel.
1D	GC - Single coil gas chromatography.
Total	Aliphatics & Aromatics.
AL	Aliphatics only.
AR	Aromatics only.
2D	GC-GC - Double coil gas chromatography.
#1	EH_Total but with humics mathematically subtracted
#2	EU_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +).
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry.

EMT Job No: 24/4542

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM0	Not available	PM0	No preparation is required.				
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM16/PM30	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE/Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM5/TM36	please refer to TM5 and TM36 for method details	PM12/PM16/PM30	please refer to PM16/PM30 and PM12 for method details	Yes			
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified				
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified	Yes			
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes			
TM37	Modified methods - TSS: USEPA 160.2 (1983), EN872:2005 and APHA SMEWW 2540D:1999 22nd Edition; VSS: USEPA 1684 (Jan 2001), USEPA 160.4 (1971) and SMEWW 2540E:1999 22nd Edition. Gravimetric determination of Total Suspended Solids (TSS) and Volatile Suspended Solids (VSS). Sample is filtered through a 1.5um pore size glass fibre filter and the resulting residue is dried and weighed at 105°C for TSS and 550°C for VSS	PM0	No preparation is required.	Yes			
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013l	PM0	No preparation is required.				
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013l	PM0	No preparation is required.	Yes			
TM57	Modified US EPA Method 410.4. (Rev. 2.0 1993) Comparable with ISO 15705:2002. Chemical Oxygen Demand is determined by hot digestion with Potassium Dichromate and measured spectrophotometerically.	PM0	No preparation is required.	Yes			

EMT Job No: 24/4542

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM75	Modified US EPA method 310.1 (1978). Determination of Alkalinity by Metrohm automated titration analyser.	PM0	No preparation is required.	Yes			

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WSP Environmental
Town Centre House
Dublin Road
Naas
Co Kildare
Ireland

Attention :	John Moran
Date :	2nd May, 2024
Your reference :	40000205
Our reference :	Test Report 24/7056 Batch 1
Location :	Ballykelly
Date samples received :	25th April, 2024
Status :	Final Report
Issue :	202405021325

Six samples were received for analysis on 25th April, 2024 of which six were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

The greenhouse gas emissions generated (in Carbon – Co2e) to obtain the results in this report are estimated as:

Scope 1&2 emissions - 11.584 kg of CO2

Scope 1&2&3 emissions - 27.376 kg of CO2

Authorised By:

Boden

Paul Boden BSc
Senior Project Manager

Client Name: WSP Environmental
Reference: 40000205
Location: Ballykelly
Contact: John Moran
EMT Job No: 24/7056

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
$H=H_2SO_4$, Z=ZnAc, N=NaOH, $HN=HN0_3$

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	1-6	7-12	13-18	19-24	25-30	31-36							
Sample ID	SW01	BH01	BH02	BH03	BH04	SW01D							
Depth													
COC No / misc													
Containers	V H HN P G	V H HNUF P G	V H HNUF P G	V H HNUF P G	V H HNUF P G	V H HN P G							
Sample Date	17/04/2024	17/04/2024	17/04/2024	17/04/2024	17/04/2024	17/04/2024							
Sample Type	Surface Water	Ground Water	Ground Water	Ground Water	Ground Water	Surface Water							
Batch Number	1	1	1	1	1	1					LOD/LOR	Units	Method No.
Date of Receipt	25/04/2024	25/04/2024	25/04/2024	25/04/2024	25/04/2024	25/04/2024							
Dissolved Arsenic#	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5					<2.5	ug/l	TM30/PM14
Dissolved Barium#	26	80	81	18	21	26					<3	ug/l	TM30/PM14
Dissolved Beryllium	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5					<0.5	ug/l	TM30/PM14
Dissolved Boron	15	61	<12	24	27	22					<12	ug/l	TM30/PM14
Dissolved Cadmium#	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5					<0.5	ug/l	TM30/PM14
Dissolved Calcium#	48.4	140.7	122.8	59.8	96.0	48.6					<0.2	mg/l	TM30/PM14
Total Dissolved Chromium#	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5					<1.5	ug/l	TM30/PM14
Dissolved Copper#	<7	<7	<7	<7	<7	<7					<7	ug/l	TM30/PM14
Total Dissolved Iron#	<20	<20	<20	<20	<20	<20					<20	ug/l	TM30/PM14
Dissolved Lead#	<5	<5	<5	<5	<5	<5					<5	ug/l	TM30/PM14
Dissolved Magnesium#	10.1	12.3	17.2	4.1	9.3	10.3					<0.1	mg/l	TM30/PM14
Dissolved Manganese#	<2	2	31	<2	<2	<2					<2	ug/l	TM30/PM14
Dissolved Mercury#	<1	<1	<1	<1	<1	<1					<1	ug/l	TM30/PM14
Dissolved Nickel#	<2	4	<2	<2	<2	<2					<2	ug/l	TM30/PM14
Dissolved Potassium#	2.1	35.1	2.0	1.2	0.7	2.0					<0.1	mg/l	TM30/PM14
Dissolved Selenium#	<3	<3	<3	<3	<3	<3					<3	ug/l	TM30/PM14
Dissolved Sodium#	8.3	9.1	11.3	3.9	6.8	8.3					<0.1	mg/l	TM30/PM14
Dissolved Vanadium#	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5					<1.5	ug/l	TM30/PM14
Dissolved Zinc#	3	6	4	4	<3	<3					<3	ug/l	TM30/PM14
Total Chromium	<1.5	6.9	<1.5	6.7	<1.5	<1.5					<1.5	ug/l	TM30/PM14
Total Iron	<20	3653	384	2691	95	<20					<20	ug/l	TM30/PM14
MTBE#	<5	<5	<5	<5	<5	<5					<5	ug/l	TM36/PM12
Benzene#	<5	<5	<5	<5	<5	<5					<5	ug/l	TM36/PM12
Toluene#	<5	<5	<5	<5	<5	<5					<5	ug/l	TM36/PM12
Ethylbenzene#	<5	<5	<5	<5	<5	<5					<5	ug/l	TM36/PM12
m/p-Xylene#	<5	<5	<5	<5	<5	<5					<5	ug/l	TM36/PM12
o-Xylene#	<5	<5	<5	<5	<5	<5					<5	ug/l	TM36/PM12
TPH CWG													
Aliphatics													
>C5-C6 (HS_1D_AL)#	<10	<10	<10	<10	<10	<10					<10	ug/l	TM36/PM12
>C6-C8 (HS_1D_AL)#	<10	<10	<10	<10	<10	<10					<10	ug/l	TM36/PM12
>C8-C10 (HS_1D_AL)#	<10	<10	<10	<10	<10	<10					<10	ug/l	TM36/PM12
>C10-C12 (EH_CU_1D_AL)#	<5	<5	<5	<5	<5	<5					<5	ug/l	TM5/PM16/PM30
>C12-C16 (EH_CU_1D_AL)#	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/PM16/PM30
>C16-C21 (EH_CU_1D_AL)#	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/PM16/PM30
>C21-C35 (EH_CU_1D_AL)#	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/PM16/PM30
Total aliphatics C5-35 (EH_CU+HS_1D_AL)#	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/TM36/PM12/PM16/PM30

Client Name:	WSP Environmental	**Report :**	**Liquid**
Reference:	40000205		
Location:	Ballykelly		
Contact:	John Moran	**Liquids/products:**	V=40ml vial, G=glass bottle, P=plastic bottle
EMT Job No:	24/7056		H=H_2SO_4, Z=ZnAc, N=NaOH, HN=$HN0_3$

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	1-6	7-12	13-18	19-24	25-30	31-36					LOD/LOR	Units	Method No.
Sample ID	SW01	BH01	BH02	BH03	BH04	SW01D							
Depth													
COC No / misc													
Containers	V H HN P G	V H HNUF P G	V H HNUF P G	V H HNUF P G	V H HNUF P G	V H HN P G							
Sample Date	17/04/2024	17/04/2024	17/04/2024	17/04/2024	17/04/2024	17/04/2024							
Sample Type	Surface Water	Ground Water	Ground Water	Ground Water	Ground Water	Surface Water							
Batch Number	1	1	1	1	1	1							
Date of Receipt	25/04/2024	25/04/2024	25/04/2024	25/04/2024	25/04/2024	25/04/2024							
TPH CWG													
Aromatics													
>C5-EC7 (HS_1D_AR) #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM36/PM12
>EC7-EC8 (HS_1D_AR) #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM36/PM12
>EC8-EC10 (HS_1D_AR) #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM36/PM12
>EC10-EC12 (EH_CU_1D_AR) #	<5	<5	<5	<5	<5	<5					<5	ug/l	TM5/PM16/PM30
>EC12-EC16 (EH_CU_1D_AR) #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/PM16/PM30
>EC16-EC21 (EH_CU_1D_AR) #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/PM16/PM30
>EC21-EC35 (EH_CU_1D_AR) #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/PM16/PM30
Total aromatics C5-35 (EH_CU+HS_1D_AR) #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/TM36/PM12/PM16/PM30
Total aliphatics and aromatics(C5-35) (EH_CU+HS_1D_Total) #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/TM36/PM12/PM16/PM30
Sulphate as SO4 #	21.7	23.1	58.3	4.9	22.0	22.6					<0.5	mg/l	TM38/PM0
Chloride #	19.8	16.4	21.2	6.7	10.7	19.0					<0.3	mg/l	TM38/PM0
Nitrate as NO3 #	2.0	44.7	7.0	12.4	22.8	1.9					<0.2	mg/l	TM38/PM0
Nitrite as NO2 #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02					<0.02	mg/l	TM38/PM0
Ortho Phosphate as PO4 #	<0.06	0.22	<0.06	<0.06	<0.06	<0.06					<0.06	mg/l	TM38/PM0
Ammoniacal Nitrogen as N #	<0.03	0.04	0.18	0.03	<0.03	<0.03					<0.03	mg/l	TM38/PM0
Hexavalent Chromium	<6	<6	<6	<6	<6	<6					<6	ug/l	TM38/PM0
Total Dissolved Chromium III	<6	<6	<6	<6	<6	<6					<6	ug/l	TM0/PM0
Total Alkalinity as CaCO3 #	148	868	544	206	950	150					<1	mg/l	TM75/PM0
COD (Settled) #	10	13	9	<7	10	10					<7	mg/l	TM57/PM0
Total Suspended Solids #	<10	2562	842	830	2802	<10					<10	mg/l	TM37/PM0

Client Name: WSP Environmental
Reference: 40000205
Location: Ballykelly
Contact: John Moran

Matrix : Liquid

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
24/7056	1	BH01		7-12	Mercury, Metals	Sample holding time exceeded
24/7056	1	BH02		13-18	Mercury, Metals	Sample holding time exceeded
24/7056	1	BH03		19-24	Mercury, Metals	Sample holding time exceeded
24/7056	1	BH04		25-30	Mercury, Metals	Sample holding time exceeded

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating. Only analyses which are accredited are recorded as deviating if set criteria are not met.
It is a requirement under ISO 17025 that we inform clients if samples are deviating i.e. outside what is expected. A deviating sample indicates that the sample 'may' be compromised but not necessarily will be compromised. The result is still accredited and our analytical reports will still show accreditation on the relevant analytes.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 24/7056

SOILS and ASH

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. Asbestos samples are retained for 6 months.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C. Ash samples are dried at 35°C ±5°C.

Where Mineral Oil is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil is quoted, this refers to Total Aliphatics C10-C40.

STACK EMISSIONS

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation for Dioxins and Furans and Dioxin like PCBs has been performed on XAD-2 Resin, only samples which use this resin will be within our MCERTS scope.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a requirement of our Accreditation Body for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.
Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.
Laboratory records are kept for a period of no less than 6 years.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

Customer Provided Information

Sample ID and depth is information provided by the customer.

Age of Diesel

The age of release estimation is based on the nC17/pristane ratio only as prescribed by Christensen and Larsen (1993) and Kaplan, Galperin, Alimi et al., (1996).
Age estimation should be treated with caution as it can be influenced by site specific factors of which the laboratory are not aware.

Tentatively Identified Compounds (TICs)

Where Tentatively Identified Compounds (TICs) are reported, up to 10 Tentatively Identified Compounds will be listed where there is found to be a greater than 80% match with the NIST library. The reported concentration is determined semi-quantitively, with a matrix specific limit of detection. Note, other compounds may be present but are not reported.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above quantitative calibration range. The result should be considered the minimum value and is indicative only. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

HWOL ACRONYMS AND OPERATORS USED

HS	Headspace Analysis.
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent.
CU	Clean-up - e.g. by florisil, silica gel.
1D	GC - Single coil gas chromatography.
Total	Aliphatics & Aromatics.
AL	Aliphatics only.
AR	Aromatics only.
2D	GC-GC - Double coil gas chromatography.
#1	EH_Total but with humics mathematically subtracted
#2	EU_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +).
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry.

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM0	Not available	PM0	No preparation is required.				
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM16/PM30	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE/Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM5/TM36	please refer to TM5 and TM36 for method details	PM12/PM16/PM30	please refer to PM16/PM30 and PM12 for method details	Yes			
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified				
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified	Yes			
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes			
TM37	Modified methods - TSS: USEPA 160.2 (1983), EN872:2005 and APHA SMEWW 2540D:1999 22nd Edition; VSS: USEPA 1684 (Jan 2001), USEPA 160.4 (1971) and SMEWW 2540E:1999 22nd Edition. Gravimetric determination of Total Suspended Solids (TSS) and Volatile Suspended Solids (VSS). Sample is filtered through a 1.5um pore size glass fibre filter and the resulting residue is dried and weighed at 105°C for TSS and 550°C for VSS.	PM0	No preparation is required.	Yes			
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013l	PM0	No preparation is required.				
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013l	PM0	No preparation is required.	Yes			
TM57	Modified US EPA Method 410.4. (Rev. 2.0 1993) Comparable with ISO 15705:2002. Chemical Oxygen Demand is determined by hot digestion with Potassium Dichromate and measured spectrophotometerically.	PM0	No preparation is required.	Yes			

EMT Job No: 24/7056

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM75	Modified US EPA method 310.1 (1978). Determination of Alkalinity by Metrohm automated titration analyser.	PM0	No preparation is required.	Yes			

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WSP Environmental
Town Centre House
Dublin Road
Naas
Co Kildare
Ireland

4225

Attention : John Moran

Date : 17th June, 2024

Your reference : 40000205

Our reference : Test Report 24/9124 Batch 1

Location : Ballykelly

Date samples received : 29th May, 2024

Status : Final Report

Issue : 202406171326

Seven samples were received for analysis on 29th May, 2024 of which six were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

The greenhouse gas emissions generated (in Carbon – Co2e) to obtain the results in this report are estimated as:

Scope 1&2 emissions - 11.729 kg of CO2

Scope 1&2&3 emissions - 27.718 kg of CO2

Authorised By:

Simon Gomery BSc
Senior Project Manager

Client Name: WSP Environmental
Reference: 40000205
Location: Ballykelly
Contact: John Moran
EMT Job No: 24/9124

Report : **Liquid**

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
$H=H_2SO_4$, Z=ZnAc, N=NaOH, $HN=HN0_3$

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	1-6	7-12	13-17,30	18,31-35	19-24	25-29					LOD/LOR	Units	Method No.
Sample ID	BH01	BH03	BH01D	SW01	BH02	BH04							
Depth													
COC No / misc													
Containers	V H HNUF P G	V H HNUF P G	V H HNUF G P	P V H HN G	V H HN P G	V H HNUF P							
Sample Date	24/05/2024	24/05/2024	24/05/2024	24/05/2024	24/05/2024	24/05/2024							
Sample Type	Ground Water	Ground Water	Ground Water	Surface Water	Ground Water	Ground Water							
Batch Number	1	1	1	1	1	1							
Date of Receipt	29/05/2024	29/05/2024	29/05/2024	29/05/2024	29/05/2024	29/05/2024							
Dissolved Arsenic #	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5					<2.5	ug/l	TM30/PM14
Dissolved Barium #	108	13	94	19	83	14					<3	ug/l	TM30/PM14
Dissolved Beryllium	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5					<0.5	ug/l	TM30/PM14
Dissolved Boron	84	22	85	20	18	21					<12	ug/l	TM30/PM14
Dissolved Cadmium #	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5					<0.5	ug/l	TM30/PM14
Dissolved Calcium #	132.8	55.2	134.9	43.8	107.4	84.9					<0.2	mg/l	TM30/PM14
Total Dissolved Chromium #	<1.5	<1.5	6.8	<1.5	<1.5	<1.5					<1.5	ug/l	TM30/PM14
Dissolved Copper #	<7	<7	7	<7	<7	<7					<7	ug/l	TM30/PM14
Total Dissolved Iron #	<20	<20	<20	<20	<20	<20					<20	ug/l	TM30/PM14
Dissolved Lead #	<5	<5	<5	<5	<5	<5					<5	ug/l	TM30/PM14
Dissolved Magnesium #	15.4	4.0	15.6	9.6	15.2	8.5					<0.1	mg/l	TM30/PM14
Dissolved Manganese #	31	<2	<2	<2	97	<2					<2	ug/l	TM30/PM14
Dissolved Mercury #	<1	<1	<1	<1	<1	<1					<1	ug/l	TM30/PM14
Dissolved Nickel #	11	<2	6	<2	<2	<2					<2	ug/l	TM30/PM14
Dissolved Potassium #	70.1	1.0	71.7	2.0	1.8	0.6					<0.1	mg/l	TM30/PM14
Dissolved Selenium #	<3	<3	<3	<3	<3	<3					<3	ug/l	TM30/PM14
Dissolved Sodium #	12.9	4.0	13.5	8.3	10.0	6.9					<0.1	mg/l	TM30/PM14
Dissolved Vanadium #	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5					<1.5	ug/l	TM30/PM14
Dissolved Zinc #	7	<3	5	<3	4	<3					<3	ug/l	TM30/PM14
Total Chromium	12.8	30.0	13.1	<1.5	6.3	204.6					<1.5	ug/l	TM30/PM14
Total Iron	7627	24461_{AA}	2985	<20	3175	204054_{AB}					<20	ug/l	TM30/PM14
MTBE #	<5	<5	<5	<5	<5	<5					<5	ug/l	TM36/PM12
Benzene #	<5	<5	<5	<5	<5	<5					<5	ug/l	TM36/PM12
Toluene #	<5	<5	<5	<5	<5	<5					<5	ug/l	TM36/PM12
Ethylbenzene #	<5	<5	<5	<5	<5	<5					<5	ug/l	TM36/PM12
m/p-Xylene #	<5	<5	<5	<5	<5	<5					<5	ug/l	TM36/PM12
o-Xylene #	<5	<5	<5	<5	<5	<5					<5	ug/l	TM36/PM12
TPH CWG													
Aliphatics													
>C5-C6 (HS_1D_AL) #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM36/PM12
>C6-C8 (HS_1D_AL) #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM36/PM12
>C8-C10 (HS_1D_AL) #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM36/PM12
>C10-C12 (EH_CU_1D_AL) #	<5	<5	<5	<5	<5	<5					<5	ug/l	TM5/PM16/PM30
>C12-C16 (EH_CU_1D_AL) #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/PM16/PM30
>C16-C21 (EH_CU_1D_AL) #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/PM16/PM30
>C21-C35 (EH_CU_1D_AL) #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/PM16/PM30
Total aliphatics C5-35 (EH_CU+HS_1D_AL) #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/TM36/PM12/PM16/PM30

Client Name: WSP Environmental
Reference: 40000205
Location: Ballykelly
Contact: John Moran
EMT Job No: 24/9124

Report : **Liquid**

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
$H=H_2SO_4$, Z=ZnAc, N=NaOH, $HN=HN0_3$

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	1-6	7-12	13-17,30	18,31-35	19-24	25-29							
Sample ID	BH01	BH03	BH01D	SW01	BH02	BH04							
Depth													
COC No / misc													
Containers	V H HNUF P G	V H HNUF P G	V H HNUF G P	P V H HN G	V H HN P G	V H HNUF P							
Sample Date	24/05/2024	24/05/2024	24/05/2024	24/05/2024	24/05/2024	24/05/2024							
Sample Type	Ground Water	Ground Water	Ground Water	Surface Water	Ground Water	Ground Water							
Batch Number	1	1	1	1	1	1					LOD/LOR	Units	Method No.
Date of Receipt	29/05/2024	29/05/2024	29/05/2024	29/05/2024	29/05/2024	29/05/2024							
TPH CWG													
Aromatics													
>C5-EC7 (HS_1D_AR)#	<10	<10	<10	<10	<10	<10					<10	ug/l	TM36/PM12
>EC7-EC8 (HS_1D_AR)#	<10	<10	<10	<10	<10	<10					<10	ug/l	TM36/PM12
>EC8-EC10 (HS_1D_AR)#	<10	<10	<10	<10	<10	<10					<10	ug/l	TM36/PM12
>EC10-EC12 (EH_CU_1D_AR)#	<5	<5	<5	<5	<5	<5					<5	ug/l	TM5/PM16/PM30
>EC12-EC16 (EH_CU_1D_AR)#	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/PM16/PM30
>EC16-EC21 (EH_CU_1D_AR)#	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/PM16/PM30
>EC21-EC35 (EH_CU_1D_AR)#	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/PM16/PM30
Total aromatics C5-35 (EH_CU+HS_1D_AR)#	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/TM36/PM12/PM16/PM30
Total aliphatics and aromatics(C5-35) (EH_CU+HS_1D_Total)#	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/TM36/PM12/PM16/PM30
Sulphate as SO4#	91.4	3.9	82.0	21.0	28.9	23.9					<0.5	mg/l	TM38/PM0
Chloride#	28.1	5.8	25.1	19.4	21.5	13.5					<0.3	mg/l	TM38/PM0
Nitrate as NO3#	79.6	8.2	79.0	1.6	2.3	29.0					<0.2	mg/l	TM38/PM0
Nitrite as NO2#	0.02	<0.02	<0.02	<0.02	<0.02	<0.02					<0.02	mg/l	TM38/PM0
Ortho Phosphate as PO4#	0.41	<0.06	0.60	<0.06	<0.06	<0.06					<0.06	mg/l	TM38/PM0
Ammoniacal Nitrogen as N#	0.16	0.03	0.17	<0.03	<0.03	0.03					<0.03	mg/l	TM38/PM0
Hexavalent Chromium	<6	<6	<6	<6	<6	<6					<6	ug/l	TM38/PM0
Total Dissolved Chromium III	<6	<6	7	<6	<6	<6					<6	ug/l	TM0/PM0
Total Alkalinity as CaCO3#	1464	238	1046	148	388	2390					<1	mg/l	TM75/PM0
COD (Settled)#	<7	<7	9	9	<7	<7					<7	mg/l	TM57/PM0
Total Suspended Solids#	3406	1866	2884	<10	348	6800					<10	mg/l	TM37/PM0

Client Name: WSP Environmental
Reference: 40000205
Location: Ballykelly
Contact: John Moran

Matrix : Liquid

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
24/9124	1	BH04		25-29	EPH	Sample received in inappropriate container
24/9124	1	BH04		25-29	Mercury, Metals	Sample holding time exceeded

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating. Only analyses which are accredited are recorded as deviating if set criteria are not met.
It is a requirement under ISO 17025 that we inform clients if samples are deviating i.e. outside what is expected. A deviating sample indicates that the sample 'may' be compromised but not necessarily will be compromised. The result is still accredited and our analytical reports will still show accreditation on the relevant analytes.

EMT Job No.: 24/9124

SOILS and ASH

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

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It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. Asbestos samples are retained for 6 months.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C. Ash samples are dried at 35°C ±5°C.

Where Mineral Oil is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil is quoted, this refers to Total Aliphatics C10-C40.

STACK EMISSIONS

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation for Dioxins and Furans and Dioxin like PCBs has been performed on XAD-2 Resin, only samples which use this resin will be within our MCERTS scope.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a requirement of our Accreditation Body for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.
Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.
Laboratory records are kept for a period of no less than 6 years.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

Customer Provided Information

Sample ID and depth is information provided by the customer.

Age of Diesel

The age of release estimation is based on the nC17/pristane ratio only as prescribed by Christensen and Larsen (1993) and Kaplan, Galperin, Alimi et al., (1996).
Age estimation should be treated with caution as it can be influenced by site specific factors of which the laboratory are not aware.

Tentatively Identified Compounds (TICs)

Where Tentatively Identified Compounds (TICs) are reported, up to 10 Tentatively Identified Compounds will be listed where there is found to be a greater than 80% match with the NIST library. The reported concentration is determined semi-quantitively, with a matrix specific limit of detection. Note, other compounds may be present but are not reported.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above quantitative calibration range. The result should be considered the minimum value and is indicative only. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range
AA	x5 Dilution
AB	x20 Dilution

HWOL ACRONYMS AND OPERATORS USED

HS	Headspace Analysis.
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent.
CU	Clean-up - e.g. by florisil, silica gel.
1D	GC - Single coil gas chromatography.
Total	Aliphatics & Aromatics.
AL	Aliphatics only.
AR	Aromatics only.
2D	GC-GC - Double coil gas chromatography.
#1	EH_Total but with humics mathematically subtracted
#2	EU_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +).
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry.

EMT Job No: 24/9124

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM0	Not available	PM0	No preparation is required.				
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM16/PM30	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE/Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM5/TM36	please refer to TM5 and TM36 for method details	PM12/PM16/PM30	please refer to PM16/PM30 and PM12 for method details	Yes			
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified				
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified	Yes			
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes			
TM37	Modified methods - TSS: USEPA 160.2 (1983), EN872:2005 and APHA SMEWW 2540D:1999 22nd Edition; VSS: USEPA 1684 (Jan 2001), USEPA 160.4 (1971) and SMEWW 2540E:1999 22nd Edition. Gravimetric determination of Total Suspended Solids (TSS) and Volatile Suspended Solids (VSS). Sample is filtered through a 1.5um pore size glass fibre filter and the resulting residue is dried and weighed at 105°C for TSS and 550°C for VSS	PM0	No preparation is required.	Yes			
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013l	PM0	No preparation is required.				
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013l	PM0	No preparation is required.	Yes			
TM57	Modified US EPA Method 410.4. (Rev. 2.0 1993) Comparable with ISO 15705:2002. Chemical Oxygen Demand is determined by hot digestion with Potassium Dichromate and measured spectrophotometerically.	PM0	No preparation is required.	Yes			

EMT Job No: 24/9124

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM75	Modified US EPA method 310.1 (1978). Determination of Alkalinity by Metrohm automated titration analyser.	PM0	No preparation is required.	Yes			

element

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WSP Environmental
Town Centre House
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Naas
Co Kildare
Ireland

ilac-MRA

UKAS TESTING 4225

bsi ISO 14001 Environmental Management CERTIFIED

Attention :	John Moran
Date :	26th June, 2024
Your reference :	40000205
Our reference :	Test Report 24/10504 Batch 1
Location :	Ballykelly
Date samples received :	19th June, 2024
Status :	Final Report
Issue :	202406261504

Six samples were received for analysis on 19th June, 2024 of which six were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

The greenhouse gas emissions generated (in Carbon – Co2e) to obtain the results in this report are estimated as:

Scope 1&2 emissions - 12.453 kg of CO2

Scope 1&2&3 emissions - 29.429 kg of CO2

Authorised By:

Boden

Paul Boden BSc

Senior Project Manager

Client Name: WSP Environmental
Reference: 40000205
Location: Ballykelly
Contact: John Moran
EMT Job No: 24/10504

Report : **Liquid**

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
H=H_2SO_4, Z=ZnAc, N=NaOH, HN=$HN0_3$

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	1-6	7-12	13-18	19-24	25-30	31-36							
Sample ID	BH01	BH02	BH03	BH04	SW01_D	SW01							
Depth													
COC No / misc													
Containers	V H HN P G	V H HN P G	V H HN P G	V H HN P G	V H HN P G	V H HN P G							
Sample Date	13/06/2024	13/06/2024	13/06/2024	13/06/2024	13/06/2024	13/06/2024							
Sample Type	Ground Water	Ground Water	Ground Water	Ground Water	Surface Water	Surface Water							
Batch Number	1	1	1	1	1	1					LOD/LOR	Units	Method No.
Date of Receipt	19/06/2024	19/06/2024	19/06/2024	19/06/2024	19/06/2024	19/06/2024							
Dissolved Arsenic#	3.6	4.0	<2.5	3.1	<2.5	<2.5					<2.5	ug/l	TM30/PM14
Dissolved Barium#	97	79	10	22	22	22					<3	ug/l	TM30/PM14
Dissolved Beryllium	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5					<0.5	ug/l	TM30/PM14
Dissolved Boron	75	<12	23	24	15	15					<12	ug/l	TM30/PM14
Dissolved Cadmium#	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5					<0.5	ug/l	TM30/PM14
Dissolved Calcium#	126.8	105.7	50.3	100.4	46.3	46.4					<0.2	mg/l	TM30/PM14
Total Dissolved Chromium#	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5					<1.5	ug/l	TM30/PM14
Dissolved Copper#	<7	<7	<7	<7	<7	<7					<7	ug/l	TM30/PM14
Total Dissolved Iron#	<20	<20	<20	<20	<20	<20					<20	ug/l	TM30/PM14
Dissolved Lead#	<5	<5	<5	<5	<5	<5					<5	ug/l	TM30/PM14
Dissolved Magnesium#	15.0	15.8	3.7	10.1	10.6	10.5					<0.1	mg/l	TM30/PM14
Dissolved Manganese#	<2	167	<2	<2	<2	<2					<2	ug/l	TM30/PM14
Dissolved Mercury#	<1	<1	<1	<1	<1	<1					<1	ug/l	TM30/PM14
Dissolved Nickel#	6	3	<2	<2	<2	<2					<2	ug/l	TM30/PM14
Dissolved Potassium#	61.3	1.8	0.8	0.7	2.1	2.1					<0.1	mg/l	TM30/PM14
Dissolved Selenium#	<3	<3	<3	<3	<3	<3					<3	ug/l	TM30/PM14
Dissolved Sodium#	12.1	9.5	3.5	7.3	8.2	8.2					<0.1	mg/l	TM30/PM14
Dissolved Vanadium#	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5					<1.5	ug/l	TM30/PM14
Dissolved Zinc#	5	<3	<3	<3	4	4					<3	ug/l	TM30/PM14
Total Chromium	14.2	6.5	13.2	64.7	<1.5	<1.5					<1.5	ug/l	TM30/PM14
Total Iron	12057	3214	5516	49276$_{AA}$	48	53					<20	ug/l	TM30/PM14
MTBE#	<5	<5	<5	<5	<5	<5					<5	ug/l	TM36/PM12
Benzene#	<5	<5	<5	<5	<5	<5					<5	ug/l	TM36/PM12
Toluene#	<5	<5	<5	<5	<5	<5					<5	ug/l	TM36/PM12
Ethylbenzene#	<5	<5	<5	<5	<5	<5					<5	ug/l	TM36/PM12
m/p-Xylene#	<5	<5	<5	<5	<5	<5					<5	ug/l	TM36/PM12
o-Xylene#	<5	<5	<5	<5	<5	<5					<5	ug/l	TM36/PM12
TPH CWG													
Aliphatics													
>C5-C6 (HS_1D_AL)#	<10	<10	<10	<10	<10	<10					<10	ug/l	TM36/PM12
>C6-C8 (HS_1D_AL)#	<10	<10	<10	<10	<10	<10					<10	ug/l	TM36/PM12
>C8-C10 (HS_1D_AL)#	<10	<10	<10	<10	<10	<10					<10	ug/l	TM36/PM12
>C10-C12 (EH_CU_1D_AL)#	<5	<5	<5	<5	<5	<5					<5	ug/l	TM5/PM16/PM30
>C12-C16 (EH_CU_1D_AL)#	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/PM16/PM30
>C16-C21 (EH_CU_1D_AL)#	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/PM16/PM30
>C21-C35 (EH_CU_1D_AL)#	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/PM16/PM30
Total aliphatics C5-35 (EH_CU+HS_1D_AL)#	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/TM36/PM12/PM16/PM30

Client Name: WSP Environmental
Reference: 40000205
Location: Ballykelly
Contact: John Moran
EMT Job No: 24/10504

Report : **Liquid**

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
$H=H_2SO_4$, Z=ZnAc, N=NaOH, $HN=HN0_3$

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	1-6	7-12	13-18	19-24	25-30	31-36							
Sample ID	BH01	BH02	BH03	BH04	SW01_D	SW01							
Depth													
COC No / misc													
Containers	V H HN P G	V H HN P G	V H HN P G	V H HN P G	V H HN P G	V H HN P G							
Sample Date	13/06/2024	13/06/2024	13/06/2024	13/06/2024	13/06/2024	13/06/2024							
Sample Type	Ground Water	Ground Water	Ground Water	Ground Water	Surface Water	Surface Water							
Batch Number	1	1	1	1	1	1					LOD/LOR	Units	Method No.
Date of Receipt	19/06/2024	19/06/2024	19/06/2024	19/06/2024	19/06/2024	19/06/2024							
TPH CWG													
Aromatics													
>C5-EC7 (HS_1D_AR)#	<10	<10	<10	<10	<10	<10					<10	ug/l	TM36/PM12
>EC7-EC8 (HS_1D_AR)#	<10	<10	<10	<10	<10	<10					<10	ug/l	TM36/PM12
>EC8-EC10 (HS_1D_AR)#	<10	<10	<10	<10	<10	<10					<10	ug/l	TM36/PM12
>EC10-EC12 (EH_CU_1D_AR)#	<5	<5	<5	<5	<5	<5					<5	ug/l	TM5/PM16/PM30
>EC12-EC16 (EH_CU_1D_AR)#	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/PM16/PM30
>EC16-EC21 (EH_CU_1D_AR)#	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/PM16/PM30
>EC21-EC35 (EH_CU_1D_AR)#	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/PM16/PM30
Total aromatics C5-35 (EH_CU+HS_1D_AR)#	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/TM36/PM12/PM16/PM30
Total aliphatics and aromatics(C5-35) (EH_CU+HS_1D_Total)#	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/TM36/PM12/PM16/PM30
Sulphate as SO4#	72.5	22.3	3.2	27.9	22.0	21.7					<0.5	mg/l	TM38/PM0
Chloride#	24.9	21.6	4.6	16.0	19.5	19.6					<0.3	mg/l	TM38/PM0
Nitrate as NO3#	58.2	0.4	4.7	32.7	0.9	0.9					<0.2	mg/l	TM38/PM0
Nitrite as NO2#	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02					<0.02	mg/l	TM38/PM0
Ortho Phosphate as PO4#	0.41	<0.06	<0.06	<0.06	<0.06	<0.06					<0.06	mg/l	TM38/PM0
Ammoniacal Nitrogen as N#	0.06	0.09	<0.03	0.03	0.05	0.05					<0.03	mg/l	TM38/PM0
Hexavalent Chromium	<6	<6	<6	<6	<6	<6					<6	ug/l	TM38/PM0
Total Dissolved Chromium III	<6	<6	<6	<6	<6	<6					<6	ug/l	TM0/PM0
Total Alkalinity as CaCO3#	1446	482	214	1138	140	140					<1	mg/l	TM75/PM0
COD (Settled)#	12	<7	<7	<7	<7	<7					<7	mg/l	TM57/PM0
Total Suspended Solids#	3351	820	1273	3145	12	15					<10	mg/l	TM37/PM0

Client Name:	WSP Environmental
Reference:	40000205
Location:	Ballykelly
Contact:	John Moran

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 24/10504						

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating. Only analyses which are accredited are recorded as deviating if set criteria are not met.

It is a requirement under ISO 17025 that we inform clients if samples are deviating i.e. outside what is expected. A deviating sample indicates that the sample ‘may’ be compromised but not necessarily will be compromised. The result is still accredited and our analytical reports will still show accreditation on the relevant analytes.

EMT Job No.: 24/10504

SOILS and ASH

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. Asbestos samples are retained for 6 months.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C. Ash samples are dried at 35°C ±5°C.

Where Mineral Oil is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil is quoted, this refers to Total Aliphatics C10-C40.

STACK EMISSIONS

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation for Dioxins and Furans and Dioxin like PCBs has been performed on XAD-2 Resin, only samples which use this resin will be within our MCERTS scope.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a requirement of our Accreditation Body for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.
Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.
Laboratory records are kept for a period of no less than 6 years.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

Customer Provided Information

Sample ID and depth is information provided by the customer.

Age of Diesel

The age of release estimation is based on the nC17/pristane ratio only as prescribed by Christensen and Larsen (1993) and Kaplan, Galperin, Alimi et al., (1996).
Age estimation should be treated with caution as it can be influenced by site specific factors of which the laboratory are not aware.

Tentatively Identified Compounds (TICs)

Where Tentatively Identified Compounds (TICs) are reported, up to 10 Tentatively Identified Compounds will be listed where there is found to be a greater than 80% match with the NIST library. The reported concentration is determined semi-quantitively, with a matrix specific limit of detection. Note, other compounds may be present but are not reported.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above quantitative calibration range. The result should be considered the minimum value and is indicative only. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range
AA	x10 Dilution

HWOL ACRONYMS AND OPERATORS USED

HS	Headspace Analysis.
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent.
CU	Clean-up - e.g. by florisil, silica gel.
1D	GC - Single coil gas chromatography.
Total	Aliphatics & Aromatics.
AL	Aliphatics only.
AR	Aromatics only.
2D	GC-GC - Double coil gas chromatography.
#1	EH_Total but with humics mathematically subtracted
#2	EU_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +).
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry.

EMT Job No: 24/10504

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM0	Not available	PM0	No preparation is required.				
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM16/PM30	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE/Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM5/TM36	please refer to TM5 and TM36 for method details	PM12/PM16/PM30	please refer to PM16/PM30 and PM12 for method details	Yes			
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified				
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified	Yes			
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes			
TM37	Modified methods - TSS: USEPA 160.2 (1983), EN872:2005 and APHA SMEWW 2540D:1999 22nd Edition; VSS: USEPA 1684 (Jan 2001), USEPA 160.4 (1971) and SMEWW 2540E:1999 22nd Edition. Gravimetric determination of Total Suspended Solids (TSS) and Volatile Suspended Solids (VSS). Sample is filtered through a 1.5um pore size glass fibre filter and the resulting residue is dried and weighed at 105°C for TSS and 550°C for VSS.	PM0	No preparation is required.	Yes			
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013l	PM0	No preparation is required.				
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013l	PM0	No preparation is required.	Yes			
TM57	Modified US EPA Method 410.4. (Rev. 2.0 1993) Comparable with ISO 15705:2002. Chemical Oxygen Demand is determined by hot digestion with Potassium Dichromate and measured spectrophotometerically.	PM0	No preparation is required.	Yes			

EMT Job No: 24/10504

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM75	Modified US EPA method 310.1 (1978). Determination of Alkalinity by Metrohm automated titration analyser.	PM0	No preparation is required.	Yes			

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W: www.element.com

WSP Environmental
Town Centre House
Dublin Road
Naas
Co Kildare
Ireland

Attention :	John Moran
Date :	24th July, 2024
Your reference :	40000205
Our reference :	Test Report 24/12294 Batch 1 Schedule A 24/12294 Batch 1 Schedule B
Location :	Ballykellly
Date samples received :	17th July, 2024
Status :	Final Report
Issue :	202407241506

Six samples were received for analysis on 17th July, 2024 of which six were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

The greenhouse gas emissions generated (in Carbon – Co2e) to obtain the results in this report are estimated as:

Scope 1&2 emissions - 12.525 kg of CO2

Scope 1&2&3 emissions - 29.6 kg of CO2

Authorised By:

Paul Boden BSc
Senior Project Manager

Client Name: WSP Environmental
Reference: 40000205
Location: Ballykellly
Contact: John Moran
EMT Job No: 24/12294

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
H=H$_2$SO$_4$, Z=ZnAc, N=NaOH, HN=HN0$_3$

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	1-6	7-12	13-18	19-24	25-30	31-36							
Sample ID	BH01	BH02	BH03	BH04	SW01	BH03_D							
Depth													
COC No / misc													
Containers	V H HN P G	V H HN P G	V H HN P G	V H HN P G	V H HN P G	V H HN P G							
Sample Date	11/07/2024	15/07/2024	11/07/2024	15/07/2024	11/07/2024	11/07/2024							
Sample Type	Ground Water	Ground Water	Ground Water	Ground Water	Surface Water	Ground Water							
Batch Number	1	1	1	1	1	1					LOD/LOR	Units	Method No.
Date of Receipt	17/07/2024	17/07/2024	17/07/2024	17/07/2024	17/07/2024	17/07/2024							
Dissolved Arsenic #	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5					<2.5	ug/l	TM30/PM14
Dissolved Barium #	70	70	14	27	27	16					<3	ug/l	TM30/PM14
Dissolved Beryllium	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5					<0.5	ug/l	TM30/PM14
Dissolved Boron	51	<12	16	28	21	25					<12	ug/l	TM30/PM14
Dissolved Cadmium #	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5					<0.5	ug/l	TM30/PM14
Dissolved Calcium #	127.6	96.4	53.0	101.6	44.4	52.9					<0.2	mg/l	TM30/PM14
Total Dissolved Chromium #	<1.5	5.0	<1.5	6.0	<1.5	<1.5					<1.5	ug/l	TM30/PM14
Dissolved Copper #	<7	<7	<7	<7	<7	<7					<7	ug/l	TM30/PM14
Total Dissolved Iron #	<20	<20	<20	<20	<20	<20					<20	ug/l	TM30/PM14
Dissolved Lead #	<5	<5	<5	<5	<5	<5					<5	ug/l	TM30/PM14
Dissolved Magnesium #	10.9	12.7	3.7	9.7	9.9	3.8					<0.1	mg/l	TM30/PM14
Dissolved Manganese #	4	74	22	<2	4	23					<2	ug/l	TM30/PM14
Dissolved Mercury #	<1	<1	<1	<1	<1	<1					<1	ug/l	TM30/PM14
Dissolved Nickel #	2	<2	<2	<2	<2	<2					<2	ug/l	TM30/PM14
Dissolved Potassium #	35.8	1.8	0.8	0.8	2.0	0.8					<0.1	mg/l	TM30/PM14
Dissolved Selenium #	<3	<3	<3	<3	<3	<3					<3	ug/l	TM30/PM14
Dissolved Sodium #	8.7	9.2	4.2	7.7	8.2	4.2					<0.1	mg/l	TM30/PM14
Dissolved Vanadium #	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5					<1.5	ug/l	TM30/PM14
Dissolved Zinc #	5	5	3	8	<3	5					<3	ug/l	TM30/PM14
Total Chromium	33.0	33.3	43.5	107.6	<1.5	54.7					<1.5	ug/l	TM30/PM14
Total Iron	39152$_{AA}$	28726$_{AA}$	38875$_{AA}$	115584$_{AB}$	25	52187$_{AB}$					<20	ug/l	TM30/PM14
MTBE #	<5	<5	<5	<5	<5	<5					<5	ug/l	TM36/PM12
Benzene #	<5	<5	<5	<5	<5	<5					<5	ug/l	TM36/PM12
Toluene #	<5	<5	<5	<5	<5	<5					<5	ug/l	TM36/PM12
Ethylbenzene #	<5	<5	<5	<5	<5	<5					<5	ug/l	TM36/PM12
m/p-Xylene #	<5	<5	<5	<5	<5	<5					<5	ug/l	TM36/PM12
o-Xylene #	<5	<5	<5	<5	<5	<5					<5	ug/l	TM36/PM12
TPH CWG													
Aliphatics													
>C5-C6 (HS_1D_AL) #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM36/PM12
>C6-C8 (HS_1D_AL) #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM36/PM12
>C8-C10 (HS_1D_AL) #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM36/PM12
>C10-C12 (EH_CU_1D_AL) #	<5	<5	<5	<5	<5	<5					<5	ug/l	TM5/PM16/PM30
>C12-C16 (EH_CU_1D_AL) #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/PM16/PM30
>C16-C21 (EH_CU_1D_AL) #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/PM16/PM30
>C21-C35 (EH_CU_1D_AL) #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/PM16/PM30
Total aliphatics C5-35 (EH_CU+HS_1D_AL) #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/TM36/PM12/PM16/PM30

Client Name:	WSP Environmental
Reference:	40000205
Location:	Ballykellly
Contact:	John Moran
EMT Job No:	24/12294

Report : **Liquid**

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
$H=H_2SO_4$, Z=ZnAc, N=NaOH, HN=$HN0_3$

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	1-6	7-12	13-18	19-24	25-30	31-36							
Sample ID	BH01	BH02	BH03	BH04	SW01	BH03_D							
Depth													
COC No / misc													
Containers	V H HN P G	V H HN P G	V H HN P G	V H HN P G	V H HN P G	V H HN P G							
Sample Date	11/07/2024	15/07/2024	11/07/2024	15/07/2024	11/07/2024	11/07/2024							
Sample Type	Ground Water	Ground Water	Ground Water	Ground Water	Surface Water	Ground Water							
Batch Number	1	1	1	1	1	1					LOD/LOR	Units	Method No.
Date of Receipt	17/07/2024	17/07/2024	17/07/2024	17/07/2024	17/07/2024	17/07/2024							
TPH CWG													
Aromatics													
>C5-EC7 (HS_1D_AR) #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM36/PM12
>EC7-EC8 (HS_1D_AR) #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM36/PM12
>EC8-EC10 (HS_1D_AR) #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM36/PM12
>EC10-EC12 (EH_CU_1D_AR) #	<5	<5	<5	<5	<5	<5					<5	ug/l	TM5/PM16/PM30
>EC12-EC16 (EH_CU_1D_AR) #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/PM16/PM30
>EC16-EC21 (EH_CU_1D_AR) #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/PM16/PM30
>EC21-EC35 (EH_CU_1D_AR) #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/PM16/PM30
Total aromatics C5-35 (EH_CU+HS_1D_AR) #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/TM36/PM12/PM16/PM30
Total aliphatics and aromatics(C5-35) (EH_CU+HS_1D_Total) #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/TM36/PM12/PM16/PM30
Sulphate as SO4 #	29.9	20.0	3.7	26.1	20.3	3.9					<0.5	mg/l	TM38/PM0
Chloride #	13.1	20.9	5.1	15.3	19.4	5.4					<0.3	mg/l	TM38/PM0
Nitrate as NO3 #	32.5	0.3	5.8	33.4	0.7	6.0					<0.2	mg/l	TM38/PM0
Nitrite as NO2 #	<0.02	0.03	<0.02	<0.02	<0.02	<0.02					<0.02	mg/l	TM38/PM0
Ortho Phosphate as PO4 #	0.20	<0.06	<0.06	<0.06	<0.06	<0.06					<0.06	mg/l	TM38/PM0
Ammoniacal Nitrogen as N #	0.34	0.05	<0.03	0.03	<0.03	<0.03					<0.03	mg/l	TM38/PM0
Hexavalent Chromium	<6	<6	41	<6	<6	<6					<6	ug/l	TM38/PM0
Total Dissolved Chromium III	<6	<6	<6	6	<6	<6					<6	ug/l	TM0/PM0
Total Alkalinity as CaCO3 #	764	500	208	1200	136	254					<1	mg/l	TM75/PM0
COD (Settled) #	10	<7	<7	<7	21	<7					<7	mg/l	TM57/PM0
Total Suspended Solids #	1447	828	828	3074	<10	1027					<10	mg/l	TM37/PM0

Client Name: WSP Environmental
Reference: 40000205
Location: Ballykellly
Contact: John Moran

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 24/12294						

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating. Only analyses which are accredited are recorded as deviating if set criteria are not met.
It is a requirement under ISO 17025 that we inform clients if samples are deviating i.e. outside what is expected. A deviating sample indicates that the sample 'may' be compromised but not necessarily will be compromised. The result is still accredited and our analytical reports will still show accreditation on the relevant analytes.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 24/12294

SOILS and ASH

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. Asbestos samples are retained for 6 months.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C. Ash samples are dried at 35°C ±5°C.

Where Mineral Oil is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil is quoted, this refers to Total Aliphatics C10-C40.

STACK EMISSIONS

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation for Dioxins and Furans and Dioxin like PCBs has been performed on XAD-2 Resin, only samples which use this resin will be within our MCERTS scope.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a requirement of our Accreditation Body for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.
Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.
Laboratory records are kept for a period of no less than 6 years.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

Customer Provided Information

Sample ID and depth is information provided by the customer.

Age of Diesel

The age of release estimation is based on the nC17/pristane ratio only as prescribed by Christensen and Larsen (1993) and Kaplan, Galperin, Alimi et al., (1996).
Age estimation should be treated with caution as it can be influenced by site specific factors of which the laboratory are not aware.

Tentatively Identified Compounds (TICs)

Where Tentatively Identified Compounds (TICs) are reported, up to 10 Tentatively Identified Compounds will be listed where there is found to be a greater than 80% match with the NIST library. The reported concentration is determined semi-quantitively, with a matrix specific limit of detection. Note, other compounds may be present but are not reported.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above quantitative calibration range. The result should be considered the minimum value and is indicative only. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range
AA	x5 Dilution
AB	x10 Dilution

HWOL ACRONYMS AND OPERATORS USED

HS	Headspace Analysis.
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent.
CU	Clean-up - e.g. by florisil, silica gel.
1D	GC - Single coil gas chromatography.
Total	Aliphatics & Aromatics.
AL	Aliphatics only.
AR	Aromatics only.
2D	GC-GC - Double coil gas chromatography.
#1	EH_Total but with humics mathematically subtracted
#2	EU_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +).
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry.

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM0	Not available	PM0	No preparation is required.				
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM16/PM30	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE/Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM5/TM36	please refer to TM5 and TM36 for method details	PM12/PM16/PM30	please refer to PM16/PM30 and PM12 for method details	Yes			
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified				
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified	Yes			
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes			
TM37	Modified methods - TSS: USEPA 160.2 (1983), EN872:2005 and APHA SMEWW 2540D:1999 22nd Edition; VSS: USEPA 1684 (Jan 2001), USEPA 160.4 (1971) and SMEWW 2540E:1999 22nd Edition. Gravimetric determination of Total Suspended Solids (TSS) and Volatile Suspended Solids (VSS). Sample is filtered through a 1.5um pore size glass fibre filter and the resulting residue is dried and weighed at 105°C for TSS and 550°C for VSS.	PM0	No preparation is required.	Yes			
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013l	PM0	No preparation is required.				
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013l	PM0	No preparation is required.	Yes			
TM57	Modified US EPA Method 410.4. (Rev. 2.0 1993) Comparable with ISO 15705:2002. Chemical Oxygen Demand is determined by hot digestion with Potassium Dichromate and measured spectrophotometerically.	PM0	No preparation is required.	Yes			

EMT Job No: 24/12294

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM75	Modified US EPA method 310.1 (1978). Determination of Alkalinity by Metrohm automated titration analyser.	PM0	No preparation is required.	Yes			

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WSP Environmental
Town Centre House
Dublin Road
Naas
Co Kildare
Ireland

Attention :	John Moran
Date :	9th September, 2024
Your reference :	40000205
Our reference :	Test Report 24/14693 Batch 1
Location :	Ballykelly
Date samples received :	28th August, 2024
Status :	Final Report
Issue :	202409091506

Six samples were received for analysis on 28th August, 2024 of which six were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

The greenhouse gas emissions generated (in Carbon – Co2e) to obtain the results in this report are estimated as:

Scope 1&2 emissions - 13.539 kg of CO2

Scope 1&2&3 emissions - 31.996 kg of CO2

Authorised By:

Simon Gomery BSc
Senior Project Manager

Element Materials Technology

Client Name: WSP Environmental
Reference: 40000205
Location: Ballykelly
Contact: John Moran
EMT Job No: 24/14693

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
H=H_2SO_4, Z=ZnAc, N=NaOH, HN=$HN0_3$

EMT Sample No.	1-6	7-12	13-18	19-24	25-30	31-36					LOD/LOR	Units	Method No.
Sample ID	BH01	BH02	BH03	BH04	SW01	SW01_DUP							
Depth													
COC No / misc													
Containers	V H HN P G	V H HN P G	V H HN P G	V H HN P G	V H HN P G	V H HN P G							
Sample Date	26/08/2024	26/08/2024	26/08/2024	26/08/2024	26/08/2024	26/08/2024							
Sample Type	Ground Water	Ground Water	Ground Water	Ground Water	Surface Water	Surface Water							
Batch Number	1	1	1	1	1	1							
Date of Receipt	28/08/2024	28/08/2024	28/08/2024	28/08/2024	28/08/2024	28/08/2024							
Dissolved Arsenic#	5.4	<2.5	<2.5	<2.5	<2.5	<2.5					<2.5	ug/l	TM30/PM14
Dissolved Barium#	85	63	8	18	23	23					<3	ug/l	TM30/PM14
Dissolved Beryllium	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5					<0.5	ug/l	TM30/PM14
Dissolved Boron	55	17	17	19	13	16					<12	ug/l	TM30/PM14
Dissolved Cadmium#	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5					<0.5	ug/l	TM30/PM14
Dissolved Calcium#	121.3	96.1	42.5	89.1	42.6	42.8					<0.2	mg/l	TM30/PM14
Total Dissolved Chromium#	4.6	6.6	6.9	<1.5	<1.5	<1.5					<1.5	ug/l	TM30/PM14
Dissolved Copper#	<7	<7	<7	<7	<7	<7					<7	ug/l	TM30/PM14
Dissolved Lead#	<5	<5	<5	<5	<5	<5					<5	ug/l	TM30/PM14
Dissolved Magnesium#	10.9	12.5	3.1	8.1	10.1	10.1					<0.1	mg/l	TM30/PM14
Dissolved Manganese#	40	<2	22	<2	27	27					<2	ug/l	TM30/PM14
Dissolved Mercury#	<1	<1	<1	<1	<1	<1					<1	ug/l	TM30/PM14
Dissolved Nickel#	4	<2	<2	<2	<2	<2					<2	ug/l	TM30/PM14
Dissolved Potassium#	31.4	2.0	0.7	0.6	2.1	2.1					<0.1	mg/l	TM30/PM14
Dissolved Selenium#	<3	<3	<3	<3	<3	<3					<3	ug/l	TM30/PM14
Dissolved Sodium#	8.9	9.3	4.5	7.1	8.4	8.3					<0.1	mg/l	TM30/PM14
Dissolved Vanadium#	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5					<1.5	ug/l	TM30/PM14
Dissolved Zinc#	26	9	11	13	<3	3					<3	ug/l	TM30/PM14
Total Chromium	<1.5	<1.5	35.9	<1.5	<1.5	<1.5					<1.5	ug/l	TM30/PM14
Total Iron	1018	536	25033$_{AA}$	198	26	29					<20	ug/l	TM30/PM14
MTBE#	<5	<5	<5	<5	<5	<5					<5	ug/l	TM36/PM12
Benzene#	<5	<5	<5	<5	<5	<5					<5	ug/l	TM36/PM12
Toluene#	<5	<5	<5	<5	<5	<5					<5	ug/l	TM36/PM12
Ethylbenzene#	<5	<5	<5	<5	<5	<5					<5	ug/l	TM36/PM12
m/p-Xylene#	<5	<5	<5	<5	<5	<5					<5	ug/l	TM36/PM12
o-Xylene#	<5	<5	<5	<5	<5	<5					<5	ug/l	TM36/PM12
TPH CWG													
Aliphatics													
>C5-C6 (HS_1D_AL)#	<10	<10	<10	<10	<10	<10					<10	ug/l	TM36/PM12
>C6-C8 (HS_1D_AL)#	<10	<10	<10	<10	<10	<10					<10	ug/l	TM36/PM12
>C8-C10 (HS_1D_AL)#	<10	<10	<10	<10	<10	<10					<10	ug/l	TM36/PM12
>C10-C12 (EH_CU_1D_AL)#	<5	<5	<5	<5	<5	<5					<5	ug/l	TM5/PM16/PM30
>C12-C16 (EH_CU_1D_AL)#	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/PM16/PM30
>C16-C21 (EH_CU_1D_AL)#	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/PM16/PM30
>C21-C35 (EH_CU_1D_AL)#	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/PM16/PM30
Total aliphatics C5-35 (EH_CU+HS_1D_AL)#	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/TM36/PM12/PM16/PM30

Please see attached notes for all abbreviations and acronyms

Client Name:	WSP Environmental	**Report :**	**Liquid**
Reference:	40000205		
Location:	Ballykelly		
Contact:	John Moran	**Liquids/products:**	V=40ml vial, G=glass bottle, P=plastic bottle
EMT Job No:	24/14693		$H=H_2SO_4$, Z=ZnAc, N=NaOH, HN=$HN0_3$

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	1-6	7-12	13-18	19-24	25-30	31-36					LOD/LOR	Units	Method No.
Sample ID	BH01	BH02	BH03	BH04	SW01	SW01_DUP							
Depth													
COC No / misc													
Containers	V H HN P G	V H HN P G	V H HN P G	V H HN P G	V H HN P G	V H HN P G							
Sample Date	26/08/2024	26/08/2024	26/08/2024	26/08/2024	26/08/2024	26/08/2024							
Sample Type	Ground Water	Ground Water	Ground Water	Ground Water	Surface Water	Surface Water							
Batch Number	1	1	1	1	1	1							
Date of Receipt	28/08/2024	28/08/2024	28/08/2024	28/08/2024	28/08/2024	28/08/2024							
TPH CWG													
Aromatics													
>C5-EC7 (HS_1D_AR) #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM36/PM12
>EC7-EC8 (HS_1D_AR) #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM36/PM12
>EC8-EC10 (HS_1D_AR) #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM36/PM12
>EC10-EC12 (EH_CU_1D_AR) #	<5	<5	<5	<5	<5	<5					<5	ug/l	TM5/PM16/PM30
>EC12-EC16 (EH_CU_1D_AR) #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/PM16/PM30
>EC16-EC21 (EH_CU_1D_AR) #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/PM16/PM30
>EC21-EC35 (EH_CU_1D_AR) #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/PM16/PM30
Total aromatics C5-35 (EH_CU+HS_1D_AR) #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/TM36/PM12/PM16/PM30
Total aliphatics and aromatics(C5-35) (EH_CU+HS_1D_Total) #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/TM36/PM12/PM16/PM30
Sulphate as SO4 #	23.3	19.1	2.5	19.5	20.4	20.4					<0.5	mg/l	TM38/PM0
Chloride #	14.2	20.1	3.8	15.0	19.1	19.1					<0.3	mg/l	TM38/PM0
Nitrate as NO3 #	27.2	0.9	3.8	21.5	0.5	0.5					<0.2	mg/l	TM38/PM0
Nitrite as NO2 #	0.16	<0.02	<0.02	<0.02	<0.02	<0.02					<0.02	mg/l	TM38/PM0
Ortho Phosphate as PO4 #	0.27	0.09	0.08	0.08	0.07	0.07					<0.06	mg/l	TM38/PM0
Ammoniacal Nitrogen as N #	0.16	<0.03	0.03	<0.03	<0.03	0.03					<0.03	mg/l	TM38/PM0
Hexavalent Chromium	<6	<6	<6	<6	<6	<6					<6	ug/l	TM38/PM0
Total Dissolved Chromium III	<6	7	7	<6	<6	<6					<6	ug/l	TM0/PM0
Total Alkalinity as CaCO3 #	352	258	160	208	122	122					<1	mg/l	TM75/PM0
COD (Settled) #	14	18	<7	21	25	12					<7	mg/l	TM57/PM0
Total Suspended Solids #	55	24	548	15	<10	<10					<10	mg/l	TM37/PM0

Please include all sections of this report if it is reproduced
All solid results are expressed on a dry weight basis unless stated otherwise.

Client Name: WSP Environmental
Reference: 40000205
Location: Ballykelly
Contact: John Moran

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 24/14693						

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating. Only analyses which are accredited are recorded as deviating if set criteria are not met.
It is a requirement under ISO 17025 that we inform clients if samples are deviating i.e. outside what is expected. A deviating sample indicates that the sample 'may' be compromised but not necessarily will be compromised. The result is still accredited and our analytical reports will still show accreditation on the relevant analytes.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 24/14693

SOILS and ASH

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. Asbestos samples are retained for 6 months.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C. Ash samples are dried at 35°C ±5°C.

Where Mineral Oil is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil is quoted, this refers to Total Aliphatics C10-C40.

STACK EMISSIONS

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation for Dioxins and Furans and Dioxin like PCBs has been performed on XAD-2 Resin, only samples which use this resin will be within our MCERTS scope.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a requirement of our Accreditation Body for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.
Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.
Laboratory records are kept for a period of no less than 6 years.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

Customer Provided Information

Sample ID and depth is information provided by the customer.

Age of Diesel

The age of release estimation is based on the nC17/pristane ratio only as prescribed by Christensen and Larsen (1993) and Kaplan, Galperin, Alimi et al., (1996).
Age estimation should be treated with caution as it can be influenced by site specific factors of which the laboratory are not aware.

Tentatively Identified Compounds (TICs)

Where Tentatively Identified Compounds (TICs) are reported, up to 10 Tentatively Identified Compounds will be listed where there is found to be a greater than 80% match with the NIST library. The reported concentration is determined semi-quantitively, with a matrix specific limit of detection. Note, other compounds may be present but are not reported.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above quantitative calibration range. The result should be considered the minimum value and is indicative only. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range
AA	x5 Dilution

HWOL ACRONYMS AND OPERATORS USED

HS	Headspace Analysis.
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent.
CU	Clean-up - e.g. by florisil, silica gel.
1D	GC - Single coil gas chromatography.
Total	Aliphatics & Aromatics.
AL	Aliphatics only.
AR	Aromatics only.
2D	GC-GC - Double coil gas chromatography.
#1	EH_Total but with humics mathematically subtracted
#2	EU_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +).
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry.

EMT Job No: 24/14693

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM0	Not available	PM0	No preparation is required.				
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM16/PM30	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE/Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM5/TM36	please refer to TM5 and TM36 for method details	PM12/PM16/PM30	please refer to PM16/PM30 and PM12 for method details	Yes			
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified				
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified	Yes			
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes			
TM37	Modified methods - TSS: USEPA 160.2 (1983), EN872:2005 and APHA SMEWW 2540D:1999 22nd Edition; VSS: USEPA 1684 (Jan 2001), USEPA 160.4 (1971) and SMEWW 2540E:1999 22nd Edition. Gravimetric determination of Total Suspended Solids (TSS) and Volatile Suspended Solids (VSS). Sample is filtered through a 1.5um pore size glass fibre filter and the resulting residue is dried and weighed at 105°C for TSS and 550°C for VSS	PM0	No preparation is required.	Yes			
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013l	PM0	No preparation is required.				
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013l	PM0	No preparation is required.	Yes			
TM57	Modified US EPA Method 410.4. (Rev. 2.0 1993) Comparable with ISO 15705:2002. Chemical Oxygen Demand is determined by hot digestion with Potassium Dichromate and measured spectrophotometerically.	PM0	No preparation is required.	Yes			

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Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM75	Modified US EPA method 310.1 (1978). Determination of Alkalinity by Metrohm automated titration analyser.	PM0	No preparation is required.	Yes			