



Detailed Quantitative Risk Assessment (DQRA) Report

Point of Ayr (PoA), Talacre, Holywell

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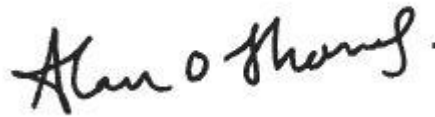
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ACRONYMS AND ABBREVIATIONS

Acronyms	Description
°C	degrees Celsius
µg/L	micrograms per litre
µS/cm	microSiemens per centimetre
AA	Annual Average
aOD	above Ordnance Datum
bgl	below ground level
Client	ENI UK Limited
9Cl-PF3ONS	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid
cm	Centimetre
CW	Controlled Waters
CWRA	Controlled Waters Risk Assessment
DF	Dilution Factor
ADONA	4,8-Dioxa-3H-perfluorononanoic acid
DQRA	Detailed Quantitative Risk Assessment
DWS	Drinking Water Standard
EA	Environment Agency
Element	Element Materials Technology Laboratory
EQS	Environmental Quality Standards
ERM	Environmental Resources Management Limited
EU	European Union
GAC	Generic Assessment Criteria
GQRA	Generic Quantitative Risk Assessment
HFPO-DA	Hexafluoropropylene oxide dimer acid
HI	Hazard Index
L	Litre
m	metre
MAC	Maximum Allowable Concentrations
ug/l	micrograms per litre
ug/kg	micrograms per kilogram
mg/kg	milligrams per kilogram

Acronyms	Description
mg/L	milligrams per litre
mm	millimetre
MRL	Method Reporting Limit
mV	Millivolts
NEtFOSA	N-ethyl perfluorooctanesulfonamide
NEtFOSAA	N-ethyl perfluorooctanesulfonamidoacetic acid
NMeFOSA	N-methyl perfluorooctanesulfonamide
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid
NRW	Natural Resources Wales
PFBS	Perfluorobutanesulfonic acid
PFBA	Perfluorobutanoic acid
PFDS	Perfluorodecanesulfonic acid
PFDA	Perfluorodecanoic acid
PFDoS	Perfluorododecanesulfonic acid
PFDoDA	Perfluorododecanoic acid
8:2FTS	1H,1H, 2H, 2H-Perfluorodecane sulfonic acid
PFHpS	Perfluoroheptanesulfonic acid
PFHpA	Perfluoroheptanoic acid
4:2FTS	1H,1H, 2H, 2H-Perfluorohexane sulfonic acid
PFHxS	Perfluorohexanesulfonic acid
PFHxA	Perfluorohexanoic acid
PFHxDA	Perfluoro-n-hexadecanoic acid
PFODA	Perfluoro-n-octadecanoic acid
PFNS	Perfluorononanesulfonic acid
PFNA	Perfluorononanoic acid
PFOSA	Perfluorooctanesulfonamide
6:2FTS	1H,1H, 2H, 2H-Perfluorooctane sulfonic acid
PFOA	Perfluorooctanoic acid
PFPeA	Perfluoropentanoic acid
PFPeS	Perfluoropentansulfonic acid
PFTeDA	Perfluorotetradecanoic acid
PFTrDA	Perfluorotridecanoic acid

Acronyms	Description
PFUnDA	Perfluoroundecanoic acid
OWS	Oily water System
PoA	Point of Ayr
POP	Persistent Organic Pollutant
ppm	Parts per million
Site	Point of Ayr Gas Terminal, adjacent former colliery area and associated contractor's car park located in Talacre, Flintshire, CH8 9RD, United Kingdom
SSC	Subsurface Service Clearance
SWS	Surface Water System
UK	United Kingdom
wt%	% by weight

EXECUTIVE SUMMARY

ENI UK Limited (hereafter referred to as 'the Client' or 'Eni') operates the Point of Ayr Gas Terminal (hereafter referred to as 'the site' or 'PoA') in Talacre, Flintshire, CH8 9RD, United Kingdom to process natural gas imported from the off-shore Douglas Platform and then exported via pipeline to Connah's Quay Power Station.

To support its Carbon Capture and Storage (CCS) Project, Eni is planning to convert the existing PoA terminal to facilitate CO₂ injection to the offshore assets. Consequently, demolition and redevelopment of PoA is required using a phased approach.

ERM undertook a Phase 2 site investigation in March 2024 undertook laboratory analysis of soil and groundwater samples for a suite of analytes that were selected based on the nature of historical and current potential sources of contamination at the Site. It concluded that, *with the exception of PFAS, based on the findings of the GQRA, the potential risk to Human Health and Controlled Waters from identified soil and groundwater contamination at the Site is considered to be "low"*.

To understand the implications of the identified PFAS contamination in the context of the proposed redevelopment (both at the demolition, construction phase and in the long term) Eni retained ERM to undertake a further phase of investigation works and detailed quantitative risk assessment.

The finds of the risk assessment are presented as follows:

- In terms of PFAS then it is clear that the historic handling and use of AFFF firefighting foam at the site has resulted in a legacy of soil, concrete and groundwater PFAS contamination at the site.
- The predominant PFAS are the PFSAs most notably PFOS though a range other PFAS are detected at lower concentrations.
- Spatially the distribution of PFAS impacted soils and groundwaters mostly reflects historic incidents and known usage of AFFF however PFAS have also been detected in areas of the site not thought to have been previously impacted.
- Vertical Strong vertical attenuation of PFAS in shallow soils is noted but the PFOS and other PFAS are likely to act as an ongoing source to groundwater and back diffusion of PFAS sorbed to the aquifer matrix may also occur in the long term.
- In terms of human health then soil samples from only two discrete locations were identified above the C4SL screening levels for ongoing commercial use.
- For controlled waters the risk to adjacent surface waters from groundwater contamination is complicated by the interaction of the existing surface water drainage regime with groundwater and the resultant capture and discharge of impacted waters to the adjacent Talacre Brook. This in turn discharges to another stream and at the sampling point furthest from the site and the concentration of PFOS (in this sampling round) were still significantly above the EQS. Given the current regime and the findings of the DQRA then migration off site in groundwater and recharge to the Estuary appears less significant.

- Treatment of any waters produced as part of the redevelopment works (dewatering during demolition and construction, surface waters from construction) will be undertaken to the extent practicable. The proposed remedial target for discharges from dewatering and other construction activities during the construction and development period is a PFOS concentration 0.10ug/l (noting that reduction of all other PFAS will take place as well)

Based on the above it is recommended that Eni undertake a remedial options appraisal (ROA) and develop a remediation strategy to address the issues identified and based on the remedial targets proposed in the DQRA

1. INTRODUCTION

1.1 BACKGROUND

ENI UK Limited (hereafter referred to as 'the Client' or 'Eni') operates the Point of Ayr Gas Terminal (hereafter referred to as 'the site' or 'PoA') in Talacre, Flintshire, CH8 9RD, United Kingdom to process natural gas imported from the off-shore Douglas Platform and then exported via pipeline to Connah's Quay Power Station.

To support its Carbon Capture and Storage (CCS) Project, Eni is planning to convert the existing PoA terminal to facilitate CO₂ injection to the offshore assets. Consequently, demolition and redevelopment of PoA is required using a phased approach.

As part of the redevelopment process Eni commissioned Environmental Resources Management Limited (hereafter referred to as 'ERM') to undertake a Phase 2 site investigation in March 2024. The most significant result of this investigation¹ was the identification of groundwater impact from a range of Per- and polyfluoroalkyl substances (PFAS) that were subsequently linked to the storage and testing of aqueous fire-fighting foams (AFFF) over the lifetime of the facility.

The Phase 2 site investigation in March 2024 undertook laboratory analysis of soil and groundwater samples for a suite of analytes that were selected based on the nature of historical and current potential sources of contamination at the Site. It concluded that, *with the exception of PFAS, based on the findings of the GQRA, the potential risk to Human Health and Controlled Waters from identified soil and groundwater contamination at the Site is considered to be "low"*.

To understand the implications of the identified PFAS contamination in the context of the proposed redevelopment (both at the demolition, construction phase and in the long term) Eni retained ERM to undertake a further phase of investigation works and detailed quantitative risk assessment based on ERM's proposal².

At the time of undertaking this investigation, ERM understands Eni's plans of redevelopment of the PoA Gas Terminal will include demolition of the current plant area and construction in the grassed area to the north of the current plant area. ERM also understands that a contractor's compound will be established during the redevelopment period and is proposed to be in the north of the PoA terminal, to the west of the current flare. A Site location map is provided as Figure 1 (Appendix A), the current site layout is provided as Figure 2(Appendix A) and a future layout of the proposed development is provided in Figure 3(Appendix A).

¹ ERM, 2024, Point of Ayr (PoA) Environmental Site Assessment, April 2024, 0712595

² ERM, 2024, Point of Ayr (PoA) Carbon Capture and Storage project – Further support to address identified per- and polyfluoroalkyl substances (PFAS) contamination. Proposal June 2024

1.2 SCOPE OF WORK

As described in our proposal the scope of ERM's PFAS DQRA was as follows:

- Review available Eni documents, and conduct discussions with Eni operations personnel, to understand potentially significant PFAS contamination sources that may be present at the Site;
- Design a risk-based soil and groundwater sampling plan based on available information, previous assessments and historical data;
- Undertake a further investigation, including soil and groundwater sampling and analysis;
- Use the results of the investigation to update the Conceptual Site Model (CSM), to understand potential PFAS pollution pathways and linkages at the Site;
- Undertake a Human Health and Controlled Waters Detailed Quantitative Risk Assessment (DQRA) based on the results of the soil and groundwater analysis;
- Prepare this report, presenting the findings of the investigation and including recommendations and remedial targets (if any) in relation to mitigation of risk to human health from PFAS soil and groundwater contamination during and post redevelopment of the PoA Gas Terminal.

1.3 STRUCTURE OF REPORT

This report presents the background, scope of works, results, and findings of the assessment, and is structured as follows:

- **Section 2: Updated Site Context and Site History** presents the findings of the PFAS source identification review and updated understanding of the site conceptual model prior to the additional intrusive works;
- **Section 3: Fieldwork Methodology** provides details of the scope of works undertaken by ERM at the Site, including preparatory works, borehole drilling, trial pitting, monitoring well installation, and soil and groundwater sampling;
- **Section 4: Fieldwork Findings** presents the physical observations made by ERM during the fieldworks, including the geology, hydrogeology and field evidence of contamination;
- **Section 5: Human Health Risk Assessment** presents the results of the soil laboratory analysis, as well as the findings of the human health risk assessment;
- **Section 6 Controlled Waters Risk Assessment** presents the results of the groundwater, surface water and concrete laboratory analysis, as well as the findings of the controlled waters risk assessment;
- **Section 7: Assessment of DQRA in context of proposed works** – presents an analysis of the significance of the DQRA in the context of the proposed phases of work at the site; and
- **Section 8: Summary & Recommendations** presents a summary of the key findings along with recommendations for further work and/or mitigation measures during development (if any).

2. UPDATED SITE CONTEXT AND SITE HISTORY

A detailed description of the general site setting, history and environmental context was provided in ERM's previous site investigation report¹. A summary of the site context and history is included in Section 2.1 below.

2.1 SUMMARY OF SITE CONTEXT AND SITE HISTORY

Key aspects of the Site's history, obtained by review of historical maps² (dating between 1872 and 2023):

- Prior to any development c. 1878, the Site (PoA and adjacent colliery areas) is depicted as undeveloped/agricultural land. The eastern part of the colliery area is shown as a salt marsh;
- Colliery operations to the south of the Site are shown from c. 1900 to c. 1996, including hazardous waste storage and deposition of spoil, mining waste and sludges;
- The PoA Gas Terminal was constructed in c. 1994 and has remained in its current layout since with the main site at an elevation of approximately 4.5m AOD;
- Demolition of the adjacent colliery occurred in c. 1996-2000.

ERM conducted fieldwork as part of the Phase 2 Environmental Site Assessment works in February and March 2024. Key findings of the assessment comprise:

- Geology underlying the PoA Gas Terminal comprises up to 1.2 m of Made Ground (dense engineered gravel), underlain by superficial deposits of sandy Silt or silty Clay (typically 1-2 m in thickness) overlying fine Sand, consistent with Tidal Flat Deposits;
- Resting groundwater levels were recorded between 2.8 m to 4.7 m above Ordnance Datum (ground level is at 6.48 and 4.98m AOD at these two points respectively) and indicated an overall flow direction away from the PoA Gas Terminal process area, towards the north/northeast and south/southeast. Localised 'mounding' of groundwater under the process area may be related to the effects of subsurface structures (e.g., foundations) and/or losses from the drainage network on the hydrogeological regime.
- No visual or olfactory evidence of contamination was recorded by the ERM consultant during the Site works;

The Phase 2 site investigation in February and March 2024 undertook laboratory analysis of soil and groundwater samples for a suite of analytes that were selected based on the nature of historical and current potential sources of contamination at the Site³.

- No exceedances of Generic Assessment Criteria (GAC) protective of human health for users of the Site (assuming an ongoing commercial land use).

¹ ERM, 2024, Point of Ayr (PoA) Environmental Site Assessment, April 2024, 0712595

² Historical maps of the Eni PoA site, former colliery and surrounding area, purchased from the Landmark Information Group (envirocheck) on 10-Nov-2023.

³ Analytical suite - Asbestos screening (soil only); Metals; Volatile Organic Compounds (VOCs); Semi-Volatile Organic Compounds (SVOCs), including PAHs; Total Petroleum Hydrocarbons Criteria Working Group (TPH-CWG), Per- and Poly-Fluoroalkyl Substances (PFAS, groundwater only); pH; Total Cyanide; Mercury; (PCBs, soil only); and Alcohols and Acetates

- Concentrations of a small number of analytes in soils were considered to be potential indicators of localised, low-level Site-related impacts, notably:
 - Methanol was reported in soil adjacent to the Methanol AST in the southeastern corner of the PoA Gas Terminal as well as due south in the northeastern corner of the former colliery. Although no corresponding Methanol was detected in groundwater samples, it is suspected that this represents a historic leak or spill that has migrated from the PoA site onto the former colliery. Methanol readily breakdowns down and the concentrations in soils are not considered a risk;
 - Total cyanide was detected in groundwater in BH160 however it is considered that the limited concentration detections do not pose a significant risk;
- Concentrations of metals were reported at concentrations above the marine EQS in one or more groundwater samples. All reported concentrations were within one order of magnitude of the respective EQS value. The locations of the exceedances were at different locations and are not considered to indicate a site wide source. The EQS is the environmental quality standard that should not be exceeded at the receptor; the River Dee Estuary. Comparing the onsite groundwater concentration against the EQS is very conservative. If off-site migration of metals is present, once retardation and further dilution within the groundwater along the pathway between the site and receptor and dilution within the River Dee Estuary is taken into account, it is unlikely that there will be significant impact to the River Dee Estuary from concentrations currently recorded onsite in the groundwater.
- Concentrations of PFAS (in particular PFOS) in groundwater are reported as elevated in samples of groundwater recovered from the southeastern corner of the main process area as well as in the north. The groundwater profile does suggest flow away from the PoA Gas Terminal process area in an off-site direction. Given the elevated concentrations reported, if a groundwater migration pathway is confirmed, there is a potential for PFAS to pose a risk to Controlled Waters.
- Shallow soils at the site have not been tested for PFAS. Given the concentrations reported in groundwater, there is a high potential for shallow soils to pose a risk to human health (in areas where PFAS has already been detected) and for further leaching from soils to be occurring. The presence of PFAS at the site will require further investigation and assessment.

The Phase 2 Environmental Site Assessment concluded that, with the exception of PFAS, and based on the findings of the GQRA, the potential risk to Human Health and Controlled Waters from identified soil and groundwater contamination at the Site is considered to be “low”.

As such, ERM recommended further investigation and assessment of the elevated concentrations of PFAS detected at the PoA Gas Terminal and the development of appropriate actions for the proposed construction works at the Site. This is the purpose of this report.

2.2 AFFF USAGE & SOURCES

The focus of this section is to describe the findings of a site walkover (held on the 18th July 2024) and interviews with site staff that were undertaken with the objective of better understanding the usage and sources of AFFF at the site as well as gaining further insight into the conceptual site

model focusing in particular on the surface water management system (both current and future) prior to finalizing the design of the additional intrusive works.

As outlined above in order to better understand the history and usage of AFFF at the site ERM undertook a site visit and interviewed a number of Eni staff. The key findings of this review are as follows:

The firefighting system at the site was described as consisting of a fire water ring main that draws water from a fire water pond in the north west of the site and is routed around the site. In key locations across the site there are a series of 12 foam monitors that each consist of an above ground AFFF foam storage tank (approx. 1 m³ capacity) connected to a nozzle that when activated would trigger the discharge of the firewater into which is mixed the foam concentrate at a concentration of 3% and air to produce the foam which would be directed at the source of a fire.

The firefighting system has been in place for the lifetime of the operational facility and initially is understood to have used a C8 based AFFF (that would have contained perfluorooctane sulfonate (PFOS) amongst other PFAS components). PFOS was listed as a persistent organic pollutant (POP) in Annex B (restriction) of the UNEP Stockholm Convention on POPs in 2009. Fire-fighting foams that were placed on the market before 27 December 2006 could also be used until 27 June 2011. Any firefighting foams containing PFOS should have been removed from use prior to June 2011 and ethically disposed of. At the site it was understood that the C8 product was transitioned to the current C6 modern telomer based product (Angus Fire Tridol ATFC 2/6 AR -AFF) in or around 2011 as stocks were run down. No detailed analysis of the current product has been undertaken but it is known to include both hydrocarbon and fluorocarbon surface active agents typically shorter chain PFAS (C6 or less).

Operationally current practice at the site is to test fire the monitors each month but this is with water only – no foam. Foam was tested with the fire monitors on a single occasion each year (12 month period) but this practice has been stopped. Historically it is understood that testing used to be completed through sampling directly from the concentrate (i.e. straight from the concentrate container). However for the last 4-5 years testing has been done on the post-mixed/ released foam which suggests that the foam has only been fired and released to ground over the course of the last 4-5 years (i.e. only 4 to 5 times). It is understood that a 3% concentration of foam is used. The staff undertaking the testing estimate that they would use approximately 1L of foam concentrate per monitor for each test each year. During the test a board would be set up circa 20m from the fire monitor to collect the foam. Therefore the spray/ range of the spray and foam released is in a ~20m arc. When testing the monitor would be pointed away from the plant towards the grass or a gravelled area. This also means that the spray would travel over the road and there is the possibility that the foam has entered the drain system here. The exception to the above is for the methanol area where the foam is collected in the run off sump adjacent to the tank. This foam and associated water is collected via a bowser and is sprayed onto the grassed areas to the north and south of the site. Concentrated foam is currently stored in the north of the site and is decanted to the foam tanks associated with each monitor when needed. When each monitor is refilled this is undertaken directly by decanting from the concentrate container.

According to Eni operatives working on-site, there has been only one event in which firefighting foam (AFFF) was used in an emergency situation. This was in 1998, when the Site was controlled by BHP Billiton, and it is understood the emergency use of AFFF was used to combat a release of condensate in the area north of the methanol tank (Figure 4).

Anecdotal evidence suggests that approximately 3,000 litres of AFFF was used and released into the area north of the methanol sump. The released AFFF was allowed to go to ground and entered the drains whereby it entered the site surface water treatment system and was reportedly treated with granular activated carbon prior to discharge.

No other release events were known about by site staff.

2.3 SITE DRAINAGE

Figure 5(Appendix A) illustrates the site drainage layout for the site.

Based on discussions with Eni the drainage philosophy is described as the following:

- The surface water system (SWS) comprises a series of French drains that collect rain water from roads surfaces and roof tops. This is "clean" effluent" with no contact to pollutants.
- The oily water system (OWS) collects water from paved areas mainly. All areas with potential heavy spills are within kerbed areas that are vacuum trucked to an oily water basin.
- Both systems run side-by side from East to West. The SWS passes through an interceptor while the OWS passes through a TPS (tilted plate separator)
- Both systems then merge before reaching a Clean Water Collection Sump that lifts water to the Outfall Basin. The frequency of pumps operation depends on the water-level within the sump. On average this is understood to be twice/hour.
- When the Basin is full, a laboratory technician tests the reservoir for pH levels. The water is then released to the discharge pumps and line to the Talacre Brook (located west to the terminal).
- The drainage network was designed to be located above the resting groundwater table. However, Eni believes that the network is partially submerged under the groundwater table. As the SWS is mainly collecting water using perforated pipes, the drainage network is likely to capture some groundwater. . This has been considered in the context of the current and future conceptual site model.
- Based on Eni records, over the last 9 years, the drainage system has been discharging an average of 457m³ a day to the Talacre Brook though as noted this is not necessarily discharged every day and depends on when the sump is full and has been tested as outlined above.

Upon discharge to the Talacre Brook on the western part of the site the water is understood to flow in a south easterly and then easterly direction along the edge of the site in an engineered but highly vegetated (reeds) channel. To the south east of the site the brook then appears to be directed into a further fully culverted channel in a southerly direction under the former colliery car park to where it discharges into an unnamed brook (see picture). The latter in turn flows through

further reedbeds before ultimately discharging into the Dee Estuary via a channel known as the Sluice House Gutter.

2.4 SUMMARY OF KEY FINDINGS IN THE CONTEXT OF THE PRE-INVESTIGATION CONCEPTUAL SITE MODEL

2.4.1 SOURCES

The storage and use of PFAS containing AFFF at the site is confirmed with C8 AFFF (containing PFOS) used from site operation until its phase out in 2011.

Potential residual sources of AFFF at the site include locations where the foam concentrate was stored, decanted and tested. These include the 12 foam monitors and surrounding open areas in an approximate ~20m arc where monitors have been discharged during testing, areas of open grassland where the bowser may have sprayed PFAS containing water from the methanol sump, the storage location/wash area of the bowser itself and the storage area of the foam concentrate. There is limited detailed information on AFFF storage /handling during the early years of operation.

There is one known significant active incident that occurred in 1998 in the methanol/condensate area where a significant quantity (~3000l) of the C8 AFFF was discharged as a result of an incident.

2.4.2 PATHWAYS

The onsite drainage system may have been a significant pathway for the migration of PFAS containing water to the wider environment under current conditions from:

1. surface water /foam run off from roadways, paved areas and entry into either the OWS or SWS system
2. the migration of PFAS in groundwater and subsequent collection and extraction of groundwater as part of the observed ongoing operation of the system.

The significance of these pathways is considered in the DQRA described in the following sections.

3. FIELDWORK METHODOLOGY

3.1 OVERVIEW

Fieldworks were completed at the Site between 29th July 2024 and 2nd August 2024, as follows:

- 29th and 30th July 2024: Subsurface Service Clearance (SSC) and GPS survey;
- 29th July – 1st August 2024: Hand pitting and concrete coring; and
- 29th July – 2nd August 2024: Groundwater monitoring and groundwater and surface water sampling, and groundwater permeability testing.

Specialist subcontractors, engaged and overseen at all times by ERM, undertook the SSC survey and hand pitting phase of works. ERM consultants performed the soil logging, field screening, soil sampling, surface water sampling, and groundwater monitoring and sampling works. Detailed descriptions of the methodologies employed are described in the following sections.

3.2 SCOPE OF WORK

ERM designed the scope of the investigation to assess the potential presence and extent of PFAS contamination in soil, concrete and groundwater associated with historical and current activities which may affect the proposed future Site redevelopment works.

The rationale for each of the investigation locations is based on the revised iteration of the conceptual site model described above and is presented in Table 3.2-1, below.

TABLE 3.2-1: INVESTIGATION LOCATION RATIONALE

Locations	Rationale
PoA Gas Terminal	
Hand pits (FM01-FM12)	Hand-dug pits (up to 1 m depth) were advanced in the spray arc of the proposed test areas of the site fire monitors. It was understood from site staff that the fire monitors are turned away from the plant areas and sprayed onto grass/stoned areas during a routine test fire. Hand dug pits in these areas are to assess potential risk to human health from shallow soil contamination and understand the penetration of PFAS into deeper soils.
Hand pits (HP306, HP313, HP315-HP319)	Hand-dug pits (up to 1 m depth) in the proposed development areas to assess potential risk to human health from shallow soil contamination.
Hand pits (HP301 – bowser parking)	Hand-dug pits (up to 1 m depth) were advanced in the area of the bowser parking as well as potential bowser spray areas, to assess potential risk to human health from shallow soil contamination derived from the use of the bowser to distribute PFAS containing AFFF on site.
(HP303-HP305, HP307-HP312, HP314)	It was understood from site staff that the methanol sump is filled with AFFF during routine test firing of the fire monitors. The sump is then emptied using the tractor bowser and sprayed on grassed areas around the site.

Locations	Rationale
Hand pits (HP302)	Hand-dug pits (up to 1 m depth) adjacent to the chemical store rainwater run-off bund in an area in which the bund is pumped out to ground to assess potential risk to human health from shallow soil contamination.
Hand pits (HP323)	Hand-dug pits (up to 1 m depth) in the proposed contractors compound area to assess potential risk to human health from shallow soil contamination.
Existing ERM 2024 boreholes (WS202-WS206, WS208-211, WS213, WS215)	A groundwater sample was recovered from each of the existing ERM groundwater monitoring wells to assess potential groundwater impacts and potential groundwater migration of PFAS contaminants.
Existing Fugro 2022 borehole (BH160)	A groundwater sample was recovered from the Fugro groundwater monitoring well (BH160) to assess potential groundwater impacts and potential groundwater migration of PFAS contaminants.
Concrete Cores (CC01- CC08)	Concrete cores were recovered from across the site to assess potential risk to human health and groundwaters should the concrete be crushed and reused as part of redevelopment works at the site.

Investigation locations are shown on Figure 6 (Appendix A).

3.3 HEALTH AND SAFETY

Prior to commencement of the work, ERM prepared a Site- and project-specific Health and Safety Plan, including risk assessments and method statements for tasks to be undertaken by ERM and their subcontractors. The Health and Safety Plan was reviewed by the Client prior to the works. All Site works were undertaken under a permit to work, issued by the Site Operations Manager.

All activities were conducted by suitably trained and experienced personnel. ERM subcontractors were directly supervised by an ERM consultant at all times.

No health and safety or incidents occurred during the work.

3.4 SUBSURFACE SERVICE CLEARANCE

ERM performed Subsurface Service Clearance (SSC) protocol prior to excavation and hand pitting to minimise the likelihood of a subsurface utility strike during the works. This included:

- Procurement and review of statutory and Site-specific utility drawings;
- On-Site visual assessment for indicators of buried services (e.g., surface scarring, manhole covers); and
- Surveying of the proposed investigation locations for the potential presence of buried services by a specialist subcontractor, Geo UK Ltd, using a Cable Avoidance Tool with signal generator and Ground Penetrating Radar techniques.

Once all known services had been located and marked out using floor paint, a 3 m x 3 m 'box' was cleared around each borehole location prior to breaking ground.

3.5 CONCRETE CORING

Concrete core samples were recovered from different areas around the site to assess the level of PFAS penetration into concrete surfaces.

A total of 8 concrete cores were recovered; four cores were taken from the concrete plinths beneath the AFFF storage tanks which are distributed around site and located immediately adjacent to each fire monitor (CC03, CC04, CC06 and CC08), two cores taken from within the methanol storage area (CC01 and CC02) and two cores were taken from within the main process area away from any fire monitors (CC05 and CC07). Concrete of up to 0.2m thickness was encountered at all locations.

Concrete core samples were collected and transferred into cool boxes for shipment to the laboratory (Element) under chain of custody documentation. Concrete core samples then analysed in two phases to understand the extent of PFAS penetration. All samples were crushed prior to sampling to mimic the re-use of concrete on site.

The first phase of analysis removed the surface 5cm of each core, which was independently crushed and analysed for leachate PFAS compounds. The second phase of analysis crushed the remaining core (i.e. 5cm to approximately 20cm) prior to analysis for both solid phase and leachate PFAS compounds.

3.6 HAND PITTING

A total of 35 hand dug pits (FM01-FM12 and HP301-HP323) were advanced to a maximum depth of 1.0 m bgl with insulated hand tools. . Once at the target depth, soils were logged and sampled by a supervising ERM consultant. All hand dug pits were reinstated by the compaction of backfilled arisings.

Soil samples were collected into containers supplied and prepared by the laboratory (Element Materials Technology (Element)). Samples were transferred into cool boxes for shipment to the laboratory under chain of custody documentation.

In general, within the Made Ground horizons encountered on the PoA Gas Terminal, a breaker was required to progress the hand pits through a dense, engineered gravel fill, typically located between 0.1 and 0.7 m bgl.

Excavation of the hand pits was completed by a specialist subcontractor (Geotron UK Ltd), supervised by the ERM consultant at all times.

An experienced ERM consultant logged the geological succession at each location and recovered samples for visual/olfactory assessment and laboratory analysis (see below).

Sample depths are presented on the borehole logs in Appendix B.

3.7 TOPOGRAPHIC SURVEY

ERM's specialist surveying contractor, GEO UK Limited, completed a topographic survey of the investigation locations and surface water sampling locations on 30th and 31st July 2024.

Investigation locations were surveyed to National Grid Reference and Ordnance Datum.

The grid references and elevations of the monitoring wells sampled as part of the works are presented on the borehole logs in Appendix B.

3.8 GROUNDWATER MONITORING AND SAMPLING

ERM performed groundwater monitoring and sampling at the thirteen groundwater monitoring wells (WS202 – WS206, WS208 – WS211, WS213, WS215 and BH160) between 30th July and 1st August 2024.

Groundwater level monitoring was undertaken at all locations using an oil-water interface probe to measure the depth to product (if present), depth to water and depth to the base of the monitoring well. Groundwater level monitoring was undertaken in one single round over the course of approximate 2 hours. Groundwater data loggers were also installed during this time and were left to record for a period of 1 week.

Depth to groundwater and groundwater elevations are presented in Table C1 (Appendix C).

Each monitoring well was purged by 'low-flow' methodology using a peristaltic pump and dedicated LDPE polyethylene tubing coupled to a multi-parameter water quality meter. The low-flow methodology draws groundwater into the well from the surrounding strata in order to provide a representative sample for analysis. Water quality parameters, including pH, temperature, electrical conductivity, dissolved oxygen and redox potential, were measured using the water quality meter during purging. Once the parameters were deemed to have stabilised, a sample was collected.

Water quality parameters are presented in Table C2 (Appendix C).

ERM collected samples into containers supplied and prepared by the laboratory (Element) and transferred them into cool boxes for shipment to the laboratory under chain of custody documentation. PFAS sampling was undertaken in line with PFAS specific guidance^{1, 2} to ensure that possible sample contamination during sampling was mitigated.

3.9 SURFACE WATER SAMPLING

Surface water sampling was undertaken at eight locations on 1st August 2024. The surface water sampling locations are presented on Figure 6. Samples were obtained using a disposable bailer that could be lowered into the surface water and filled, with a different bailer being used at each location.

ERM collected samples into containers supplied and prepared by the laboratory (Element) and transferred them into cool boxes for shipment to the laboratory under chain of custody

¹ Michigan Department of Environmental Quality, *Groundwater PFAS Sampling Guidance*. Dated October 2018

² Michigan Department of Environment, Great Lakes, and Energy. *General PFAS Sampling Guidance*. Dated January 2024.

documentation. PFAS sampling was undertaken in line with PFAS specific guidance^{1, 2} to ensure that possible sample contamination during sampling was mitigated.

3.10 LABORATORY ANALYSIS

Due to the focused nature of this investigation, soil and groundwater samples were scheduled for analysis of PFAS as the primary contaminants of concern identified in the previous works. The PFAS suite selected for the analysis based on the identification of a range of 37 of the more common PFAS compounds and is considered sufficient for the likely primary PFAS of concern at the site³. Further details of the laboratory method of analysis for PFAS are presented in Appendix E.

In addition to analysis of the individual PFAS an in line with guidance for assessing former fire training sites a selection of soil samples were also subject to an advanced testing method called Total Oxidizable Precursor (TOP) Assay. The TOP assay has been used to determine both the presence of precursors and terminal compounds. The methodology analyses⁴ the total PFAS concentrations, including those of precursors in the soil. This can assist in identifying where precursor based foams, including fluorotelomers, such as 6:2 FTS and 6:2 FTAB may have been applied.

The analysis of chloride was undertaken to give some indication of the salinity of the water and total organic carbon was measured in a series of samples to inform the DQRA.

Soil (solid phase and leachate), groundwater, surface water and crushed concrete samples (solid phase and leachate) were also analysed as part of the investigation.⁵

3.11 DATA LOGGER INSTALLATION

Dataloggers record the changes in the water column above them based on the changes in pressure. The readings are then compensated for changes in barometric pressure to give an absolute water thickness above the data logger. If the initial groundwater elevation is known, the absolute water thickness can be used to determine the groundwater elevations over time.

¹ Michigan Department of Environmental Quality, *Groundwater PFAS Sampling Guidance*. Dated October 2018

² Michigan Department of Environment, Great Lakes, and Energy. *General PFAS Sampling Guidance*. Dated January 2024.

³ Analysis of PFAS compounds in water and soil is by LC-MS/MS. For waters, as received samples are centrifuged and the supernatant is used for the PFAS analysis. For soils, as received solid samples are extracted in methanol: ammonium hydroxide solution by sonication and end over end shaker.

⁴ A portion of received soil sample is extracted within 0.1% ammonium hydroxide in methanol and the resultant extract treated with potassium persulphate (60mM) and sodium hydroxide (0.125M) before heating at 85°C for 6 hours. Once cool, the sample is neutralized with HCl prior to analysis by LC/MS/MS for PFAS suite. The soil extract is also analysed untreated by LC/MS/MS for PFAS suite. The difference between the treated and untreated concentrations is the concentration of the non-discrete PFAA precursors.

⁵ Soil leachate and concrete leachate preparation is CEN 10:1 methodology

3.11.1 TIDAL INFLUENCE

To determine whether the tidal nature of the River Dee Estuary influenced groundwater elevations on site data loggers were installed at 15 locations around the site, including at the Outlet. These were set to record the groundwater elevation at fifteen minute intervals for a period of 5 days. A baro logger was also installed which recorded the barometric pressure over the same period of time. Figure 9 presents the locations of the long term data loggers.

3.11.2 HYDRAULIC CONDUCTIVITY TESTING

To determine the likely range of site specific hydraulic conductivity values rising head tests were undertaken at six locations around the site. Data loggers were installed and set to record the pressure at one second intervals. Using a plastic bailer 1l of water was instantaneously removed from the monitoring well and the data logger left to allow the groundwater elevations to recover. Where time allowed the rising head test was repeated. Figure 8 (Appendix A) presents the locations of the rising head tests

4. FIELDWORK FINDINGS

Fieldwork findings are summarised in the following sections. Investigation locations are shown on Figure 7 (Appendix A).

4.1 GEOLOGY

4.1.1 MADE GROUND

Made Ground across the Site typically comprised dark brown / brown, sandy, gravelly clay overlying sandy gravels of limestone (engineered fill). Shallow topsoil (maximum 0.2m thick) was present in some grassy parts of the Site.

The thickness of the Made Ground ranged between 0.4 m (HP312) and 1.0 m (HP307), typically less than 1 m.

4.1.2 SUPERFICIAL DEPOSITS

Superficial deposits were generally consistent across the Site, comprising sandy Silt or silty Clay.

Hand pit investigation locations terminated at a maximum depth of 1 m bgl within the superficial deposits. The superficial deposits encountered were consistent with Tidal Flat Deposits in line with BGS mapping and previous ground investigation reports for the Site.

Bedrock was not proven in any of the investigation locations.

4.2 HYDROGEOLOGY

4.2.1 TIDAL INFLUENCE

Figure 9 (Appendix A) presents the hydrographs showing groundwater elevations over time at all locations where they were recorded along with the high and low tide times for the River Dee Estuary. The individual hydrographs for each location are presented in Appendix D.

It can be seen that the outlet where Talacre Brook discharges is tidally influenced with water elevations dropping by approximately 2m between high and low tides.

Of the data loggers installed in monitoring wells, only BH201 and BH203 show a slight tidal influence of up to 2cm. Both BH201 and BH203 are off site, to the south on the former colliery site and are therefore unlikely to be influenced by the onsite drainage system.

At all other locations any potential tidal influence is masked by the background noise of the changes in groundwater elevation i.e. any potential tidal influence is likely to be in mm and therefore not discernable from the natural fluctuations in groundwater elevation over time.

The locations where the long term data loggers were installed are presented in Figure 8(Appendix A).

4.2.2 GROUNDWATER FLOW

Figure 10 (Appendix A) presents the inferred groundwater contours and flow direction across the site based on the groundwater elevations recorded by the data loggers at hightide on August 2nd

(10.20am) in monitoring wells WS202-WS213. This is considered representative of the current groundwater regime onsite as there is limited tidal influence within the groundwater. Therefore the groundwater elevations at low tide have not been contoured.

It can be seen that groundwater flow is generally from the north to the southwest with a flat area in the central area of the site around WS210, WS211 and WS213. WS206 on the eastern boundary is a low point and WS205 in the southeast corner of the site is a high point, causing a component of flow towards the west towards WS204 and northwards towards WS206... This flow is likely to be influenced by the drainage system and local surface water bodies since a flow to the east would have been anticipated. The surface water elevation was measured at the outlet which was below the groundwater elevations, indicating there will be a flow of water towards the channel along the southern boundary, however this has not been included in the groundwater contour map as only one reading from the channel was made.

4.2.3 HYDRAULIC CONDUCTIVITY

The results from the rising head tests were analysed using AquiferTest12. The analysis graphs are presented in Appendix D and the results of each individual test are presented in Table D1 (Appendix D).

The range of hydraulic conductivities calculated from the rising head tests covers two orders of magnitude from 0.00267 (at WS203) to 0.353 (at BH160) m/day with a geometric mean of 0.015m/day. These values are at the low end of the literature range of hydraulic conductivities for sand, in the middle of the range for silt or till, but too high for the range for clay.¹

This supports the field data that the site is underlain by silty sand or sandy silt, and even if clay lenses are present, the silty sand/sandy silt is likely to be the preferential pathway for any groundwater and therefore contaminant flow. The variation in hydraulic conductivities across the site is likely to be due to the silt or sand content in the response zone in the vicinity of the monitoring well.

4.3 FIELD OBSERVATIONS OF POTENTIAL CONTAMINATION

4.3.1 SOIL

No visual or olfactory evidence of contamination was recorded by the ERM consultant at any of the locations throughout the hand pitting and soil sampling works.

4.3.2 GROUNDWATER/SURFACE WATER

No visual or olfactory evidence of impact was encountered during the development, monitoring, or sampling of the installed wells or surface water sampling.

Water quality parameters measured during purging are presented in Table C2 (Appendix C) and summarised in Table 4.3-1.

¹ Physical and Chemical Hydrogeology, Domenico & Schwartz, 1990

Groundwater quality parameters were recorded and groundwater samples recovered over a three day period. Groundwater quality parameters were recorded during low-flow purging of groundwater wells prior to recovery of a sample. The sample was then recovered once the groundwater quality parameters had stabilized.

Surface water samples were collected shortly after the site had undertaken a discharge event from the sump into Talacre Brook.

TABLE 4.3-1 - SUMMARY OF WATER QUALITY PARAMETERS (30TH JULY – 1ST AUGUST 2024)

Parameter	Units	Maximum	Minimum	Comments
Temperature	°C	17.4 (WS205)	14.4 (WS208)	The temperature range is warmer than the previous round undertaken in March 2024. This is indicative of the warmer weather in July/August.
Electrical Conductivity	µS/cm	2948 (BH160)	714 (WS215)	High conductivity values suggest brackish water and possible continuity with the River Dee Estuary
pH	pH units	7.58 (BH160)	6.82 (WS203)	
Dissolved Oxygen	mg/L	2.64 (WS213)	0.19 (BH160)	Dissolved oxygen readings of between 0.5mg/l and 1mg/l generally indicate a mildly aerobic environment. Below 0.5mg/l the environment is likely to be anaerobic.
Redox (field)	mV	-178.8 (BH160)	106.2 (WS205)	The lower the redox potential the less aerobic (or more anaerobic) the environment.

°C = degrees Celsius; µS/cm = microSiemens per centimetre; mg/L = milligrams per litre; mV = millivolts

5. HUMAN HEALTH RISK ASSESSMENT

This section of the report serves presents the results of the soils analytical data in the context of the site conceptual model focusing on the observed concentrations and distribution of PFAS across the site and then uses the data to undertake a generic quantitative risk assessment for human health assuming future commercial /industrial end use. The rationale and potential receptors for the basis of the risk assessment were described in ERM's previous assessment and are not repeated here.

5.1 SCREENING CRITERIA

For the purposes of screening the soils data the recently published UK Interim Category 4 Screening Levels (C4SLs) for PFAS compounds were used¹. The interim² screening levels have only been published for four PFAS compounds which are considered to be most hazardous, namely perfluorooctanoic acid (PFOA), perfluorononanoic acid (PFNA), perfluorohexane sulfonic acid (PFHxS) and perfluorooctane sulfonic acid (PFOS). As noted in report the interim C4SLs should be used in a Hazard Index approach when comparing with measured soil concentrations to assess risk and that is the approach adopted here. In addition, the values focus solely on chronic risks and acute risks should be considered separately.

5.2 RESULTS

The full analytical results for soils are presented in Table C3 (Appendix C), Table C4 (Appendix C) presents the results for just the detected PFAS, and Table C5 (Appendix C) presents the results of the HI calculation used in screening the results against the interim C4SLs Table C5 (Appendix C). Laboratory certificates are provided in Appendix E.

Table C3 and C5 indicate that of the 61 soil samples submitted for laboratory analysis, 49 soil samples reported a detection of one or more PFAS compounds above the laboratory Method Reporting limited (MRL). 12 soil samples reported no detections of any PFAS.

In terms of the nature and distribution of PFAS a number of observations may be made;

A relatively limited number of individual PFAS are detected across the site and in the majority of samples the perfluorosulfonic acid group (PFSA) dominate (>90% of total PFAS in 33 samples) and PFOS is typically the predominant compound (>70% of the total PFAS in 32 samples). The spatial distribution of PFOS is summarized in Figure 11 (Appendix A). The highest concentration of PFOS and total PFAS are associated with samples obtained from the vicinity of foam monitors in

¹ CL:AIRE, 2024. Interim Category 4 Screening Levels for per- and polyfluoroalkyl substances (PFAS):perfluorooctanoic acid (PFOA), perfluorononanoic acid (PFNA), perfluorohexane sulfonic acid (PFHxS) and perfluorooctane sulfonic acid (PFOS). CL:AIRE, Reading.

² as noted in the report the European Food Safety Authority (EFSA, 2020) tolerable weekly intake (TWI) for the sum of these four PFAS has been used as the basis of the low level of toxicological concern (LLTC) for derivation of the C4SLs presented herein. The label "interim" has been used throughout this report to reflect the concerns raised by the Committee on Toxicity (COT) and the fact that further work by COT and others may result in the need for the LLTC to be updated (including accounting for potential non-threshold behaviour).

the north (FM02 1644ug/kg total PFAS) and on the southern edge of the site (FM06 1619 ug/kg total PFAS). The predominance of PFOS within the samples reflects the historic use of C8 AFFF discussed earlier. Where PFOS is not the dominant compound then typically PFHxS, some of the longer chain PFSA or other compounds are present though these are typically at much lower concentrations than PFOS.

Samples taken from depth, presented in Figure 12 (Appendix A) show strong evidence of vertical attenuation of PFOS in the deeper soils and relative enrichment with lower molecular weight PFAS. In the deeper samples (typically from 0.9m bgl) PFAS were detected in 16 of the 18 locations sampled with a mean concentration of 56ug/kg and a maximum of 262ug/kg. Three of the samples with the greatest evidence of vertical migration were located in the inlet area (HP308, HP320 & HP322) (possibly associated with the historic spillage), while a further two were associated with samples collected from foam monitors (FM02 and FM08). Although concentrations were reduced PFOS was still evident in many of the deeper samples with a maximum concentration of 121ug/kg in HP322 and 129ug/kg in FM08 (both at 0.9m depth). Overall these results are consistent with observations from other sites and the expected behaviour of PFAS where individual compounds such as PFOS migrate only very slowly and can act as a long term source for dissolved phase for years or even decades.

In terms of the human health risk assessment then the four PFAS for which interim C4SL screening levels have been derived represent on average 83.5% of the total PFAs detected across the site and represent greater than 90% of the total PFAS in 29 samples. The use of the screening levels is therefore considered appropriate. The results indicate that two exceedances were identified for the soil samples when compared to the screening levels protective of human health in a commercial land use scenario.

- PFOS was detected above the screening level of 600 ug/kg at locations FM02 (1096.3 ug/kg) and FM06 (1537.9 ug/kg) both at depth of between 0.3-0.4 m bgl and calculated the hazard index was exceeded in the same locations.

In addition to the analysis of individual PFAS then as noted previously selected samples were analysed using the TOP assay to assess the potential for the presence of precursors and possibly unidentified source areas. The results of this analysis are presented in Table C6 (Appendix C) with the laboratory certificates in Appendix E. The results indicate that significant increase in total extractable PFAS are noted in a number of locations (HP320, HP321, FM03 and HP308) all were already impacted with a range of PFAS and are located in and around the former methanol area associated with the historic spillage and these results further confirm the significance of this area. Individual concentration rises of a number of precursor carboxylate compounds such as PFNA and PFHxA as well as PFOA itself were noted in these samples. In samples with relatively low initial concentrations of PFAS then the TOP assay results did not see any significant increases in total PFAS concentrations these included the samples taken from soils around foam monitors away from the historic incident as well samples taken from open ground where disposal of liquid may have occurred. These results suggest that the most significant of the potential source remains the location of the former historic release of foam around the methanol area.

6. CONTROLLED WATERS RISK ASSESSMENT

6.1 INTRODUCTION

This section of the report presents the results of the groundwater and concrete leachate analytical data in the context of the CSM to assess the potential current and future risks to controlled waters due to onsite concentrations of PFAS.

The controlled waters quantitative risk assessment (CWRA) was conducted in accordance with the current UK guidance for hydrogeological risk assessment, the Remedial Targets Methodology (RTM)¹. The UK guidance is based on a tiered approach to determine risk-based remedial targets for soil and groundwater.

Level 1 Assessment – The first tier of assessment compares appropriate assessment criteria with concentrations present in the pore water located within source area soils, in order to determine if the concentrations have the potential to adversely impact the receptor. In practice, this can be undertaken through direct comparison with soil leachate or perched water analytical results, or soil partitioning calculations.

Level 2 Assessment – compares appropriate assessment criteria with concentrations of parameters within the saturated zone, and groundwater immediately underlying the source area (including attenuation and dilution into the groundwater directly beneath the source area). In practice, this can be undertaken through modelling from soil leachate (simulated or analysed) or perched groundwater analytical results, and through direct comparison with groundwater analytical results collected from the aquifer.

Level 3 Assessment – considers the influence of transport, attenuation and retardation within the saturated zone towards a compliance point located down-gradient of the site. In practice, this can be undertaken through modelling soil leachate (simulated or analysed), perched groundwater & groundwater analytical results.

Level 4 Assessment – considers the dilution in a receiving watercourse or groundwater abstraction.

The CWRA was undertaken using the following approach:

- Step 1: Comparison of the groundwater and surface water samples against a generic screening criteria i.e. a Level 2 generic quantitative risk assessment (GQRA). In addition the concrete samples were assessed at a Level 1 (soil leachate) GQRA to determine their suitability for re-use during the redevelopment of the site;
- Step 2: Integration of the laboratory data with the field data collected, including groundwater elevations, data logger information and updated drainage information to develop an updated conceptual site model (CSM) based on the current conditions;

¹ Remedial Targets Methodology: Hydrogeological Risk Assessment for Land Contamination- main report, Environment Agency, 2006

- Step 3: Adjustment of the current CSM developed in step 2 in the context of the proposed re-development and future land use; and
- Step 4: Detailed quantitative risk assessment (DQRA) based on the revised CSM in Step 3 using site specific information. This consists of both a Level 3 and Level 4 assessment.

6.1.1 STEP 1: LEVEL 2 GENERIC QUANTITATIVE RISK ASSESSMENT (GQRA)

6.1.1.1 SCREENING CRITERIA

In general, screening criteria for a Level 2 assessment include published Environmental Quality Standards (EQS) relating to UK rivers or marine environments and/or UK Drinking Water Standards/Water Supply Regulations (DWS) depending on the site setting and conceptual site model.

The superficial deposits underlying the site have been classified as unproductive and the underlying bedrock is classified as a Secondary A aquifer. It is therefore considered unlikely that groundwater beneath the site would be used as a potable water supply and the UK Drinking Water Standards/Water Supply Regulations have not been considered for this assessment.

Given the site's proximity to Talacre Brook within an area of ecological significance¹ and the fact that the Talacre Brook ultimately discharges to the River Dee Estuary, the recorded groundwater and surface water concentrations have been compared against both the UK/EU EQS for freshwater environments and marine environments, derived from the EU Water Framework Directive (Standards & Classification) 2015.

Currently freshwater and marine EQS are only available for one PFAS compound, namely PFOS, which has been classified as a priority hazardous substance in the Water Framework Directive Regulations. Research within the EU is currently ongoing to determine freshwater and marine EQS for PFAS other than PFOS². Table 6.1-1 presents the proposed EU EQS for these additional substances as well as the current UK EQS for PFOS. The proposed EQS are based on protection of ecological receptors (rather than indirect human health effects from the consumption of shell fish and fish (which drives the current UK EQS) and this is because of uncertainty around human health toxicology. At the PoA site, given the presence of shellfish beds in the River Dee Estuary both receptors may be considered relevant, however there remain a number of areas of conservatism that should be considered in assessing the significance of observed concentrations:

- The existing EQS for protection of human health is understood to be based on a conservative estimate³ of fish consumption rate of 0.115 kg/day (AMDI) while in reality over the last 5 years UK fish consumptions rates are nearer 0.023 kg/day⁴;

¹ SSSI, RAMSAR, SAC and SPA

² SCHEER (Scientific Committee on Health, Environmental and Emerging Risks), Final Opinion on Draft Environmental Quality Standards for Priority Substances under the Water Framework Directive - PFAS, 18 August 2022

³ Wilson, A., 2015, Evaluation of the 'new' EU PFOS Environmental Quality Standard, Paper presented at NICOLE Spring Workshop, Manchester

⁴ Watson, R., 2024, Seafood Consumption (2024 Update), Seafish

- Data from ongoing EA monitoring¹ of shellfish tissue in River Dee Estuary indicates that PFOS concentrations (averaging 1.2 ug/kg and with a maximum of 1.43 ug/kg from 6 samples over last 2 years) are all well below the current biota criteria for PFOS of 9.1 µg/kg wet weight;
- The UK EA in its review of monitoring of PFOS in water and biota², suggested that the current EQS value may be conservative based on observed water and biota concentrations and empirically derived a value of 0.003 ug/l;
- The EU, in an ongoing update to the EQS for a number of PFAS, proposed a freshwater EQS of 0.023 ug/l and marine EQS of 0.0023 ug/l for protection of biota³ (note this has not been adopted as yet);
- The US EPA has recently published its aquatic life chronic criteria for PFOS in freshwater of 0.25 ug/l⁴.

Notwithstanding the above for each EQS the Maximum Allowable Concentration (MAC) and Annual Average (AA) have been derived. The Maximum Allowable Concentration (MAC) is a short term standard based on the analysis of data on acute (short-term) toxicity. The Annual Average (AA) is a long term standard and is derived by analysing data from chronic (long term) toxicity tests.

TABLE 6.1-1 CURRENT AND PROPOSED PFAS EQS

PFAS	Freshwater AA (ug/l)	Freshwater MAC (ug/l)	Marine AA (ug/l)	Marine MAC (ug/l)	Source
PFOS	6.5E-4	36	1.3e-4	7.2	UK EQS
PFBA	220	1100	11	110	Proposed EU EQS
PFPeA	32	3200	3.2	320	Proposed EU EQS
PFxA	200	860	20	86	Proposed EU EQS
PFBS	100	3700	10	370	Proposed EU EQS
PFOA	30	1200	3	12	Proposed EU EQS

Whilst the physicochemical properties of each individual PFAS vary, short chain perfluoroalkylated substances are more mobile and are therefore more likely to be present in water, having the

¹ NRW 2024 Natural Resources Wales Water Quality Monitoring Data Base Marine File 2020 - 2029

² EA , 2021, Perfluorooctane sulfonate (PFOS) and related substances: challenges for the environment, Environment Agency

³ SCHEER (Scientific Committee on Health, Environmental and Emerging Risks), Final Opinion on Draft Environmental Quality Standards for Priority Substances under the Water Framework Directive - PFAS, 18 August 2022

⁴ US EPA , 2024, Freshwater Aquatic Life Ambient Water Quality Criteria and acute saltwater benchmark for PFOS

greatest potential to reach groundwater. Longer perfluoroalkylated chain substances have a greater potential to bioaccumulate, as evidenced by their presence in otters, cetaceans and birds. Some PFAS compounds such as PFHxS, PFOS and PFOA are both mobile and bioaccumulate¹.

A UK EQS is available for PFOS, and although EQS are proposed in the EU for five other PFAS these are all higher than the current UK EQS for PFOS. In addition, as discussed below, PFOS was the predominant PFAS identified in the majority of samples. PFOS has therefore been used as a PFAS marker compound for this risk assessment.

6.1.1.2 PFOS RESULTS

Table C7 (Appendix C) presents the screening tables for the groundwater, soil leachate and surface water concentrations recorded. Elevated concentrations at WS205 and WS206, in the vicinity of the methanol tank, coincide with the elevated soil concentrations in the shallow soil from HP309 up to FM03 and the area of the historical release of AFFF. The elevated concentration at WS204 coincides with the elevated soil concentration at FM06.

The concentrations recorded at WS208 and WS209 are in the vicinity or downgradient of FM01 and FM02 which have elevated soil concentrations.

The groundwater monitoring results support the PFOS concentrations recorded in March 2024.

TABLE 6.1-2 SUMMARY OF GROUNDWATER EXCEEDANCES OF PFOS

EQS Type	EQS Concentration (ug/l)	Location of Exceedances	Range of Exceedances (ug/l)
Freshwater AA	6.5E-4	WS203, WS204, WS205, WS206, WS208, WS209, WS213, WS215	0.14 – 13.68
Freshwater MAC	36	None	None
Marine AA	1.3E-4	WS203, WS204, WS205, WS206, WS208, WS209, WS213, WS215	0.14 – 13.68
Marine MAC	7.2	WS204, WS205, WS206	10.7-13.68

(Appendix A) presents the locations where the PFOS EQS was exceeded for a freshwater environment, and Figure 14 and Figure 15 (Appendix A) presents the locations where an exceedance of the PFOS marine EQS was recorded. The laboratory certificates for the chemical analysis are presented in Appendix E.

¹ Poly- and perfluoroalkyl substances (PFAS): sources, pathways and environmental data, Chief Scientist’s Group Report, Environment Agency, August 2021

Groundwater

Table 6.1-2 presents a summary of the groundwater exceedances for both the freshwater and marine EQS.

PFOS

When compared against the freshwater EQS there are no exceedances of the MAC (36ug/l) but there are eight (out of twelve locations) exceedances of the AA (6.5E-4µg/l) across the site. No PFOS was detected at WS202, WS210, WS211 and BH160.

When compared against the marine EQS there are eight (out of twelve locations) exceedances of the AA (1.37E-4µg/l). Of these, three locations in the southeast corner of the site at WS204, WS205 and WS206 exceed the MAC (7.2µg/l).

Elevated concentrations at WS205 and WS206, in the vicinity of the methanol tank, coincide with the elevated soil concentrations in the shallow soil from HP309 up to FM03 and the area of the historical release of AFFF. The elevated concentration at WS204 coincides with the elevated soil concentration at FM06.

The concentrations recorded at WS208 and WS209 are in the vicinity or downgradient of FM01 and FM02 which have elevated soil concentrations.

The groundwater monitoring results support the PFOS concentrations recorded in March 2024.

TABLE 6.1-2 SUMMARY OF GROUNDWATER EXCEEDANCES OF PFOS

EQS Type	EQS Concentration (ug/l)	Location of Exceedances	Range of Exceedances (ug/l)
Freshwater AA	6.5E-4	WS203, WS204, WS205, WS206, WS208, WS209, WS213, WS215	0.14 – 13.68
Freshwater MAC	36	None	None
Marine AA	1.3E-4	WS203, WS204, WS205, WS206, WS208, WS209, WS213, WS215	0.14 – 13.68
Marine MAC	7.2	WS204, WS205, WS206	10.7-13.68

Other PFAS

With the exception of an exceedance of the marine AA EQS for PFPeA at WS206 (3.67ug/l against an EQS of 3.2ug/l) there are no exceedances of the proposed EU EQSs.

Soil Leachate

PFOS

Six soil samples were taken and analysed for soil leachate concentrations (Table C11). The sampling locations are presented on Figure 14 (Appendix A) for freshwater EQS and Figure 15 (Appendix A) for marine EQS. All locations exceeded the annual average EQS for both freshwater

and marine water. FM06, close to WS204, exceeded the maximum allowable concentration EQS for both freshwater and marine water.

Other PFAS

There are no exceedances of the proposed EU EQSs for either freshwater or marine water.

Surface Water

PFOS

Surface water samples were taken at the fire pond, store bund, wastewater pond, up and down gradient of where the waste pond discharges from the site into Talacre Brook, at Brook East, at the outlet where the Talacre Brook discharges to an unnamed surface water course and upgradient of the outlet. The sampling locations and exceedances of the EQS are presented on Figure 13(Appendix A) for freshwater EQS and Figure 15.(Appendix A) for marine EQS.

The fire pond is filled with mains water and the laboratory results confirm the absence of PFOS. The store bund contains surface water runoff from the store area and is emptied when full. The 'no detection' of PFOS indicates that there are no current leaks within the store area.

Concentrations from the wastewater pond, discharge up, discharge down, Brook East and the outlet all exceed the AA freshwater and marine EQS. None of the samples exceeded either the MAC freshwater or marine EQS.

The wastewater pond sample had a concentration of 1.71ug/l, whilst the discharge up and discharge down had concentrations of 1.75 and 1.88ug/l respectively and Brook East of 2.06µg/l. The similarity in these results, and the fact that they are higher than the concentration detected in the groundwater onsite, but outside of the southeast corner of the site, indicates that the main source of PFOS within Talacre Brook is likely to be the discharge from the wastewater pond.

Adjacent to the discharge location there is no noticeable flow and it is likely that the up and down discharge concentrations are both from dispersion of the discharge at the discharge point. It also indicates that there is very little dilution at the point of discharge.

There is a slight increase in concentration at Brook East. This may be due to a contribution of PFOS from the groundwater which is high in this area adjacent to the brook (near WS204 and WS205), or due to natural variation in concentration from different samples.

The concentration at the outlet drops to 0.1ug/l and at outlet up no PFOS is detected. It may be that the concentration of PFOS in Talacre Brook is diluted as it discharges to the unnamed surface water course, reducing the concentration by an order of magnitude.

Another possibility is that as the surface water samples were taken shortly after the discharge of the wastewater pond into Talacre Brook, the concentration of PFOS at the outlet would be dependent on the velocity of the 'slug flow'. i.e. as a slug of water is periodically discharged into Talacre Brook it takes time to flow from the site discharge point to the outlet. It may be that the timing of sampling at the outlet was such that the discharge water had not yet reached the outlet, and that the concentration detected here was due to the residual PFOS concentration, potentially being released over time from the sediment.

Other PFAS

There are no exceedances of the proposed EU EQSs.

6.1.1.3 PFAS DISTRIBUTION

Figure 16(Appendix A) presents the concentration of the different PFAS substances detected in each water sample. Figure 17 (Appendix A) presents the concentration of each PFAS substance as a % of the total PFAS concentration in that sample.

It can be seen that in the south east corner of this site (WS204-WS206), WS215 and in the surface water samples, PFOS is the predominant PFAS. Whereas in WS203, WS213 and WS209 the predominant PFAS is PFHxS, with PFOS being the second most abundant.

The distribution of PFAS in WS205 and WS206 appear to be very similar, with WS204 showing a slightly different fingerprint (higher overall PFOS and PFHxS), indicating that WS205 and WS206 have a similar source. Both these locations are in the area of the historical release of AFFF, where as WS204 is adjacent to the elevated soil concentrations at FM06.

The surface water samples all show evidence of 6:2 FTS, which is a substance found in the current C6 modern telomer based product. This substance is also detected at a lesser concentration at WS206.

6.1.1.4 CHLORIDE CONCENTRATIONS

Chloride concentrations from groundwater samples taken from the WS series installed to 5m bgl range from 9.8 to 22.5mg/l. The concentration of chloride detected at BH160 was 332.1mg/l. BH160 has a base at approximately -7.625m aOD, which, combined with the chloride concentration at BH160 being two orders of magnitude greater than the WS series. may be indicative of the presence of two waterbodies, potentially due to a saline wedge intruding onsite resulting in a brackish or saline groundwater layer at depth with the freshwater layer on top. This is supported by the fact that during the groundwater monitoring, field parameters at BH160 (specific conductance, redox potential and dissolved oxygen) indicated that the groundwater at BH160 had a different chemistry from the WS series locations.

Chloride concentrations from the wastewater pond and up and down discharge locations are above 1,000mg/l. This is a higher concentration than recorded at BH160, or at the other surface water locations, indicating that there is a source of chloride getting directly into the wastewater pond which is not related to either shallow or deeper groundwater. The chloride concentrations may be related to the treatment of the wastewater pond to regulate the pH prior to discharge.

6.1.2 CONCRETE ASSESMENT

Concrete cores recovered from eight locations across the site: from plinths directly beneath AFFF fire monitors and the AFFF storage tanks (CC03, CC04, CC06 and CC08), from adjacent to the methanol sump area (CC01 and CC02) and from locations within the existing plant area but away from AFFF fire monitors or storage tanks (CC05 and CC07).

Analysis of the concrete cores was undertaken in two stages. Firstly, the top (surface) 5cm of the core was removed, crushed and analysed for PFAS leachate compounds. Secondly, the remainder of the core, 5cm to approximately 20cm, was crushed and analysed for solid PFAS compounds

The analytical results from the concrete samples are presented in Table C8, C9 and C10 (Appendix C).

Top (surface) 5cm of Concrete

It can be seen from Table C8I, that PFAS, including PFOS has been detected at all locations. PFOS exceeds the freshwater and marine AA EQS at all locations, and the marine MAC EQS at CC04. 6:2 FTS is detected at CC01, CC02, CC03, CC04 and CC05.

This indicates that PFAS has penetrated in the top (5cm) of the concrete slabs at concentrations that would have the potential to impact controlled waters if the concrete were crushed and placed in an area where infiltration of precipitation was allowed to occur.

5cm to approximately 20cm of Concrete

Initial analysis of the deeper concrete indicates that the PFAS has not penetrated the full thickness of concrete core. Eight deeper concrete samples were analysed for solid phase PFAS (Table C9) and five were analysed for concrete leachate concentrations (Table C10).

Table C9 shows very minor detections of solid phase PFAS at locations CC01, CC04 and CC05, with all detections well below the Human Health screening criteria.

Table C10 shows very minor detections of leachate PFAS for the corresponding compounds detected in the solid phase, however in comparison leachate concentrations are much reduced. The maximum leachate concentration is 25% of the corresponding solid phase concentration. All leachate concentrations remain well below the annual average EQS for both freshwater and marine water. This indicates that PFAS has not significantly penetrated beyond the top (5cm) of the concrete slabs at concentrations

However, given the results of the surface concrete and complexities related to segregating any surface layers, it is considered prudent to remove all concrete within the immediate vicinity of the AFFF fire monitors (i.e. plinths) from the site. Overall, it is likely that the concrete within 20m of each fire monitor may represent a significant source of PFAS and should not be crushed and reused on site. It is possible that contamination may have spread beyond this and this should be confirmed with additional testing.

6.2 STEP 2: CURRENT HYDROLOGICAL CSM

There are potentially two groundwater bodies on site, a shallow freshwater body and an underlying brackish groundwater body. Within the shallow groundwater body there does not appear to be any noticeable tidal influence and groundwater flow is currently mainly towards the southwest, likely due to the influence of the site drainage, with a minor component towards the east. The effect of tides is thought to be significant only over a short distance in unconfined aquifers with significant fluctuations unlikely to extend to more than about 20 or 30m from open

water.¹ Therefore the lack of tidal influence onsite does not mean that there is no connectivity between the site and the River Dee Estuary.

Elevated concentrations of PFOS in the soil are the most likely source of elevated concentrations of PFOS within the groundwater. The main groundwater source is in the southeast corner of the site in the vicinity of the methanol tank. The lower concentrations of PFOS recorded in groundwater around the site are likely to be due to other smaller temporary sources such as spraying of the mobile bowser or fire monitor spray testing etc. rather than the migration of the main groundwater source across the site.

Current elevated concentrations of PFOS within Talacre Brook are likely due to the discharge of wastewater from the site rather than groundwater migration. This is supported by the PFAS distribution where the samples from Talacre Brook show a similar PFAS distribution or 'fingerprint' to the sample from the waste water pond but different to the groundwater samples.

As discussed in Section 4.2, based on ERM's analysis of groundwater elevations and comparison with the invert levels of the current drainage then it is clear that for a large part of the site the drainage (at the time of monitoring) and pumping from the drainage network is capturing part of the natural groundwater and is acting as a preferential pathway for groundwater from the main source area in the south east to the wastewater pond. ERM's interpretation of this showing the extent of capture is presented as Figure 18 (Appendix A). The influence of this system may extend across the site to the south eastern corner and it is notable that in this corner of the site there is an element of groundwater flow or capture towards the site (in a westerly direction) that may be sufficient to help contain the elevated concentrations of PFOS noted in groundwater. It is also noted that this does not extend northwards along the whole site boundary where an easterly flow component is evident.

It can therefore be concluded that the current drainage and pumping regime on site is serving to capture PFOS across a large area of the site and transporting it to the wastewater pond. The pond is then discharged to the Talacre Brook which discharges to the unnamed surface water course. At the time of this sampling the concentration at the outlet to this surface water course was 0.1ug/l; above the AA freshwater (6.5E-4ug/l) and marine (1.3E-4ug/l) EQS.

Based on the concentration of PFOS in the discharge water from the site (1.71ug/l) and extrapolating this single result across the daily average wastewater discharge volume (457m³ day) then it is estimated that the total quantity of PFOS discharged per year is approximately 0.285kg/year. Based on the observed hydraulic properties of the aquifer and assuming a plume width of 300m and 10m thickness discharging across the eastern boundary, then based on the average concentration in the south eastern section of the site (12.6ug/l) the annual mass discharge in groundwater is 0.0011kg a year. This is of course sensitive to potential variation in hydraulic parameters but does indicate that under current conditions the surface water discharge appears to be the most significant in terms of mass discharge. Based on the hydraulic properties

¹ Contaminant Transport in Coastal Aquifers, Yuan Ding and Yong Peng, Department of Civil and Environmental Engineering, New Jersey Institute of Technology, April 2009.

presented in Table F1, Appendix F, the groundwater velocity is 2.9E-4m/day, with a travel time of approximately 940 years to travel 100m which supports the theory that the surface water discharge is likely to be the most significant.

6.3 STEP 3 FUTURE HYDROGEOLOGICAL CSM

Currently the main source-receptor-pathway for PFOS is from the discharge from the wastewater pond into Talacre Brook that eventually discharges to the River Dee Estuary. If discharge from the wastewater pond ceases, or the discharge is treated to reduce the PFOS concentration, the concentration of PFOS within the Brook should decrease.

The current identified groundwater flow is likely to be influenced by the current drainage and pumping regime..

The area of high PFOS concentration in the southeast of the site is on the site boundary. It should therefore be assumed that there is a high likelihood that groundwater flow from this area, and therefore migration of contaminants, could be either directly towards the River Dee Estuary or into the neighbouring Talacre Brook which discharges to an unnamed surface water course and the River Dee Estuary (or a combination of the two pathways).

6.4 STEP 4 DQRA

6.4.1 LEVEL 3 ASSESSMENT

Under current conditions PFOS concentrations in Talacre Brook exceed the freshwater and marine EQS as a result of the discharge of wastewater from the site.

During re-development of the site there will be the opportunity to remove soil that would potentially impact controlled waters due to elevated concentrations of PFAS.

A GQRA is inherently conservative as it does not allow for retardation, degradation, dispersion or dilution of the contaminant between the source or the receptor. PFOS is considered persistent in the environment i.e. there is limited or no degradation at the source or between the source and the receptor (River Dee Estuary), however there may be retardation, dilution and dispersion along the pathway and dilution at the receiving water.

To determine whether current onsite soil and groundwater concentrations have the potential to exceed the marine EQS¹ at the River Dee Estuary through direct lateral groundwater migration, a Level 3 soil assessment, as identified in the RTM using the Remedial Target Workbook (RTW) has been undertaken. The inputs for the RTW are presented in Appendix F including input justification and sources.

Three models have been run; the first assuming the source is 100m from the receptor i.e. the distance from the site boundary to the River Dee Estuary, and the second with a pathway of 150m and the third with a pathway of 200m. The three models have then been used to calculate a

¹ The freshwater EQS has not been considered as the marine EQS is considered an appropriate criteria for Estuaries.

remedial target concentration for a soil and soil leachate at the specified distance from the receptor, below which the soil or soil leachate is unlikely to present a risk to the River Dee Estuary.

Table 6.4-1 presents the results of the Level 3 assessment.

TABLE 6.4-1 LEVEL 3 ASSESSMENT

Source-Receptor Distance (m)	Marine EQS (AA) (ug/l)	Remedial Target Concentration Soil Leachate (ug/l)	Remedial Target Concentration Soil (mg/kg)
100m	1.3 E-4	0.104	3.13E-3
150m	1.3 E-4	20.9	0.629
200m	1.3 E-4	2,740	82.6

Assuming that the pathway from the site to the River Dee Estuary includes the surface water channels within the mudflats, the results show that the current soil and groundwater concentrations of site would potentially impact the River Dee Estuary depending on the distance between the source area and the River Dee Estuary.

With regards to current groundwater concentrations, concentrations at WS205 and WS206 which are located in the south east corner of the site, would potentially exceed the soil leachate remedial target (assuming a pathway distance of 100m). None of the recorded groundwater concentrations exceed the calculated soil leachate remedial target if the pathway is 150m or greater.

With regards to current soil concentrations, again it is the locations in the south east corner (with a pathway of 100m or less) including FM03, FMO4, HP305, HP307, HP308, HP309, HP310, as well as concentrations in the northeast at FM02 and HP303 that exceed the soil remedial target and have the potential to impact the Dees Estuary. Locations that exceed the remedial target for a pathway of 150m are located greater than 150m from the Dee Estuary. No recorded soil concentrations exceed the soil remedial target for a pathway of 200m.

The Level 3 assessment is considered conservative as it assumes a constant source and does not allow for the decrease in source concentration over time due to washout, or dilution in the receiving water as this is considered in a Level 4 assessment, it also considers that all flow is towards the River Dee Estuary which is currently not the case. In addition, a conservative approach has been used to determine the pathway distance between the site and the River Dee Estuary, including the surface water channels and mudflats. The RTW models may be also overconservative for PFAS as they do not reflect the unique properties of this group of substances and further iteration may be justified.

6.4.2 LEVEL 4 ASSESSMENT

In light of the above, to determine the likely concentration of PFOS in the River Dees Estuary under future conditions a Level 4 risk assessment has been undertaken.

A Level 4 assessment, as identified in the RTM, represents the final tier of assessment and needs to demonstrate that any impact does not jeopardise future use of the resource or that the cost of

remediation is disproportionate in relation to improvement of groundwater or surface water quality.

As detailed in the RTM, dilution with a surface water body can be taken into account where:

- The impact of groundwater contamination on the aquifer between the source and the receptor has been assessed;
- The impact does not prevent current or future use of the aquifer; and
- The predicted impact on the receptor does not result in:
 - Any measurable deterioration in water quality;
 - Exceedance of environmental standards; and
 - Failure to achieve objectives.

The site is not within a currently designated groundwater source protection zone (SPZ) and there are no SPZs or known private water supplies between the site and the receptor. Based on the chloride concentration detected at BH160, it is considered unlikely that groundwater between the site and the Dee Estuary will be used for potable water in the future.

6.4.2.1 METHODOLOGY

The Level 4 Risk Assessment methodology assesses the dilution of a contaminant plume as it enters the river. It involves the calculation of a dilution factor (DF) which is then applied to the concentration within the groundwater at the receptor. A Level 4 Risk Assessment has been undertaken based on the overall approach and equations recommended in the Environment Agency Guidelines. The full methodology and calculations are presented in Appendix F.

6.4.2.2 RESULTS

The DF calculated at the River Dee Estuary is 1,918,752 (assuming only River flow in River Dee 30km upstream of estuary – therefore highly conservative). The highest concentration of groundwater detected on site is 13.68ug/l. Based on the calculated DF the concentration in the River Dees Estuary would be 7.12E-6 ug/l.

In line with Environment Agency guidance¹, and to allow for the impact on the River Dee Estuary water quality from other sources, the diluted concentrations is then assessed against 10% of the appropriate screening criteria i.e. 1.3E-5ug/l.

It can be seen that once dilution in the River Dee Estuary is taken into account, the current concentrations of PFOS on site are unlikely to present a significant impact to the River Dee Estuary if groundwater flow were directly to the River Dee Estuary.

If the DF is the applied to the Level 3 assessment the soil leachate remedial targets would be 2.00E4ug/l if the pathway was 100m, 4.01E6ug/l if the pathway was 150m and 5.26E8ug/l if the pathway was 200m.. All current groundwater results are below these concentrations.

¹ Remedial Targets Methodology, Environment Agency 2006

6.4.2.3 SENSITIVITY ANALYSIS

To determine the sensitivity of the different input parameters used to calculate the DF a sensitivity analysis has been undertaken where the aquifer thickness, hydraulic gradient and hydraulic conductivity has been adjusted to determine their influence on the DF calculated.

Table 6.4-26.4-2 presents the results of the different DF on the current maximum groundwater concentration (13.68ug/l) along with the inputs that were altered.

TABLE 6.4-2 SENSTIVITY ANALYSIS RESULTS

	Input Adjustments						
	Original Inputs	Reduced aquifer thickness	Increased aquifer thickness	Reduced hydraulic gradient	Increased hydraulic gradient	Reduced hydraulic conductivity	Increased hydraulic conductivity
Aquifer thickness (m)	10	5	15	10	10	10	10
Hydraulic gradient	0.005	0.005	0.005	0.001	0.01	0.005	0.005
Hydraulic conductivity (m/day)	0.0154	0.0154	0.0154	0.0154	0.0154	0.002	0.3435
DF	1,918,754	3,837,507	1,279,170	9,593,767	959,378	14,774,401	86,024
Diluted concentration ¹ (ug/l)	7.13E-6	3.56E-6	1.07E-5	1.43E-6	1.43E-5	9.26E-7	1.50E-4

Note: Exceeds 10% of the marine EQS (1.37E-5ug/l)

The sensitivity analysis shows that for the majority of scenarios the diluted concentration remains below 10% of the marine EQS. However it can be seen that either increasing the hydraulic gradient (by a factor of 2) or the conductivity (by an order of magnitude) the diluted concentration is then predicted to exceed 10% of the marine EQS and the marine EQS itself.

The original hydraulic gradient of 0.005 was selected based on EA guidance where the hydraulic gradient cannot be measured. Although the natural hydraulic gradient is not known, the current hydraulic gradient across the site is approximately 0.001. In addition, although the shallow onsite groundwater has not been identified as tidally influenced, tidal influence is likely to increase along the pathway between the site and River Dee Estuary, reducing the overall hydraulic gradient towards the River Dee Estuary. It is therefore considered unlikely that the hydraulic gradient would increase to 0.01.

The original hydraulic conductivity used to calculated the DF was based on the geometric mean of the calculated onsite values, with the increased and reduced value being the maximum and minimum calculated values. The maximum hydraulic conductivity was recorded at BH160 which, as discussed in Sections 6.1 and 6.2. is likely to represent a saline wedge beneath the freshwater

¹ Based on a maximum onsite concentration of 13.68ug/l

layer. Further calculations indicate that the maximum hydraulic conductivity value that would not result in an exceedance of 10% of the EQS is 0.029m/day. This value was only exceeded in three of the nine rising head tests undertaken on the WS series monitoring wells.

6.4.2.4 SURFACE WATER DISCHARGE

In respect of the surface water discharge during the development process as well as for any groundwater/surface water arising from dewatering works, ; ERM has used EA guidance to determine the discharge limits for an Environmental Permit allowing for dilution in the receiving water (assuming in this case the River Dee Estuary is the sensitive receptor but assuming a conservative calculation based on the flow of the River Dee recorded approximately 30km upstream at Chester).¹ Whilst Eni are not directly discharging to the River Dee Estuary, ERM has undertaken these calculations to determine the potential maximum concentration of PFOS that could be discharged (again using PFOS as an indicator species for PFAS). The detailed calculations are provided in Appendix G.

Based on this guidance, the likely maximum permissible PFOS concentration in the discharge is calculated to be 0.12ug/l.

6.5 SUMMARY OF RISK ASSESSMENT

The results of the groundwater sampling support the results of the previous round of groundwater monitoring with the highest concentrations of PFOS being recorded in the southeastern corner of the main process area (WS204, WS205 and WS206) exceeding the MAC marine EQS. There are also widespread exceedances of the AA marine EQS across the site with the exception of the area around BH160, WS210, and WS211 and in the area of WS202.

Currently PFOS within the groundwater appears to be captured by the onsite drainage and pumping system which appears to be providing a preferential pathway for elevated concentrations in the south eastern corner to the wastewater pond. Water from the wastewater pond is then discharged directly into Talacre Brook which discharges to an unnamed surface water course and then to the River Dee Estuary. Concentrations of PFOS in Talacre Brook, and at the point it discharges from Talacre Brook, exceed the marine EQS..

For groundwater, if there is groundwater flow directly towards the River Dee Estuary in the future and dilution within the River Dee Estuary is taken into account, it is considered unlikely that that current onsite groundwater concentrations would impact the River Dee Estuary..

¹ ERM 2025 Remedial Options Appraisal Point of Ayr (PoA), Talacre, Holywell – in preparation

7. ASSESSMENT OF DQRA FINDINGS IN CONTEXT OF PROPOSED DEMOLITION, CONSTRUCTION PROGRAMME AND FUTURE USE OF THE SITE

The primary objective of the foregoing investigation and DQRA is to provide Eni and its contractor with an assessment of the significance of the observed PFAS contamination in the context of the proposed development of the site, both during the demolition/construction phase and in the context of long term protection of human health and the environment during the operational lifetime of the new plant and enable Eni to discharge its planning obligations. This section of the report consolidates and summarizes ERM's key observations and recommendations for each stage of the lifecycle of the project together with our proposed remedial targets and is based on ERM's current understanding of the scope and nature of the redevelopment works.

7.1 CURRENT SITUATION

The conceptual site model for the site has been significantly improved during the course of the investigation. It is clear that the historic handling and use of AFFF fire fighting foam at the site has resulted in a legacy of soil, concrete and groundwater PFAS contamination at the site. The predominant PFAS are the PFASs most notably PFOS though a range other PFAS are detected at lower concentrations. Spatially the distribution of PFAS impacted soils and groundwaters mostly reflects historic incidents and known usage of AFFF however PFAS have also been detected in areas of the site not thought to have been previously impacted. Strong vertical attenuation of PFAS in shallow soils is noted but the PFOS and other PFAS present are likely to act as an ongoing source to groundwater and back diffusion of PFAS sorbed to the aquifer matrix may also occur in the long term.

In terms of human health, soil samples from only two discrete locations were identified above the C4SL screening levels for ongoing commercial use. For controlled waters the risk to adjacent surface waters from groundwater contamination is currently complicated by the interaction of the existing surface water drainage regime with groundwater and the resultant capture and discharge of impacted waters to the adjacent Talacre Brook. This in turn discharges to another stream and at the sampling point furthest from the site and the concentration of PFOS (in this sampling round) were still significantly above the EQS. Given the current regime and the findings of the DQRA then migration off site in groundwater and recharge to the Estuary appears less significant.

Overall however irrespective of the plans for redevelopment then as a minimum some form of active intervention would be required to address the ongoing discharge of PFAS to the surface water together with measures to minimise the ongoing leaching of residual soils.

7.2 DEMOLITION & CONSTRUCTION PHASE

The actual construction phase will be preceded by a demolition of much of the existing infrastructure at the site. The proposed decommissioning and demolition plan are undergoing review and refinement in the context of the identified PFAS contamination. It is imperative that during these works consideration is given to the presence of residual PFAS contamination in any of the infrastructure associated with the storage and use of AFFF (e.g. foam monitors). The results of

the concrete analysis indicate that in the vicinity of the infrastructure such as the foam monitors it is likely that the concrete may represent a significant source of PFAS and should not be crushed and reused on site. Any drainage works undertaken as part of the decommissioning process should also consider the potential presence of PFAS impacted sediments and water and should be assessed and treated accordingly.

The proposed final layout of the site is shown in Figure 3. Based on the most recent information received by ERM for the groundworks phase, it is understood that the Utilities and Inlet areas (as indicated in Figure 18) are planned to be cleared both above and underground for the new plant installations. This is understood to include the total demolition and partial removal of pile heads in locations required for future construction, foundations, drainage network and cables and will require excavation of all soils to a maximum depth of 3m. Note that care should be taken when removing drains to ensure that any residues within the drains and within the pipe bedding, are appropriately considered.

The inlet area has been confirmed as a significant residual source of PFAS contamination in the soil and groundwater. Given that excavations are planned to a maximum depth of 3m, these works will have a significant benefit in terms of PFAS mass removal both in the soil and as an indirect result of dewatering activities and some shallow soils located in the unsaturated zone that are impacted with PFAS will be removed from site and disposed of appropriately. However the methodology adopted and all arisings from these works will need to be evaluated and reused, disposed of or treated appropriately. Construction is also proposed in the compression area and it is assumed that as a minimum the top soil and sub soil will be removed as part of the construction programme. This material is also impacted with lower level of PFAS and will also need to be evaluated prior to reuse on site and or disposed of appropriately as indicated above should it be necessary.

In addition to the above works piling will be required for all areas with new installations as per the plot plan. Piles may serve to act as preferential pathways and consideration should be given to the possible mobilisation of PFAS during this phase of works at the detailed design stage. It is considered likely that a foundation risk assessment will be required by NRW and that an alternative solution, such as continuous flight auger piles or similar, may be required and a piling management plan will be implemented.

Overall the development works are coincident with many of the identified and suspected source areas for PFAS and the planned earth and groundworks will result in some source removal, however as indicated in the results some of the highest PFAS concentrations in surface soils are outside the planned redevelopment foot print and these will be addressed the time of redevelopment through isolated soil removal as described in the remedial options appraisal¹.

The complete elimination of residual groundwater impacts is not considered technically feasible or sustainable. Treatment of waters arising during construction is planned however no treatment of

¹ ERM 2025 Remedial Options Appraisal Point of Ayr (PoA), Talacre, Holywell – in preparation

the site surface water discharge is currently planned. This will be monitored and evaluated post construction following primary source removal.

7.2.1 PROPOSED CONSOLIDATED REMEDIAL TARGETS

7.2.2 SOILS

For the purposes of developing integrated remediation criteria as the starting point, then based on the review DQRA the Commercial Soils C4SL value of 600 ug/kg is adopted as the primary standard, this also being protective of controlled waters given the Level 3 risk assessment generated soils based criteria with a broad range of results between 3 ug/kg (a source 100m from the receptor) and 82,600 ug/kg (200m from the receptor). Based on a review of the source locations and assuming a natural prevailing groundwater flow direction to the east then a distance of ~100m is considered conservative for the majority of significant sources and the calculated acceptable soil concentration is 629 ug/kg so the 600ug/kg proposed for human health is also protective of controlled waters.

No other soils impact is considered significant to date however a watching brief (together with appropriate analytical analysis) will be maintained during the course of the works, and any unexpected contamination will be addressed either as part of the existing planned remediation or will be segregated and treated or disposed of separately.

7.2.3 GROUNDWATER

Given that the Level 4 risk assessment indicated no risk to the River Dee then no specific criteria are proposed for groundwater other than general betterment through the programme of works proposed. Given that the PFOS and other PFAS source mass removal of soils to the extent practical is proposed, there will likely be significant betterment. In respect of the potential for future cross-boundary issues the potential requirement for active treatment is therefore considered limited. No specific remedial criteria are proposed for this element although significant reduction in mass discharge would be anticipated.

7.2.4 SURFACE WATER DISCHARGE

As noted above (Section 6) PFAS appear to be currently discharged into the adjacent surface water as part of the drainage system. No ongoing treatment of this surface water discharge is currently proposed, this will be monitored and the requirement for treatment evaluated further post construction. Treatment of any waters produced as part of the redevelopment works (dewatering during demolition and construction, surface waters from construction) will be undertaken to the extent practicable. The proposed remedial target for discharges from dewatering and other construction activities during the construction and development period is a PFOS concentration 0.10ug/l (noting that reduction of all other PFAS will take place as well). The number being developed from a consensus of technology suppliers, reputable contractors and consultant evaluation as providing a balance of protection of ecological receptors, public health and what is practically and economically feasible,.

7.3 FUTURE OPERATIONAL PHASE

In terms of the future site operation then assuming that the main source areas have been removed from site then one potential concern is the migration of residual impact groundwater off site and the ongoing discharge of the surface water drainage. Based on the findings of the DQRA the former is not currently considered significant, the latter will be monitored and further evaluated post construction.

8. SUMMARY AND RECOMMENDATIONS

As part of the redevelopment process for the PoA facility Eni commissioned ERM to undertake an additional investigation and detailed risk assessment of the identified groundwater impact from a range of PFAS that were linked to the storage and testing of aqueous AFFF over the lifetime of the present facility. The overall objective of the works were to understand the implications of this identified contamination in the context of the proposed redevelopment (both at the construction phase and in the long term) and enable Eni and its contractor to discharge planning conditions associated with the redevelopment. The key findings of the additional investigation and DQRA are as follows:

- AFFF has been part of the site firefighting system since the inception of the plant, and until 2011 used on a C8 (PFOS containing) formulation. Apart from yearly routine testing of foam monitors that uses limited quantities of foam the only known significant operational release of foam was in 1998 in the inlet area where approx. 3,000l was reportedly discharged.
- The near surface geology was consistent with that encountered in the previous phase of work comprising up to 1.2 m of Made Ground (dense engineered gravel), underlain by superficial deposits of sandy Silt or silty Clay (typically 1-2 m in thickness) overlying fine Sand, consistent with Tidal Flat Deposits;
- Investigation of the groundwater regime through the installation of data loggers has confirmed that there is very limited evidence of any tidal interaction within the current plant boundary. Critically the observed hydraulic gradients confirm a significant of groundwater flow to the west across a large part of the site and based on assessment of the relative levels of the site drainage it is clear that the current surface water drainage system is capturing and extracting groundwater.
- The hydraulic conductivity results obtained from the risking head tests are indicative of a sandy/silt strata but is variable with a range of two orders of magnitude across the site.
- In terms of PFAS then it is clear that the historic handling and use of AFFF firefighting foam at the site has resulted in a legacy of soil, concrete and groundwater PFAS contamination at the site. The predominant PFAS are the PFASs most notably PFOS though a range other PFAS are detected at lower concentrations. Spatially the distribution of PFAS impacted soils and groundwaters mostly reflects historic incidents and known usage of AFFF however PFAS have also been detected in areas of the site not thought to have been previously impacted. Vertical Strong vertical attenuation of PFAS in shallow soils is noted but the PFOS and other PFAS are likely to act as an ongoing source to groundwater and back diffusion of PFAS sorbed to the aquifer matrix may also occur in the long term.
- In terms of human health then soil samples from only two discrete locations were identified above the C4SL screening levels for ongoing commercial use. For controlled waters the risk to adjacent surface waters from groundwater contamination is complicated by the interaction of the existing surface water drainage regime with groundwater and the resultant capture and discharge of impacted waters to the adjacent Talacre Brook. This in turn discharges to another stream and at the sampling point furthest from the site and the concentration of PFOS (in this sampling round) were still significantly above the EQS. Given the current regime and the

findings of the DQRA then migration off site in groundwater and recharge to the Estuary appears less significant.

findings of the DQRA then migration off site in groundwater and recharge to the Estuary appears less significant.

Based on the above it is recommended that Eni undertake a remedial options appraisal (ROA) and develop a remediation strategy to address the issues identified and based on the remedial targets proposed in the DQRA.



APPENDIX A FIGURES

Figure 1: Site Location Map

Figure 2: Site Layout Plan

Figure 3: Future site layout

Figure 4: Site Plan showing potential sources of pfas

Figure 5: Site drainage plan

Figure 6: investigation locations

Figure 7: Long term data logger locations

Figure 8: Rising head test locations

Figure 9: Hydrograph for all wells

Figure 10: Groundwater elevation plan

Figure 11: Spatial distribution of PFOS in soils

Figure 12: Vertical Attenuation of PFAS In Soil

Figure 13: Groundwater and surface water exceedances (freshwater EQS)

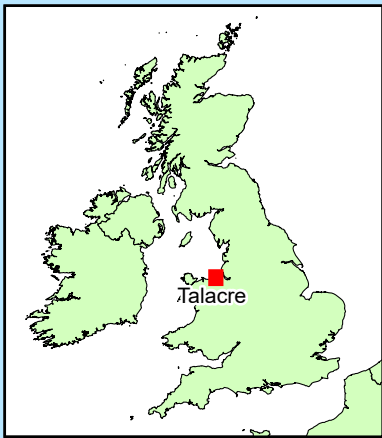
Figure 14: Groundwater and surface water exceedances (marine EQS)

Figure 15: PFAS distribution in water (ug/l)

Figure 16: PFAS distribution in water (%)

Figure 17: Groundwater capture by site Drainage

Figure 18: Site Designated areas

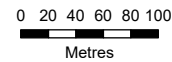


				<p>Figure 1 Site Location Plan</p>	
<p>SIZE: A4 SCALE: 1:100,000 PROJECT: 0743746 DATE: 29/10/2024</p>		<p>VERSION: A01 DRAWN: MTC CHECKED: SD APPROVED:</p>			
<p>SOURCE: GB Topographic; Contains OS data © Crown Copyright and database right 2023 Contains data from OS Zoomstack</p>					

PROJECTION: British National Grid



- Approximate Site Boundary
- Current Plant Area to be Demolished
- Approximate Proposed Contractor's Compound
- Approximate Proposed Contractor's Compound - Alternate Location
- Proposed Contractor's Car Park



**Figure 2
Site Layout**

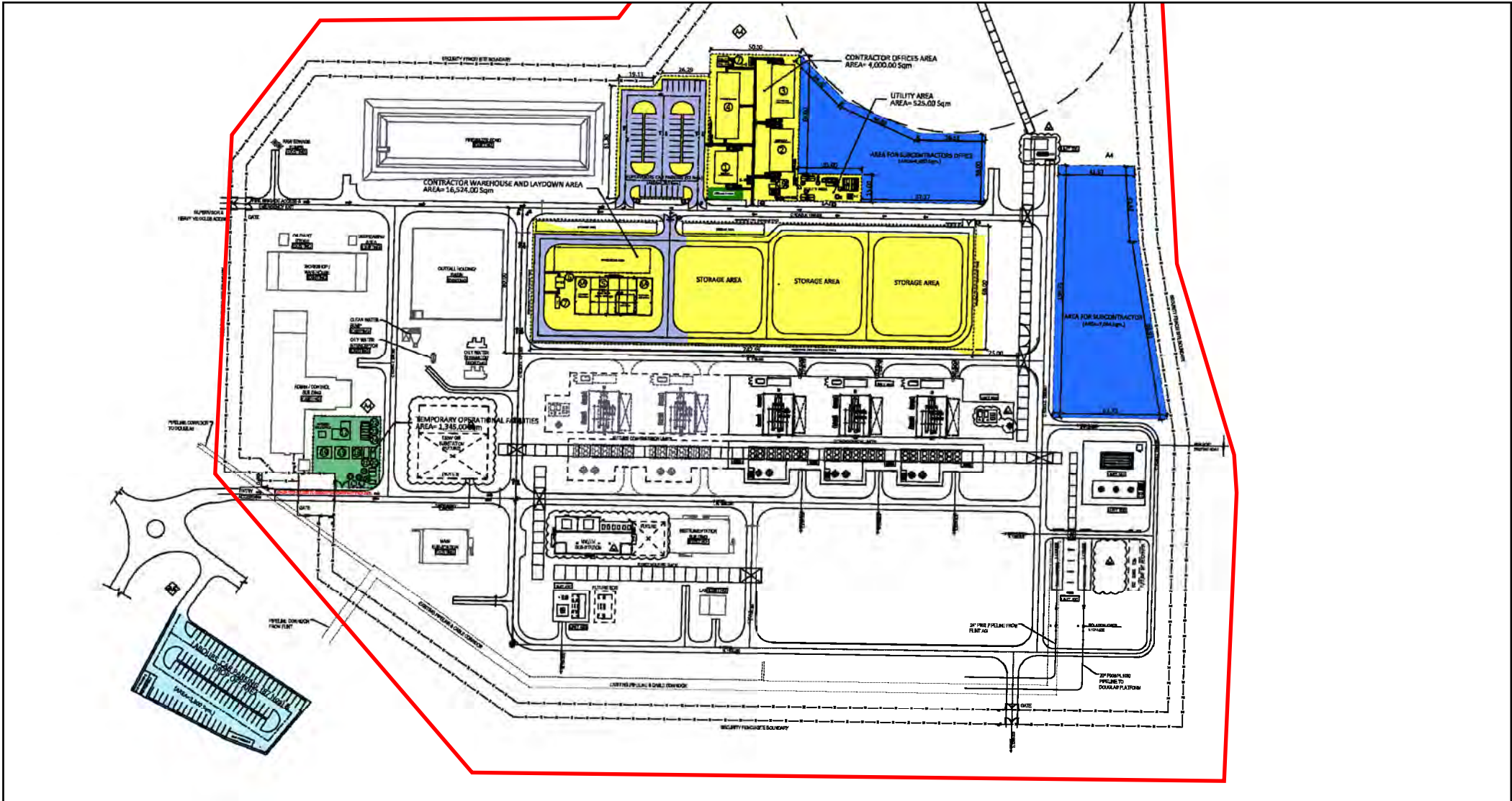
SCALE: See Scale Bar
 SIZE: A4
 PROJECT: 0743746
 DATE: 29/10/2024


VERSION: A01
 DRAWN: MTC
 CHECKED: SD
 APPROVED:



ERM





 Approximate Site Boundary

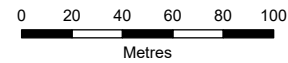
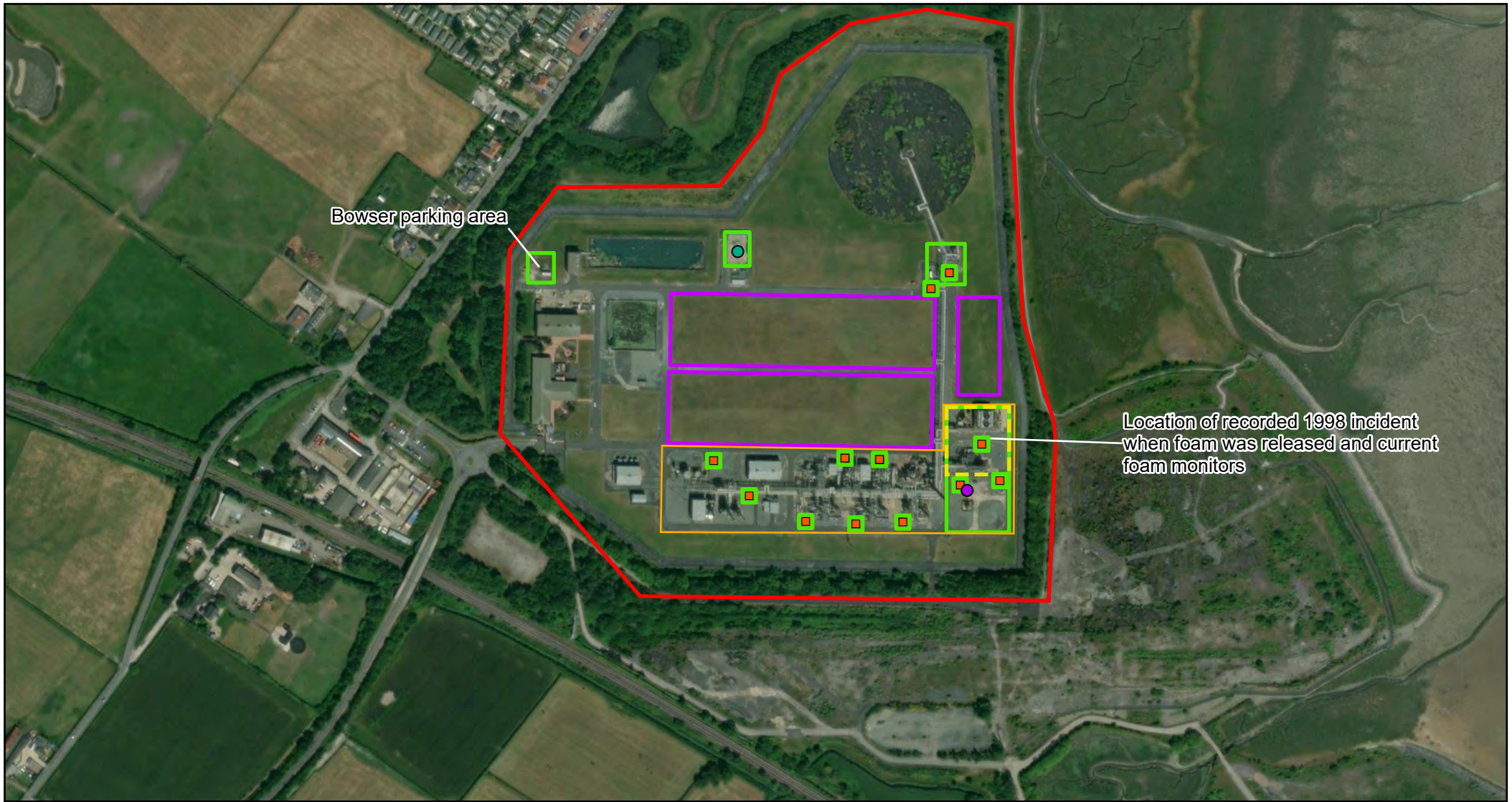


Figure 3
Future Site Layout

SCALE: See Scale Bar
 SIZE: A4
 PROJECT: 0743746
 DATE: 29/10/2024

VERSION: A01
 DRAWN: MTC
 CHECKED: SD
 APPROVED:





- Site Boundary
- Current Plant Area to be Demolished
- Location of Foam Release in 1998

Identified Potential Sources:

- Methanol Sump
- Chemical Storage Area inc. Bulk PFAS Storage

- Potential PFAS Sources and AFFF Fire Monitors and Storage Tanks
- Open Ground Periodically used for Disposal of Foam Contaminated Water Using Bowser
- Foam Monitors Around Edge of Operational Facility and 20m Arc of Open Ground Around

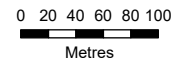
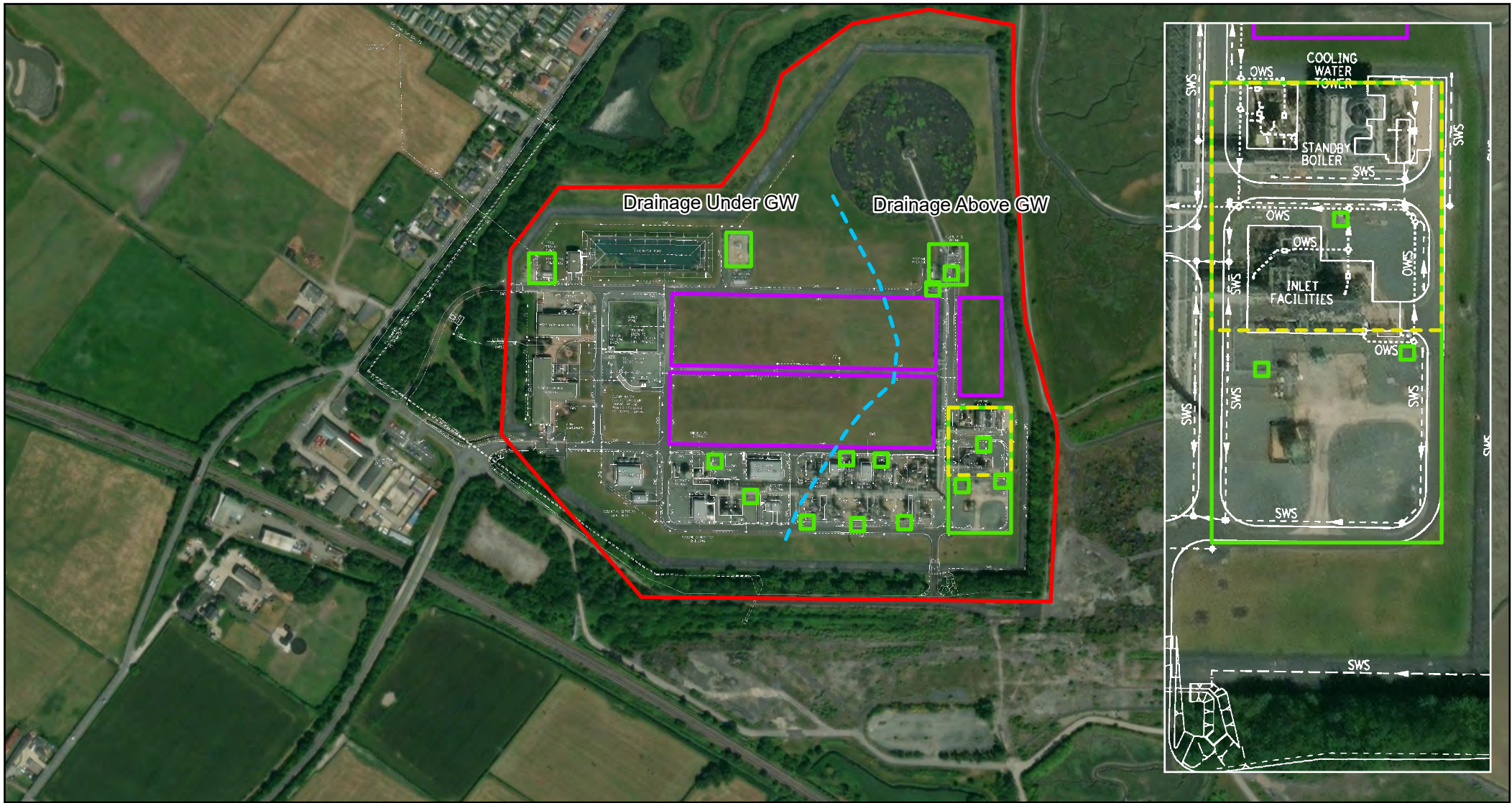


Figure 4
Site Plan Showing potential Sources of PFAS

SCALE: See Scale Bar
 SIZE: A4
 PROJECT: 0743746
 DATE: 29/10/2024

VERSION: A01
 DRAWN: MTC
 CHECKED: SD
 APPROVED:





- ▭ Approximate Site Boundary
- Location of Foam Release in 1998
- ▣ Potential PFAS Sources and AFFF Fire Monitors and Storage Tanks
- ▭ Open Ground Periodically used for Disposal of Foam Contaminated Water Using Bowser
- - - Groundwater Captured by Site Drainage

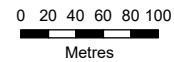


Figure 5
Site Drainage Plan

SCALE: See Scale Bar
 SIZE: A4
 PROJECT: 0743746
 DATE: 29/10/2024

VERSION: A01
 DRAWN: MTC
 CHECKED: SD
 APPROVED:



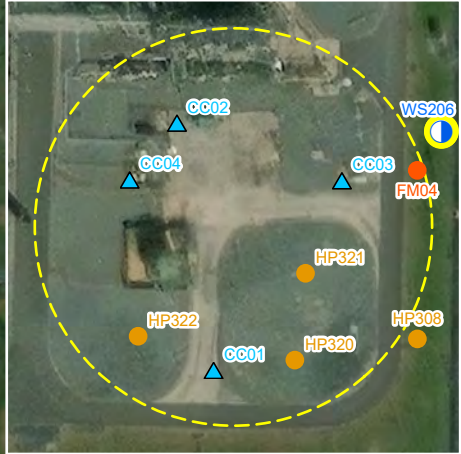


Approximate Site Boundary	Window Sample
Approximate Location of Condensate Incident in 1998 (in which 2,000ltr of foam was used)	Surface Water Sample
Existing: Fugro 2022 Borehole	Hand Pit
ERM 2024 Locations: Deep Borehole	Fire Monitor Hand Pit
	Concrete Core

SCALE: See Scale Bar SIZE: A4 PROJECT: 0743746 DATE: 23/09/2024	VERSION: A01 DRAWN: MTC CHECKED: SD APPROVED:	

Figure 6 Investigation Locations	

PROJECTION: British National Grid



<p>PROJECTION: British National Grid</p> <p>Maxar, Microsoft</p>	<p> Approximate Site Boundary</p> <p> Approximate Location of Condensate Incident in 1998 (in which 2,000ltr of foam was used)</p> <p>Existing:</p> <ul style="list-style-type: none"> Fugro 2022 Borehole <p>ERM 2024 Locations:</p> <ul style="list-style-type: none"> Deep Borehole 	<ul style="list-style-type: none"> Window Sample Surface Water Sample Hand Pit Fire Monitor Hand Pit Concrete Core Long Term Data Logger Location 	<p>0 20 40 60 80 100</p> <p>Metres</p> <p></p>	<p>Figure 7</p> <p>Long Term Data Logger Locations</p>
	<p>SCALE: See Scale Bar</p> <p>SIZE: A4</p> <p>PROJECT: 0743746</p> <p>DATE: 23/09/2024</p>	<p>VERSION: A01</p> <p>DRAWN: MTC</p> <p>CHECKED: SD</p> <p>APPROVED:</p>		



<p> Approximate Site Boundary</p> <p> Approximate Location of Condensate Incident in 1998 (in which 2,000ltr of foam was used)</p> <p>Existing:</p> <ul style="list-style-type: none"> Fugro 2022 Borehole <p>ERM 2024 Locations:</p> <ul style="list-style-type: none"> Deep Borehole 	<ul style="list-style-type: none"> Window Sample Surface Water Sample Hand Pit Fire Monitor Hand Pit Concrete Core Rising Head Test Location 	<p>0 20 40 60 80 100 Metres</p> <p>N</p>	<p>Figure 8 Rising Head Test Locations</p>
<p>SCALE: See Scale Bar</p> <p>SIZE: A4</p> <p>PROJECT: 0743746</p> <p>DATE: 19/09/2024</p>		<p>VERSION: A01</p> <p>DRAWN: MTC</p> <p>CHECKED: SD</p> <p>APPROVED:</p>	

PROJECTION: British National Grid

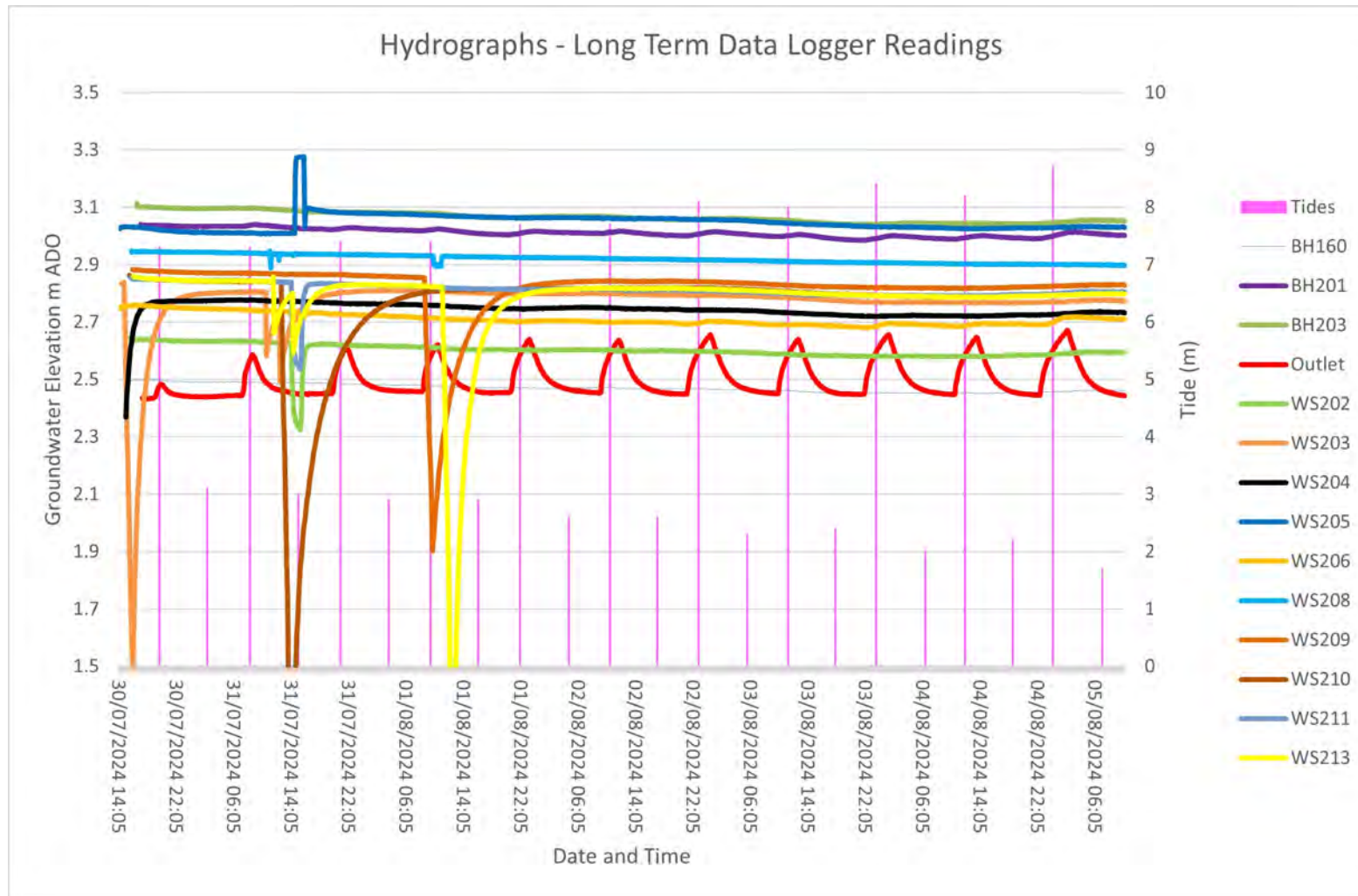
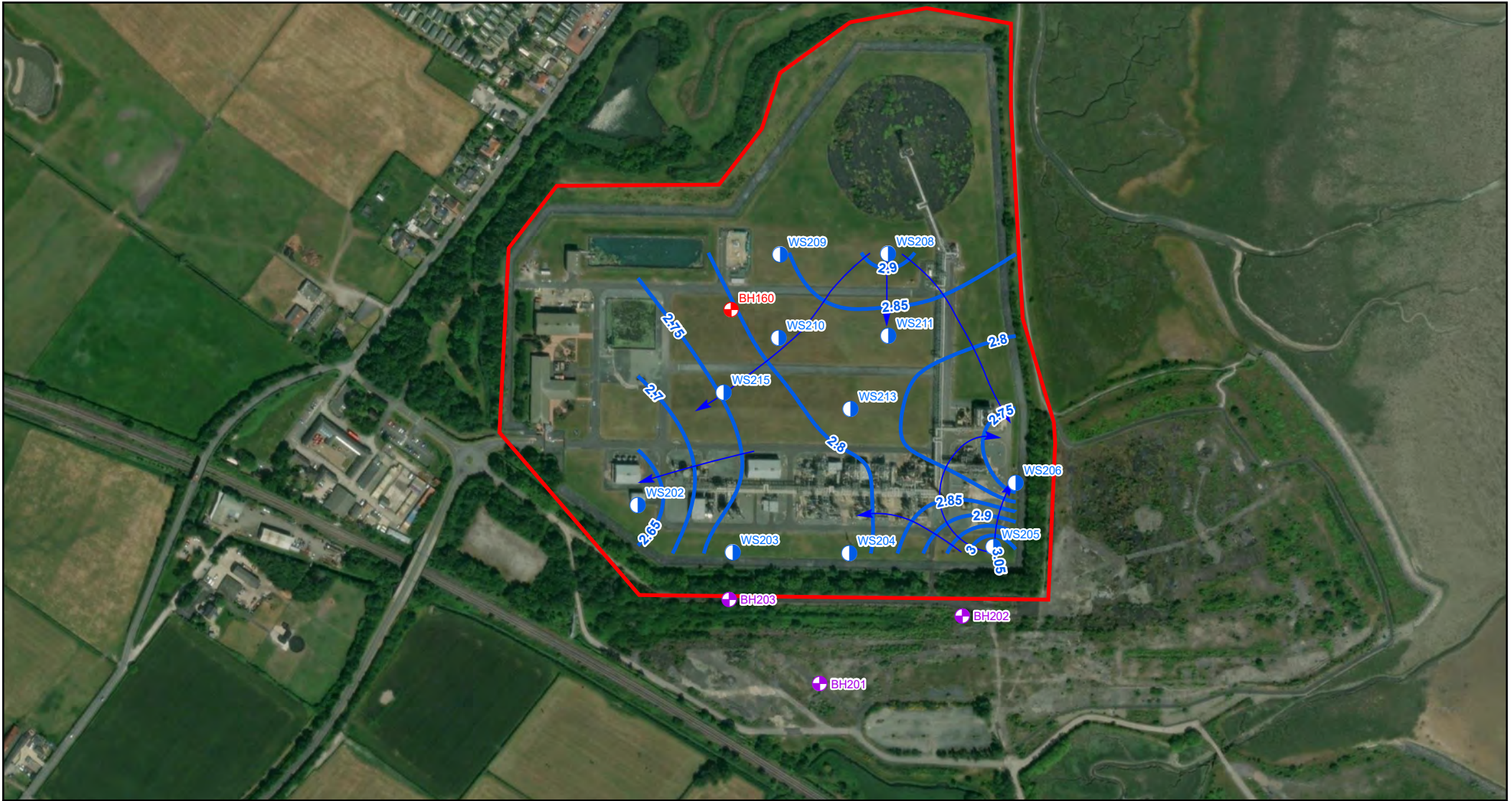


Figure 9
Hydrograph for All Locations

SCALE: See Scale Bar
 SIZE: A4
 PROJECT: 0743746
 DATE: 29/10/2024

VERSION: A01
 DRAWN: MTC
 CHECKED: SD
 APPROVED:





- ▭ Approximate Site Boundary
- ➔ Inferred Groundwater Flow Direction
- GW Contours - Low Tide

- Existing:
- ⊕ Fugro 2022 Borehole
- ERM 2024 Locations:
- ⊕ Deep Borehole
 - Window Sample

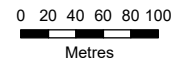
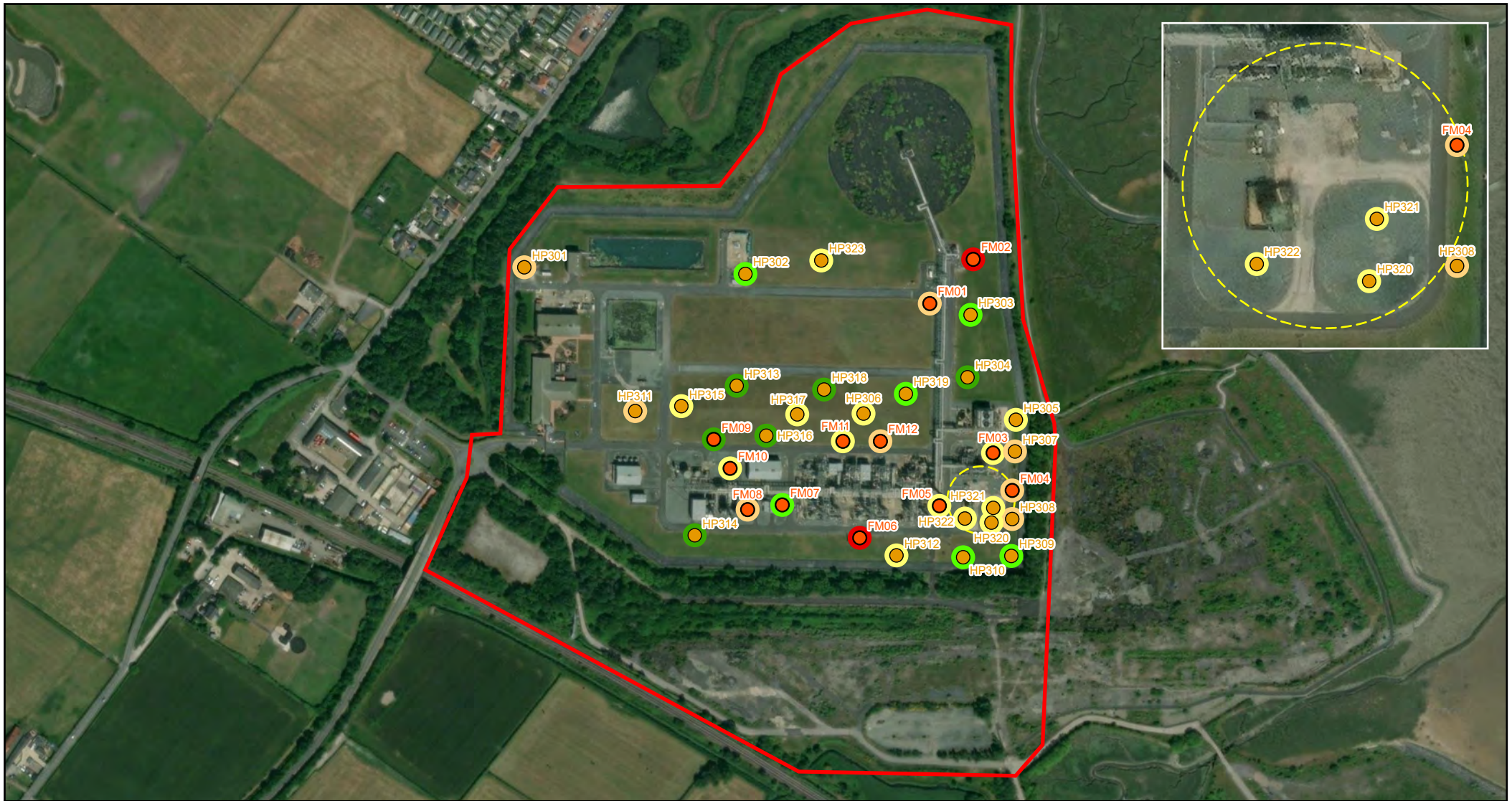


Figure 10
Groundwater Elevation Plan - Aug 2024

SCALE: See Scale Bar
 SIZE: A4
 PROJECT: 0743746
 DATE: 29/10/2024

VERSION: A01
 DRAWN: MTC
 CHECKED: SD
 APPROVED:





Approximate Site Boundary Approximate Location of Condensate Incident in 1998 (in which 2,000ltr of foam was used) Hand Pit Fire Monitor Hand Pit	PFOS ($\mu\text{g}/\text{kg}$) >600 600 - 100 100 - 10 10 - 1 <MDL	Generic Assessment Criteria Threshold for Commercial Land Use is 600 $\mu\text{g}/\text{kg}$	 	Figure 11 Soil Concentrations	
				SCALE: See Scale Bar SIZE: A4 PROJECT: 0712595 DATE: 28/08/2024	VERSION: A01 DRAWN: MTC CHECKED: PTB APPROVED:

PROJECTION: British National Grid

Shallow vs Deep - Concentrations of PFAS compounds in selected locations

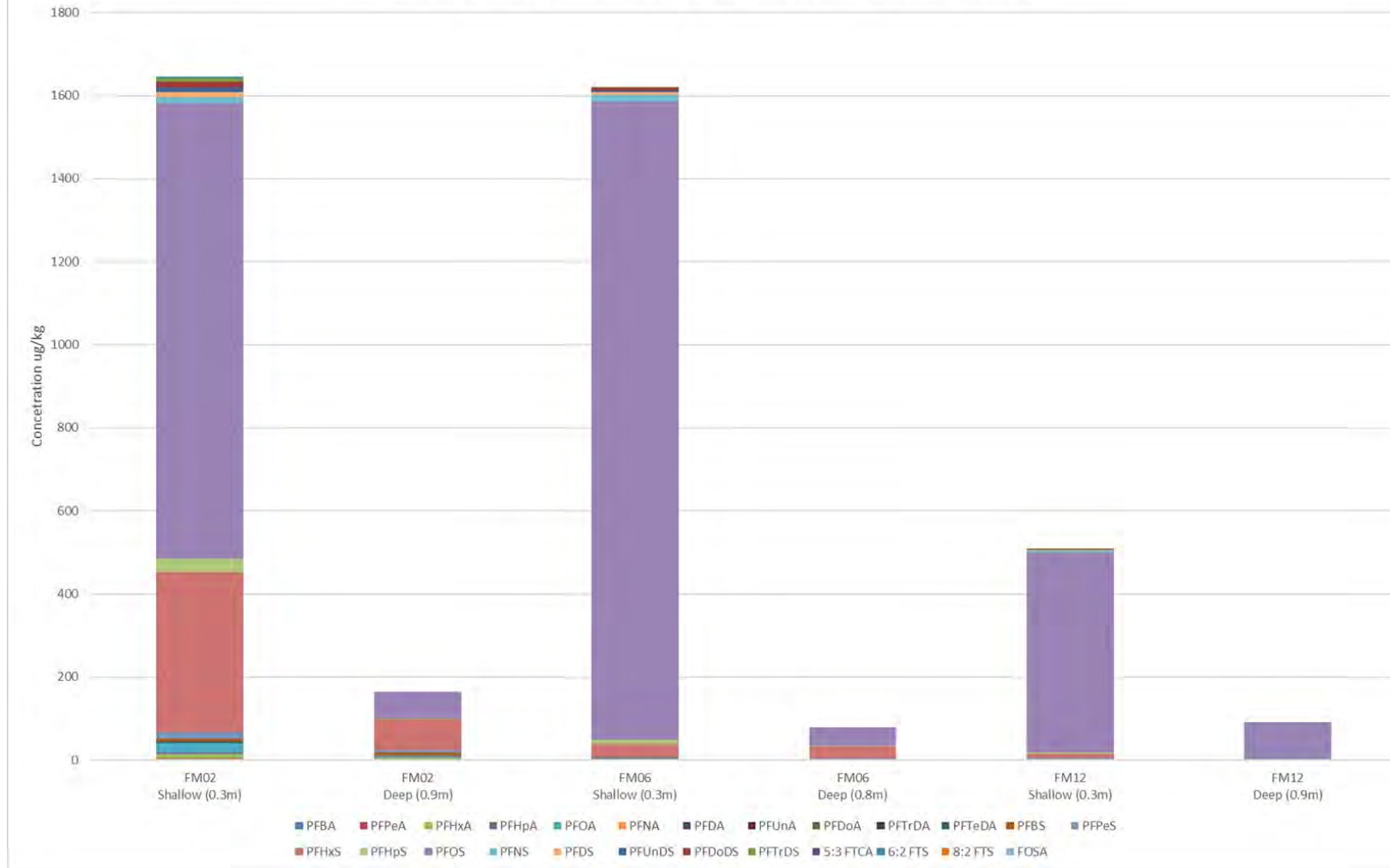


Figure 12
Vertical Attenuation of PFAS

SCALE: See Scale Bar
 SIZE: A4
 PROJECT: 0743746
 DATE: 29/10/2024

VERSION: A01
 DRAWN: MTC
 CHECKED: SD
 APPROVED:

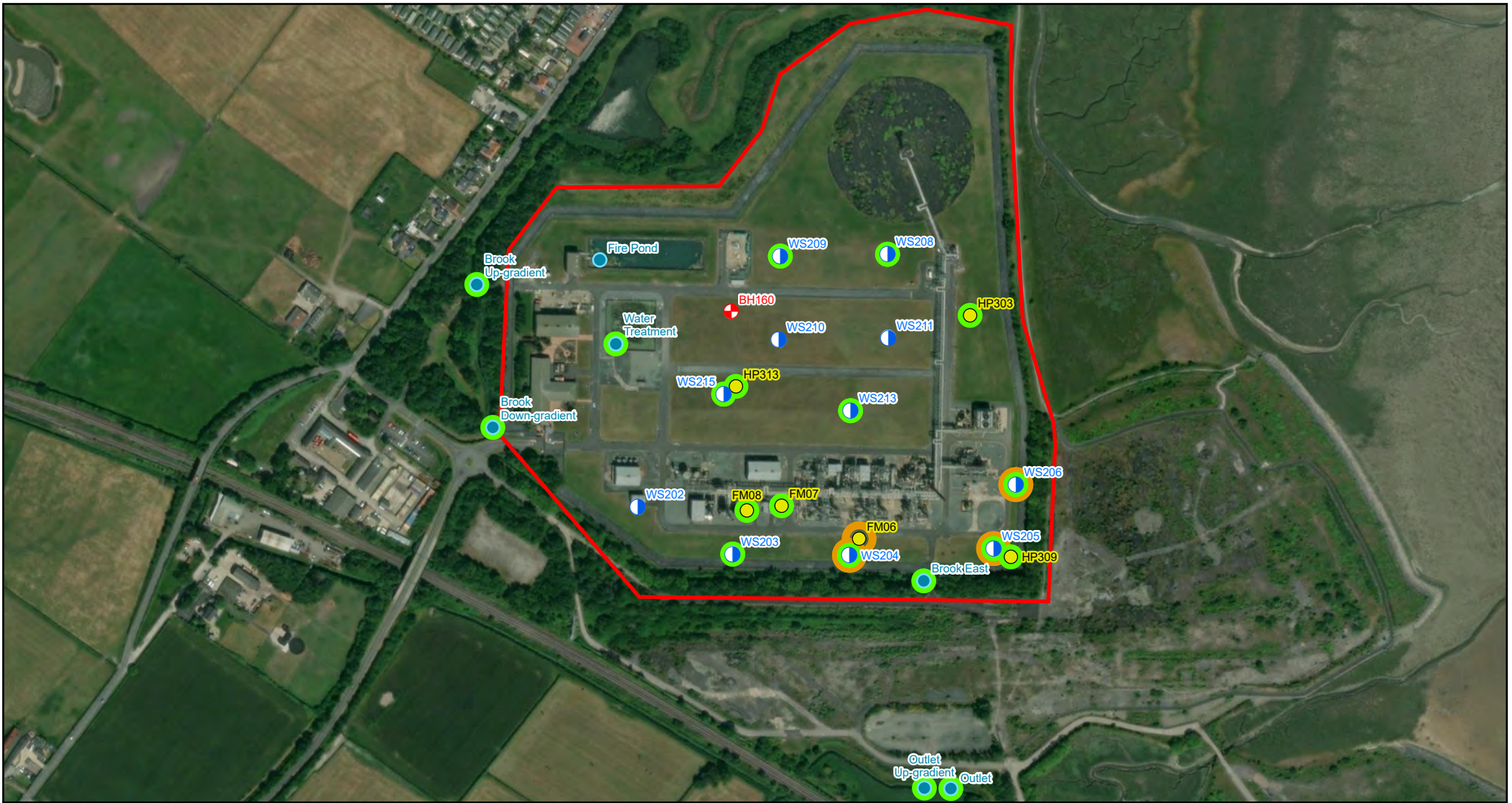


PROJECTION: British National Grid



<p> Approximate Site Boundary</p> <p>Existing:</p> <ul style="list-style-type: none"> Fugro 2022 Borehole <p>ERM 2024 Locations:</p> <ul style="list-style-type: none"> Window Sample Surface Water Sample Soil Leachate Sample Location 	<p>Freshwater AA EQS:</p> <ul style="list-style-type: none"> Exceeds Annual Average 6.5E-4µg/l <p>Freshwater MAC EQS:</p> <ul style="list-style-type: none"> Exceeds Maximum Allowable Concentration 36µg/l 	<p>0 20 40 60 80 100 Metres</p> <p></p>	<p>Figure 13 Groundwater and Surface Water Exceedances of the Freshwater EQS</p>
<p>SCALE: See Scale Bar VERSION: A01</p> <p>SIZE: A4 DRAWN: MTC</p> <p>PROJECT: 0743746 CHECKED: SD</p> <p>DATE: 29/10/2024 APPROVED:</p>			

PROJECTION: British National Grid



- Approximate Site Boundary
- Existing:
 - + Fugro 2022 Borehole
- ERM 2024 Locations:
 - Window Sample
 - Surface Water Sample
 - Soil Leachate Sample Location

- Marine AA EQS:
- Exceeds Annual Average 1.3E-4µg/l
- Marine MAC EQS:
- Exceeds Maximum Allowable Concentration 7.2µg/l

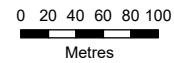


Figure 14
Groundwater and Surface Water
Exceedances of the Marine EQS

SCALE: See Scale Bar
 SIZE: A4
 PROJECT: 0743746
 DATE: 29/10/2024

VERSION: A01
 DRAWN: MTC
 CHECKED: SD
 APPROVED:



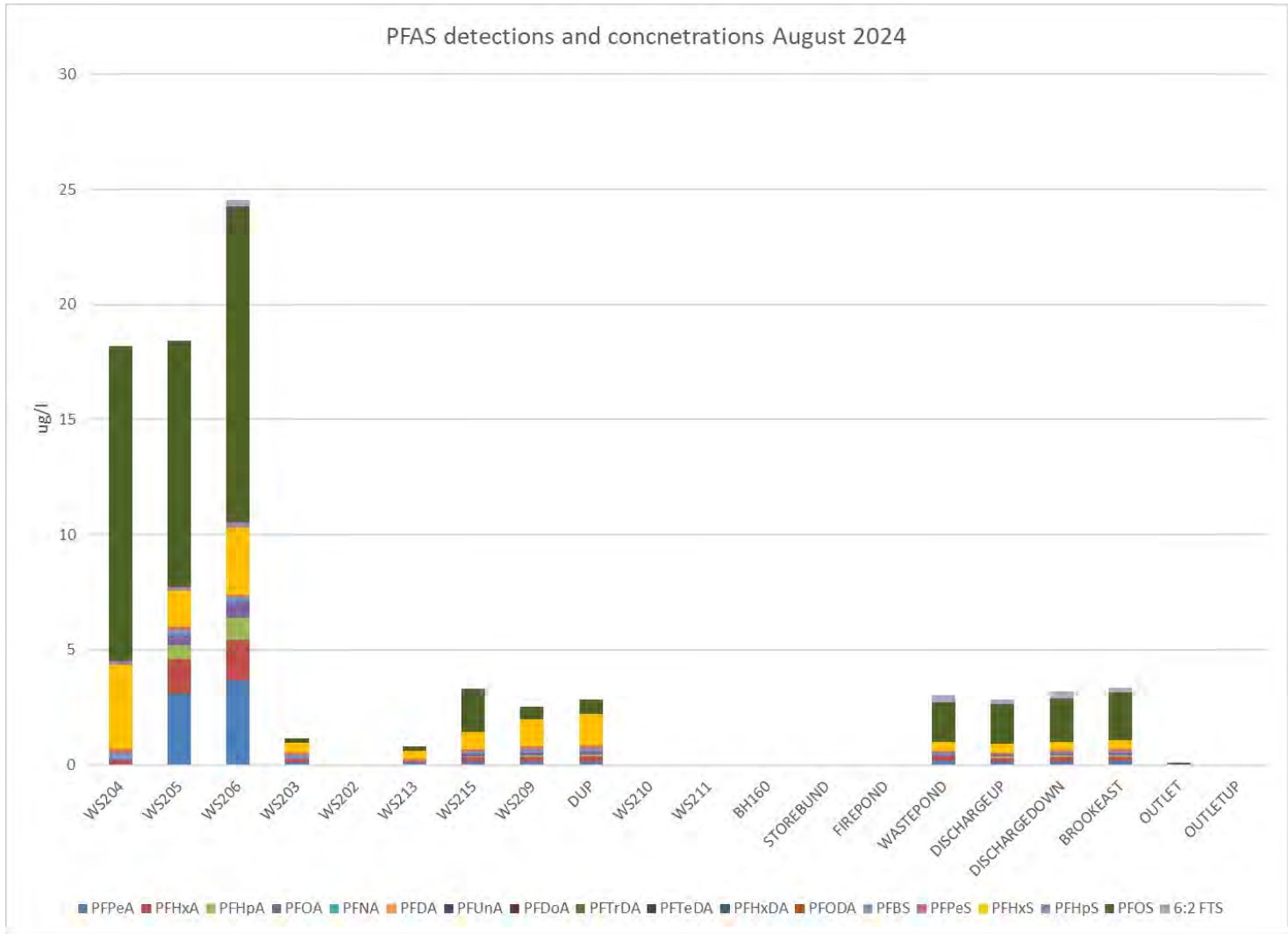


Figure 15
PFAS Distribution Within Groundwater and
Surface Water (ug/l)

SCALE: See Scale Bar
 SIZE: A4
 PROJECT: 0743746
 DATE: 29/10/2024

VERSION: A01
 DRAWN: MTC
 CHECKED: SD
 APPROVED:



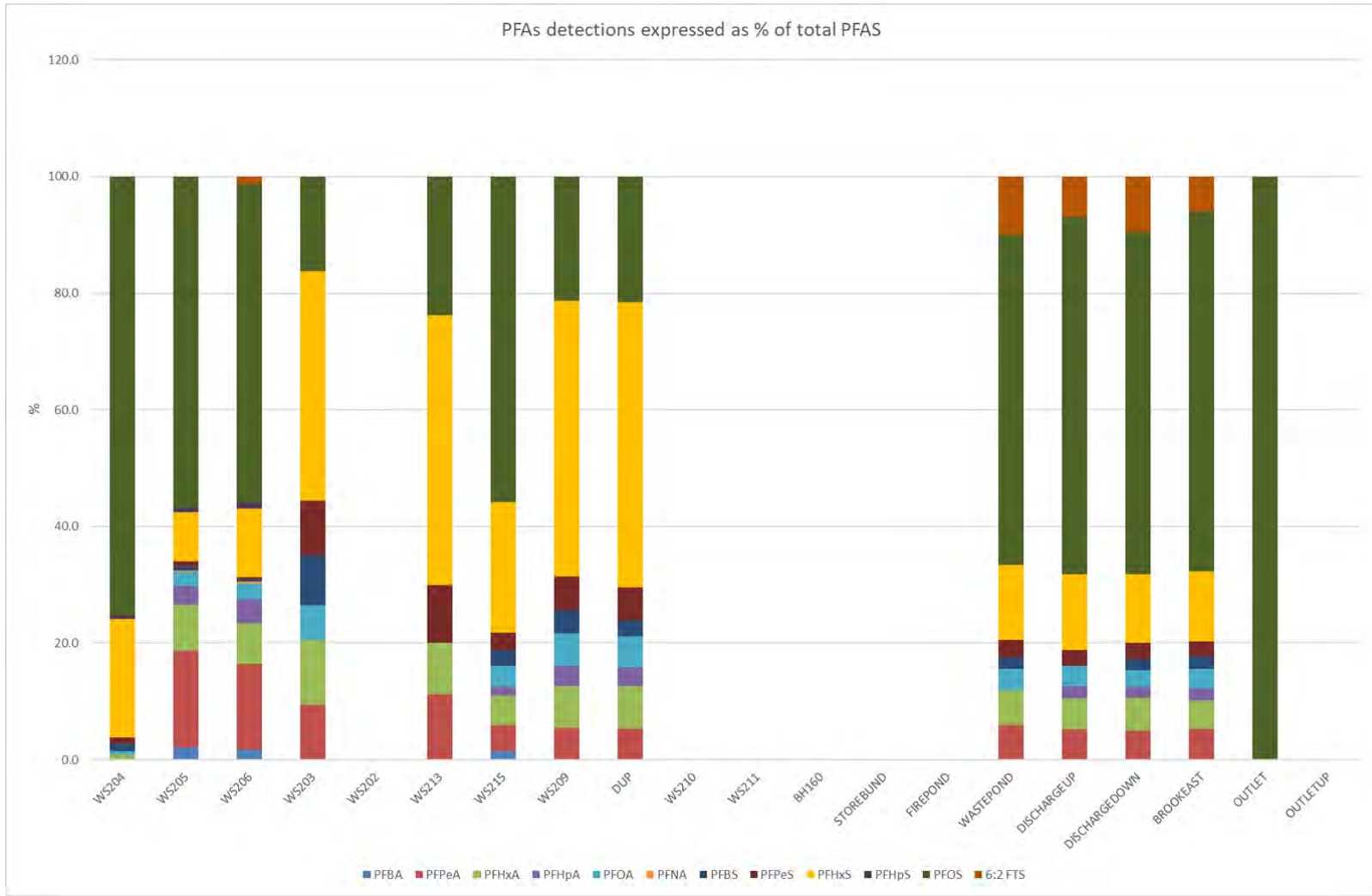


Figure 16
PFAS Distribution within Groundwater and
Surface water (%)

SCALE: See Scale Bar
 SIZE: A4
 PROJECT: 0743746
 DATE: 29/10/2024

VERSION: A01
 DRAWN: MTC
 CHECKED: SD
 APPROVED:





- ▭ Approximate Site Boundary
- ▭ Potential PFAS Sources and AFFF Fire Monitors and Storage Tanks
- ▭ Open Ground Periodically used for Disposal of Foam Contaminated Water Using Bowser
- - - Groundwater Captured by Site Drainage

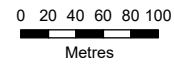
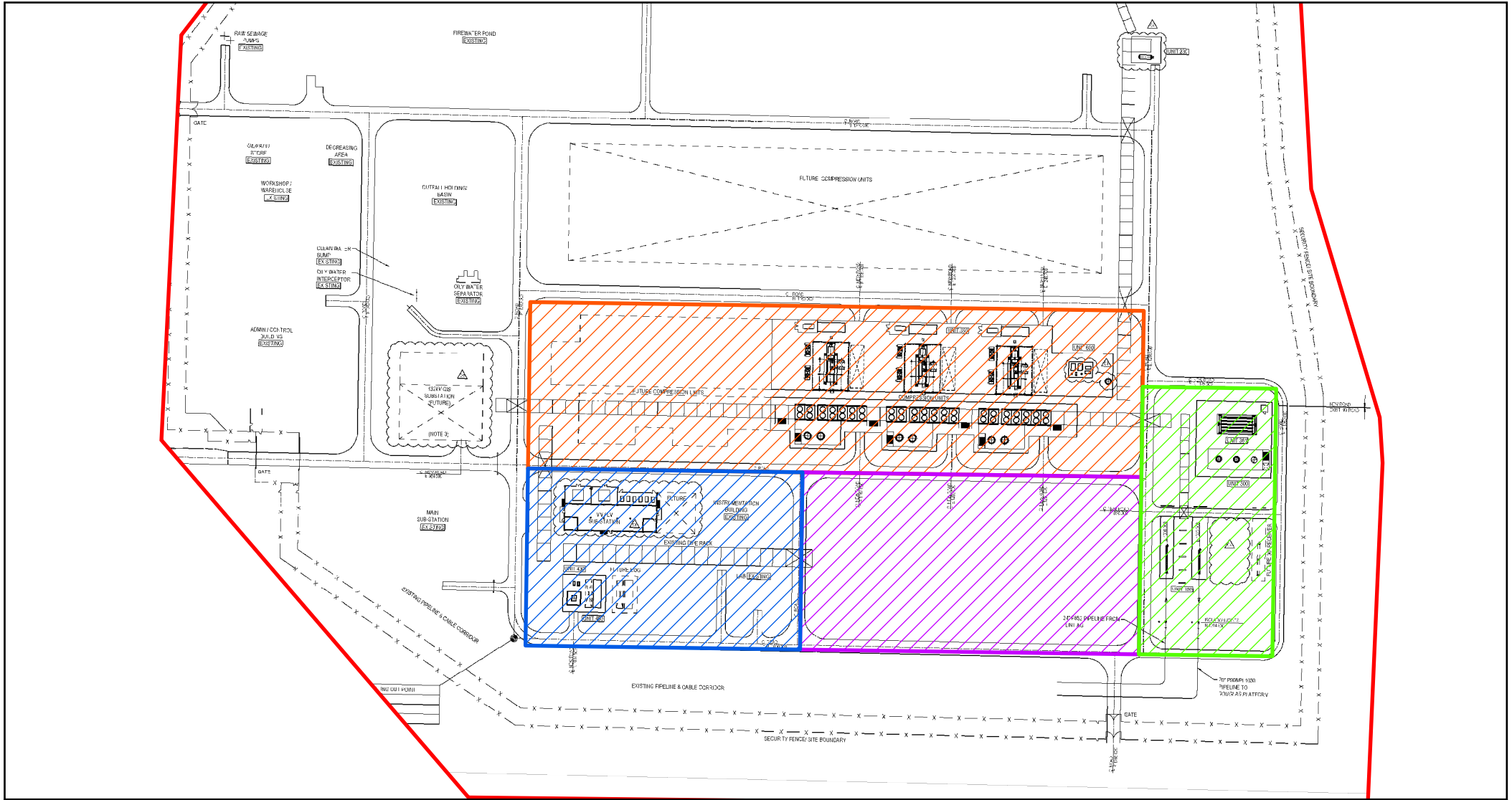


Figure 17
Groundwater Captured by Site Drainage

SCALE: See Scale Bar
 SIZE: A4
 PROJECT: 0743746
 DATE: 29/10/2024

VERSION: A01
 DRAWN: MTC
 CHECKED: SD
 APPROVED:





Approximate Site Boundary

Site Designated Area:

- Compression Unit
- Existing Process Unit
- Inlet & Metering Unit
- Utilities Unit

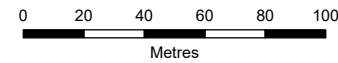


Figure 18
Site Designated Areas

SCALE: See Scale Bar

SIZE: A4

PROJECT: 0743746

DATE: 29/10/2024

VERSION: A01

DRAWN: MTC

CHECKED: SD

APPROVED:





APPENDIX B BOREHOLE LOGS

FM01	HP320
FM02	HP321
FM03	HP322
FM04	HP323
FM05	BH201
FM06	BH202
FM07	BH203
FM08	WS202
FM09	WS203
FM10	WS204
FM11	WS205
FM12	WS206
HP301	WS208
HP302	WS209
HP303	WS210
HP304	WS211
HP305	WS213
HP306	WS215
HP307	
HP308	
HP309	
HP310	
HP311	
HP312	
HP313	
HP314	
HP315	
HP316	
HP317	
HP318	
HP319	

Location ID: HP323

Start Date: 09-Aug-2024	Northing: 384113.85	Client: Eni UK Site Name: Point of Ayr Location: Point of Ayr Terminal Holywell
End Date: 09-Aug-2024	Easting: 312305.46	
Contractor: Geotron UK Ltd	Surface Elevation: 4.9 m AOD	
Method: Hand Pitting	Water Encountered:	
Equipment: Insulated Hand Tools	Logged By: BS	
Driller: NA	Reviewed By:	
SSC Contractor: Geotron UK Ltd		

TEST PIT PROFILE						
Depth (m)	Elevation (m AOD)	Sample Interval	USCS	Lithology	Water Level	Stratigraphic Description
5.2						
5.0						
0.0			Top Soil			Topsoil, dark brown to black, with a loamy texture. Contains a mixture of fine to medium-sized particles, including organic matter and occasional small stones.
0.2			Made Ground			Topsoil, dark brown to black, with a loamy texture, consisting of fine to medium-sized particles, including organic matter and occasional small stones, transitioning into brown clayey gravel: gravel fine to coarse and subangular to angular, composed of limestone and sandstone. ENGINEERED FILL.
0.4						
4.4						
4.2						
0.8						
4.0						
3.8						
1.2						
3.6						
1.4						
3.4						
1.6						
3.2						
1.8						
3.0						
2.8						
2.2						
2.6						
2.4						
2.6						
2.2						
2.8						
2.0						
3.0						
1.8						
3.2						
1.6						
3.4						
1.4						
3.6						
1.2						
3.8						



Remarks:

SSC - Subsurface Clearance m - meter
 PID - Photoionization Detector ppm - parts per million
 NA - not available or not applicable AOD - Above Ordance Datum
 mm - millimeter m bgs - meters below ground surface

Sheet: Page 1 of 1

Location ID: HP322

Start Date: 29-Jul-2024	Northing: 383852.13	Client: Eni UK Site Name: Point of Ayr Location: Point of Ayr Terminal Holywell
End Date: 09-Aug-2024	Easting: 312451.09	
Contractor: Geotron UK Ltd	Surface Elevation: 4.4 m AOD	
Method: Hand Pitting	Water Encountered:	
Equipment: Insulated Hand Tools	Logged By: BS	
Driller: NA	Reviewed By:	
SSC Contractor: Geotron UK Ltd		

TEST PIT PROFILE						
Depth (m)	Elevation (m AOD)	Sample Interval	USCS	Lithology	Water Level	Stratigraphic Description
4.6						
0.0	4.4		Made Ground			Dark grey gravelly surface aggregate: gravel is coarse, angular, composed of limestone. ENGINEERED FILL
0.2	4.2					Dark brown clayey gravel: gravel is fine to coarse, subangular to angular, composed of limestone and sandstone. ENGINEERED FILL.
0.4	4.0					Light brown to grey clayey gravel: gravel is fine to coarse, subangular to angular, composed of limestone and sandstone. ENGINEERED FILL. Membrane at 0.6m
0.6	3.8		SW-SC			Natural soft grey clayey SAND. Sand is fine.
0.8	3.6		CH			Natural soft grey sandy CLAY.
1.0	3.4					
1.2	3.2					
1.4	3.0					
1.6	2.8					
1.8	2.6					
2.0	2.4					
2.2	2.2					
2.4	2.0					
2.6	1.8					
2.8	1.6					
3.0	1.4					
3.2	1.2					
3.4	1.0					
3.6	0.8					
3.8	0.6					





Remarks:
 SSC - Subsurface Clearance m - meter
 PID - Photoionization Detector ppm - parts per million
 NA - not available or not applicable AOD - Above Ordance Datum
 mm - millimeter m bgs - meters below ground surface

Sheet: Page 1 of 1

Location ID: HP321

Start Date: 29-Jul-2024	Northing: 383862.95	Client: Eni UK Site Name: Point of Ayr Location: Point of Ayr Terminal Holywell
End Date: 29-Jul-2024	Easting: 312479.87	
Contractor: Geotron UK Ltd	Surface Elevation: 4.5 m AOD	
Method: Hand Pitting	Water Encountered:	
Equipment: Insulated Hand Tools	Logged By: BS	
Driller: NA	Reviewed By:	
SSC Contractor: Geotron UK Ltd		

TEST PIT PROFILE						
Depth (m)	Elevation (m AOD)	Sample Interval	USCS	Lithology	Water Level	Stratigraphic Description
4.6						
0.0	4.4		Aggregate			Dark grey gravelly surface aggregate: gravel is coarse, angular, composed of limestone.
0.2	4.2		Made Ground			Dark brown clayey gravel: gravel is fine to coarse, subangular to angular, composed of limestone and sandstone. ENGINEERED FILL.
0.4	4.0					Light brown to grey clayey gravel: gravel is fine to coarse, subangular to angular, composed of limestone and sandstone. ENGINEERED FILL.
0.6	3.8					Grey clayey gravel: gravel is fine to coarse, subangular to angular, composed of limestone and sandstone. ENGINEERED FILL. Water Strike 0.8m.
0.8	3.6					
1.0	3.4					
1.2	3.2					
1.4	3.0					
1.6	2.8					
1.8	2.6					
2.0	2.4					
2.2	2.2					
2.4	2.0					
2.6	1.8					
2.8	1.6					
3.0	1.4					
3.2	1.2					
3.4	1.0					
3.6	0.8					
3.8						



Remarks:

SSC - Subsurface Clearance m - meter
 PID - Photoionization Detector ppm - parts per million
 NA - not available or not applicable AOD - Above Ordance Datum
 mm - millimeter m bgs - meters below ground surface

Location ID: HP320

Start Date: 29-Jul-2024	Northing: 383848.03	Client: Eni UK Site Name: Point of Ayr Location: Point of Ayr Terminal Holywell
End Date: 21-Jul-2024	Easting: 312478.03	
Contractor: Geotron UK Ltd	Surface Elevation: 4.4 m AOD	
Method: Hand Pitting	Water Encountered:	
Equipment: Insulated Hand Tools	Logged By: BS	
Driller: NA	Reviewed By:	
SSC Contractor: Geotron UK Ltd		

TEST PIT PROFILE					
Depth (m)	Elevation (m AOD)	Sample Interval	USCS	Lithology	Water Level
Stratigraphic Description					
4.6					
4.4					
4.2					Dark grey gravelly surface aggregate: gravel is coarse, angular, composed of limestone. ENGINEERED FILL
4.0					Dark brown clayey gravel: gravel is fine to coarse, subangular to angular, composed of limestone and sandstone. ENGINEERED FILL.
3.8			Made Ground		Light brown to grey clayey gravel: gravel is fine to coarse, subangular to angular, composed of limestone and sandstone. ENGINEERED FILL.
3.6					Grey clayey gravel: gravel is fine to coarse, subangular to angular, composed of limestone and sandstone. ENGINEERED FILL. Water Strike at 0.9m.
3.4					
3.2					
3.0					
2.8					
2.6					
2.4					
2.2					
2.0					
1.8					
1.6					
1.4					
1.2					
1.0					
0.8					
0.6					



Remarks:
 SSC - Subsurface Clearance m - meter
 PID - Photoionization Detector ppm - parts per million
 NA - not available or not applicable AOD - Above Ordance Datum
 mm - millimeter m bgs - meters below ground surface

Location ID: HP319

Start Date: 09-Aug-2024	Northing: 383978.61	Client: Eni UK Site Name: Point of Ayr Location: Point of Ayr Terminal Holywell
End Date: 09-Aug-2024	Easting: 312391.20	
Contractor: Geotron UK Ltd	Surface Elevation: 4.7 m AOD	
Method: Hand Pitting	Water Encountered:	
Equipment: Insulated Hand Tools	Logged By: BS	
Driller: NA	Reviewed By:	
SSC Contractor: Geotron UK Ltd		

TEST PIT PROFILE						
Depth (m)	Elevation (m AOD)	Sample Interval	USCS	Lithology	Water Level	Stratigraphic Description
4.8						
0.0	4.6		Top Soil			Topsoil, dark brown to black, with a loamy texture. Contains a mixture of fine to medium-sized particles, including organic matter and occasional small stones. Membrane at 0.2m
0.2	4.4		Made Ground			Brown to red sandy clayey gravel: gravel is fine to coarse, subangular to angular, composed of limestone and sandstone. ENGINEERED FILL.
0.4	4.2					
0.6	4.0		CH			Natural soft dark grey sandy CLAY.
0.8	3.8					
1.0	3.6					
1.2	3.4					
1.4	3.2					
1.6	3.0					
1.8	2.8					
2.0	2.6					
2.2	2.4					
2.4	2.2					
2.6	2.0					
2.8	1.8					
3.0	1.6					
3.2	1.4					
3.4	1.2					
3.6	1.0					
3.8						



Remarks:

SSC - Subsurface Clearance m - meter
 PID - Photoionization Detector ppm - parts per million
 NA - not available or not applicable AOD - Above Ordnance Datum
 mm - millimeter m bgs - meters below ground surface

Location ID: HP318

Start Date: 09-Aug-2024	Northing: 383982.96	Client: Eni UK Site Name: Point of Ayr Location: Point of Ayr Terminal Holywell
End Date: 09-Aug-2024	Easting: 312308.29	
Contractor: Geotron UK Ltd	Surface Elevation: 4.5 m AOD	
Method: Hand Pitting	Water Encountered:	
Equipment: Insulated Hand Tools	Logged By: BS	
Driller: NA	Reviewed By:	
SSC Contractor: Geotron UK Ltd		

TEST PIT PROFILE						
Depth (m)	Elevation (m AOD)	Sample Interval	USCS	Lithology	Water Level	Stratigraphic Description
4.8						
4.6						
0.0			Top Soil			Topsoil, dark brown to black, with a loamy texture. Contains a mixture of fine to medium-sized particles, including organic matter and occasional small stones. Membrane at 0.1m.
4.4						
0.2			Made Ground			Brown to red clayey gravel: gravel is fine to coarse, subangular to angular, composed of limestone and sandstone. ENGINEERED FILL.
4.2						
0.4						
4.0						
0.6						
3.8			CL			Natural soft grey sandy CLAY.
0.8						
3.6						
1.0						
3.4						
1.2						
3.2						
1.4						
3.0						
1.6						
2.8						
1.8						
2.6						
2.0						
2.4						
2.2						
2.0						
1.8						
1.6						
1.4						
1.2						
1.0						
0.8						



Remarks:
 SSC - Subsurface Clearance m - meter
 PID - Photoionization Detector ppm - parts per million
 NA - not available or not applicable AOD - Above Ordance Datum
 mm - millimeter m bgs - meters below ground surface

Location ID: HP317

Start Date: 09-Aug-2024	Northing: 383957.79	Client: Eni UK Site Name: Point of Ayr Location: Point of Ayr Terminal Holywell
End Date: 09-Aug-2024	Easting: 312281.07	
Contractor: Geotron UK Ltd	Surface Elevation: 4.8 m AOD	
Method: Hand Pitting	Water Encountered:	
Equipment: Insulated Hand Tools	Logged By: BS	
Driller: NA	Reviewed By:	
SSC Contractor: Geotron UK Ltd		

TEST PIT PROFILE						
Depth (m)	Elevation (m AOD)	Sample Interval	USCS	Lithology	Water Level	Stratigraphic Description
5.0	4.8					
0.0	4.6		Top Soil			Topsoil, dark brown to black, with a loamy texture. Contains a mixture of fine to medium-sized particles, including organic matter and occasional small stones. Membrane at 0.2m.
0.2	4.4		Made Ground			Brown sandy clayey gravel: gravel is fine to coarse, subangular to angular, composed of limestone and sandstone. ENGINEERED FILL.
0.4	4.2					
0.6	4.0					
0.8	3.8					
1.0	3.6					
1.2	3.4					
1.4	3.2					
1.6	3.0					
1.8	2.8					
2.0	2.6					
2.2	2.4					
2.4	2.2					
2.6	2.0					
2.8	1.8					
3.0	1.6					
3.2	1.4					
3.4	1.2					
3.6	1.0					
3.8						



Remarks:

SSC - Subsurface Clearance m - meter
 PID - Photoionization Detector ppm - parts per million
 NA - not available or not applicable AOD - Above Ordance Datum
 mm - millimeter m bgs - meters below ground surface

Location ID: HP316

Start Date: 09-Aug-2024	Northing: 383936.16	Client: Eni UK Site Name: Point of Ayr Location: Point of Ayr Terminal Holywell
End Date: 09-Aug-2024	Easting: 312249.67	
Contractor: Geotron UK Ltd	Surface Elevation: 4.6 m AOD	
Method: Hand Pitting	Water Encountered:	
Equipment: Insulated Hand Tools	Logged By: BS	
Driller: NA	Reviewed By:	
SSC Contractor: Geotron UK Ltd		

TEST PIT PROFILE						
Depth (m)	Elevation (m AOD)	Sample Interval	USCS	Lithology	Water Level	Stratigraphic Description
4.8	4.6					
0.0	4.4		Top Soil			Topsoil, dark brown to black, with a loamy texture. Contains a mixture of fine to medium-sized particles, including organic matter and occasional small stones. Membrane at 0.2m.
0.2	4.2		Made Ground			Grey sandy gravel: gravel is fine to coarse, subangular to angular, composed of limestone and sandstone. ENGINEERED FILL.
0.4	4.0					Brown clayey sandy gravel: gravel is fine to coarse, subangular to angular, composed of limestone and sandstone. ENGINEERED FILL.
0.6	3.8					
0.8	3.6					
1.0	3.4					
1.2	3.2					
1.4	3.0					
1.6	2.8					
1.8	2.6					
2.0	2.4					
2.2	2.2					
2.4	2.0					
2.6	1.8					
2.8	1.6					
3.0	1.4					
3.2	1.2					
3.4	1.0					
3.6	0.8					
3.8						



Remarks:

SSC - Subsurface Clearance m - meter
 PID - Photoionization Detector ppm - parts per million
 NA - not available or not applicable AOD - Above Ordnance Datum
 mm - millimeter m bgs - meters below ground surface

Sheet: Page 1 of 1

Location ID: HP315

Start Date: 09-Aug-2024	Northing: 383966.13	Client: Eni UK Site Name: Point of Ayr Location: Point of Ayr Terminal Holywell
End Date: 09-Aug-2024	Easting: 312163.54	
Contractor: Geotron UK Ltd	Surface Elevation: 4.7 m AOD	
Method: Hand Pitting	Water Encountered:	
Equipment: Insulated Hand Tools	Logged By: BS	
Driller: NA	Reviewed By:	
SSC Contractor: Geotron UK Ltd		

TEST PIT PROFILE						
Depth (m)	Elevation (m AOD)	Sample Interval	USCS	Lithology	Water Level	Stratigraphic Description
4.8						
0.0	4.6		Top Soil			Topsoil, dark brown to black, with a loamy texture. Contains a mixture of fine to medium-sized particles, including organic matter and occasional small stones. Membrane at 0.2m.
0.2	4.4		Made Ground			Dark grey sandy clayey gravel: gravel is fine to coarse, subangular to angular, composed of limestone and sandstone. ENGINEERED FILL. Membrane at 0.6m.
0.4	4.2					
0.6	4.0		CL			Natural firm dark grey to brown sandy CLAY. Sand is fine.
0.8	3.8					
1.0	3.6					
1.2	3.4					
1.4	3.2					
1.6	3.0					
1.8	2.8					
2.0	2.6					
2.2	2.4					
2.4	2.2					
2.6	2.0					
2.8	1.8					
3.0	1.6					
3.2	1.4					
3.4	1.2					
3.6	1.0					
3.8						



Remarks:

SSC - Subsurface Clearance m - meter
 PID - Photoionization Detector ppm - parts per million
 NA - not available or not applicable AOD - Above Ordnance Datum
 mm - millimeter m bgs - meters below ground surface

Sheet: Page 1 of 1

Location ID: HP314

Start Date: 09-Aug-2024	Northing: 383835.18	Client: Eni UK Site Name: Point of Ayr Location: Point of Ayr Terminal Holywell
End Date: 09-Aug-2024	Easting: 312177.14	
Contractor: Geotron UK Ltd	Surface Elevation: 4.4 m AOD	
Method: Hand Pitting	Water Encountered:	
Equipment: Insulated Hand Tools	Logged By: BS	
Driller: NA	Reviewed By:	
SSC Contractor: Geotron UK Ltd		

TEST PIT PROFILE						
Depth (m)	Elevation (m AOD)	Sample Interval	USCS	Lithology	Water Level	Stratigraphic Description
4.6						
0.0	4.4		Top Soil			Topsoil, dark brown to black, with a loamy texture. Contains a mixture of fine to medium-sized particles, including organic matter and occasional small stones.
0.2	4.2		Made Ground			Reworked brown soft clay with gravel. gravel is fine to coarse, subangular to angular, composed of limestone and sandstone. ENGINEERED FILL
0.4	4.0					
0.6	3.8		CH			Natural soft brown sandy CLAY. Sand is fine.
0.8	3.6					
1.0	3.4					
1.2	3.2					
1.4	3.0					
1.6	2.8					
1.8	2.6					
2.0	2.4					
2.2	2.2					
2.4	2.0					
2.6	1.8					
2.8	1.6					
3.0	1.4					
3.2	1.2					
3.4	1.0					
3.6	0.8					
3.8	0.6					



Remarks:

SSC - Subsurface Clearance m - meter
 PID - Photoionization Detector ppm - parts per million
 NA - not available or not applicable AOD - Above Ordnance Datum
 mm - millimeter m bgs - meters below ground surface

Sheet: Page 1 of 1

Location ID: HP313

Start Date: 09-Aug-2024	Northing: 383986.82	Client: Eni UK Site Name: Point of Ayr Location: Point of Ayr Terminal Holywell
End Date: 09-Aug-2024	Easting: 312219.65	
Contractor: Geotron UK Ltd	Surface Elevation: 4.6 m AOD	
Method: Hand Pitting	Water Encountered:	
Equipment: Insulated Hand Tools	Logged By: BS	
Driller: NA	Reviewed By:	
SSC Contractor: Geotron UK Ltd		

TEST PIT PROFILE						
Depth (m)	Elevation (m AOD)	Sample Interval	USCS	Lithology	Water Level	Stratigraphic Description
4.8	4.6		Top Soil			Topsoil, dark brown to black, with a loamy texture. Contains a mixture of fine to medium-sized particles, including organic matter and occasional small stones. Membrane at 0.2m.
0.2	4.4		Made Ground			Dark grey sandy clayey gravel: gravel is fine to coarse, subangular to angular, composed of limestone and sandstone. ENGINEERED FILL. Membrane at 0.6m.
0.4	4.2					
0.6	4.0		CH			Natural firm dark grey to brown sandy CLAY. Sand is fine.
0.8	3.8					
1.0	3.6					
1.2	3.4					
1.4	3.2					
1.6	3.0					
1.8	2.8					
2.0	2.6					
2.2	2.4					
2.4	2.2					
2.6	2.0					
2.8	1.8					
3.0	1.6					
3.2	1.4					
3.4	1.2					
3.6	1.0					
3.8	0.8					

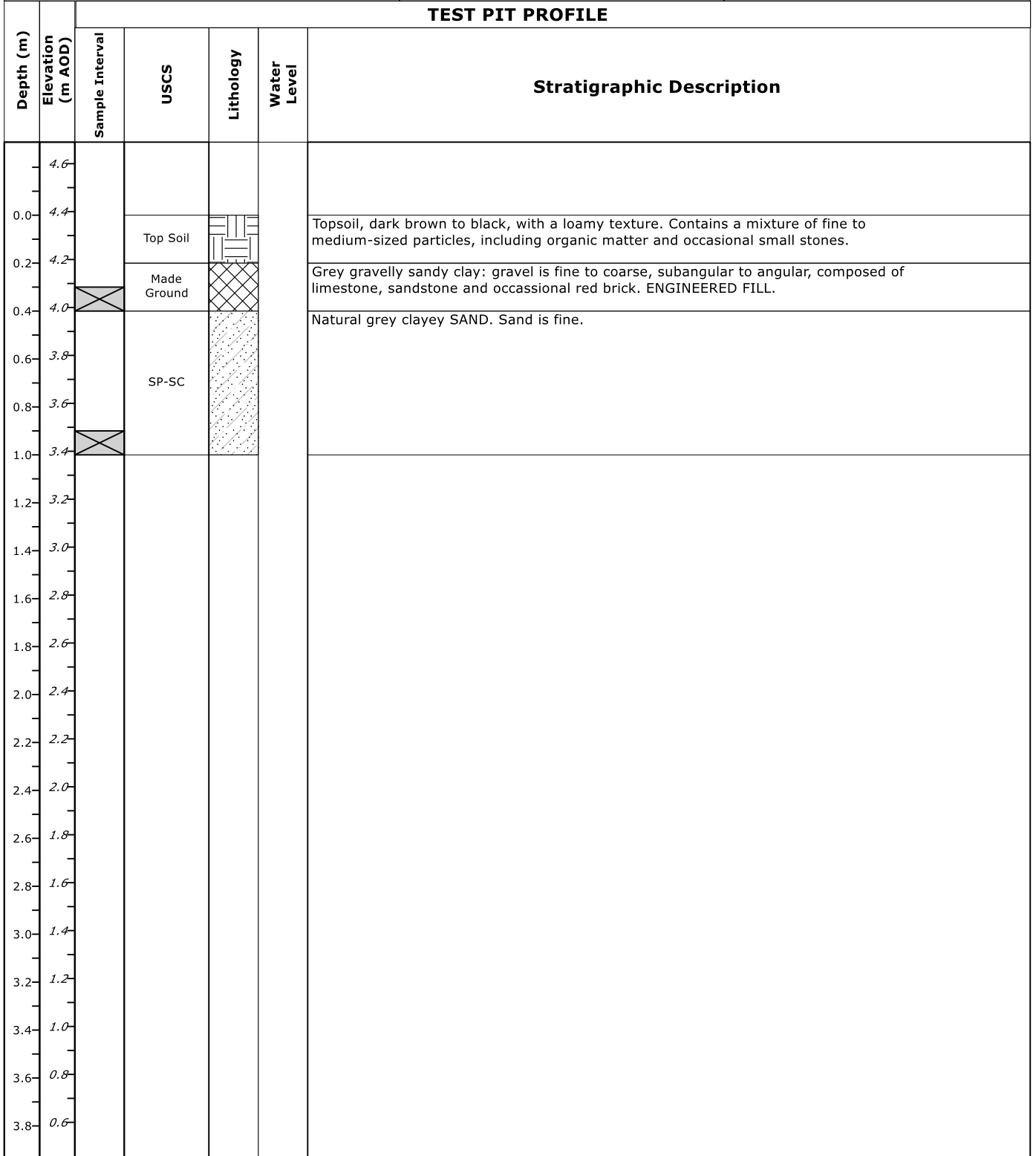


Remarks:

SSC - Subsurface Clearance m - meter
 PID - Photoionization Detector ppm - parts per million
 NA - not available or not applicable AOD - Above Ordance Datum
 mm - millimeter m bgs - meters below ground surface

Location ID: HP312

Start Date: 09-Aug-2024	Northing: 383814.76	Client: Eni UK Site Name: Point of Ayr Location: Point of Ayr Terminal Holywell
End Date: 09-Jul-2024	Easting: 312381.69	
Contractor: Geotron UK Ltd	Surface Elevation: 4.4 m AOD	
Method: Hand Pitting	Water Encountered:	
Equipment: Insulated Hand Tools	Logged By: BS	
Driller: NA	Reviewed By:	
SSC Contractor: Geotron UK Ltd		

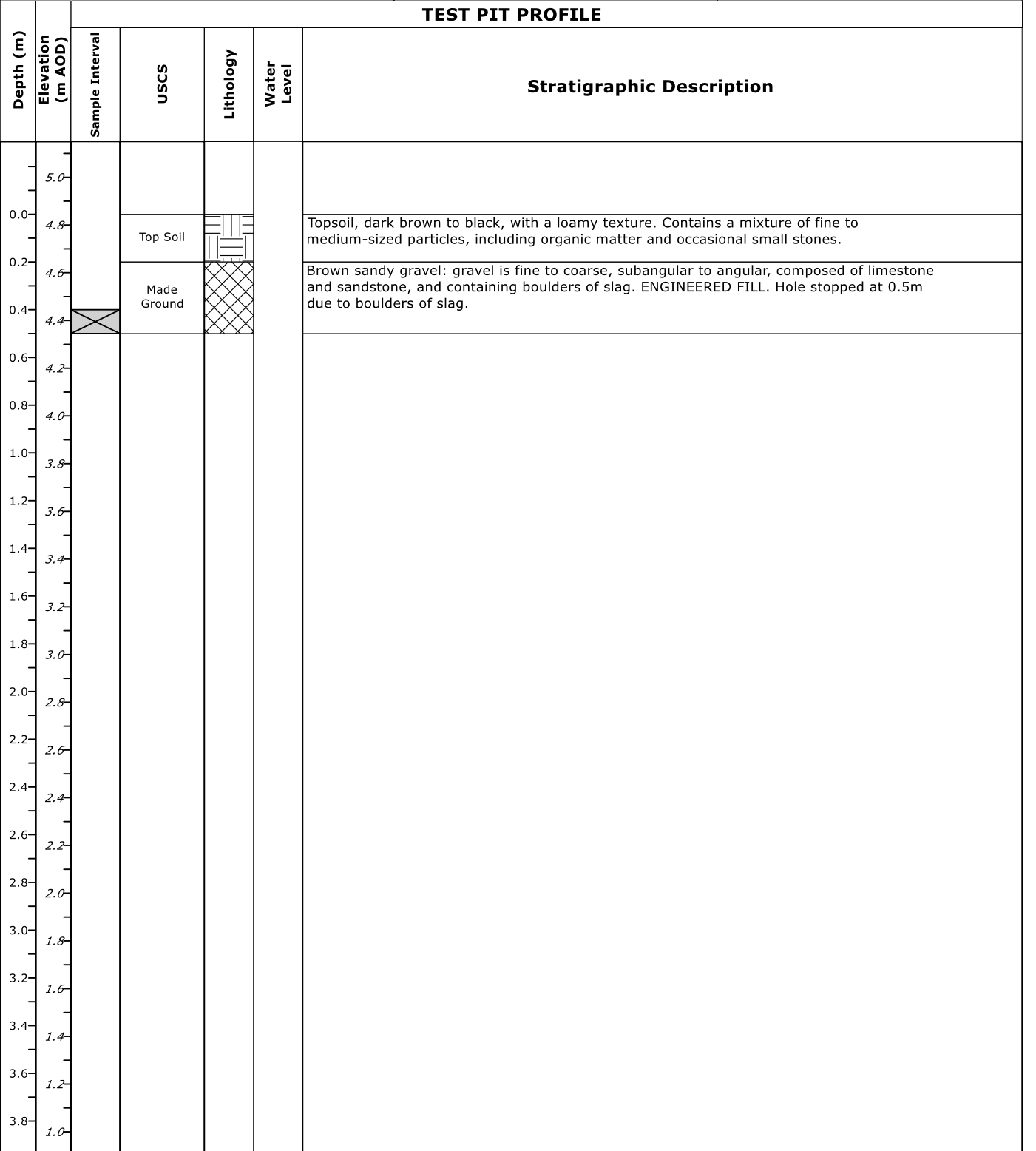


Remarks:

SSC - Subsurface Clearance m - meter
 PID - Photoionization Detector ppm - parts per million
 NA - not available or not applicable AOD - Above Ordance Datum
 mm - millimeter m bgs - meters below ground surface

Location ID: HP311

Start Date: 09-Aug-2024	Northing: 383961.15	Client: Eni UK Site Name: Point of Ayr Location: Point of Ayr Terminal Holywell
End Date: 09-Aug-2024	Easting: 312116.76	
Contractor: Geotron UK Ltd	Surface Elevation: 4.8 m AOD	
Method: Hand Pitting	Water Encountered:	
Equipment: Insulated Hand Tools	Logged By: BS	
Driller: NA	Reviewed By:	
SSC Contractor: Geotron UK Ltd		



Remarks:

SSC - Subsurface Clearance m - meter
 PID - Photoionization Detector ppm - parts per million
 NA - not available or not applicable AOD - Above Ordance Datum
 mm - millimeter m bgs - meters below ground surface

Location ID: HP310

Start Date: 30-Jul-2024	Northing: 383812.88	Client: Eni UK Site Name: Point of Ayr Location: Point of Ayr Terminal Holywell
End Date: 09-Aug-2024	Easting: 312449.33	
Contractor: Geotron UK Ltd	Surface Elevation: 4.5 m AOD	
Method: Hand Pitting	Water Encountered:	
Equipment: Insulated Hand Tools	Logged By: BS	
Driller: NA	Reviewed By:	
SSC Contractor: Geotron UK Ltd		

TEST PIT PROFILE						
Depth (m)	Elevation (m AOD)	Sample Interval	USCS	Lithology	Water Level	Stratigraphic Description
4.8						
4.6						
0.0			Top Soil			Topsoil, dark brown to black, with a loamy texture. Contains a mixture of fine to medium-sized particles, including organic matter and occasional small stones.
0.2			Made Ground			Brown sandy gravelly clay: gravel is fine to coarse, subangular to angular, composed of limestone and sandstone with occasional boulders. ENGINEERED FILL.
0.4						
0.6						
0.8						
1.0						
1.2						
1.4						
1.6						
1.8						
2.0						
2.2						
2.4						
2.6						
2.8						
3.0						
3.2						
3.4						
3.6						
3.8						



Remarks:

SSC - Subsurface Clearance m - meter
 PID - Photoionization Detector ppm - parts per million
 NA - not available or not applicable AOD - Above Ordnance Datum
 mm - millimeter m bgs - meters below ground surface

Sheet: Page 1 of 1

Location ID: HP309

Start Date: 09-Aug-2024	Northing: 383814.21	Client: Eni UK Site Name: Point of Ayr Location: Point of Ayr Terminal Holywell
End Date: 09-Aug-2024	Easting: 312498.23	
Contractor: Geotron UK Ltd	Surface Elevation: 4.4 m AOD	
Method: Hand Pitting	Water Encountered:	
Equipment: Insulated Hand Tools	Logged By: BS	
Driller: NA	Reviewed By:	
SSC Contractor: Geotron UK Ltd		

TEST PIT PROFILE					
Depth (m)	Elevation (m AOD)	Sample Interval	USCS	Lithology	Water Level
Stratigraphic Description					
4.6	4.4		Top Soil		Topsoil, dark brown to black, with a loamy texture. Contains a mixture of fine to medium-sized particles, including organic matter and occasional small stones.
0.0	4.2		Made Ground		Grey sandy clayey gravel: gravel is fine to coarse, subangular to angular, composed of limestone and sandstone. ENGINEERED FILL.
0.2	4.0				
0.4	3.8		CH		Natural soft brown sandy CLAY.
0.6	3.6				
0.8	3.4				
1.0	3.2				
1.2	3.0				
1.4	2.8				
1.6	2.6				
1.8	2.4				
2.0	2.2				
2.2	2.0				
2.4	1.8				
2.6	1.6				
2.8	1.4				
3.0	1.2				
3.2	1.0				
3.4	0.8				
3.6	0.6				
3.8					



Remarks:

SSC - Subsurface Clearance m - meter
 PID - Photoionization Detector ppm - parts per million
 NA - not available or not applicable AOD - Above Ordance Datum
 mm - millimeter m bgs - meters below ground surface

Sheet: Page 1 of 1

Location ID: HP308

Start Date: 09-Aug-2024	Northing: 383851.67	Client: Eni UK Site Name: Point of Ayr Location: Point of Ayr Terminal Holywell
End Date: 09-Aug-2024	Easting: 312499.10	
Contractor: Geotron UK Ltd	Surface Elevation: 4.6 m AOD	
Method: Hand Pitting	Water Encountered:	
Equipment: Insulated Hand Tools	Logged By: BS	
Driller: NA	Reviewed By:	
SSC Contractor: Geotron UK Ltd		

TEST PIT PROFILE						
Depth (m)	Elevation (m AOD)	Sample Interval	USCS	Lithology	Water Level	Stratigraphic Description
4.8	4.6		Top Soil			Topsoil, dark brown to black, with a loamy texture. Contains a mixture of fine to medium-sized particles, including organic matter and occasional small stones.
0.2	4.4		Made Ground			Grey gravel: gravel is fine to coarse, subangular to angular, composed of limestone, sandstone and concrete fragments. ENGINEERED FILL. Membrane at 0.7m.
0.4	4.2					
0.6	4.0					
0.8	3.8		CL			Natural firm brown sandy CLAY.
1.0	3.6					
1.2	3.4					
1.4	3.2					
1.6	3.0					
1.8	2.8					
2.0	2.6					
2.2	2.4					
2.4	2.2					
2.6	2.0					
2.8	1.8					
3.0	1.6					
3.2	1.4					
3.4	1.2					
3.6	1.0					
3.8	0.8					





Remarks:

SSC - Subsurface Clearance m - meter
 PID - Photoionization Detector ppm - parts per million
 NA - not available or not applicable AOD - Above Ordnance Datum
 mm - millimeter m bgs - meters below ground surface

Location ID: HP307

Start Date: 09-Aug-2024	Northing: 383920.19	Client: Eni UK Site Name: Point of Ayr Location: Point of Ayr Terminal Holywell
End Date: 09-Aug-2024	Easting: 312501.89	
Contractor: Geotron UK Ltd	Surface Elevation: 4.5 m AOD	
Method: Hand Pitting	Water Encountered:	
Equipment: Insulated Hand Tools	Logged By: BS	
Driller: NA	Reviewed By:	
SSC Contractor: Geotron UK Ltd		

TEST PIT PROFILE

Depth (m)	Elevation (m AOD)	Sample Interval	USCS	Lithology	Water Level	Stratigraphic Description
4.6						
0.0	4.4		Top Soil			Topsoil, dark brown to black, with a loamy texture. Contains a mixture of fine to medium-sized particles, including organic matter and occasional small stones.
0.4	4.2		Made Ground			Grey sandy clayey gravel: gravel is fine to coarse, subangular to angular, composed of limestone, sandstone and occasional red brick fragments. ENGINEERED FILL.
0.6	4.0					
0.8	3.8					
1.0	3.6					
1.2	3.4					
1.4	3.2					
1.6	3.0					
1.8	2.8					
2.0	2.6					
2.2	2.4					
2.4	2.2					
2.6	2.0					
2.8	1.8					
3.0	1.6					
3.2	1.4					
3.4	1.2					
3.6	1.0					
3.8	0.8					
	0.6					
	0.4					
	0.2					



Remarks:

SSC - Subsurface Clearance m - meter
 PID - Photoionization Detector ppm - parts per million
 NA - not available or not applicable AOD - Above Ordnance Datum
 mm - millimeter m bgs - meters below ground surface

Location ID: HP306

Start Date: 09-Aug-2024	Northing: 383958.61	Client: Eni UK Site Name: Point of Ayr Location: Point of Ayr Terminal Holywell
End Date: 09-Aug-2024	Easting: 312348.30	
Contractor: Geotron UK Ltd	Surface Elevation: 4.8 m AOD	
Method: Hand Pitting	Water Encountered:	
Equipment: Insulated Hand Tools	Logged By: BS	
Driller: NA	Reviewed By:	
SSC Contractor: Geotron UK Ltd		

TEST PIT PROFILE						
Depth (m)	Elevation (m AOD)	Sample Interval	USCS	Lithology	Water Level	Stratigraphic Description
5.0	4.8					
0.0	4.6		Top Soil			Topsoil, dark brown to black, with a loamy texture. Contains a mixture of fine to medium-sized particles, including organic matter and occasional small stones. Membrane at 0.2m.
0.2	4.4		Made Ground			Brown sandy clayey gravel: gravel is fine to coarse, subangular to angular, composed of limestone and sandstone. ENGINEERED FILL.
0.4	4.2					
0.6	4.0					
0.8	3.8					
1.0	3.6					
1.2	3.4					
1.4	3.2					
1.6	3.0					
1.8	2.8					
2.0	2.6					
2.2	2.4					
2.4	2.2					
2.6	2.0					
2.8	1.8					
3.0	1.6					
3.2	1.4					
3.4	1.2					
3.6	1.0					
3.8						



Remarks:

SSC - Subsurface Clearance m - meter
 PID - Photoionization Detector ppm - parts per million
 NA - not available or not applicable AOD - Above Ordance Datum
 mm - millimeter m bgs - meters below ground surface

Location ID: HP305

Start Date: 09-Aug-2024	Northing: 383952.30	Client: Eni UK Site Name: Point of Ayr Location: Point of Ayr Terminal Holywell
End Date: 09-Aug-2024	Easting: 312502.82	
Contractor: Geotron UK Ltd	Surface Elevation: 4.5 m AOD	
Method: Hand Pitting	Water Encountered:	
Equipment: Insulated Hand Tools	Logged By: BS	
Driller: NA	Reviewed By:	
SSC Contractor: Geotron UK Ltd		

TEST PIT PROFILE						
Depth (m)	Elevation (m AOD)	Sample Interval	USCS	Lithology	Water Level	Stratigraphic Description
4.6						
0.0	4.4		Top Soil			Topsoil, dark brown to black, with a loamy texture. Contains a mixture of fine to medium-sized particles, including organic matter and occasional small stones
0.2	4.2					
0.4	4.0		CH			Natural firm brown sandy CLAY.
0.6	3.8					
0.8	3.6					
1.0	3.4					
1.2	3.2					
1.4	3.0					
1.6	2.8					
1.8	2.6					
2.0	2.4					
2.2	2.2					
2.4	2.0					
2.6	1.8					
2.8	1.6					
3.0	1.4					
3.2	1.2					
3.4	1.0					
3.6	0.8					
3.8						



Remarks:

SSC - Subsurface Clearance m - meter
 PID - Photoionization Detector ppm - parts per million
 NA - not available or not applicable AOD - Above Ordnance Datum
 mm - millimeter m bgs - meters below ground surface

Location ID: HP304

Start Date: 09-Aug-2024	Northing: 383995.41	Client: Eni UK Site Name: Point of Ayr Location: Point of Ayr Terminal Holywell
End Date: 09-Aug-2024	Easting: 312453.76	
Contractor: Geotron UK Ltd	Surface Elevation: 4.6 m AOD	
Method: Hand Pitting	Water Encountered:	
Equipment: Insulated Hand Tools	Logged By: BS	
Driller: NA	Reviewed By:	
SSC Contractor: Geotron UK Ltd		

TEST PIT PROFILE						
Depth (m)	Elevation (m AOD)	Sample Interval	USCS	Lithology	Water Level	Stratigraphic Description
4.8	4.6					
0.0	4.4		Top Soil			Topsoil, dark brown to black, with a loamy texture. Contains a mixture of fine to medium-sized particles, including organic matter and occasional small stones.
0.2	4.2		Made Ground			Brown sandy clayey gravel: gravel is fine to coarse, subangular to angular, composed of limestone and sandstone. ENGINEERED FILL.
0.4	4.0		CH			Natural firm dark grey sandy CLAY.
0.6	3.8					
0.8	3.6					
1.0	3.4					
1.2	3.2					
1.4	3.0					
1.6	2.8					
1.8	2.6					
2.0	2.4					
2.2	2.2					
2.4	2.0					
2.6	1.8					
2.8	1.6					
3.0	1.4					
3.2	1.2					
3.4	1.0					
3.6	0.8					



Remarks:

SSC - Subsurface Clearance m - meter
 PID - Photoionization Detector ppm - parts per million
 NA - not available or not applicable AOD - Above Ordnance Datum
 mm - millimeter m bgs - meters below ground surface

Sheet: Page 1 of 1

Location ID: HP303

Start Date: 09-Aug-2024	Northing: 384058.72	Client: Eni UK Site Name: Point of Ayr Location: Point of Ayr Terminal Holywell
End Date: 09-Aug-2024	Easting: 312456.87	
Contractor: Geotron UK Ltd	Surface Elevation: 4.8 m AOD	
Method: Hand Pitting	Water Encountered:	
Equipment: Insulated Hand Tools	Logged By: BS	
Driller: NA	Reviewed By:	
SSC Contractor: Geotron UK Ltd		

TEST PIT PROFILE					
Depth (m)	Elevation (m AOD)	Sample Interval	USCS	Lithology	Water Level
Stratigraphic Description					
5.0	4.8				
0.0	4.6		Top Soil		Topsoil, dark brown to black, with a loamy texture. Contains a mixture of fine to medium-sized particles, including organic matter and occasional small stones.
0.2	4.4				
0.4	4.2		Made Ground		Brown sandy clayey gravel: gravel is fine to coarse, subangular to angular, composed of limestone and sandstone with occasional boulders. ENGINEERED FILL.
0.6	4.0				
0.8	3.8				
1.0	3.6				
1.2	3.4				
1.4	3.2				
1.6	3.0				
1.8	2.8				
2.0	2.6				
2.2	2.4				
2.4	2.2				
2.6	2.0				
2.8	1.8				
3.0	1.6				
3.2	1.4				
3.4	1.2				
3.6	1.0				
3.8					



Remarks:

SSC - Subsurface Clearance m - meter
 PID - Photoionization Detector ppm - parts per million
 NA - not available or not applicable AOD - Above Ordnance Datum
 mm - millimeter m bgs - meters below ground surface

Location ID: HP302

Start Date: 09-Aug-2024	Northing: 384100.19	Client: Eni UK Site Name: Point of Ayr Location: Point of Ayr Terminal Holywell
End Date: 09-Aug-2024	Easting: 312228.50	
Contractor: Geotron UK Ltd	Surface Elevation: 4.5 m AOD	
Method: Hand Pitting	Water Encountered:	
Equipment: Insulated Hand Tools	Logged By: BS	
Driller: NA	Reviewed By:	
SSC Contractor: Geotron UK Ltd		

TEST PIT PROFILE						
Depth (m)	Elevation (m AOD)	Sample Interval	USCS	Lithology	Water Level	Stratigraphic Description
4.8						
4.6						
0.0						Dark grey gravelly surface aggregate: gravel is coarse, angular, composed of limestone. ENGINEERED FILL
0.2	4.4		Made Ground	[Cross-hatched pattern]		Grey to brown sandy gravel: gravel is fine to coarse, subangular to angular, composed of limestone and sandstone and containing cobbles of limestone. ENGINEERED FILL. Membrane at 0.8m. From 0.5 m to 0.6 m, the gravel shows moderate discoloration. Water perched on top of membrane.
0.4	4.2					
0.6	4.0					
0.8	3.8					
1.0	3.6		CH	[Horizontal line pattern]		Natural firm dark grey CLAY.
1.2	3.4					
1.4	3.2					
1.6	3.0					
1.8	2.8					
2.0	2.6					
2.2	2.4					
2.4	2.2					
2.6	2.0					
2.8	1.8					
3.0	1.6					
3.2	1.4					
3.4	1.2					
3.6	1.0					
3.8	0.8					



Remarks:

SSC - Subsurface Clearance m - meter
 PID - Photoionization Detector ppm - parts per million
 NA - not available or not applicable AOD - Above Ordance Datum
 mm - millimeter m bgs - meters below ground surface

Location ID: HP301

Start Date: 09-Aug-2024	Northing: 384106.97	Client: Eni UK Site Name: Point of Ayr Location: Point of Ayr Terminal Holywell
End Date: 09-Aug-2024	Easting: 312004.25	
Contractor: Geotron UK Ltd	Surface Elevation: 4.3 m AOD	
Method: Hand Pitting	Water Encountered:	
Equipment: Insulated Hand Tools	Logged By: BS	
Driller: NA	Reviewed By:	
SSC Contractor: Geotron UK Ltd		

TEST PIT PROFILE						
Depth (m)	Elevation (m AOD)	Sample Interval	USCS	Lithology	Water Level	Stratigraphic Description
4.6						
4.4			Top Soil			Topsoil, dark brown to black, with a loamy texture. Contains a mixture of fine to medium-sized particles, including organic matter and occasional small stones.
4.2			Made Ground			Brown sandy clayey gravel: gravel is fine to coarse, subangular to angular, composed of limestone and sandstone. ENGINEERED FILL. Concrete slab at 0.3m.
4.0						
3.8						
3.6						
3.4						
3.2						
3.0						
2.8						
2.6						
2.4						
2.2						
2.0						
1.8						
1.6						
1.4						
1.2						
1.0						
0.8						
0.6						
0.4						
0.2						
0.0						



Remarks:

SSC - Subsurface Clearance m - meter
 PID - Photoionization Detector ppm - parts per million
 NA - not available or not applicable AOD - Above Ordance Datum
 mm - millimeter m bgs - meters below ground surface

Location ID: FM12

Start Date: 09-Aug-2024	Northing: 383930.49	Client: Eni UK Site Name: Point of Ayr Location: Point of Ayr Terminal Holywell
End Date: 09-Aug-2024	Easting: 312365.39	
Contractor: Geotron UK Ltd	Surface Elevation: 4.6 m AOD	
Method: Hand Pitting	Water Encountered:	
Equipment: Insulated Hand Tools	Logged By: BS	
Driller: NA	Reviewed By:	
SSC Contractor: Geotron UK Ltd		

TEST PIT PROFILE						
Depth (m)	Elevation (m AOD)	Sample Interval	USCS	Lithology	Water Level	Stratigraphic Description
4.8	4.6					
0.0	4.4		Top Soil			Topsoil, dark brown to black, with a loamy texture. Contains a mixture of fine to medium-sized particles, including organic matter and occasional small stones. Membrane at 0.2m.
0.2	4.4		Made Ground			Grey sandy clayey gravel: gravel is fine to coarse, subangular to angular, composed of limestone and sandstone. ENGINEERED FILL.
0.4	4.2					Red to orange sandy gravel: gravel is fine to coarse, subangular to angular, composed of limestone and sandstone. ENGINEERED FILL.
0.6	4.0					
0.8	3.8					
1.0	3.6					
1.2	3.4					
1.4	3.2					
1.6	3.0					
1.8	2.8					
2.0	2.6					
2.2	2.4					
2.4	2.2					
2.6	2.0					
2.8	1.8					
3.0	1.6					
3.2	1.4					
3.4	1.2					
3.6	1.0					
3.8	0.8					



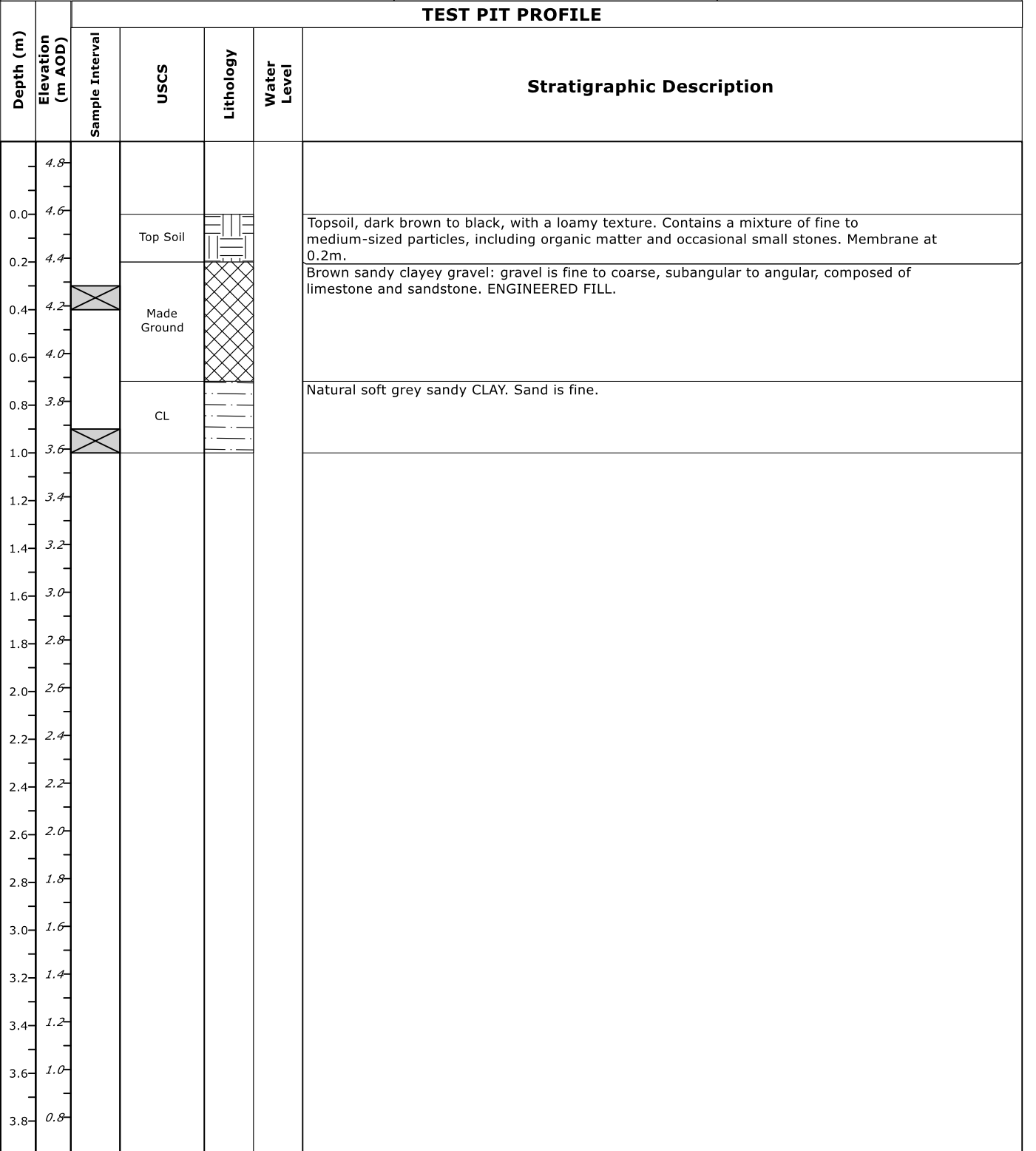
Remarks:

SSC - Subsurface Clearance m - meter
 PID - Photoionization Detector ppm - parts per million
 NA - not available or not applicable AOD - Above Ordnance Datum
 mm - millimeter m bgs - meters below ground surface

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Location ID: FM11

Start Date: 09-Aug-2024	Northing: 383930.47	Client: Eni UK Site Name: Point of Ayr Location: Point of Ayr Terminal Holywell
End Date: 31-Jul-2024	Easting: 312327.34	
Contractor: Geotron UK Ltd	Surface Elevation: 4.6 m AOD	
Method: Hand Pitting	Water Encountered:	
Equipment: Insulated Hand Tools	Logged By: BS	
Driller: NA	Reviewed By:	
SSC Contractor: Geotron UK Ltd		



Remarks:

SSC - Subsurface Clearance m - meter
 PID - Photoionization Detector ppm - parts per million
 NA - not available or not applicable AOD - Above Ordnance Datum
 mm - millimeter m bgs - meters below ground surface

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Location ID: FM10

Start Date: 09-Aug-2024	Northing: 383903.03	Client: Eni UK Site Name: Point of Ayr Location: Point of Ayr Terminal Holywell
End Date: 09-Aug-2024	Easting: 312212.96	
Contractor: Geotron UK Ltd	Surface Elevation: 4.5 m AOD	
Method: Hand Pitting	Water Encountered:	
Equipment: Insulated Hand Tools	Logged By: BS	
Driller: NA	Reviewed By:	
SSC Contractor: Geotron UK Ltd		

TEST PIT PROFILE						
Depth (m)	Elevation (m AOD)	Sample Interval	USCS	Lithology	Water Level	Stratigraphic Description
4.6						
0.0	4.4		Made Ground	[Cross-hatched pattern]		Dark grey gravelly surface aggregate: gravel is coarse, angular, composed of limestone. ENGINEERED FILL
0.2	4.2					
0.4	4.0	[X-pattern]				
0.6	3.8					
0.8	3.6					
1.0	3.4					
1.2	3.2					
1.4	3.0					
1.6	2.8					
1.8	2.6					
2.0	2.4					
2.2	2.2					
2.4	2.0					
2.6	1.8					
2.8	1.6					
3.0	1.4					
3.2	1.2					
3.4	1.0					
3.6	0.8					
3.8	0.6					



Remarks:
 SSC - Subsurface Clearance m - meter
 PID - Photoionization Detector ppm - parts per million
 NA - not available or not applicable AOD - Above Ordnance Datum
 mm - millimeter m bgs - meters below ground surface

Location ID: FM09

Start Date: 09-Aug-2024	Northing: 383932.44	Client: Eni UK Site Name: Point of Ayr Location: Point of Ayr Terminal Holywell
End Date: 09-Aug-2024	Easting: 312196.39	
Contractor: Geotron UK Ltd	Surface Elevation: 4.6 m AOD	
Method: Hand Pitting	Water Encountered:	
Equipment: Insulated Hand Tools	Logged By: BS	
Driller: NA	Reviewed By:	
SSC Contractor: Geotron UK Ltd		

TEST PIT PROFILE						
Depth (m)	Elevation (m AOD)	Sample Interval	USCS	Lithology	Water Level	Stratigraphic Description
4.8	4.6		Top Soil			Topsoil, dark brown to black, with a loamy texture. Contains a mixture of fine to medium-sized particles, including organic matter and occasional small stones. Membrane at 0.2m.
0.2	4.4		Made Ground			Dark brown clayey gravel: gravel is fine to coarse, subangular to angular, composed of limestone and sandstone. ENGINEERED FILL. Membrane at 0.7m.
0.4	4.2					
0.6	4.0					
0.8	3.8		CH			Natural soft dark brown sandy CLAY. Sand is fine.
1.0	3.6					
1.2	3.4					
1.4	3.2					
1.6	3.0					
1.8	2.8					
2.0	2.6					
2.2	2.4					
2.4	2.2					
2.6	2.0					
2.8	1.8					
3.0	1.6					
3.2	1.4					
3.4	1.2					
3.6	1.0					
3.8	0.8					



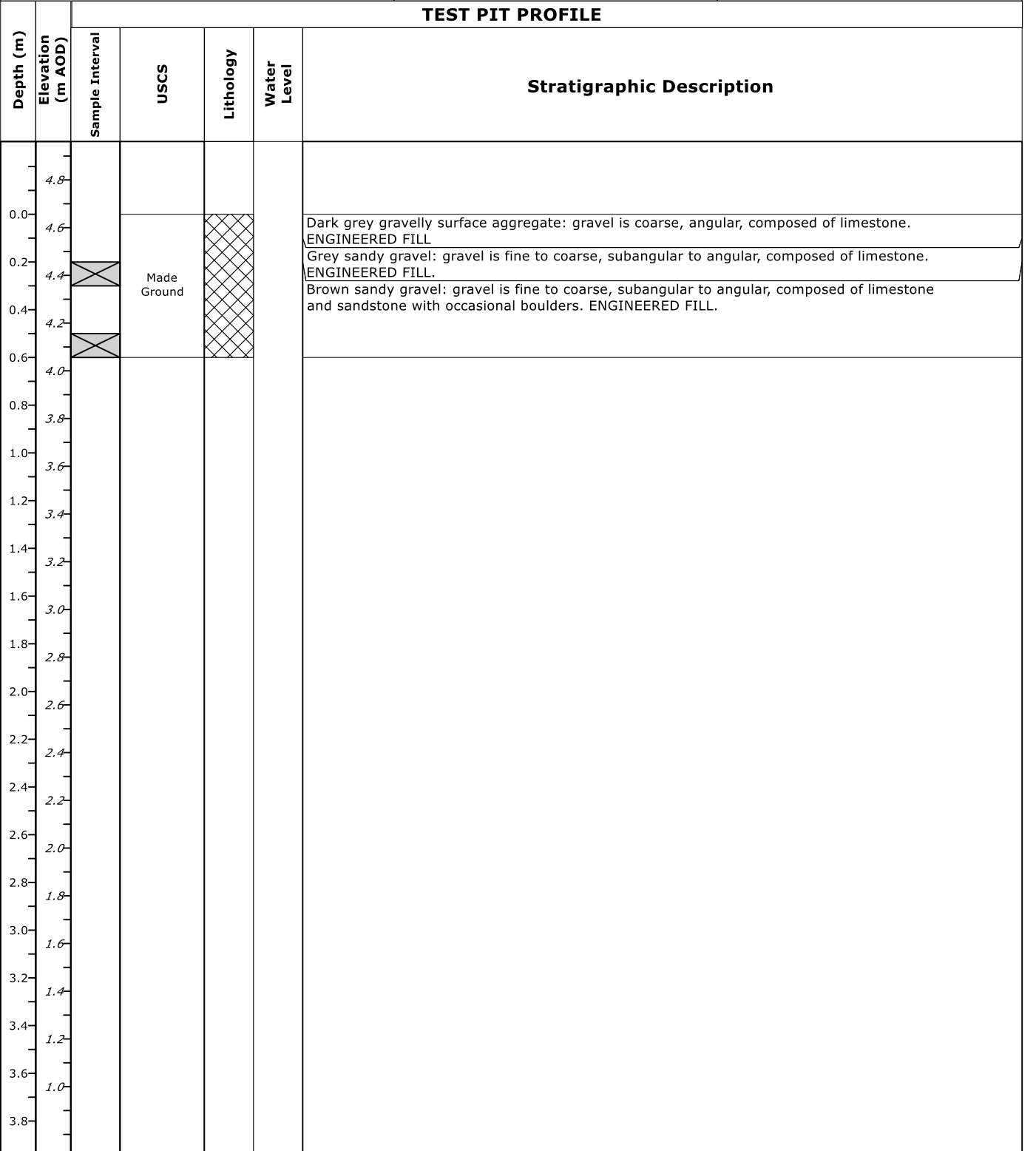
Remarks:

SSC - Subsurface Clearance m - meter
 PID - Photoionization Detector ppm - parts per million
 NA - not available or not applicable AOD - Above Ordance Datum
 mm - millimeter m bgs - meters below ground surface

Sheet: Page 1 of 1

Location ID: FM08

Start Date: 09-Aug-2024	Northing: 383861.21	Client: Eni UK Site Name: Point of Ayr Location: Point of Ayr Terminal Holywell
End Date: 09-Aug-2024	Easting: 312230.74	
Contractor: Geotron UK Ltd	Surface Elevation: 4.7 m AOD	
Method: Hand Pitting	Water Encountered:	
Equipment: Insulated Hand Tools	Logged By: BS	
Driller: NA	Reviewed By:	
SSC Contractor: Geotron UK Ltd		



Remarks:
 SSC - Subsurface Clearance m - meter
 PID - Photoionization Detector ppm - parts per million
 NA - not available or not applicable AOD - Above Ordance Datum
 mm - millimeter m bgs - meters below ground surface

Location ID: FM07

Start Date: 09-Aug-2024	Northing: 383865.95	Client: Eni UK Site Name: Point of Ayr Location: Point of Ayr Terminal Holywell
End Date: 09-Aug-2024	Easting: 312265.86	
Contractor: Geotron UK Ltd	Surface Elevation: 4.5 m AOD	
Method: Hand Pitting	Water Encountered:	
Equipment: Insulated Hand Tools	Logged By: BS	
Driller: NA	Reviewed By:	
SSC Contractor: Geotron UK Ltd		

TEST PIT PROFILE						
Depth (m)	Elevation (m AOD)	Sample Interval	USCS	Lithology	Water Level	Stratigraphic Description
4.8						
4.6						
0.0						Dark grey gravelly surface aggregate: gravel is coarse, angular, composed of limestone. ENGINEERED FILL
0.2			Made Ground			Brown sandy clayey gravel: gravel is fine to coarse, subangular to angular, composed of limestone and sandstone with occasional boulders. ENGINEERED FILL.
0.4						
0.4						
0.6						
0.8						
1.0						
1.2						
1.4						
1.6						
1.8						
2.0						
2.2						
2.4						
2.6						
2.8						
3.0						
3.2						
3.4						
3.6						
3.8						



Remarks:
 SSC - Subsurface Clearance m - meter
 PID - Photoionization Detector ppm - parts per million
 NA - not available or not applicable AOD - Above Ordnance Datum
 mm - millimeter m bgs - meters below ground surface

Sheet: Page 1 of 1

Location ID: FM06

Start Date: 09-Aug-2024	Northing: 383832.58	Client: Eni UK Site Name: Point of Ayr Location: Point of Ayr Terminal Holywell
End Date: 09-Aug-2024	Easting: 312344.46	
Contractor: Geotron UK Ltd	Surface Elevation: 4.4 m AOD	
Method: Hand Pitting	Water Encountered:	
Equipment: Insulated Hand Tools	Logged By: BS	
Driller: NA	Reviewed By:	
SSC Contractor: Geotron UK Ltd		



TEST PIT PROFILE						
Depth (m)	Elevation (m AOD)	Sample Interval	USCS	Lithology	Water Level	Stratigraphic Description
4.6	4.4		Top Soil			Topsoil, dark brown to black, with a loamy texture. Contains a mixture of fine to medium-sized particles, including organic matter and occasional small stones.
0.0	4.2		Made Ground	[Cross-hatched pattern]		Grey gravelly sand: gravel is fine to coarse, subangular to angular, composed of limestone and sandstone. Sand is fine. ENGINEERED FILL.
0.2	4.0					
0.4	3.8					
0.6	3.6					
0.8	3.4					
1.0	3.2					
1.2	3.0					
1.4	2.8					
1.6	2.6					
1.8	2.4					
2.0	2.2					
2.2	2.0					
2.4	1.8					
2.6	1.6					
2.8	1.4					
3.0	1.2					
3.2	1.0					
3.4	0.8					
3.6	0.6					
3.8						



Remarks:
 SSC - Subsurface Clearance m - meter
 PID - Photoionization Detector ppm - parts per million
 NA - not available or not applicable AOD - Above Ordnance Datum
 mm - millimeter m bgs - meters below ground surface

Location ID: FM05

Start Date: 29-Jul-2024	Northing: 383865.05	Client: Eni UK Site Name: Point of Ayr Location: Point of Ayr Terminal Holywell
End Date: 09-Aug-2024	Easting: 312425.23	
Contractor: Geotron UK Ltd	Surface Elevation: 4.4 m AOD	
Method: Hand Pitting	Water Encountered:	
Equipment: Insulated Hand Tools	Logged By: BS	
Driller: NA	Reviewed By:	
SSC Contractor: Geotron UK Ltd		

TEST PIT PROFILE						
Depth (m)	Elevation (m AOD)	Sample Interval	USCS	Lithology	Water Level	Stratigraphic Description
4.6						
0.0	4.4		Made Ground			Dark grey gravelly surface aggregate: gravel is coarse, angular, composed of limestone. ENGINEERED FILL
0.2	4.2					Orange to brown sandy clayey gravel: gravel is fine to coarse, subangular to angular, composed of limestone, sandstone and occasional red brick. ENGINEERED FILL.
0.4	4.0					
0.6	3.8					
0.8	3.6					
1.0	3.4					
1.2	3.2					
1.4	3.0					
1.6	2.8					
1.8	2.6					
2.0	2.4					
2.2	2.2					
2.4	2.0					
2.6	1.8					
2.8	1.6					
3.0	1.4					
3.2	1.2					
3.4	1.0					
3.6	0.8					
3.8	0.6					



Remarks:

SSC - Subsurface Clearance m - meter
 PID - Photoionization Detector ppm - parts per million
 NA - not available or not applicable AOD - Above Ordnance Datum
 mm - millimeter m bgs - meters below ground surface

Location ID: FM04

Start Date: 09-Aug-2024	Northing: 383880.64	Client: Eni UK Site Name: Point of Ayr Location: Point of Ayr Terminal Holywell
End Date: 09-Aug-2024	Easting: 312499.08	
Contractor: Geotron UK Ltd	Surface Elevation: 4.6 m AOD	
Method: Hand Pitting	Water Encountered:	
Equipment: Insulated Hand Tools	Logged By: BS	
Driller: NA	Reviewed By:	
SSC Contractor: Geotron UK Ltd		

TEST PIT PROFILE						
Depth (m)	Elevation (m AOD)	Sample Interval	USCS	Lithology	Water Level	Stratigraphic Description
4.8	4.6					
0.0	4.4		Top Soil			Topsoil, dark brown to black, with a loamy texture. Contains a mixture of fine to medium-sized particles, including organic matter and occasional small stones.
0.2	4.2		Made Ground			Orange sandy clayey gravel: gravel is fine to coarse, subangular to angular, composed of limestone and sandstone with occasional red brick fragments. ENGINEERED FILL.
0.4	4.0					Grey sandy gravel: gravel is fine to coarse, subangular to angular, composed of limestone and sandstone. ENGINEERED FILL. Membrane at 0.8m.
0.6	3.8		CH			Natural soft brown sandy CLAY.
0.8	3.6					
1.0	3.4					
1.2	3.2					
1.4	3.0					
1.6	2.8					
1.8	2.6					
2.0	2.4					
2.2	2.2					
2.4	2.0					
2.6	1.8					
2.8	1.6					
3.0	1.4					
3.2	1.2					
3.4	1.0					
3.6	0.8					
3.8						





Remarks:

SSC - Subsurface Clearance m - meter
 PID - Photoionization Detector ppm - parts per million
 NA - not available or not applicable AOD - Above Ordance Datum
 mm - millimeter m bgs - meters below ground surface

Location ID: FM03

Start Date: 09-Aug-2024	Northing: 383918.69	Client: Eni UK Site Name: Point of Ayr Location: Point of Ayr Terminal Holywell
End Date: 09-Aug-2024	Easting: 312479.67	
Contractor: Geotron UK Ltd	Surface Elevation: 4.4 m AOD	
Method: Hand Pitting	Water Encountered:	
Equipment: Insulated Hand Tools	Logged By: BS	
Driller: NA	Reviewed By:	
SSC Contractor: Geotron UK Ltd		

TEST PIT PROFILE					
Depth (m)	Elevation (m AOD)	Sample Interval	USCS	Lithology	Water Level
Stratigraphic Description					
4.6	4.4				
0.0	4.2		Made Ground		Dark grey gravelly surface aggregate: gravel is coarse, angular, composed of limestone. ENGINEERED FILL
0.2	4.0				Grey sandy clayey gravel: gravel is fine to coarse, subangular to angular, composed of limestone. ENGINEERED FILL.
0.4	3.8				
0.6	3.6				
0.8	3.4				
1.0	3.2				
1.2	3.0				
1.4	2.8				
1.6	2.6				
1.8	2.4				
2.0	2.2				
2.2	2.0				
2.4	1.8				
2.6	1.6				
2.8	1.4				
3.0	1.2				
3.2	1.0				
3.4	0.8				
3.6	0.6				
3.8					



Remarks:

SSC - Subsurface Clearance m - meter
 PID - Photoionization Detector ppm - parts per million
 NA - not available or not applicable AOD - Above Ordnance Datum
 mm - millimeter m bgs - meters below ground surface

Location ID: FM02

Start Date: 09-Aug-2024	Northing: 384114.99	Client: Eni UK Site Name: Point of Ayr Location: Point of Ayr Terminal Holywell
End Date: 09-Aug-2024	Easting: 312459.53	
Contractor: Geotron UK Ltd	Surface Elevation: 4.5 m AOD	
Method: Hand Pitting	Water Encountered:	
Equipment: Insulated Hand Tools	Logged By: BS	
Driller: NA	Reviewed By:	
SSC Contractor: Geotron UK Ltd		

TEST PIT PROFILE						
Depth (m)	Elevation (m AOD)	Sample Interval	USCS	Lithology	Water Level	Stratigraphic Description
4.8						
4.6						
0.0			Top Soil			Topsoil, dark brown to black, with a loamy texture. Contains a mixture of fine to medium-sized particles, including organic matter and occasional small stones.
0.2						
0.4						
0.4			Made Ground			Brown sandy clayey gravel: gravel is fine to coarse, subangular to angular, composed of limestone and sandstone. ENGINEERED FILL.
0.6						
0.8						
1.0						
1.0						
1.2						
1.4						
1.6						
1.8						
2.0						
2.2						
2.4						
2.6						
2.8						
3.0						
3.2						
3.4						
3.6						
3.8						





Remarks:

SSC - Subsurface Clearance m - meter
 PID - Photoionization Detector ppm - parts per million
 NA - not available or not applicable AOD - Above Ordnance Datum
 mm - millimeter m bgs - meters below ground surface

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Location ID: FM01

Start Date: 09-Aug-2024	Northing: 384070.15	Client: Eni UK Site Name: Point of Ayr Location: Point of Ayr Terminal Holywell
End Date: 09-Aug-2024	Easting: 312415.49	
Contractor: Geotron UK Ltd	Surface Elevation: 4.7 m AOD	
Method: Hand Pitting	Water Encountered:	
Equipment: Insulated Hand Tools	Logged By: BS	
Driller: NA	Reviewed By:	
SSC Contractor: Geotron UK Ltd		

TEST PIT PROFILE						
Depth (m)	Elevation (m AOD)	Sample Interval	USCS	Lithology	Water Level	Stratigraphic Description
4.8						
0.0	4.6		Top Soil			Topsoil, dark brown to black, with a loamy texture. Contains a mixture of fine to medium-sized particles, including organic matter and occasional small stones. Membrane at 0.2m.
0.2	4.4		Made Ground			Brown sandy clayey gravel: gravel is fine to coarse, subangular to angular, composed of limestone and sandstone. ENGINEERED FILL.
0.4						
4.2						
0.6						
4.0						
0.8						
3.8						
1.0						
3.6						
1.2						
3.4						
1.4						
3.2						
1.6						
3.0						
1.8						
2.8						
2.0						
2.6						
2.2						
2.4						
2.4						
2.2						
2.6						
2.0						
2.8						
1.8						
3.0						
1.6						
3.2						
1.4						
3.4						
1.2						
3.6						
1.0						
3.8						



Remarks:

SSC - Subsurface Clearance m - meter
 PID - Photoionization Detector ppm - parts per million
 NA - not available or not applicable AOD - Above Ordnance Datum
 mm - millimeter m bgs - meters below ground surface

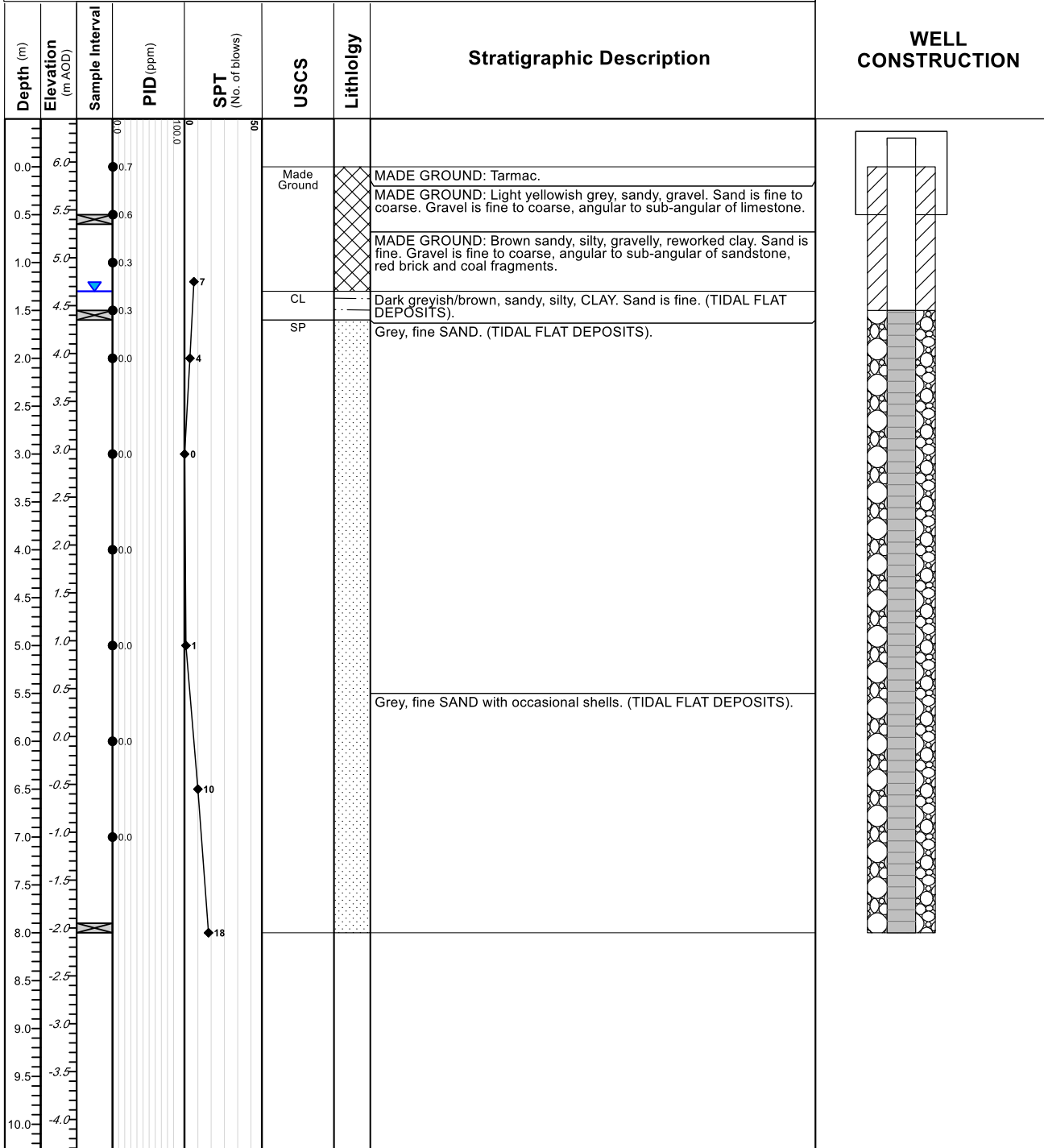
Boring/ Well ID: BH201

Drill Start/End Date: 27-Feb-2024 / 27-Feb-2024
Drilling Contractor: Geotron
Drilling Method: Percussion
Rig Make/Model: Comacchio GEO305
Driller:
SSC Contractor: Geo UK Ltd
SSC Method: Other
SSC Diam./Depth: 200 mm / 1.2 m

Northing: 383683.68
Easting: 312304.63
Surface Elevation: 6.0 m AOD
Datum Elevation: m AOD
Borehole Diam./Depth: 50.0 mm/ 8.0
Water Encountered: 1.3 m bgs
Logged By: BS
Reviewed By: PTB

Client: Eni UK
Site Name: Point of Ayr
Location: Point of Ayr Terminal Holywell

SOIL PROFILE



Remarks:

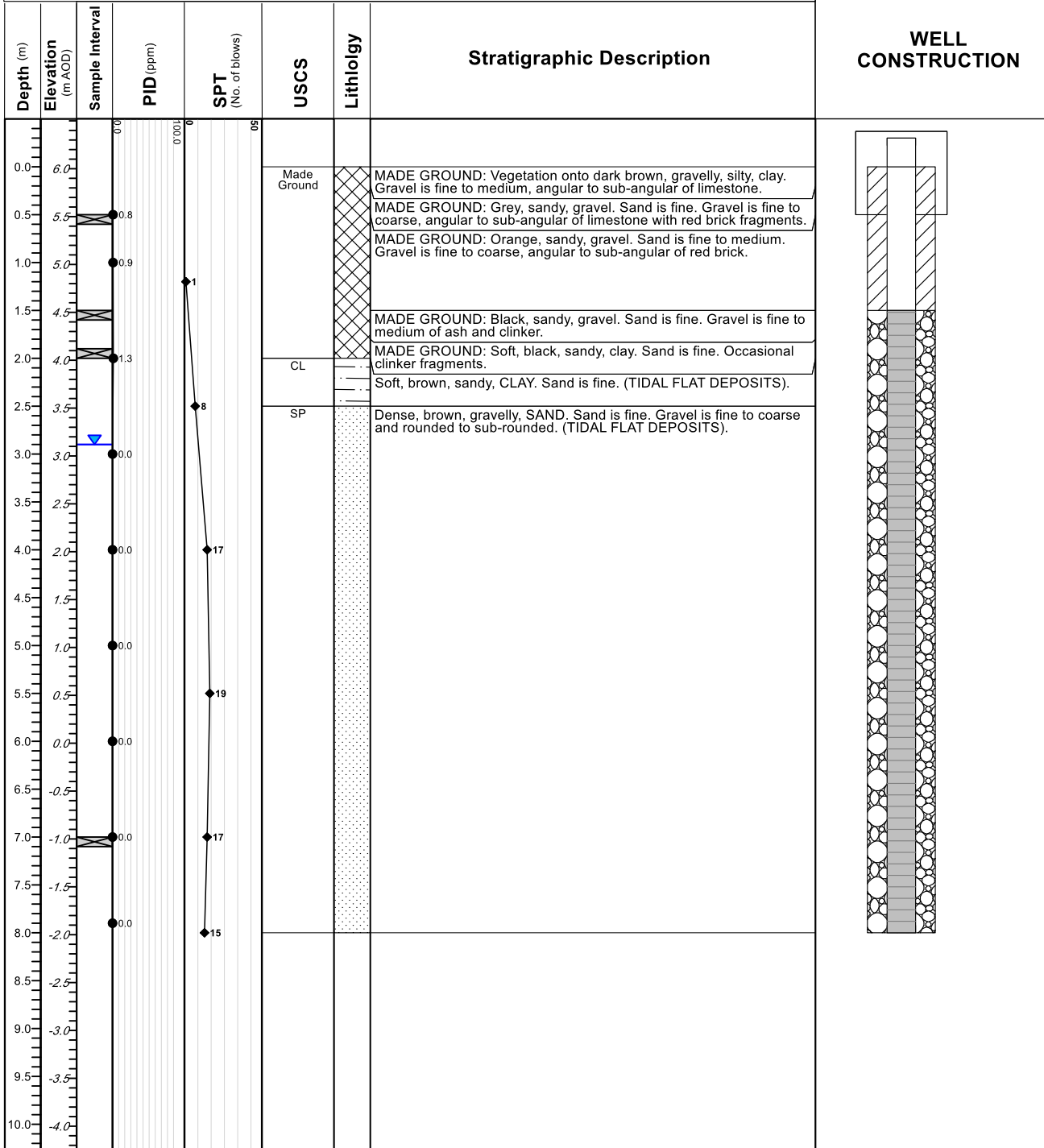
SSC - Subsurface Clearance m - meter SPT - Standard Penetration Test
 PID - Photoionization Detector ppm - parts per million
 NA - not available or not applicable AOD - Above Ordnance Datum
 mm - millimeter m bgs - meters below ground surface

Drill Start/End Date: 28-Feb-2024 / 28-Feb-2024
 Drilling Contractor: Geotron
 Drilling Method: Percussion
 Rig Make/Model: Comacchio GEO305
 Driller:
 SSC Contractor: Geo UK Ltd
 SSC Method: Other
 SSC Diam./Depth: 200 mm / 1.2 m

Northing: 383752.62
 Easting: 312449.21
 Surface Elevation: 6.0 m AOD
 Datum Elevation: m AOD
 Borehole Diam./Depth: 50.0 mm / 8.0
 Water Encountered: 2.9 m bgs
 Logged By: BS
 Reviewed By: PTB

Client: Eni UK
 Site Name: Point of Ayr
 Location: Point of Ayr Terminal Holywell

SOIL PROFILE



Remarks:

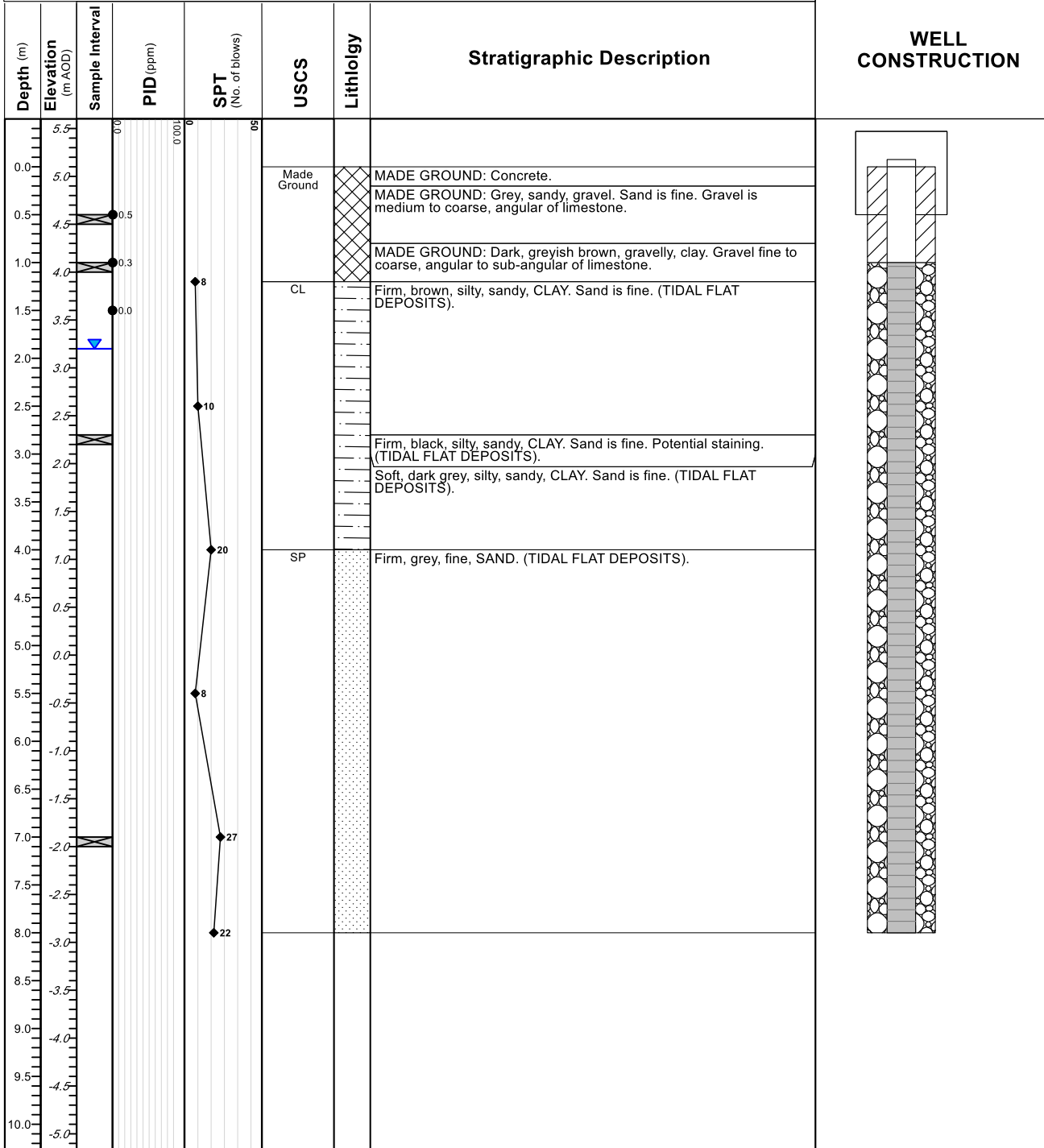
SSC - Subsurface Clearance m - meter SPT - Standard Penetration Test
 PID - Photoionization Detector ppm - parts per million
 NA - not available or not applicable AOD - Above Ordnance Datum
 mm - millimeter m bgs - meters below ground surface

Drill Start/End Date: 28-Feb-2024 / 29-Feb-2024
Drilling Contractor: Geotron
Drilling Method: Percussion
Rig Make/Model: Comacchio GEO305
Driller:
SSC Contractor: Geo UK Ltd
SSC Method: Other
SSC Diam./Depth: 200 mm / 1.2 m

Northing: 383769.03
Easting: 312212.92
Surface Elevation: 5.1 m AOD
Datum Elevation: m AOD
Borehole Diam./Depth: 50.0 mm / 8.0
Water Encountered: 1.9 m bgs
Logged By: BS
Reviewed By: PTB

Client: Eni UK
Site Name: Point of Ayr
Location: Point of Ayr Terminal Holywell

SOIL PROFILE



Remarks:

SSC - Subsurface Clearance m - meter SPT - Standard Penetration Test
 PID - Photoionization Detector ppm - parts per million
 NA - not available or not applicable AOD - Above Ordnance Datum
 mm - millimeter m bgs - meters below ground surface

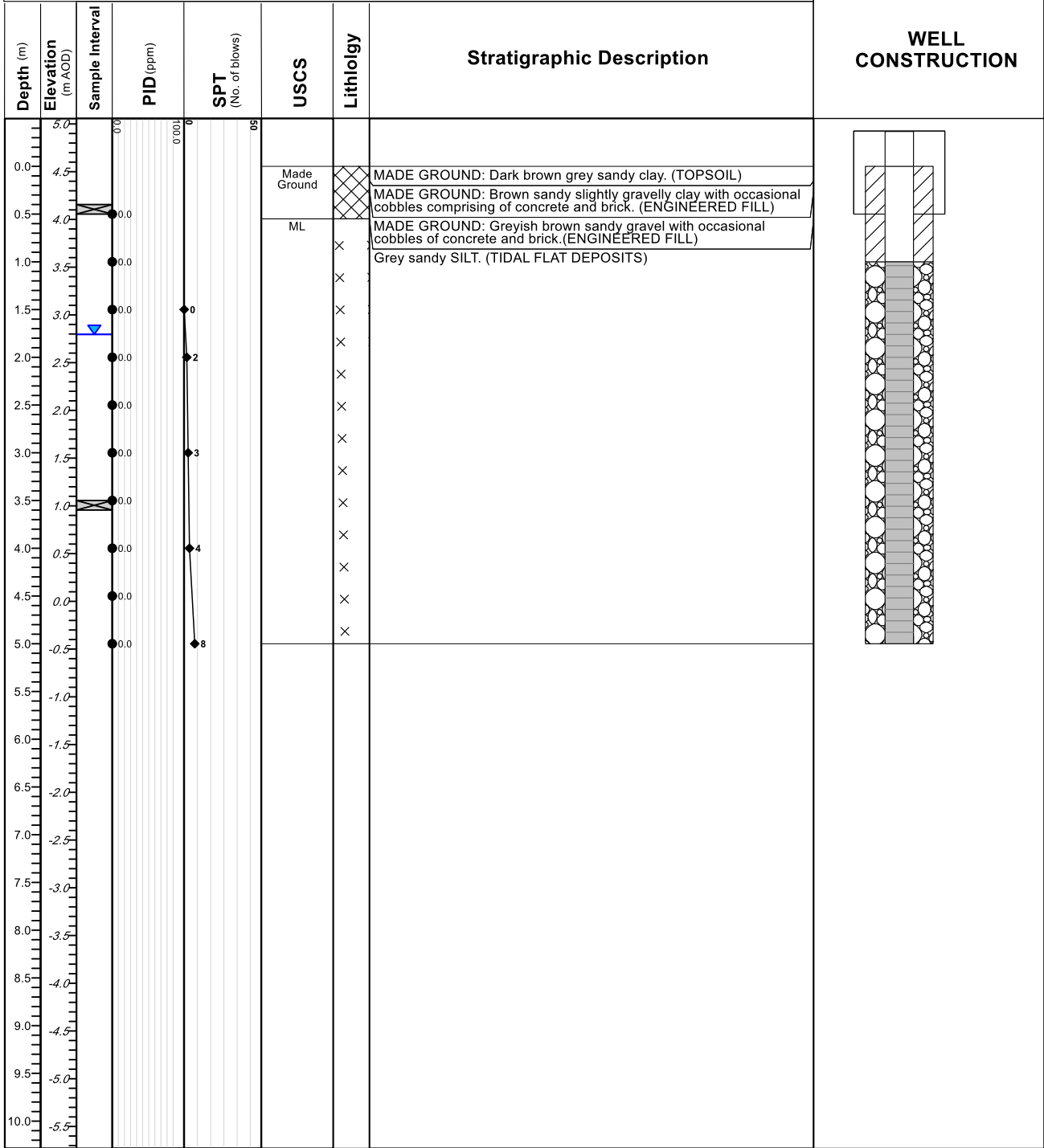
Boring/ Well ID: WS202

Drill Start/End Date: 26-Feb-2024 / 26-Feb-2024
Drilling Contractor: Geotron
Drilling Method: Direct Push
Rig Make/Model: Dart Dart
Driller:
SSC Contractor: Geotron
SSC Method: Shovel
SSC Diam./Depth: 80 mm / 1.5 m

Northing: 383864.69
Easting: 312120.23
Surface Elevation: 4.6 m AOD
Datum Elevation: m AOD
Borehole Diam./Depth: 63.0 mm / 5.0
Water Encountered: 1.8 m bgs
Logged By: MG
Reviewed By: PTB

Client: Eni UK
Site Name: Point of Ayr
Location: Point of Ayr Terminal Holywell

SOIL PROFILE



Remarks:

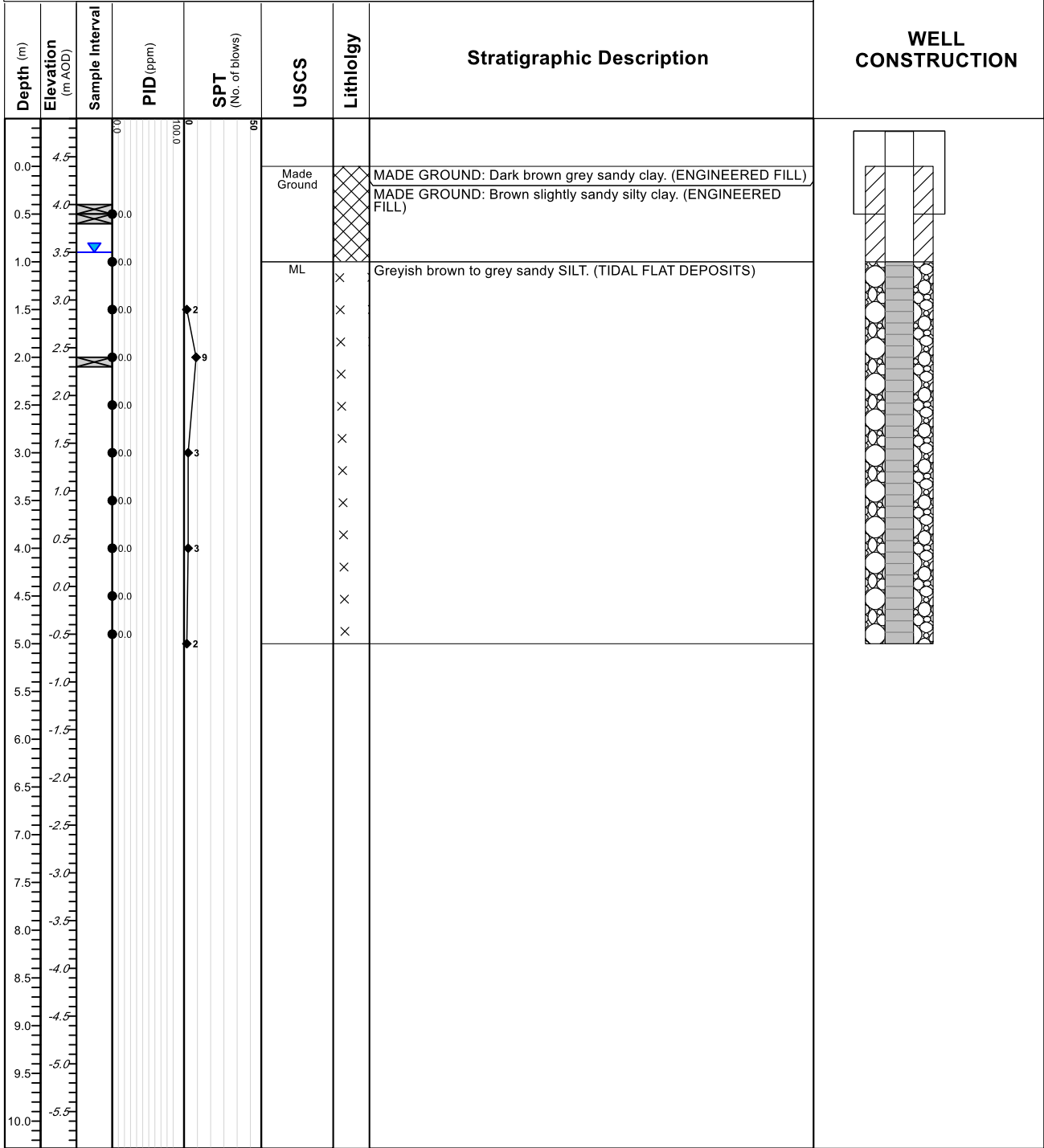
SSC - Subsurface Clearance m - meter SPT - Standard Penetration Test
 PID - Photoionization Detector ppm - parts per million
 NA - not available or not applicable AOD - Above Ordnance Datum
 mm - millimeter m bgs - meters below ground surface

Drill Start/End Date: 28-Feb-2024 / 28-Feb-2024
 Drilling Contractor: Geotron
 Drilling Method: Direct Push
 Rig Make/Model: Dart Dart
 Driller:
 SSC Contractor: Geotron
 SSC Method: Shovel
 SSC Diam./Depth: 80 mm / 1.5 m

Northing: 383816.95
 Easting: 312216.35
 Surface Elevation: 4.4 m AOD
 Datum Elevation: m AOD
 Borehole Diam./Depth: 63.0 mm / 5.0
 Water Encountered: 0.9 m bgs
 Logged By: MG
 Reviewed By: PTB

Client: Eni UK
 Site Name: Point of Ayr
 Location: Point of Ayr Terminal Holywell

SOIL PROFILE



Remarks:

SSC - Subsurface Clearance m - meter SPT - Standard Penetration Test
 PID - Photoionization Detector ppm - parts per million
 NA - not available or not applicable AOD - Above Ordnance Datum
 mm - millimeter m bgs - meters below ground surface

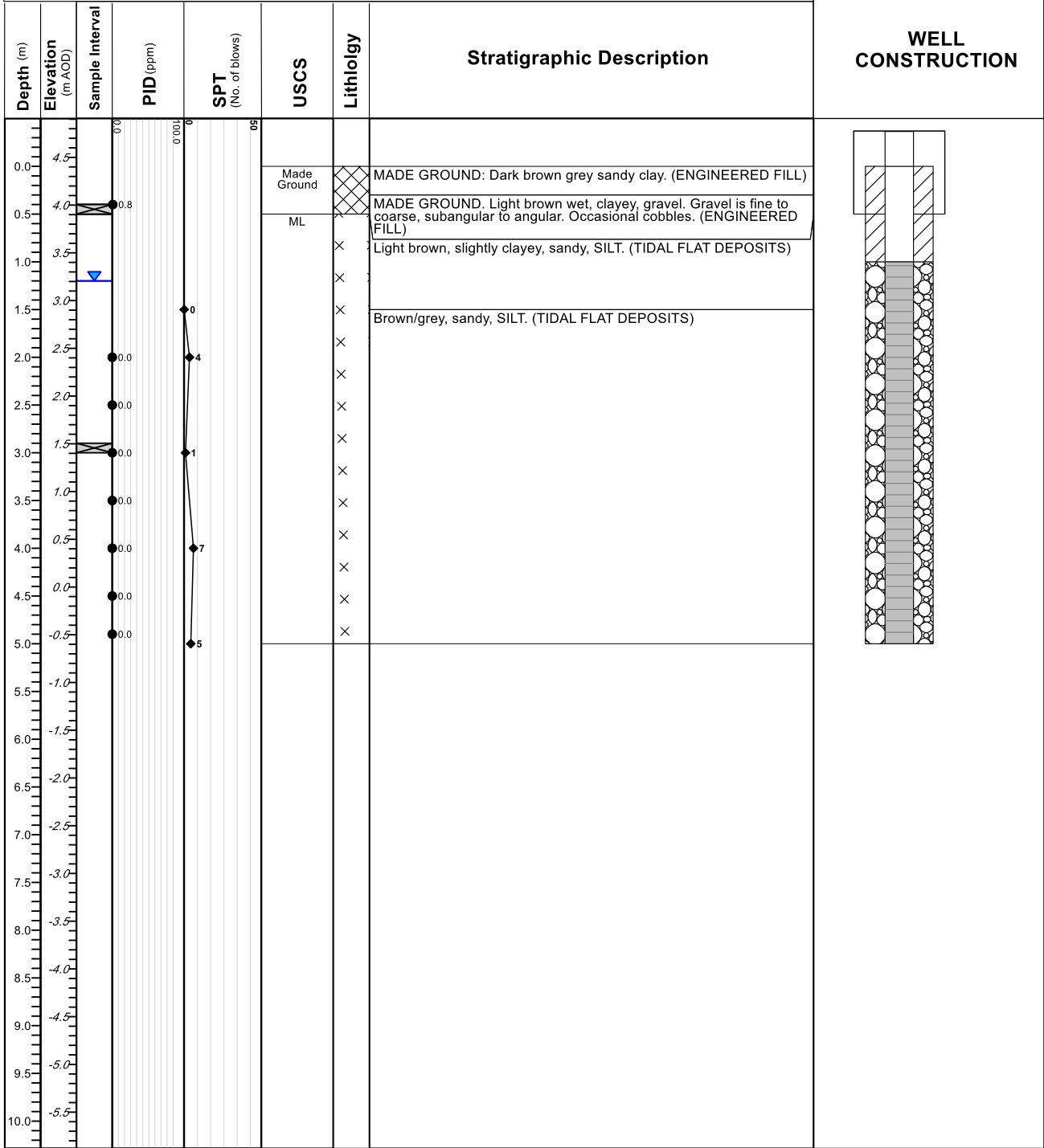
Boring/ Well ID: WS204

Drill Start/End Date: 29-Feb-2024 / 29-Feb-2024
Drilling Contractor: Geotron
Drilling Method: Direct Push
Rig Make/Model: Dart Dart
Driller:
SSC Contractor: Geotron
SSC Method: Shovel
SSC Diam./Depth: 80 mm / 1.5 m

Northing: 383815.81
Easting: 312334.58
Surface Elevation: 4.4 m AOD
Datum Elevation: m AOD
Borehole Diam./Depth: 63.0 mm / 5.0
Water Encountered: 1.2 m bgs
Logged By: MG
Reviewed By: PTB

Client: Eni UK
Site Name: Point of Ayr
Location: Point of Ayr Terminal Holywell

SOIL PROFILE



Remarks:

SSC - Subsurface Clearance m - meter SPT - Standard Penetration Test
 PID - Photoionization Detector ppm - parts per million
 NA - not available or not applicable AOD - Above Ordnance Datum
 mm - millimeter m bgs - meters below ground surface

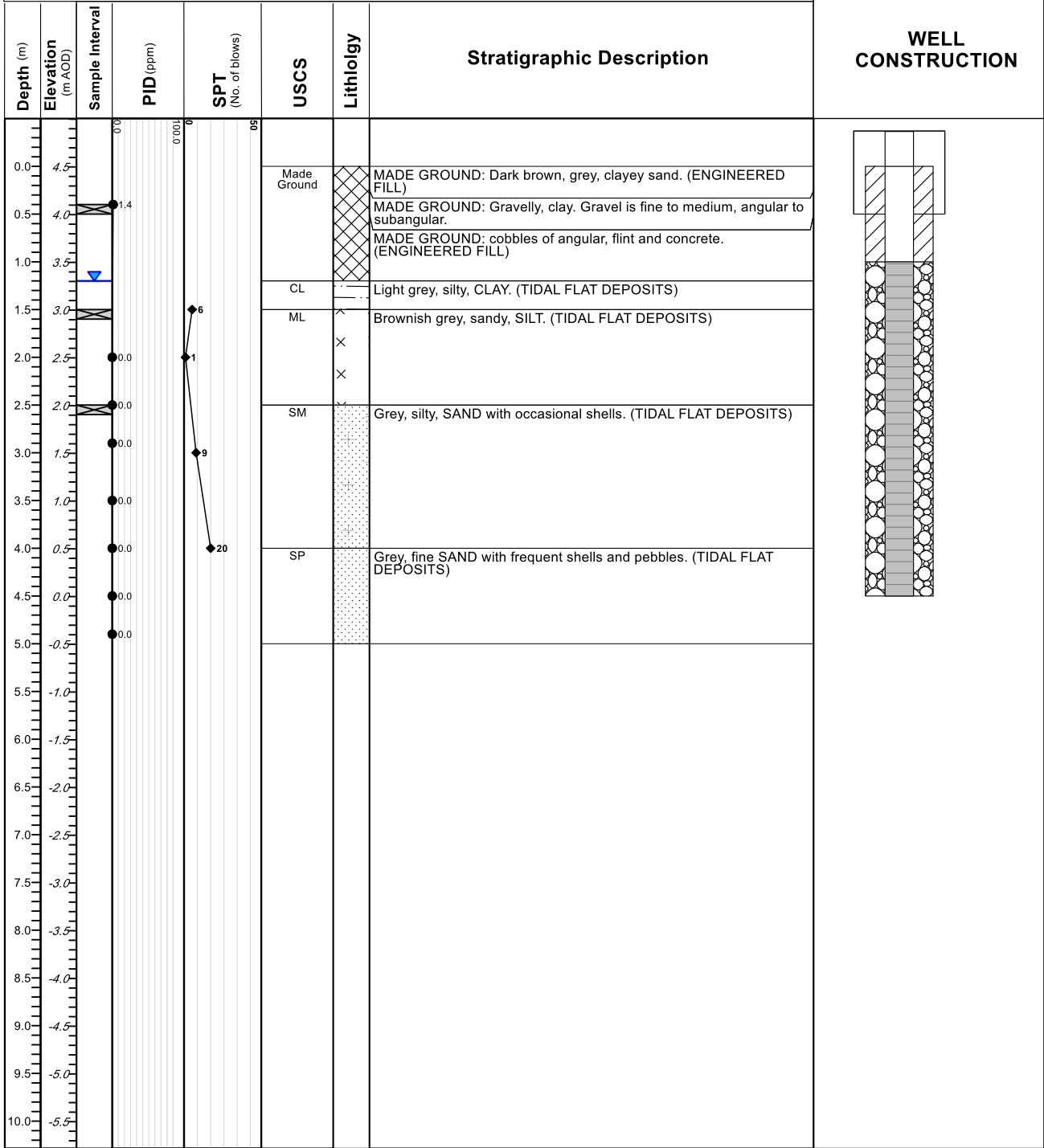
Boring/ Well ID: WS205

Drill Start/End Date: 29-Feb-2024 / 29-Feb-2024
Drilling Contractor: Geotron
Drilling Method: Direct Push
Rig Make/Model: Dart Dart
Driller:
SSC Contractor: Geotron
SSC Method: Shovel
SSC Diam./Depth: 80 mm / 1.5 m

Northing: 383822.58
Easting: 312480.60
Surface Elevation: 4.5 m AOD
Datum Elevation: m AOD
Borehole Diam./Depth: 63.0 mm / 5.0
Water Encountered: 1.2 m bgs
Logged By: MG
Reviewed By: PTB

Client: Eni UK
Site Name: Point of Ayr
Location: Point of Ayr Terminal Holywell

SOIL PROFILE



Remarks:

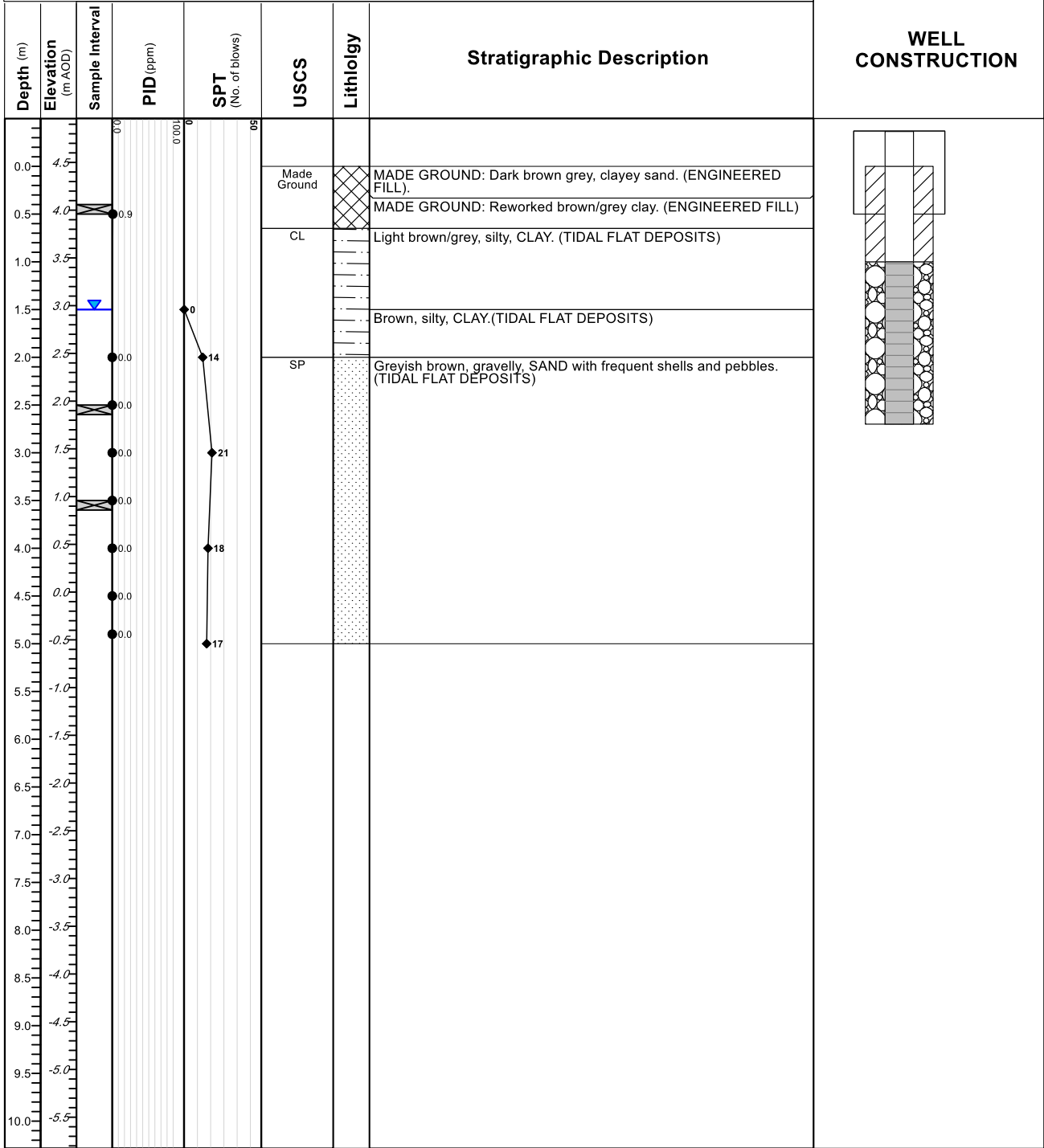
SSC - Subsurface Clearance m - meter SPT - Standard Penetration Test
 PID - Photoionization Detector ppm - parts per million
 NA - not available or not applicable AOD - Above Ordnance Datum
 mm - millimeter m bgs - meters below ground surface

Drill Start/End Date: 01-Mar-2024 / 01-Mar-2024
Drilling Contractor: Geotron
Drilling Method: Direct Push
Rig Make/Model: Dart Dart
Driller:
SSC Contractor: Geotron
SSC Method: Shovel
SSC Diam./Depth: 80 mm / 1.5 m

Northing: 383887.35
Easting: 312503.07
Surface Elevation: 4.5 m AOD
Datum Elevation: m AOD
Borehole Diam./Depth: 63.0 mm / 5.0
Water Encountered: 1.5 m bgs
Logged By: MG
Reviewed By: PTB

Client: Eni UK
Site Name: Point of Ayr
Location: Point of Ayr Terminal Holywell

SOIL PROFILE



Remarks:

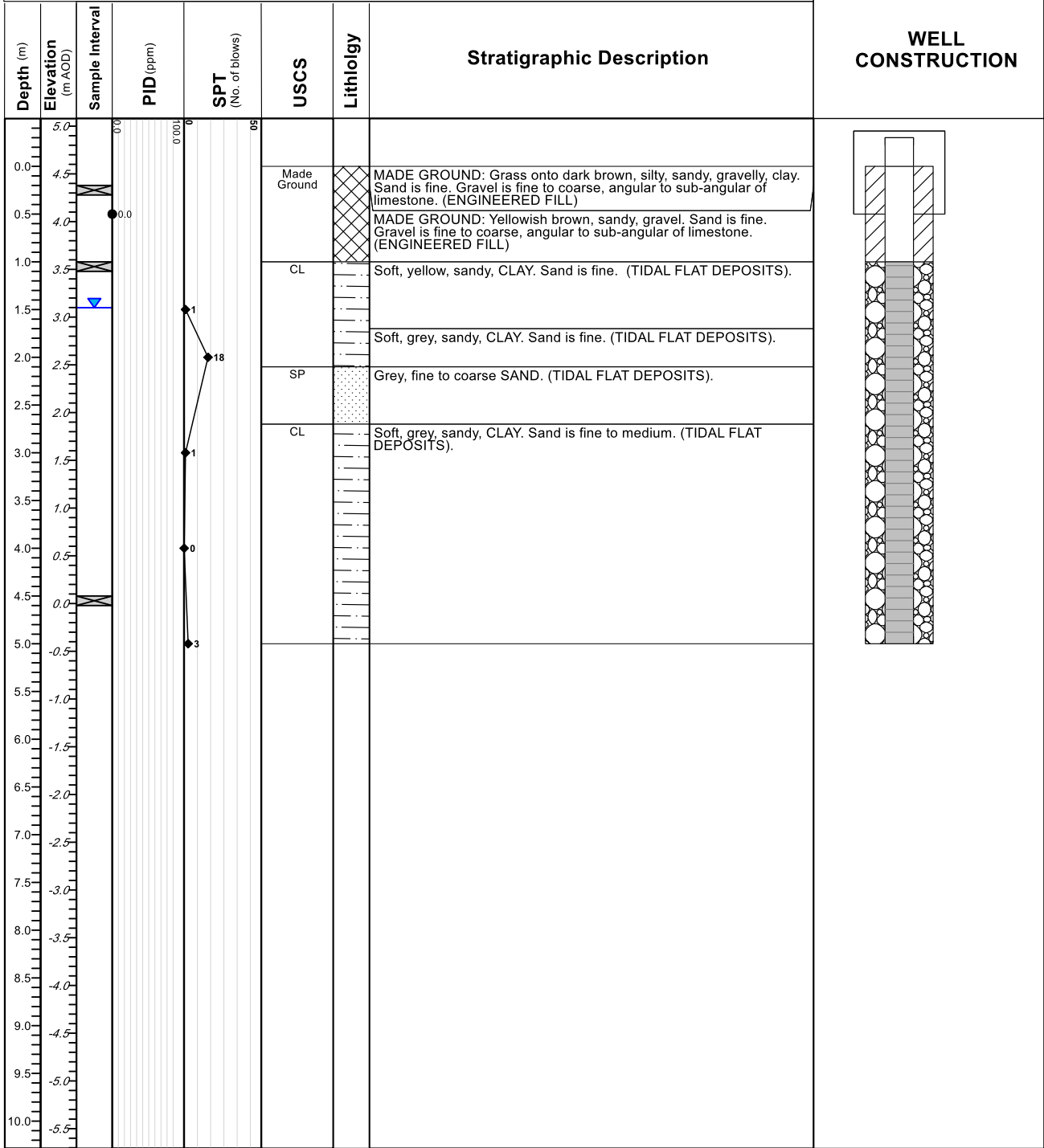
SSC - Subsurface Clearance m - meter SPT - Standard Penetration Test
 PID - Photoionization Detector ppm - parts per million
 NA - not available or not applicable AOD - Above Ordnance Datum
 mm - millimeter m bgs - meters below ground surface

Drill Start/End Date: 06-Mar-2024 / 06-Mar-2024
Drilling Contractor: Geotron
Drilling Method: Percussion
Rig Make/Model: Dart Dart
Driller:
SSC Contractor: Geo UK Ltd
SSC Method: Other
SSC Diam./Depth: 200 mm / 1.5 m

Northing: 384119.51
Easting: 312373.81
Surface Elevation: 4.6 m AOD
Datum Elevation: m AOD
Borehole Diam./Depth: 50.0 mm / 5.0
Water Encountered: 1.5 m bgs
Logged By: BS
Reviewed By: PTB

Client: Eni UK
Site Name: Point of Ayr
Location: Point of Ayr Terminal Holywell

SOIL PROFILE



Remarks:

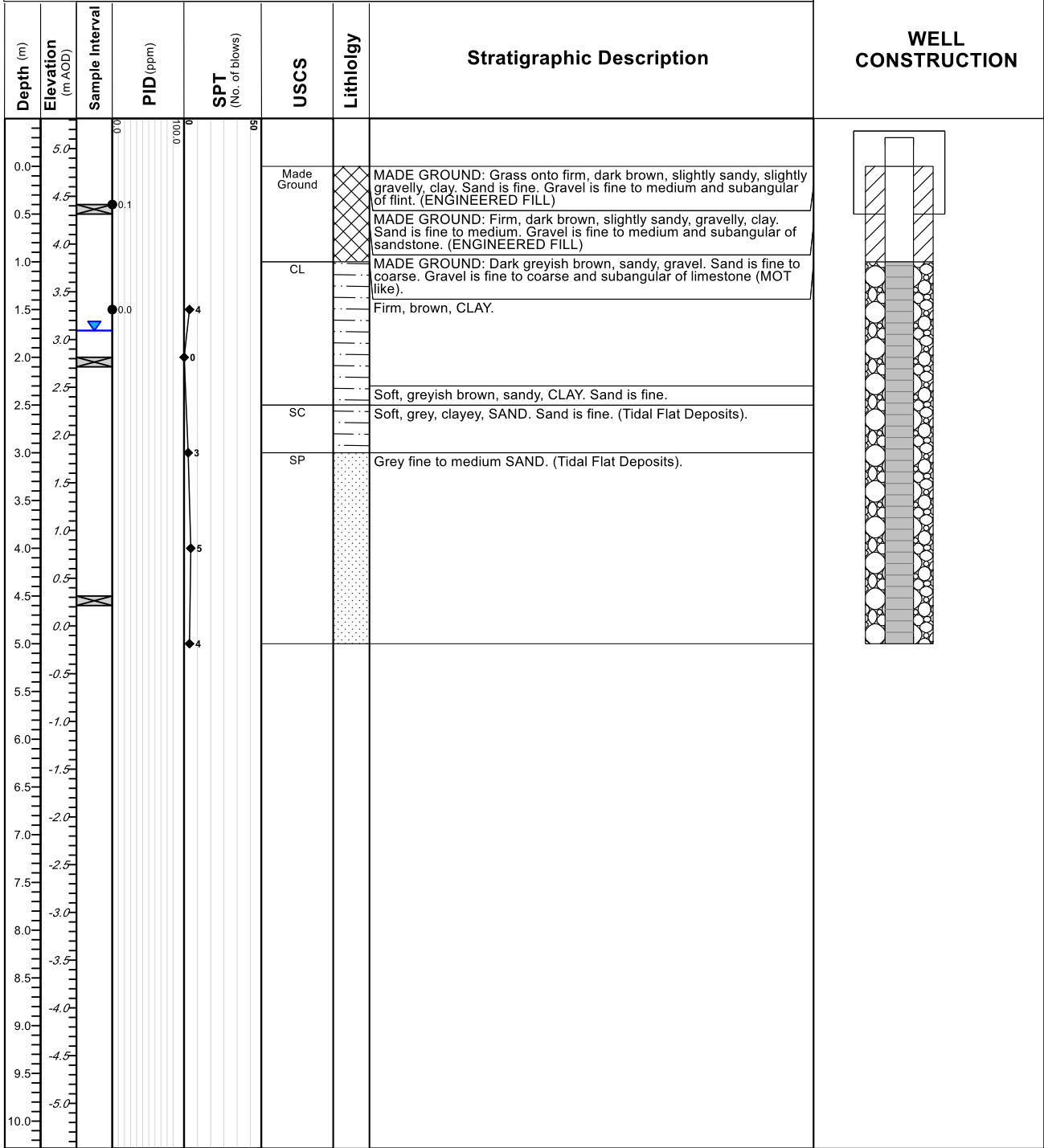
SSC - Subsurface Clearance m - meter SPT - Standard Penetration Test
 PID - Photoionization Detector ppm - parts per million
 NA - not available or not applicable AOD - Above Ordnance Datum
 mm - millimeter m bgs - meters below ground surface

Drill Start/End Date: 05-Mar-2024 / 05-Mar-2024
 Drilling Contractor: Geotron
 Drilling Method: Percussion
 Rig Make/Model: Dart Dart
 Driller:
 SSC Contractor: Geo UK Ltd
 SSC Method: Other
 SSC Diam./Depth: 200 mm / 1.5 m

Northing: 384118.78
 Easting: 312264.57
 Surface Elevation: 4.8 m AOD
 Datum Elevation: m AOD
 Borehole Diam./Depth: 50.0 mm / 5.0
 Water Encountered: 1.7 m bgs
 Logged By: BS
 Reviewed By: PTB

Client: **Eni UK**
 Site Name: Point of Ayr
 Location: Point of Ayr Terminal Holywell

SOIL PROFILE



Remarks:
 SSC - Subsurface Clearance m - meter SPT - Standard Penetration Test
 PID - Photoionization Detector ppm - parts per million
 NA - not available or not applicable AOD - Above Ordnance Datum
 mm - millimeter m bgs - meters below ground surface

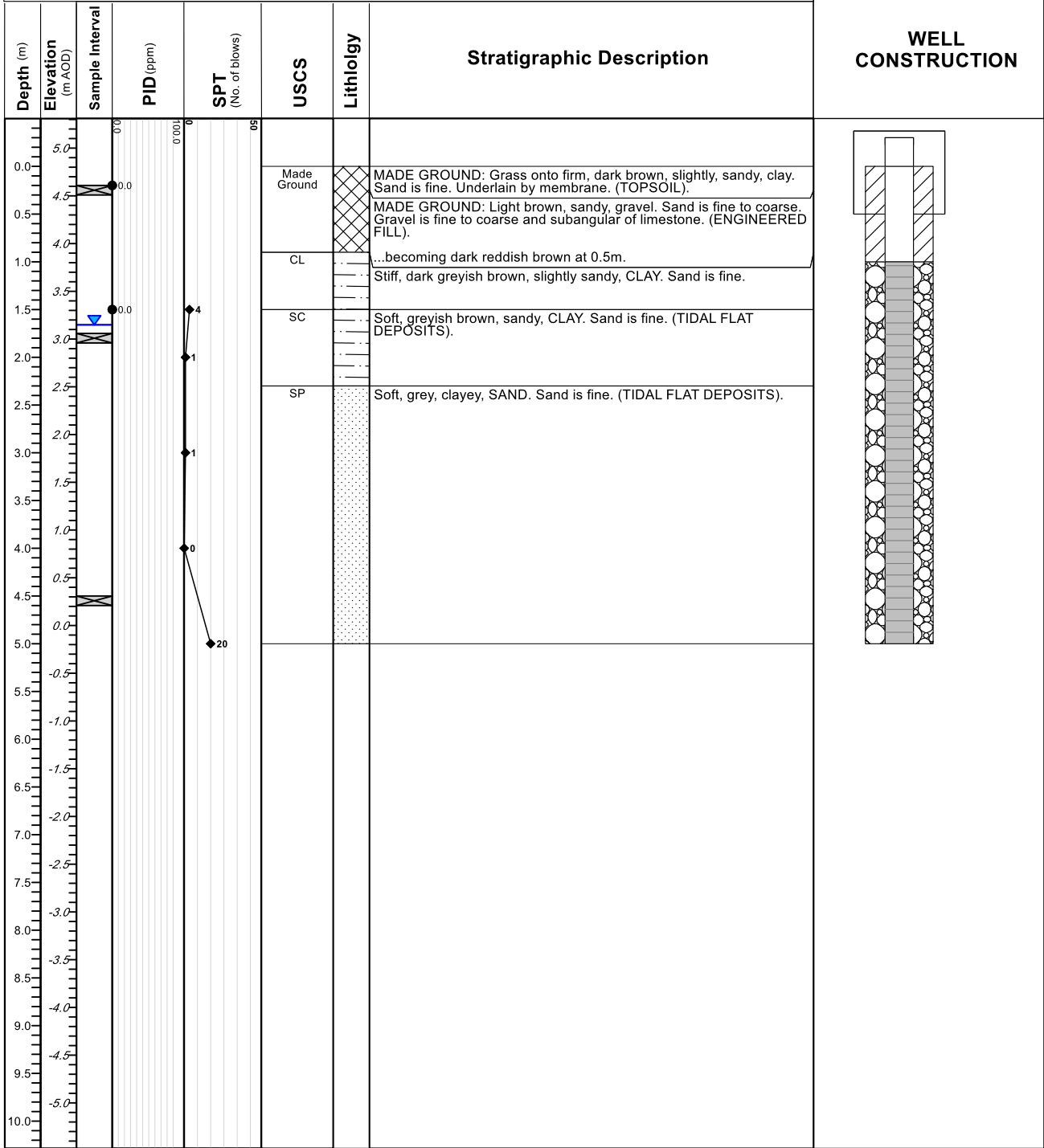
Boring/ Well ID: WS210

Drill Start/End Date: 05-Mar-2024 / 05-Mar-2024
Drilling Contractor: Geotron
Drilling Method: Percussion
Rig Make/Model: Dart Dart
Driller:
SSC Contractor: Geo UK Ltd
SSC Method: Other
SSC Diam./Depth: 200 mm / 1.5 m

Northing: 384034.00
Easting: 312262.98
Surface Elevation: 4.8 m AOD
Datum Elevation: m AOD
Borehole Diam./Depth: 50.0 mm / 5.0
Water Encountered: 1.7 m bgs
Logged By: BS
Reviewed By: PTB

Client: Eni UK
Site Name: Point of Ayr
Location: Point of Ayr Terminal Holywell

SOIL PROFILE



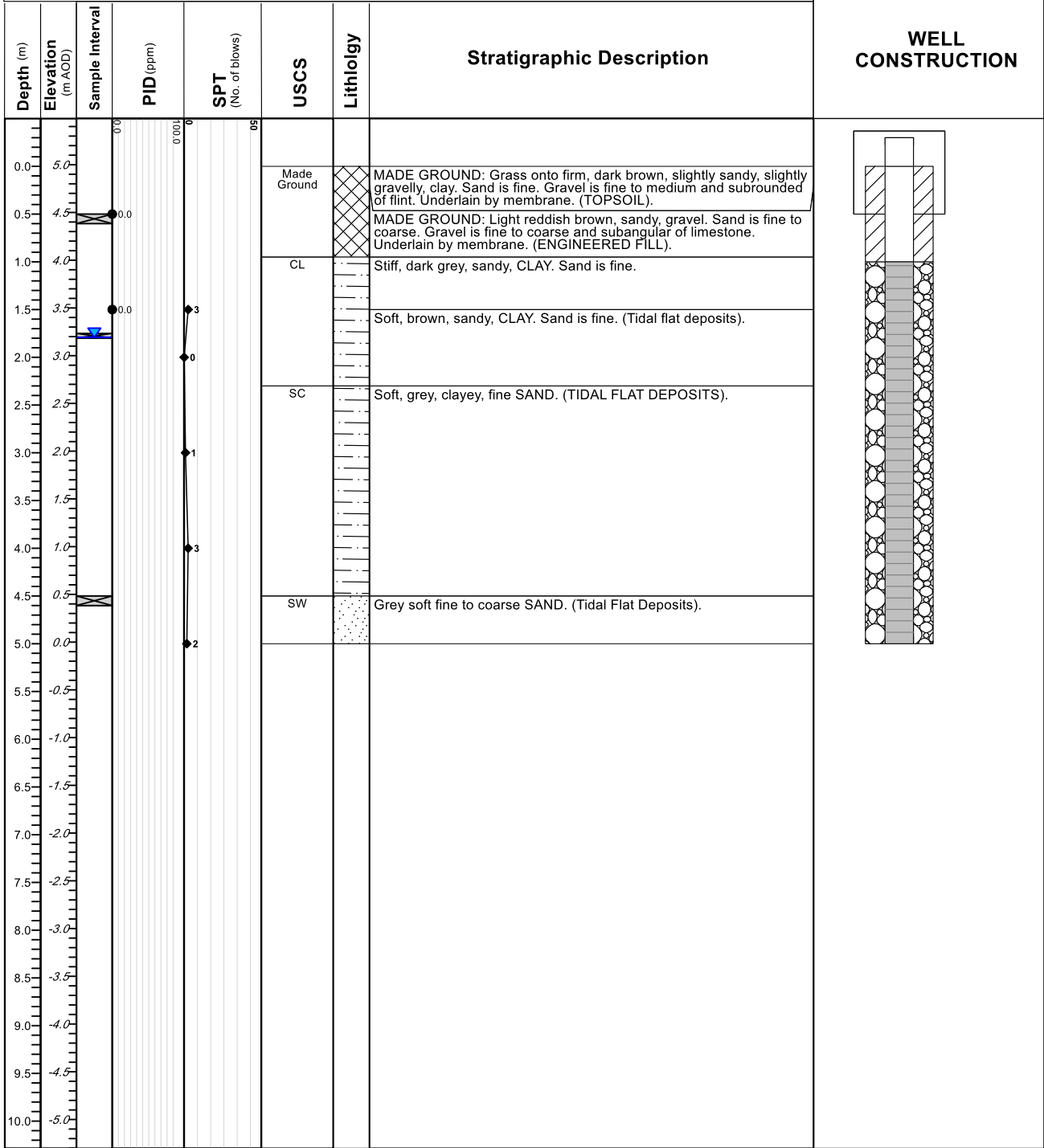
Remarks:
 SSC - Subsurface Clearance m - meter SPT - Standard Penetration Test
 PID - Photoionization Detector ppm - parts per million
 NA - not available or not applicable AOD - Above Ordnance Datum
 mm - millimeter m bgs - meters below ground surface

Drill Start/End Date: 05-Mar-2024 / 05-Mar-2024
 Drilling Contractor: Geotron
 Drilling Method: Percussion
 Rig Make/Model: Dart Dart
 Driller:
 SSC Contractor: Geo UK Ltd
 SSC Method: Other
 SSC Diam./Depth: 200 mm / 1.5 m

Northing: 384036.13
 Easting: 312374.18
 Surface Elevation: 5.0 m AOD
 Datum Elevation: m AOD
 Borehole Diam./Depth: 50.0 mm / 5.0
 Water Encountered: 1.8 m bgs
 Logged By: BS
 Reviewed By: PTB

Client: Eni UK
 Site Name: Point of Ayr
 Location: Point of Ayr Terminal Holywell

SOIL PROFILE



Remarks:

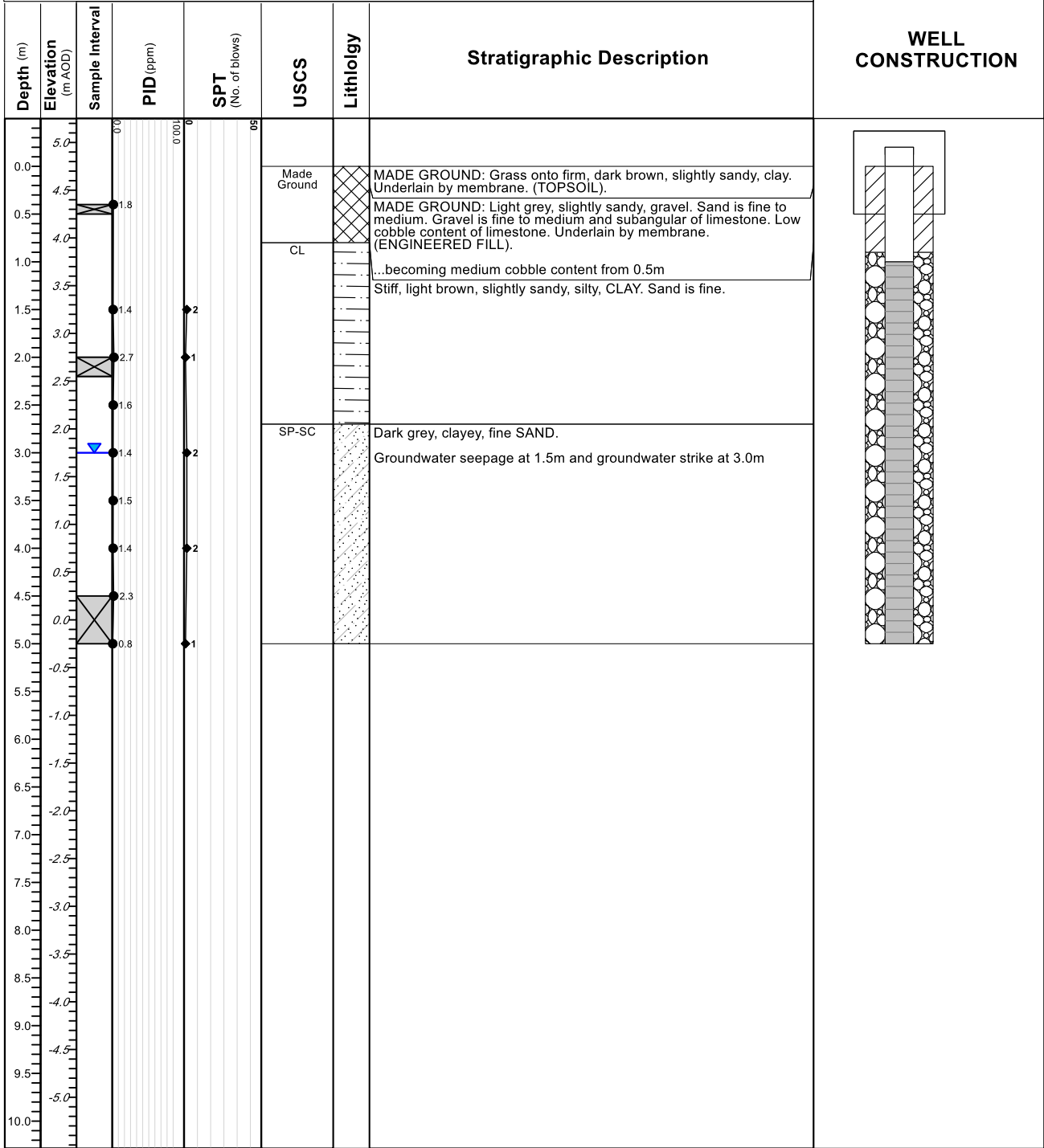
SSC - Subsurface Clearance m - meter SPT - Standard Penetration Test
 PID - Photoionization Detector ppm - parts per million
 NA - not available or not applicable AOD - Above Ordnance Datum
 mm - millimeter m bgs - meters below ground surface

Drill Start/End Date: 01-Mar-2024 / 04-Mar-2024
Drilling Contractor: Geotron UK Ltd
Drilling Method: Direct Push
Rig Make/Model: Dart Dart
Driller:
SSC Contractor: Geo UK Ltd
SSC Method: Shovel
SSC Diam./Depth: 300 mm / 1.5 m

Northing: 383962.10
Easting: 312335.77
Surface Elevation: 4.8 m AOD
Datum Elevation: m AOD
Borehole Diam./Depth: 300.0 mm / 5.0
Water Encountered: 3.0 m bgs
Logged By: BS
Reviewed By: PTB

Client: Eni UK
Site Name: Point of Ayr
Location: Point of Ayr Terminal Holywell

SOIL PROFILE



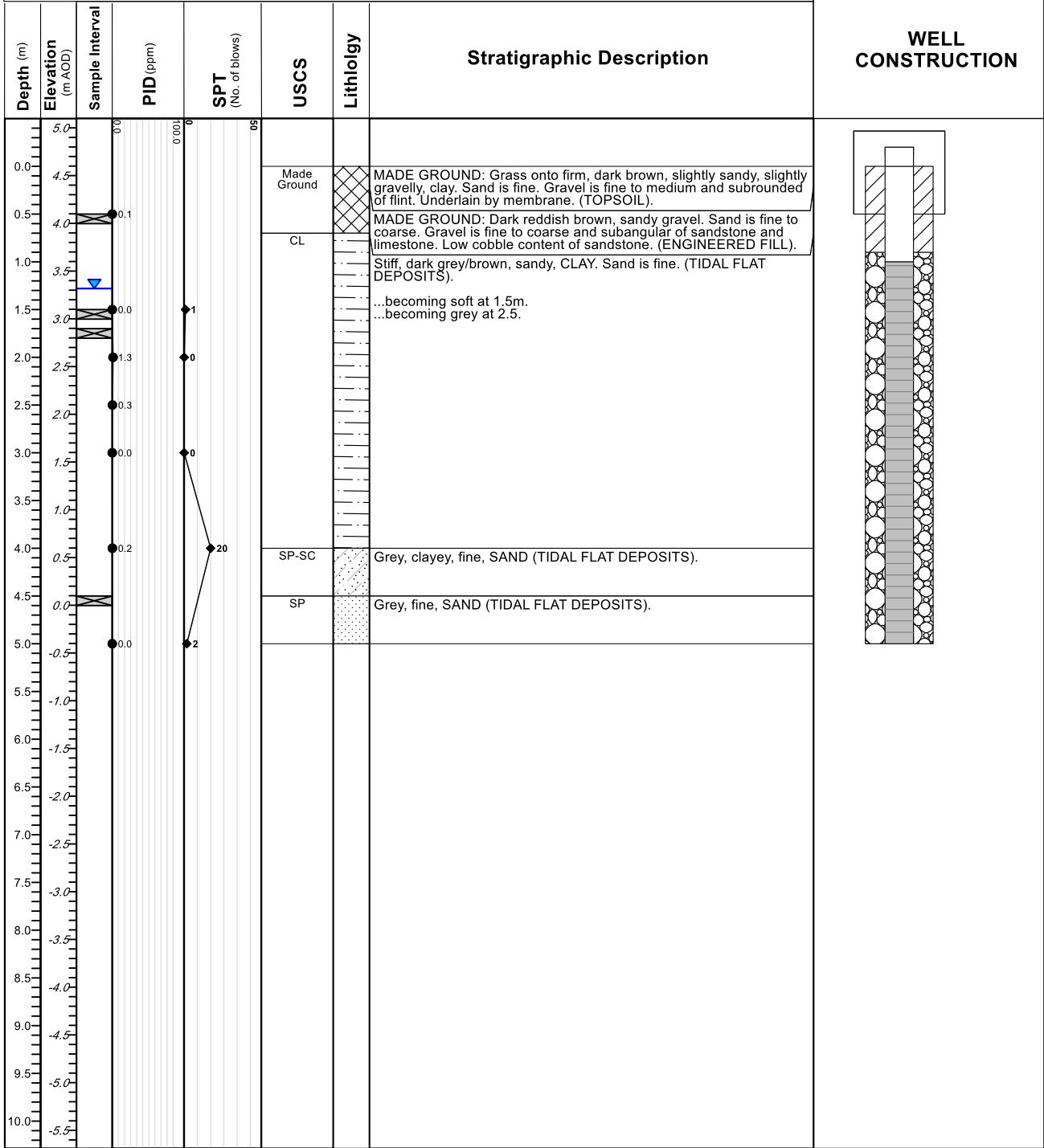
Remarks:
 SSC - Subsurface Clearance m - meter SPT - Standard Penetration Test
 PID - Photoionization Detector ppm - parts per million
 NA - not available or not applicable AOD - Above Ordnance Datum
 mm - millimeter m bgs - meters below ground surface

Drill Start/End Date: 04-Mar-2024 /
 Drilling Contractor:
 Drilling Method: Direct Push
 Rig Make/Model: Dart Dart
 Driller:
 SSC Contractor: Geo UK Ltd
 SSC Method: Shovel
 SSC Diam./Depth: 300 mm / 1.5 m

Northing: 383978.91
 Easting: 312207.29
 Surface Elevation: 4.6 m AOD
 Datum Elevation: m AOD
 Borehole Diam./Depth: 300.0 mm / 5.5
 Water Encountered: 1.3 m bgs
 Logged By: BS
 Reviewed By: PTB

Client: **Eni UK**
 Site Name: Point of Ayr
 Location: Point of Ayr Terminal Holywell

SOIL PROFILE



Remarks:

SSC - Subsurface Clearance m - meter SPT - Standard Penetration Test
 PID - Photoionization Detector ppm - parts per million
 NA - not available or not applicable AOD - Above Ordnance Datum
 mm - millimeter m bgs - meters below ground surface



ERM

APPENDIX C TABLES

TABLE C1: GROUNDWATER ELEVATION DATA

TABLE C2: GROUNDWATER QUALITY PARAMETERS

TABLE C3: FULL SOIL RESULTS

TABLE C4: SOIL RESULTS (DETECTED PFAS ONLY)

TABLE C5: HAZARD INDEX CALCULATION

TABLE C6: TOP ASSAY SUMMARY OF RESULTS

TABLE C7: GROUNDWATER AND SURFACE WATER SCREENING TABLES

TABLE C8: CONCRETE SCREENING RESULTS – LEACHATE – TOP 5 cm OF CORE

TABLE C9: CONCRETE SCREENING RESULTS – SOLIDS – REMAINING CORE

TABLE C10: CONCRETE SCREENING RESULTS – LEACHATE – REMAINING CORE

TABLE C11: SOIL LEACHATE SCREENING RESULTS

Table C1: Groundwater Elevations

Location	Depth to Water (m bgl)	Depth to Base (m bgl)	Groundwater Elevation (m aOD)	Base Elevation (m aOD)	Time dipped
WS202	1.965	4.71	2.594	-0.151	10:04
WS203	1.6	5.01	2.834	-0.576	14:28
WS204	1.64	4.57	2.799	-0.131	14:15
WS205	1.48	3.5	3.024	1.004	14:05
WS206	1.66	2.28	2.747	2.127	14:03
WS208	1.67	5.13	2.948	-0.512	15:40
WS209	1.93	4.95	2.883	-0.137	15:49
WS210	1.97	5.17	2.864	-0.336	15:27
WS211	2.13	5.16	2.857	-0.173	15:34
WS213	1.91	4.98	2.86	-0.21	16:00
WS215	1.79	4.43	2.851	0.211	14:40
BH160	2.07	12.62	2.5	-8.05	15:22
BH201	3.16	8.12	3.04	-1.91	16:59
BH202	Blocked - dip meter won't progress beyond 1.5				16:28
BH203	1.92	7.54	3.113	-2.507	16:32
Brook East	2.79 -		2.706	2.695	16:42
Outlet	1.91 -		2.436	2.177	17:14

Table C2: Groundwater Quality Parameters

Location	Date	C	DO (%)	DO (mg/L)	SPC (uS/cm)	pH	ORP (mV)	Description
WS202	31/07/2024							
WS203	30/07/2024	14.9	3.9	0.39	979	6.82	27.3	Yellowish brown, some suspended sediment, NVO
WS204	30/07/2024	16.0	6.3	0.61	856	6.87	15.3	Yellowish brown, some suspended sediment, NVO
WS205	30/07/2024	17.4	10.0	0.94	1041	6.95	106.2	Yellowish brown, some suspended sediment, NVO
WS206	30/07/2024	16.2	6.8	0.65	897	6.68	95.0	Clear, NVO
WS208	01/08/2024	14.4	9.1	0.91	791	6.94	40.7	Clear, NVO
WS209	01/08/2024	14.5	4.1	0.44	992	6.98	-19.2	Clear, NVO
WS210	31/07/2024	15.2	5.1	0.50	853	7.10	63.9	Clear, slightly yellow brown, slight suspended sediment, NVO
WS211	31/07/2024	15.5	2.3	0.22	841	6.87	56.3	Clear, slightly yellow brown, slight suspended sediment, NVO
WS213	01/08/2024	15.7	26.6	2.64	829	7.04	26.0	Clear, NVO
WS215	31/07/2024	15.7	5.0	0.50	714	6.98	102.8	Clear, slightly yellow brown, slight suspended sediment, NVO
BH160	31/07/2024	15.2	1.9	0.19	2948	7.88	-178.8	Clear, slightly yellow brown, slight suspended sediment, NVO
NOV	No visual or olfactory evidence of contamination							

Table C3: Full Soil Results

Location			FM01	FM02	FM02	FM03	FM04	FM04	FM05	FM06	FM06	FM07
Depth			0.30-0.40	0.30-0.40	0.90-1.00	0.30-0.40	0.30-0.40	0.90-1.00	0.30-0.40	0.30-0.40	0.80-0.90	0.30-0.40
Sampled Date			31/07/2024	30/07/2024	30/07/2024	30/07/2024	30/07/2024	30/07/2024	29/07/2024	01/08/2024	01/08/2024	01/08/2024
Analyte	Units	LOD										
Natural Moisture Content	%	<0.1	5.9	22.5	7	5.5	11.5	20.6	3.3	10	7.2	4
PFAAS												
PFBA	ug/kg	<0.5	0.5	1.2	0.6	<0.5	0.6	<0.5	<0.5	1.2	<0.5	<0.5
PFPeA	ug/kg	<0.5	0.6	3.3	1.1	<0.5	2.3	1.4	<0.5	1.1	<0.5	<0.5
PFHxA	ug/kg	<0.5	<0.5	9.4	4.8	<0.5	0.9	0.7	<0.5	0.7	<0.5	<0.5
PFHpA	ug/kg	<0.5	<0.5	4	1.3	<0.5	0.8	<0.5	<0.5	<0.5	<0.5	<0.5
PFOA	ug/kg	<0.5	1.7	23	3.5	<0.5	1.1	1	<0.5	1.5	1.8	<0.5
PFNA	ug/kg	<0.5	<0.5	0.9	<0.5	<0.5	1.2	<0.5	<0.5	<0.5	<0.5	<0.5
PFDA	ug/kg	<0.5	<0.5	2.2	<0.5	<0.5	0.6	<0.5	<0.5	<0.5	<0.5	<0.5
PFUnA	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PFDoA	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PFTTrDA	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PFTeDA	ug/kg	<0.5	<0.5	<0.5	<0.5	0.8	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PFHxDA	ug/kg	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
PFODA	ug/kg	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
PFBS	ug/kg	<0.5	<0.5	8.2	6	<0.5	<0.5	<0.5	<0.5	1.2	0.5	<0.5
PFPeS	ug/kg	<0.5	<0.5	14.8	6.5	<0.5	<0.5	<0.5	<0.5	2.4	1.5	<0.5
PFHxS	ug/kg	<0.5	7.1	386.1	74.3	1.9	6.2	2.7	0.6	28.8	27.8	<0.5
PFHpS	ug/kg	<0.5	2.1	31.6	2.6	<0.5	0.8	<0.5	<0.5	10.7	1.9	<0.5
PFOS	ug/kg	<0.5	132.5	1096.3	63.1	24.3	108.7	37.1	16.1	1537.9	45.3	1.9
PFNS	ug/kg	<0.5	0.5	15.6	<0.5	<0.5	1.8	<0.5	<0.5	15.7	<0.5	<0.5
PFDS	ug/kg	<0.5	<0.5	11.4	<0.5	0.6	<0.5	<0.5	<0.5	6.5	<0.5	<0.5
PFUnDS	ug/kg	<0.5	<0.5	11.5	<0.5	1.1	<0.5	<0.5	<0.5	4.6	<0.5	<0.5
PFDoDS	ug/kg	<0.5	<0.5	14.1	<0.5	2.4	<0.5	<0.5	<0.5	6.4	<0.5	<0.5
PFTTrDS	ug/kg	<0.5	<0.5	9.2	<0.5	3.9	<0.5	<0.5	<0.5	0.9	<0.5	<0.5
HFPO-DA (Gen X)	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
DONA	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
5:3 FTCA	ug/kg	<1	<1	<1	<1	3	1	<1	<1	<1	<1	<1
9CI-PF3ONS	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
4:2 FTS	ug/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
6:2 FTS	ug/kg	<1	<1	2	<1	3	<1	<1	<1	<1	<1	<1
8:2 FTS	ug/kg	<1	<1	<1	<1	2	<1	<1	<1	<1	<1	<1
FOSA	ug/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
N-MeFOSA	ug/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
N-EtFOSA	ug/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
N-MeFOSAA	ug/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
N-EtFOSAA	ug/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
8:2diPAP	ug/kg	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
FOUEA	ug/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
			145	1644.8	163.8	43	126.6	42.9	16.7	1619.6	78.8	1.9
		PFCA	2.8	44	11	1	8	3	0	5	2	0
		PFSA	142.2	1599	153	34	118	40	17	1615	77	2
		Other	0	2	0	8	1	0	0	0	0	0
		C4SL	141.3	1506	141	26	117	41	17	1568	75	2
		% PFCA	1.9	3	7	2	6	7	0	0	2	0
		% PFSA	98.1	97	93	80	93	93	100	100	98	100
		% Other	0.0	0	0	19	1	0	0	0	0	0
			100.0	100	100	100	100	100	100	100	100	100
		%C4SL	97.4	91.6	86.0	60.9	92.6	95.1	100.0	96.8	95.1	100.0
		%PFOS	91.4	66.7	38.5	56.5	85.9	86.5	96.4	95.0	57.5	100.0

Table C3: Full
Soil Results

Location			FM08	FM08	FM09	FM09	FM10	FM11	FM11	FM12	FM12	HP301
Depth			0.20-0.30	0.50-0.60	0.30-0.40	0.90-1.00	0.40-0.50	0.30-0.40	0.90-1.00	0.30-0.40	0.90-1.00	0.20-0.30
Sampled Date			01/08/2024	01/08/2024	31/07/2024	31/07/2024	01/08/2024	31/07/2024	31/07/2024	31/07/2024	31/07/2024	01/08/2024
Analyte	Units	LOD										
Natural Moisture Content	%	<0.1	4.6	2.3	7.3	16	3.4	5.8	23.6	7.8	2.4	10.6
<u>PFAAS</u>												
PFBA	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.8	<0.5	0.9
PFPeA	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1	1.5	1.1	<0.5	4.4
PFHxA	ug/kg	<0.5	<0.5	0.6	<0.5	<0.5	<0.5	<0.5	0.9	0.6	<0.5	4.6
PFHpA	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.7
PFOA	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.1	2	1.2	<0.5	4.3
PFNA	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	2.9
PFDA	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	<0.5	<0.5	<0.5	11.1
PFUnA	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	5
PFDoA	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	12.8
PFTTrDA	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.3
PFTeDA	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	3.1
PFHxDA	ug/kg	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
PFODA	ug/kg	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
PFBS	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PFPeS	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	<0.5	0.9	<0.5	<0.5
PFHxS	ug/kg	<0.5	2.7	4.3	<0.5	<0.5	1	4.9	2.1	9.6	1.7	7.2
PFHpS	ug/kg	<0.5	<0.5	0.8	<0.5	<0.5	<0.5	<0.5	<0.5	3.2	<0.5	1.3
PFOS	ug/kg	<0.5	101.4	129.4	1	2.3	16.6	90.9	61.1	480.8	89.6	239.2
PFNS	ug/kg	<0.5	6.2	4.9	<0.5	<0.5	0.9	1.2	<0.5	5.5	<0.5	4.3
PFDS	ug/kg	<0.5	5.8	7.1	<0.5	<0.5	0.8	0.5	<0.5	1.8	<0.5	3.8
PFUnDS	ug/kg	<0.5	6.8	7.4	<0.5	<0.5	<0.5	<0.5	<0.5	1.1	<0.5	2.3
PFDoDS	ug/kg	<0.5	8.6	9.6	<0.5	<0.5	<0.5	0.7	<0.5	1.4	<0.5	<0.5
PFTTrDS	ug/kg	<0.5	1.2	11.4	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	<0.5	3.1
HFPO-DA (Gen X)	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
DONA	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
5:3 FTCA	ug/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	2
9CI-PF3ONS	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
4:2 FTS	ug/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
6:2 FTS	ug/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	81
8:2 FTS	ug/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	39
FOSA	ug/kg	<1	2	1	<1	<1	<1	<1	<1	<1	<1	<1
N-MeFOSA	ug/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
N-EtFOSA	ug/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
N-MeFOSAA	ug/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
N-EtFOSAA	ug/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
8:2diPAP	ug/kg	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
FOUEA	ug/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
			134.7	176.5	1	2.3	19.3	102	67.6	509.2	91.3	435.3
		PFCA	0	1	0	0	0	3	4	4	0	52
		PFSA	133	175	1	2	19	99	63	506	91	261
		Other	2	1	0	0	0	0	0	0	0	122
		C4SL	104	134	1	2	18	97	65	492	91	254
		% PFCA	0	0	0	0	0	3	7	1	0	12
		% PFSA	99	99	100	100	100	97	93	99	100	60
		% Other	1	1	0	0	0	0	0	0	0	28
			100	100	100	100	100	100	100	100	100	100
		%C4SL	77.3	75.8	100.0	100.0	91.2	95.0	96.4	96.5	100.0	58.3
		%PFOS	75.3	73.3	100.0	100.0	86.0	89.1	90.4	94.4	98.1	55.0

Table C3: Full
Soil Results

Analyte	Units	LOD	Location	HP302	HP302	HP302	HP303	HP303	HP304	HP304	HP305	HP305	
			Depth	0.20-0.30	0.50-0.60	0.90-1.00	0.30-0.40	0.70-0.80	0.30-0.40	0.90-1.00	0.30-0.40	0.90-1.00	
			Sampled Date	01/08/2024	01/08/2024	01/08/2024	30/07/2024	30/07/2024	30/07/2024	30/07/2024	30/07/2024	30/07/2024	
Natural Moisture Content	%	<0.1		4.3	5	22	18.5	11.8	20.6	18.1	18.2	21.3	
PFAAS													
PFBA	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	<0.5	
PFPeA	ug/kg	<0.5		<0.5	<0.5	<0.5	1.4	0.8	<0.5	<0.5	5.8	0.7	
PFHxA	ug/kg	<0.5		<0.5	<0.5	<0.5	1.1	0.7	<0.5	<0.5	2.8	0.7	
PFHpA	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	2.5	<0.5	
PFOA	ug/kg	<0.5		<0.5	<0.5	<0.5	0.6	<0.5	<0.5	<0.5	1.5	<0.5	
PFNA	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.7	<0.5	
PFDA	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
PFUnA	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
PFDoA	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
PFTTrDA	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
PFTeDA	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
PFHxDA	ug/kg	<2.5		<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	
PFODA	ug/kg	<2.5		<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	
PFBS	ug/kg	<0.5		<0.5	<0.5	<0.5	0.7	0.8	<0.5	<0.5	<0.5	<0.5	
PFPeS	ug/kg	<0.5		<0.5	<0.5	<0.5	0.9	0.7	<0.5	<0.5	<0.5	<0.5	
PFHxS	ug/kg	<0.5		<0.5	<0.5	<0.5	4.1	3.9	<0.5	<0.5	2.2	1.8	
PFHpS	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
PFOS	ug/kg	<0.5		3.9	0.8	<0.5	7.1	5.8	<0.5	<0.5	71.9	7	
PFNS	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.3	<0.5	
PFDS	ug/kg	<0.5		0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.7	<0.5	
PFUnDS	ug/kg	<0.5		0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
PFDoDS	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
PFTTrDS	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
HFPO-DA (Gen X)	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
DONA	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
5:3 FTCA	ug/kg	<1		<1	<1	<1	<1	<1	<1	<1	1	<1	
9CI-PF3ONS	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
4:2 FTS	ug/kg	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	
6:2 FTS	ug/kg	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	
8:2 FTS	ug/kg	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	
FOSA	ug/kg	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	
N-MeFOSA	ug/kg	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	
N-EtFOSA	ug/kg	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	
N-MeFOSAA	ug/kg	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	
N-EtFOSAA	ug/kg	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	
8:2diPAP	ug/kg	<2.5		<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	
FOUEA	ug/kg	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	
				5	0.8	0	15.9	12.7	0	0	91.6	10.2	
				PFCA	0	0	0	3	2	0	0	15	1
				PFSA	5	1	0	13	11	0	0	76	9
				Other	0	0	0	0	0	0	1	0	
				C4SL	4	1	0	12	10	0	0	76	9
				% PFCA	0	0	#DIV/0!	19	12	#DIV/0!	#DIV/0!	16	14
				% PFSA	100	100	#DIV/0!	81	88	#DIV/0!	#DIV/0!	83	86
				% Other	0	0	#DIV/0!	0	0	#DIV/0!	#DIV/0!	1	0
				100	100	#DIV/0!	100	100	#DIV/0!	#DIV/0!	100	100	
				%C4SL	78.0	100.0		74.2	76.4			83.3	86.3
				%PFOS	78.0	100.0	#VALUE!	44.7	45.7	#VALUE!	#VALUE!	78.5	68.6

Table C3: Full
Soil Results

			HP306	HP307	HP307	HP308	HP308	HP309	HP309	HP310	HP310
Location											
Depth			0.20-0.30	0.30-0.40	0.90-1.00	0.30-0.40	0.90-1.00	0.30-0.40	0.90-1.00	0.30-0.40	0.90-1.00
Sampled Date			31/07/2024	30/07/2024	30/07/2024	30/07/2024	30/07/2024	30/07/2024	30/07/2024	30/07/2024	30/07/2024
Analyte	Units	LOD									
Natural Moisture Content	%	<0.1	8.1	11.8	4.5	15.4	22	21.3	21.8	11	8.5
<u>PFAAS</u>											
PFBA	ug/kg	<0.5	<0.5	0.8	<0.5	3.3	2.2	<0.5	<0.5	<0.5	<0.5
PFPeA	ug/kg	<0.5	0.8	4.1	1.5	18.5	16.6	<0.5	<0.5	<0.5	<0.5
PFHxA	ug/kg	<0.5	<0.5	1.6	0.9	11	10.6	<0.5	<0.5	<0.5	<0.5
PFHpA	ug/kg	<0.5	<0.5	1.1	0.6	3.1	1.6	<0.5	<0.5	<0.5	<0.5
PFOA	ug/kg	<0.5	0.8	1.1	0.6	5.2	2.3	<0.5	<0.5	<0.5	<0.5
PFNA	ug/kg	<0.5	<0.5	2.1	0.8	5.8	<0.5	<0.5	<0.5	<0.5	<0.5
PFDA	ug/kg	<0.5	<0.5	0.7	<0.5	19.4	<0.5	<0.5	<0.5	<0.5	<0.5
PFUnA	ug/kg	<0.5	<0.5	<0.5	<0.5	2	<0.5	<0.5	<0.5	<0.5	<0.5
PFDoA	ug/kg	<0.5	<0.5	<0.5	<0.5	2.5	<0.5	<0.5	<0.5	<0.5	<0.5
PFTTrDA	ug/kg	<0.5	<0.5	<0.5	<0.5	0.7	<0.5	<0.5	<0.5	<0.5	<0.5
PFTeDA	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PFHxDA	ug/kg	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
PFODA	ug/kg	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
PFBS	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PFPeS	ug/kg	<0.5	<0.5	<0.5	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PFHxS	ug/kg	<0.5	3.4	5.7	9.3	1.6	4.6	1.2	<0.5	0.7	0.8
PFHpS	ug/kg	<0.5	<0.5	<0.5	0.5	<0.5	1.1	<0.5	<0.5	<0.5	<0.5
PFOS	ug/kg	<0.5	50.8	139.4	92.1	216.8	67.8	6.1	<0.5	6.2	1.7
PFNS	ug/kg	<0.5	1.1	2	0.7	11.1	<0.5	<0.5	<0.5	<0.5	<0.5
PFDS	ug/kg	<0.5	<0.5	1.9	<0.5	6.7	<0.5	<0.5	<0.5	<0.5	<0.5
PFUnDS	ug/kg	<0.5	<0.5	1.2	<0.5	3.9	<0.5	<0.5	<0.5	<0.5	<0.5
PFDoDS	ug/kg	<0.5	2.7	1.6	<0.5	2.8	<0.5	<0.5	<0.5	<0.5	<0.5
PFTTrDS	ug/kg	<0.5	1.1	0.8	<0.5	2	<0.5	<0.5	<0.5	<0.5	<0.5
HFPO-DA (Gen X)	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
DONA	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
5:3 FTCA	ug/kg	<1	<1	6	<1	43	<1	<1	<1	<1	<1
9CI-PF3ONS	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
4:2 FTS	ug/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
6:2 FTS	ug/kg	<1	<1	<1	<1	33	115	<1	<1	<1	<1
8:2 FTS	ug/kg	<1	<1	<1	<1	2	<1	<1	<1	<1	<1
FOSA	ug/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
N-MeFOSA	ug/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
N-EtFOSA	ug/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
N-MeFOSAA	ug/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
N-EtFOSAA	ug/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
8:2diPAP	ug/kg	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
FOUEA	ug/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
			60.7	170.1	107.6	394.4	221.8	7.3	0	6.9	2.5
		PFCA	2	12	4	72	33	0	0	0	0
		PFSA	59	153	103	245	74	7	0	7	3
		Other	0	6	0	78	115	0	0	0	0
		C4SL	55	148	103	229	75	7	0	7	3
		% PFCA	3	7	4	18	15	0	#DIV/0!	0	0
		% PFSA	97	90	96	62	33	100	#DIV/0!	100	100
		% Other	0	4	0	20	52	0	#DIV/0!	0	0
			100	100	100	100	100	100	#DIV/0!	100	100
		%C4SL	90.6	87.2	95.5	58.2	33.7	100.0		100.0	100.0
		%PFOS	83.7	82.0	85.6	55.0	30.6	83.6	#VALUE!	89.9	68.0

Table C3: Full Soil Results

			HP311	HP312	HP312	HP313	HP313	HP314	HP314	HP215	HP315
Location											
Depth			0.40-0.50	0.30-0.40	0.90-1.00	0.30-0.40	0.90-1.00	0.30-0.40	0.90-1.00	0.30-0.40	0.90-1.00
Sampled Date			01/08/2024	30/07/2024	30/07/2024	31/07/2024	31/07/2024	01/08/2024	01/08/2024	31/07/2024	31/07/2024
Analyte	Units	LOD									
Natural Moisture Content	%	<0.1	7.9	16.2	24.9	4.5	17.9	14.2	20.7	6.3	18.6
<u>PFAAS</u>											
PFBA	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PFPeA	ug/kg	<0.5	0.8	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PFHxA	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PFHpA	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PFOA	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PFNA	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PFDA	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PFUnA	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PFDoA	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PFTTrDA	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PFTeDA	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PFHxDA	ug/kg	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
PFODA	ug/kg	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
PFBS	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PFPeS	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PFHxS	ug/kg	<0.5	1.5	1.4	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.1
PFHpS	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PFOS	ug/kg	<0.5	147.6	12.7	3	1	<0.5	<0.5	<0.5	15.2	<0.5
PFNS	ug/kg	<0.5	3.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PFDS	ug/kg	<0.5	1.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PFUnDS	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PFDoDS	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PFTTrDS	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
HFPO-DA (Gen X)	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
DONA	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
5:3 FTCA	ug/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
9CI-PF3ONS	ug/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
4:2 FTS	ug/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
6:2 FTS	ug/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
8:2 FTS	ug/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
FOSA	ug/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
N-MeFOSA	ug/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
N-EtFOSA	ug/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
N-MeFOSAA	ug/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
N-EtFOSAA	ug/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
8:2diPAP	ug/kg	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
FOUEA	ug/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
			154.5	14.1	3	1	0	0	0	15.2	1.1
		PFCA	1	0	0	0	0	0	0	0	0
		PFSA	154	14	3	1	0	0	0	15	1
		Other	0	0	0	0	0	0	0	0	0
		C4SL	149	14	3	1	0	0	0	15	1
		% PFCA	1	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	0	0
		% PFSA	99	100	100	100	#DIV/0!	#DIV/0!	#DIV/0!	100	100
		% Other	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	0	0
			100	100	100	100	#DIV/0!	#DIV/0!	#DIV/0!	100	100
		%C4SL	96.5	100.0	100.0	100.0				100.0	100.0
		%PFOS	95.5	90.1	100.0	100.0	#VALUE!	#VALUE!	#VALUE!	100.0	#VALUE!

Table C3: Full Soil Results

Analyte	Units	LOD	Location	HP316	HP316	HP317	HP318	HP318	HP319	HP319	HP320-	HP320-	
			Depth	0.30-0.40	0.70-0.80	0.20-0.30	0.30-0.40	0.90-1.00	0.30-0.40	0.90-1.00	0.40-0.50	0.80-0.90	
			Sampled Date	31/07/2024	31/07/2024	31/07/2024	31/07/2024	31/07/2024	31/07/2024	31/07/2024	31/07/2024	29/07/2024	29/07/2024
Natural Moisture Content	%	<0.1		3.9	3.3	6.3	2.9	15.2	4.9	18.2	5.7	5	
<u>PFAAS</u>													
PFBA	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	
PFPeA	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.9	4.9	
PFHxA	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.7	2.8	
PFHpA	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	0.6	
PFOA	ug/kg	<0.5		<0.5	<0.5	0.6	<0.5	<0.5	<0.5	<0.5	1.1	1.2	
PFNA	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
PFDA	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.9	3.3	
PFUnA	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	3.9	4.8	
PFDoA	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	11.4	11.3	
PFTTrDA	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	2.6	2.3	
PFTeDA	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	4.9	4.2	
PFHxDA	ug/kg	<2.5		<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	
PFODA	ug/kg	<2.5		<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	
PFBS	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
PFPeS	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
PFHxS	ug/kg	<0.5		<0.5	<0.5	1	<0.5	<0.5	<0.5	<0.5	0.8	0.8	
PFHpS	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
PFOS	ug/kg	<0.5		<0.5	<0.5	4.4	<0.5	<0.5	1.7	<0.5	20	52.1	
PFNS	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	2.3	5.6	
PFDS	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	9.6	13.1	
PFUnDS	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	11.2	14.3	
PFDoDS	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	14.8	16.6	
PFTTrDS	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	16.6	18	
HFPO-DA (Gen X)	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
DONA	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
5:3 FTCA	ug/kg	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	
9CI-PF3ONS	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
4:2 FTS	ug/kg	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	
6:2 FTS	ug/kg	<1		<1	<1	<1	<1	<1	<1	<1	26	20	
8:2 FTS	ug/kg	<1		<1	<1	<1	<1	<1	<1	<1	29	84	
FOSA	ug/kg	<1		<1	<1	<1	<1	<1	<1	<1	1	2	
N-MeFOSA	ug/kg	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	
N-EtFOSA	ug/kg	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	
N-MeFOSAA	ug/kg	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	
N-EtFOSAA	ug/kg	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	
8:2diPAP	ug/kg	<2.5		<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	
FOUEA	ug/kg	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	
				0	0	6	0	0	1.7	0	161.2	262.5	
				PFCA	0	0	1	0	0	0	30	36	
				PFSA	0	0	5	0	0	0	75	121	
				Other	0	0	0	0	0	0	56	106	
				C4SL	0	0	6	0	0	0	22	54	
				% PFCA	#DIV/0!	#DIV/0!	10	#DIV/0!	#DIV/0!	0	#DIV/0!	19	14
				% PFSA	#DIV/0!	#DIV/0!	90	#DIV/0!	#DIV/0!	100	#DIV/0!	47	46
				% Other	#DIV/0!	#DIV/0!	0	#DIV/0!	#DIV/0!	0	#DIV/0!	35	40
					#DIV/0!	#DIV/0!	100	#DIV/0!	#DIV/0!	100	#DIV/0!	100	100
				%C4SL			100.0			100.0	13.6	20.6	
				%PFOS	#VALUE!	#VALUE!	73.3	#VALUE!	#VALUE!	100.0	#VALUE!	12.4	19.8

Table C3: Full
Soil Results

Analyte	Units	LOD	Location	HP321-	HP321-	HP322-	HP322	HP323	
			Depth	0.40-0.50	0.70-0.80	0.40-0.50	0.90-1.00	0.40-0.50	
			Sampled Date	29/07/2024	29/07/2024	29/07/2024	29/07/2024	31/07/2024	
Natural Moisture Content	%	<0.1		5.7	3.5	3.9	22.4	13.3	
<u>PFAAS</u>									
PFBA	ug/kg	<0.5		<0.5	<0.5	<0.5	0.7	0.7	
PFPeA	ug/kg	<0.5		<0.5	0.9	<0.5	1.5	1.5	
PFHxA	ug/kg	<0.5		<0.5	<0.5	<0.5	2.8	<0.5	
PFHpA	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	
PFOA	ug/kg	<0.5		<0.5	<0.5	<0.5	1.6	0.9	
PFNA	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	
PFDA	ug/kg	<0.5		0.6	0.6	<0.5	<0.5	0.6	
PFUnA	ug/kg	<0.5		0.7	0.7	<0.5	<0.5	<0.5	
PFDoA	ug/kg	<0.5		2	2.7	0.9	<0.5	<0.5	
PFTTrDA	ug/kg	<0.5		0.5	0.5	<0.5	<0.5	<0.5	
PFTeDA	ug/kg	<0.5		1	0.9	0.5	<0.5	<0.5	
PFHxDA	ug/kg	<2.5		<2.5	<2.5	<2.5	<2.5	<2.5	
PFODA	ug/kg	<2.5		<2.5	<2.5	<2.5	<2.5	<2.5	
PFBS	ug/kg	<0.5		<0.5	<0.5	<0.5	1.1	<0.5	
PFPeS	ug/kg	<0.5		<0.5	<0.5	<0.5	1	<0.5	
PFHxS	ug/kg	<0.5		1.7	0.7	1.1	8.7	5.2	
PFHpS	ug/kg	<0.5		<0.5	<0.5	<0.5	1.2	0.6	
PFOS	ug/kg	<0.5		44.4	19.9	23.7	121.8	62.9	
PFNS	ug/kg	<0.5		0.6	<0.5	0.6	<0.5	1.2	
PFDS	ug/kg	<0.5		3.6	3.9	3.5	<0.5	1.5	
PFUnDS	ug/kg	<0.5		5.2	6.8	6.9	<0.5	1.5	
PFDoDS	ug/kg	<0.5		7.8	11.3	10.9	<0.5	2	
PFTTrDS	ug/kg	<0.5		6.8	8.4	11.6	<0.5	1.6	
HFPO-DA (Gen X)	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	
DONA	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	
5:3 FTCA	ug/kg	<1		<1	<1	<1	<1	<1	
9CI-PF3ONS	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	
4:2 FTS	ug/kg	<1		<1	<1	<1	<1	<1	
6:2 FTS	ug/kg	<1		5	4	2	16	<1	
8:2 FTS	ug/kg	<1		5	8	4	2	<1	
FOSA	ug/kg	<1		<1	<1	<1	<1	<1	
N-MeFOSA	ug/kg	<1		<1	<1	<1	<1	<1	
N-EtFOSA	ug/kg	<1		<1	<1	<1	<1	<1	
N-MeFOSAA	ug/kg	<1		<1	<1	<1	<1	<1	
N-EtFOSAA	ug/kg	<1		<1	<1	<1	<1	<1	
8:2diPAP	ug/kg	<2.5		<2.5	<2.5	<2.5	<2.5	<2.5	
FOUEA	ug/kg	<1		<1	<1	<1	<1	<1	
				84.9	69.3	65.7	158.4	80.2	
				PFCA	5	6	1	7	4
				PFSA	70	51	58	134	77
				Other	10	12	6	18	0
				C4SL	46	21	25	132	69
				% PFCA	6	9	2	4	5
				% PFSA	83	74	89	84	95
				% Other	12	17	9	11	0
				100	100	100	100	100	
				%C4SL	54.3	29.7	37.7	83.4	86.0
				%PFOS	52.3	28.7	36.1	76.9	78.4

C4: Soil Results (PFAS Detections Only)

Analyte	Units	LOD	GAC	Location	FM01-	FM02-	FM02-	FM03-	FM04	FM04-	FM05	FM06	FM06-	FM07	FM08-	FM08	FM09	FM09	FM10	FM11
				Depth	0.30-0.40	0.30-0.40	0.90-1.00	0.30-0.40	0.30-0.40	0.90-1.00	0.30-0.40	0.30-0.40	0.80-0.90	0.30-0.40	0.20-0.30	0.50-0.60	0.30-0.40	0.90-1.00	0.40-0.50	0.30-0.40
				Sampled Date	31/07/2024	30/07/2024	30/07/2024	30/07/2024	30/07/2024	30/07/2024	29/07/2024	01/08/2024	01/08/2024	01/08/2024	01/08/2024	01/08/2024	01/08/2024	31/07/2024	31/07/2024	01/08/2024
Natural Moisture Content	%	<0.1			5.9	22.5	7	5.5	11.5	20.6	3.3	10	7.2	4	4.6	2.3	7.3	16	3.4	5.8
PFAAS																				
PFBA	ug/kg	<0.5			0.5	1.2	0.6	<0.5	0.6	<0.5	<0.5	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PFPeA	ug/kg	<0.5			0.6	3.3	1.1	<0.5	2.3	1.4	<0.5	1.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1
PFHxA	ug/kg	<0.5			<0.5	9.4	4.8	<0.5	0.9	0.7	<0.5	0.7	<0.5	<0.5	<0.5	0.6	<0.5	<0.5	<0.5	<0.5
PFHpA	ug/kg	<0.5			<0.5	4	1.3	<0.5	0.8	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PFOA	ug/kg	<0.5	600 ¹		1.7	23	3.5	<0.5	1.1	1	<0.5	1.5	1.8	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.1
PFNA	ug/kg	<0.5	600 ¹		<0.5	0.9	<0.5	<0.5	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PFDA	ug/kg	<0.5			<0.5	2.2	<0.5	<0.5	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.2
PFUnA	ug/kg	<0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PFDoA	ug/kg	<0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PFTTrDA	ug/kg	<0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PFTeDA	ug/kg	<0.5			<0.5	<0.5	<0.5	0.8	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PFBS	ug/kg	<0.5			<0.5	8.2	6	<0.5	<0.5	<0.5	<0.5	1.2	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PFPeS	ug/kg	<0.5			<0.5	14.8	6.5	<0.5	<0.5	<0.5	<0.5	2.4	1.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5
PFHxS	ug/kg	<0.5	600 ¹		7.1	386.1	74.3	1.9	6.2	2.7	0.6	28.8	27.8	<0.5	2.7	4.3	<0.5	<0.5	1	4.9
PFHpS	ug/kg	<0.5			2.1	31.6	2.6	<0.5	0.8	<0.5	<0.5	10.7	1.9	<0.5	<0.5	0.8	<0.5	<0.5	<0.5	<0.5
PFOS	ug/kg	<0.5	600 ¹		132.5	1096.3	63.1	24.3	108.7	37.1	16.1	1537.9	45.3	1.9	101.4	129.4	1	2.3	16.6	90.9
PFNS	ug/kg	<0.5			0.5	15.6	<0.5	<0.5	1.8	<0.5	<0.5	15.7	<0.5	<0.5	6.2	4.9	<0.5	<0.5	0.9	1.2
PFDS	ug/kg	<0.5			<0.5	11.4	<0.5	0.6	0.6	<0.5	<0.5	6.5	<0.5	<0.5	5.8	7.1	<0.5	<0.5	0.8	0.5
PFUnDS	ug/kg	<0.5			<0.5	11.5	<0.5	1.1	<0.5	<0.5	<0.5	4.6	<0.5	<0.5	6.8	7.4	<0.5	<0.5	<0.5	<0.5
PFDoDS	ug/kg	<0.5			<0.5	14.1	<0.5	2.4	<0.5	<0.5	<0.5	6.4	<0.5	<0.5	8.6	9.6	<0.5	<0.5	<0.5	0.7
PFTTrDS	ug/kg	<0.5			<0.5	9.2	<0.5	3.9	<0.5	<0.5	<0.5	0.9	<0.5	<0.5	1.2	11.4	<0.5	<0.5	<0.5	<0.5
5:3 FTCA	ug/kg	<1			<1	<1	<1	3	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
6:2 FTS	ug/kg	<1			<1	2	<1	3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
8:2 FTS	ug/kg	<1			<1	<1	<1	2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
FOSA	ug/kg	<1			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	2	1	<1	<1	<1	<1
Exceeds the GAC																				

C4: Soil Results (PFAS Detections Only)

Analyte	Units	LOD	GAC	Location	FM11	FM12	FM12	HP301	HP302	HP302	HP302	HP303	HP303	HP304	HP304	HP305	HP305	HP306	HP307	HP307		
				Depth	0.90-1.00	0.30-0.40	0.90-1.00	0.20-0.30	0.20-0.30	0.50-0.60	0.90-1.00	0.30-0.40	0.70-0.80	0.30-0.40	0.90-1.00	0.30-0.40	0.90-1.00	0.20-0.30	0.30-0.40	0.20-0.30	0.30-0.40	0.90-1.00
				Sampled Date	31/07/2024	31/07/2024	31/07/2024	01/08/2024	01/08/2024	01/08/2024	01/08/2024	30/07/2024	30/07/2024	30/07/2024	30/07/2024	30/07/2024	30/07/2024	30/07/2024	30/07/2024	31/07/2024	30/07/2024	30/07/2024
Natural Moisture Content	%	<0.1			23.6	7.8	2.4	10.6	4.3	5	22	18.5	11.8	20.6	18.1	18.2	21.3	8.1	11.8	4.5		
PFAAS																						
PFBA	ug/kg	<0.5			<0.5	0.8	<0.5	0.9	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	<0.5	<0.5	0.8	<0.5		
PFPeA	ug/kg	<0.5			1.5	1.1	<0.5	4.4	<0.5	<0.5	<0.5	1.4	0.8	<0.5	<0.5	5.8	0.7	0.8	4.1	1.5		
PFHxA	ug/kg	<0.5			0.9	0.6	<0.5	4.6	<0.5	<0.5	<0.5	1.1	0.7	<0.5	<0.5	2.8	0.7	<0.5	1.6	0.9		
PFHpA	ug/kg	<0.5			<0.5	<0.5	<0.5	1.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	2.5	<0.5	<0.5	1.1	0.6		
PFOA	ug/kg	<0.5	600 ¹		2	1.2	<0.5	4.3	<0.5	<0.5	<0.5	0.6	<0.5	<0.5	<0.5	1.5	<0.5	0.8	1.1	0.6		
PFNA	ug/kg	<0.5	600 ¹		<0.5	<0.5	<0.5	2.9	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.7	<0.5	<0.5	2.1	0.8		
PFDA	ug/kg	<0.5			<0.5	<0.5	<0.5	11.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.7	<0.5		
PFUnA	ug/kg	<0.5			<0.5	<0.5	<0.5	5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
PFDoA	ug/kg	<0.5			<0.5	<0.5	<0.5	12.8	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
PFTTrDA	ug/kg	<0.5			<0.5	<0.5	<0.5	1.3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
PFTeDA	ug/kg	<0.5			<0.5	<0.5	<0.5	3.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
PFBS	ug/kg	<0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.7	0.8	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
PFPeS	ug/kg	<0.5			<0.5	0.9	<0.5	<0.5	<0.5	<0.5	<0.5	0.9	0.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6		
PFHxS	ug/kg	<0.5	600 ¹		2.1	9.6	1.7	7.2	<0.5	<0.5	<0.5	4.1	3.9	<0.5	<0.5	2.2	1.8	3.4	5.7	9.3		
PFHpS	ug/kg	<0.5			<0.5	3.2	<0.5	1.3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5		
PFOS	ug/kg	<0.5	600 ¹		61.1	480.8	89.6	239.2	3.9	0.8	<0.5	7.1	5.8	<0.5	<0.5	71.9	7	50.8	139.4	92.1		
PFNS	ug/kg	<0.5			<0.5	5.5	<0.5	4.3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.3	<0.5	1.1	2	0.7		
PFDS	ug/kg	<0.5			<0.5	1.8	<0.5	3.8	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.7	<0.5	<0.5	1.9	<0.5		
PFUnDS	ug/kg	<0.5			<0.5	1.1	<0.5	2.3	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	<0.5		
PFDoDS	ug/kg	<0.5			<0.5	1.4	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	2.7	1.6	<0.5		
PFTTrDS	ug/kg	<0.5			<0.5	1.2	<0.5	3.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.1	0.8	<0.5		
5:3 FTCA	ug/kg	<1			<1	<1	<1	2	<1	<1	<1	<1	<1	<1	<1	1	<1	<1	6	<1		
6:2 FTS	ug/kg	<1			<1	<1	<1	81	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		
8:2 FTS	ug/kg	<1			<1	<1	<1	39	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		
FOSA	ug/kg	<1			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		

Exceeds the GAC

C4: Soil Results (PFAS Detections Only)

Analyte	Units	LOD	GAC	Location		HP308	HP308	HP309	HP309	HP310	HP310	HP311	HP312	HP312	HP313	HP313	HP314	HP314	HP315	HP315	HP316		
				Depth	Depth	0.30-0.40	0.90-1.00	0.30-0.40	0.90-1.00	0.30-0.40	0.90-1.00	0.40-0.50	0.30-0.40	0.90-1.00	0.30-0.40	0.90-1.00	0.30-0.40	0.90-1.00	0.30-0.40	0.90-1.00	0.30-0.40	0.90-1.00	0.30-0.40
				Sampled Date	Sampled Date	30/07/2024	30/07/2024	30/07/2024	30/07/2024	30/07/2024	30/07/2024	01/08/2024	30/07/2024	30/07/2024	31/07/2024	31/07/2024	01/08/2024	01/08/2024	31/07/2024	31/07/2024	31/07/2024	31/07/2024	31/07/2024
Natural Moisture Content	%	<0.1			15.4	22	21.3	21.8	11	8.5	7.9	16.2	24.9	4.5	17.9	14.2	20.7	6.3	18.6	3.9			
PFAAS																							
PFBA	ug/kg	<0.5		3.3	2.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
PFPeA	ug/kg	<0.5		18.5	16.6	<0.5	<0.5	<0.5	<0.5	<0.5	0.8	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
PFHxA	ug/kg	<0.5		11	10.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
PFHpA	ug/kg	<0.5		3.1	1.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
PFOA	ug/kg	<0.5	600 ¹	5.2	2.3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
PFNA	ug/kg	<0.5	600 ¹	5.8	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
PFDA	ug/kg	<0.5		19.4	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
PFUnA	ug/kg	<0.5		2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
PFDoA	ug/kg	<0.5		2.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
PFTTrDA	ug/kg	<0.5		0.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
PFTeDA	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
PFBS	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
PFPeS	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
PFHxS	ug/kg	<0.5	600 ¹	1.6	4.6	1.2	<0.5	0.7	0.8	1.5	1.4	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.1	<0.5		
PFHpS	ug/kg	<0.5		<0.5	1.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
PFOS	ug/kg	<0.5	600 ¹	216.8	67.8	6.1	<0.5	6.2	1.7	147.6	12.7	3	1	<0.5	<0.5	<0.5	<0.5	15.2	<0.5	<0.5	<0.5		
PFNS	ug/kg	<0.5		11.1	<0.5	<0.5	<0.5	<0.5	<0.5	3.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
PFDS	ug/kg	<0.5		6.7	<0.5	<0.5	<0.5	<0.5	<0.5	1.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
PFUnDS	ug/kg	<0.5		3.9	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
PFDoDS	ug/kg	<0.5		2.8	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
PFTTrDS	ug/kg	<0.5		2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
5:3 FTCA	ug/kg	<1		43	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		
6:2 FTS	ug/kg	<1		33	115	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		
8:2 FTS	ug/kg	<1		2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		
FOSA	ug/kg	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		

Exceeds the GAC

C4: Soil Results (PFAS Detections Only)

Analyte	Units	LOD	GAC	Location	HP316	HP317	HP318	HP318	HP319	HP319	HP320	HP320	HP321	HP321	HP322	HP322	HP323
				Depth	0.70-0.80	0.20-0.30	0.30-0.40	0.90-1.00	0.30-0.40	0.90-1.00	0.40-0.50	0.80-0.90	0.40-0.50	0.70-0.80	0.40-0.50	0.90-1.00	0.40-0.50
				Sampled Date	31/07/2024	31/07/2024	31/07/2024	31/07/2024	31/07/2024	31/07/2024	29/07/2024	29/07/2024	29/07/2024	29/07/2024	29/07/2024	29/07/2024	29/07/2024
Natural Moisture Content	%	<0.1			3.3	6.3	2.9	15.2	4.9	18.2	5.7	5	5.7	3.5	3.9	22.4	13.3
PFAAS																	
PFBA	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	<0.5	<0.5	0.7	0.7
PFPeA	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.9	4.9	<0.5	0.9	<0.5	1.5	1.5
PFHxA	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.7	2.8	<0.5	<0.5	<0.5	2.8	<0.5
PFHpA	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	0.6	<0.5	<0.5	<0.5	<0.5	<0.5
PFOA	ug/kg	<0.5	600 ¹	<0.5	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	1.1	1.2	<0.5	<0.5	<0.5	1.6	0.9
PFNA	ug/kg	<0.5	600 ¹	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PFDA	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.9	3.3	0.6	0.6	<0.5	<0.5	0.6
PFUnA	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	3.9	4.8	0.7	0.7	<0.5	<0.5	<0.5
PFDoA	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	11.4	11.3	2	2.7	0.9	<0.5	<0.5
PFTTrDA	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	2.6	2.3	0.5	0.5	<0.5	<0.5	<0.5
PFTeDA	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	4.9	4.2	1	0.9	0.5	<0.5	<0.5
PFBS	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.1	<0.5
PFPeS	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1	<0.5
PFHxS	ug/kg	<0.5	600 ¹	<0.5	1	<0.5	<0.5	<0.5	<0.5	<0.5	0.8	0.8	1.7	0.7	1.1	8.7	5.2
PFHpS	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	0.6
PFOS	ug/kg	<0.5	600 ¹	<0.5	4.4	<0.5	<0.5	<0.5	1.7	<0.5	20	52.1	44.4	19.9	23.7	121.8	62.9
PFNS	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	2.3	5.6	0.6	<0.5	0.6	<0.5	1.2
PFDS	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	9.6	13.1	3.6	3.9	3.5	<0.5	1.5
PFUnDS	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	11.2	14.3	5.2	6.8	6.9	<0.5	1.5
PFDoDS	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	14.8	16.6	7.8	11.3	10.9	<0.5	2
PFTTrDS	ug/kg	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	16.6	18	6.8	8.4	11.6	<0.5	1.6
5:3 FTCA	ug/kg	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
6:2 FTS	ug/kg	<1		<1	<1	<1	<1	<1	<1	<1	26	20	5	4	2	16	<1
8:2 FTS	ug/kg	<1		<1	<1	<1	<1	<1	<1	<1	29	84	5	8	4	2	<1
FOSA	ug/kg	<1		<1	<1	<1	<1	<1	<1	<1	1	2	<1	<1	<1	<1	<1

Exceeds the GAC

Table C5: Hazard Index Calculations

C4SL Threshold (Commercial)	0.6	0.6	0.6	0.6	
Location	mg/kg PFOA	mg/kg PFNA	mg/kg PFHxS	mg/kg PFOS	HI
FM01-SO-0.3-0.4-20240731	0.0017		0.0071	0.1325	0.2
FM02-SO-0.3-0.4-20240730	0.023	0.0009	0.3861	1.0963	2.5
FM03-SO-0.3-0.4-20240730			0.0019	0.0243	0.0
FM04-SO-0.3-0.4-20240730	0.0011	0.0012	0.0062	0.1087	0.2
FM05-SO-0.3-0.4-20240729			0.0006	0.0161	0.0
FM06-SO-0.3-0.4-20240801	0.0015		0.0288	1.5379	2.6
FM07-SO-0.3-0.4-20240801				0.0019	0.0
FM08-SO-0.2-0.3-20240801			0.0027	0.1014	0.2
FM09-SO-0.3-0.4-20240731				0.001	0.0
FM10-SO-0.4-0.5-20240801			0.001	0.0166	0.0
FM11-SO-0.3-0.4-20240731	0.0011		0.0049	0.0909	0.2
FM12-SO-0.3-0.4-20240731	0.0012		0.0096	0.4808	0.8
HP301-SO-0.2-0.3-20240801	0.0043	0.0029	0.0072	0.2392	0.4
HP302-SO-0.2-0.3-20240801				0.0039	0.0
HP303-SO-0.3-0.4-20240730	0.0006		0.0041	0.0071	0.0
HP304-SO-0.3-0.4-20240730					0.0
HP305-SO-0.3-0.4-20240730	0.0015	0.0007	0.0022	0.0719	0.1
HP306-SO-0.2-0.3-20240731	0.0008		0.0034	0.0508	0.1
HP307-SO-0.3-0.4-20240730	0.0011	0.0021	0.0057	0.1394	0.2
HP308-SO-0.3-0.4-20240730	0.0052	0.0058	0.0016	0.2168	0.4
HP309-SO-0.3-0.4-20240730			0.0012	0.0061	0.0
HP310-SO-0.3-0.4-20240730			0.0007	0.0062	0.0
HP311-SO-0.4-0.5-20240801			0.0015	0.1476	0.2
HP312-SO-0.3-0.4-20240730			0.0014	0.0127	0.0
HP313-SO-0.3-0.4-20240731				0.001	0.0
HP314-SO-0.3-0.4-20240801					0.0
HP315-SO-0.3-0.4-20240731				0.0152	0.0
HP316-SO-0.3-0.4-20240731					0.0
HP317-SO-0.2-0.3-20240731	0.0006		0.001	0.0044	0.0
HP318-SO-0.3-0.4-20240731					0.0
HP319-SO-0.3-0.4-20240731				0.0017	0.0
HP320-SO-0.4-0.5-20240729	0.0011		0.0008	0.02	0.0
HP321-SO-0.4-0.5-20240729			0.0017	0.0444	0.1
HP322-SO-0.4-0.5-20240729			0.0011	0.0237	0.0
HP323-SO-0.4-0.5-20240731	0.0009		0.0052	0.0629	0.1

Table C6: TOP Assay Summary of Results

All results are in µg/kg

Sample	24/13153-11s-HP320-SO-0.4-0.5			Sample	24/13153-17s-HP321-SO-0.4-0.5			Sample	24/13153-29s-FM05-SO-0.3-0.4		
	Pre-TOPs	Post-TOPs	Difference		Pre-TOPs	Post-TOPs	Difference		Pre-TOPs	Post-TOPs	Difference
4:2 FTS	<6	<6	-	4:2 FTS	<6	<6	-	4:2 FTS	<6	<6	-
6:2 FTS	58.535	6.058	-52.477	6:2 FTS	15.076	<6	-15.076	6:2 FTS	<6	<6	-
8:2 FTS	60.634	<6	-60.634	8:2 FTS	7.712	<6	-7.712	8:2 FTS	<6	<6	-
Me-FOSAA	<6	<6	-	Me-FOSAA	<6	<6	-	Me-FOSAA	<6	<6	-
Et-FOSAA	<6	<6	-	Et-FOSAA	<6	<6	-	Et-FOSAA	<6	<6	-
FOSA	<6	<6	-	FOSA	<6	<6	-	FOSA	<6	<6	-
PFBA	<6	117.249	117.249	PFBA	<6	34.113	34.113	PFBA	<6	7.499	7.499
PFPeA	<6	262.806	262.806	PFPeA	<6	70.436	70.436	PFPeA	<6	12.079	12.079
HFPO-DA	<6	<6	-	HFPO-DA	<6	<6	-	HFPO-DA	<6	<6	-
PFBS	<6	<6	-	PFBS	<6	<6	-	PFBS	<6	<6	-
PFHxA	<6	312.458	312.458	PFHxA	<6	43.019	43.019	PFHxA	<6	12.977	12.977
FPePA	<6	<6	-	FPePA	<6	<6	-	FPePA	<6	<6	-
PFPeS	<6	<6	-	PFPeS	<6	<6	-	PFPeS	<6	<6	-
PFHpA	<6	414.951	414.951	PFHpA	<6	16.113	16.113	PFHpA	<6	<6	-
DONA	<6	<6	-	DONA	<6	<6	-	DONA	<6	<6	-
PFHxS	<6	10.274	10.274	PFHxS	<6	<6	-	PFHxS	<6	<6	-
PFOA	<6	283.347	283.347	PFOA	<6	14.651	14.651	PFOA	<6	<6	-
PFHpS	<6	<6	-	PFHpS	<6	<6	-	PFHpS	<6	<6	-
FOUEA	<6	<6	-	FOUEA	<6	<6	-	FOUEA	<6	<6	-
PFNA	<6	326.884	326.884	PFNA	<6	7.079	7.079	PFNA	<6	<6	-
PFOS	46.179	69.211	23.032	PFOS	37.564	50.010	12.445	PFOS	23.059	27.537	4.478
N-MeFOSA	<6	<6	-	N-MeFOSA	<6	<6	-	N-MeFOSA	<6	<6	-
PFDA	<6	148.867	148.867	PFDA	<6	6.788	6.788	PFDA	<6	<6	-
N-EtFOSA	<6	<6	-	N-EtFOSA	<6	<6	-	N-EtFOSA	<6	<6	-
CI-PF3ONS	<6	<6	-	9CI-PF3ONS	<6	<6	-	9CI-PF3ONS	<6	<6	-
PFNS	<6	<6	-	PFNS	<6	<6	-	PFNS	<6	<6	-
PFUna	<6	79.439	79.439	PFUna	<6	<6	-	PFUna	<6	<6	-
PFDS	11.227	10.416	-0.812	PFDS	<6	<6	-	PFDS	<6	<6	-
PFDoA	13.914	56.999	43.085	PFDoA	<6	<6	-	PFDoA	<6	<6	-
PFUnDS	11.424	9.715	-1.709	PFUnDS	<6	<6	-	PFUnDS	<6	<6	-
PFTTrDA	6.863	8.399	1.535	PFTTrDA	<6	<6	-	PFTTrDA	<6	<6	-
PFDoDs	12.863	8.855	-4.008	PFDoDs	6.571	<6	-6.571	PFDoDs	<6	<6	-
PFTeDA	<6	<6	-	PFTeDA	<6	<6	-	PFTeDA	<6	<6	-
PFTTrDs	17.924	<6	-17.924	PFTTrDs	<6	<6	-	PFTTrDs	<6	<6	-
PFHxDA	<6	<6	-	PFHxDA	<6	<6	-	PFHxDA	<6	<6	-
PFODA	<6	<6	-	PFODA	<6	<6	-	PFODA	<6	<6	-
8:2diPAP	<6	<6	-	8:2diPAP	<6	<6	-	8:2diPAP	<6	<6	-
Total quantif	239.6	2125.9	1886.4	Total quantif	66.9	242.2	175.3	Total quantif	23.1	60.1	37.0
% change			787	% change			262	% change			161

Sample	4/13153-35s-HP309-SO-0.3-0.		
	Pre-TOPs	Post-TOPs	Difference
4:2 FTS	<6	<6	-
6:2 FTS	<6	<6	-
8:2 FTS	<6	<6	-
Me-FOSAA	<6	<6	-
Et-FOSAA	<6	<6	-
FOSA	<6	<6	-
PFBA	<6	6.634	6.634
PFPeA	<6	11.071	11.071
HFPO-DA	<6	<6	-
PFBS	<6	<6	-
PFHxA	<6	9.296	9.296
FPePA	<6	<6	-
PFPeS	<6	<6	-
PFHpA	<6	<6	-
DONA	<6	<6	-
PFHxS	<6	<6	-
PFOA	<6	<6	-
PFHpS	<6	<6	-
FOUEA	<6	<6	-
PFNA	<6	<6	-
PFOS	<6	<6	-
N-MeFOSA	<6	<6	-
PFDA	<6	<6	-
N-EtFOSA	<6	<6	-
CI-PF3ONS	<6	<6	-
PFNS	<6	<6	-
PFUna	<6	<6	-
PFDS	<6	<6	-
PFDoA	<6	<6	-
PFUnDS	<6	<6	-
PFTTrDA	<6	<6	-
PFDoDs	<6	<6	-
PFTeDA	<6	<6	-
PFTTrDs	<6	<6	-
PFHxDA	<6	<6	-
PFODA	<6	<6	-
8:2diPAP	<6	<6	-

Sample	24/13153-47s-HP310-SO-0.3-0.4		
	Pre-TOPs	Post-TOPs	Difference
4:2 FTS	<6	<6	-
6:2 FTS	<6	<6	-
8:2 FTS	<6	<6	-
Me-FOSAA	<6	<6	-
Et-FOSAA	<6	<6	-
FOSA	<6	<6	-
PFBA	<6	7.757	7.757
PFPeA	<6	14.745	14.745
HFPO-DA	<6	<6	-
PFBS	<6	<6	-
PFHxA	<6	10.770	10.770
FPePA	<6	<6	-
PFPeS	<6	<6	-
PFHpA	<6	<6	-
DONA	<6	<6	-
PFHxS	<6	<6	-
PFOA	<6	<6	-
PFHpS	<6	<6	-
FOUEA	<6	<6	-
PFNA	<6	<6	-
PFOS	7.672	6.944	-0.728
N-MeFOSA	<6	<6	-
PFDA	<6	<6	-
N-EtFOSA	<6	<6	-
9CI-PF3ONS	<6	<6	-
PFNS	<6	<6	-
PFUna	<6	<6	-
PFDS	<6	<6	-
PFDoA	<6	<6	-
PFUnDS	<6	<6	-
PFTTrDA	<6	<6	-
PFDoDs	<6	<6	-
PFTeDA	<6	<6	-
PFTTrDs	<6	<6	-
PFHxDA	<6	<6	-
PFODA	<6	<6	-
8:2diPAP	<6	<6	-

Sample	24/13153-50s-HP308-SO-0.3-0.4		
	Pre-TOPs	Post-TOPs	Difference
4:2 FTS	<6	<6	-
6:2 FTS	117.235	<6	-117.235
8:2 FTS	15.807	<6	-15.807
Me-FOSAA	<6	<6	-
Et-FOSAA	<6	<6	-
FOSA	<6	<6	-
PFBA	<6	152.395	152.395
PFPeA	7.116	314.589	307.473
HFPO-DA	<6	<6	-
PFBS	<6	<6	-
PFHxA	<6	124.644	124.644
FPePA	<6	<6	-
PFPeS	<6	<6	-
PFHpA	<6	45.436	45.436
DONA	<6	<6	-
PFHxS	<6	<6	-
PFOA	<6	27.709	27.709
PFHpS	<6	<6	-
FOUEA	<6	<6	-
PFNA	<6	18.478	18.478
PFOS	194.983	188.387	-6.596
N-MeFOSA	<6	<6	-
PFDA	13.051	20.307	7.256
N-EtFOSA	<6	<6	-
9CI-PF3ONS	<6	<6	-
PFNS	11.081	6.536	-4.544
PFUna	<6	<6	-
PFDS	7.376	<6	-7.376
PFDoA	<6	<6	-
PFUnDS	<6	<6	-
PFTTrDA	<6	<6	-
PFDoDs	<6	<6	-
PFTeDA	<6	<6	-
PFTTrDs	<6	<6	-
PFHxDA	<6	<6	-
PFODA	<6	<6	-
8:2diPAP	<6	<6	-

Total quantif 0.0 27.0 27.0
% change #DIV/O!

Total quantifable 7.7 40.2 32.5
% change 424

Total quantifable 366.6 898.5 531.8
% change 145

Sample	24/13153-86s-FM03-SO-0.3-0.4		
	Pre-TOPs	Post-TOPs	Difference
4:2 FTS	<6	<6	-
6:2 FTS	9.208	<6	-9.208
8:2 FTS	<6	<6	-
Me-FOSAA	<6	<6	-
Et-FOSAA	<6	<6	-
FOSA	<6	<6	-
PFBA	<6	23.375	23.375
PFPeA	<6	46.544	46.544
HFPO-DA	<6	<6	-
PFBS	<6	<6	-
PFHxA	<6	51.850	51.850
FPePA	<6	<6	-
PFPeS	<6	<6	-
PFHpA	<6	14.840	14.840
DONA	<6	<6	-
PFHxS	<6	8.146	8.146
PFOA	<6	19.318	19.318
PFHpS	<6	<6	-
FOUEA	<6	<6	-
PFNA	<6	6.369	6.369
PFOS	45.441	52.681	7.240
N-MeFOSA	<6	<6	-
PFDA	<6	<6	-
N-EtFOSA	<6	<6	-
9CI-PF3ONS	<6	<6	-
PFNS	<6	<6	-
PFUna	<6	<6	-
PFDS	<6	<6	-
PFDoA	<6	<6	-
PFUnDS	<6	<6	-
PFTTrDA	<6	<6	-
PFDoDs	<6	<6	-
PFTeDA	<6	<6	-
PFTTrDs	<6	<6	-
PFHxDA	<6	<6	-
PFODA	<6	<6	-
8:2diPAP	<6	<6	-

Sample	24/13153-131s-FM09-SO-0.3-0.4		
	Pre-TOPs	Post-TOPs	Difference
4:2 FTS	<6	<6	-
6:2 FTS	<6	<6	-
8:2 FTS	<6	<6	-
Me-FOSAA	<6	<6	-
Et-FOSAA	<6	<6	-
FOSA	<6	<6	-
PFBA	<6	6.358	6.358
PFPeA	<6	10.781	10.781
HFPO-DA	<6	<6	-
PFBS	<6	<6	-
PFHxA	<6	8.974	8.974
FPePA	<6	<6	-
PFPeS	<6	<6	-
PFHpA	<6	<6	-
DONA	<6	<6	-
PFHxS	<6	<6	-
PFOA	<6	<6	-
PFHpS	<6	<6	-
FOUEA	<6	<6	-
PFNA	<6	<6	-
PFOS	<6	<6	-
N-MeFOSA	<6	<6	-
PFDA	<6	<6	-
N-EtFOSA	<6	<6	-
9CI-PF3ONS	<6	<6	-
PFNS	<6	<6	-
PFUna	<6	<6	-
PFDS	<6	<6	-
PFDoA	<6	<6	-
PFUnDS	<6	<6	-
PFTTrDA	<6	<6	-
PFDoDs	<6	<6	-
PFTeDA	<6	<6	-
PFTTrDs	<6	<6	-
PFHxDA	<6	<6	-
PFODA	<6	<6	-
8:2diPAP	<6	<6	-

Sample	24/13153-143s-FM12-SO-0.3-0.4		
	Pre-TOPs	Post-TOPs	Difference
4:2 FTS	<6	<6	-
6:2 FTS	<6	<6	-
8:2 FTS	<6	<6	-
Me-FOSAA	<6	<6	-
Et-FOSAA	<6	<6	-
FOSA	<6	<6	-
PFBA	<6	7.536	7.536
PFPeA	<6	14.771	14.771
HFPO-DA	<6	<6	-
PFBS	<6	<6	-
PFHxA	<6	24.123	24.123
FPePA	<6	<6	-
PFPeS	<6	<6	-
PFHpA	<6	<6	-
DONA	<6	<6	-
PFHxS	9.151	13.880	4.730
PFOA	<6	<6	-
PFHpS	<6	<6	-
FOUEA	<6	<6	-
PFNA	<6	<6	-
PFOS	440.910	440.550	-0.360
N-MeFOSA	<6	<6	-
PFDA	<6	<6	-
N-EtFOSA	<6	<6	-
9CI-PF3ONS	<6	<6	-
PFNS	<6	<6	-
PFUna	<6	<6	-
PFDS	<6	<6	-
PFDoA	<6	<6	-
PFUnDS	<6	<6	-
PFTTrDA	<6	<6	-
PFDoDs	<6	<6	-
PFTeDA	<6	<6	-
PFTTrDs	<6	<6	-
PFHxDA	<6	<6	-
PFODA	<6	<6	-
8:2diPAP	<6	<6	-

Total quantifiable
% change

54.6

223.1

168.5
308

Total quantifiable
% change

0.0

26.1

26.1
#DIV/O!

Total quantifiable
% change

450.1

500.9

50.8
11

Sample	24/13203-24s-FM08-SO-0.2-0.3-20240801		
	Pre-TOPs	Post-TOPs	Difference
4:2 FTS	<6	<6	-
6:2 FTS	<6	<6	-
8:2 FTS	<6	<6	-
Me-FOSAA	<6	<6	-
Et-FOSAA	<6	<6	-
FOSA	<6	<6	-
PFBA	<6	16.173	16.173
PFPeA	<6	24.876	24.876
HFPO-DA	<6	<6	-
PFBS	<6	<6	-
PFHxA	<6	94.542	94.542
FPePA	<6	<6	-
PFPeS	<6	<6	-
PFHpA	<6	6.709	6.709
DONA	<6	<6	-
PFHxS	<6	11.877	11.877
PFOA	<6	31.497	31.497
PFHpS	<6	<6	-
FOUEA	<6	<6	-
PFNA	<6	<6	-
PFOS	208.151	149.012	-59.139
N-MeFOSA	<6	<6	-
PFDA	<6	<6	-
N-EtFOSA	<6	<6	-
9CI-PF3ONS	<6	<6	-
PFNS	7.335	<6	-7.335
PFUna	<6	<6	-
PFDS	8.587	<6	-8.587
PFDoA	<6	<6	-
PFUnDS	10.035	<6	-10.035
PFTTrDA	<6	<6	-
PFDoDs	<6	<6	-
PFTeDA	<6	<6	-
PFTTrDs	<6	<6	-
PFHxDA	<6	<6	-
PFODA	<6	<6	-
8:2diPAP	<6	<6	-

Sample	24/13203-45s-HP302-SO-0.2-0.3-20240801		
	Pre-TOPs	Post-TOPs	Difference
4:2 FTS	<6	<6	-
6:2 FTS	<6	<6	-
8:2 FTS	<6	<6	-
Me-FOSAA	<6	<6	-
Et-FOSAA	<6	<6	-
FOSA	<6	<6	-
PFBA	<6	6.762	6.762
PFPeA	<6	13.797	13.797
HFPO-DA	<6	<6	-
PFBS	<6	<6	-
PFHxA	<6	11.125	11.125
FPePA	<6	<	-
PFPeS	<6	<6	-
PFHpA	<6	<6	-
DONA	<6	<6	-
PFHxS	<6	<6	-
PFOA	<6	<6	-
PFHpS	<6	<6	-
FOUEA	<6	<6	-
PFNA	<6	<6	-
PFOS	<6	<6	-
N-MeFOSA	<6	<6	-
PFDA	<6	<6	-
N-EtFOSA	<6	<6	-
9CI-PF3ONS	<6	<6	-
PFNS	<6	<6	-
PFUna	<6	<6	-
PFDS	<6	<6	-
PFDoA	<6	<6	-
PFUnDS	<6	<6	-
PFTTrDA	<6	<6	-
PFDoDs	<6	<6	-
PFTeDA	<6	<6	-
PFTTrDs	<6	<6	-
PFHxDA	<6	<6	-
PFODA	<6	<6	-
8:2diPAP	<6	<6	-

Total quantifiable 234.1 334.7 100.6
% change 43

Total quantifiable F 0.0 31.7 31.7
% change #DIV/0!

Table C7: Groundwater and Surface Water Screening Tables

Location ID	Freshwater EOS	AA	MAC	WS202	WS203	WS204	WS205	WS206	WS208	WS209	WS210	WS211	WS213	WS215	BH160	DUP	STOREBUND	FIREPOND	DISCHARGEUP	DISCHARGEDOWN	BROOKEAST	OUTLET	OUTLETUP	WASTEPOND
				31/07/2024	30/07/2024	30/07/2024	30/07/2024	30/07/2024	01/08/2024	01/08/2024	31/07/2024	31/07/2024	01/08/2024	31/07/2024	31/07/2024	01/08/2024	31/07/2024	01/08/2024	01/08/2024	01/08/2024	01/08/2024	01/08/2024	01/08/2024	01/08/2024
Analyte	Units																							
Chloride	mg/l			13.2	19	15.4	9.8	12.1	18.4	22.5	18.1	18.5	20.8	16.5	332.1	21.3	-	-	-	1082.5	1097.5	92	37	1033.1
PFAAS																								
PFBA	ug/l	220	1100	<0.05	<0.05	<0.05	0.41	0.44	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
PFPeA	ug/l	32	3200	<0.05	0.11	<0.05	3.1	3.67	0.08	0.14	<0.05	<0.05	0.09	0.15	<0.05	0.15	<0.05	<0.05	0.15	0.16	0.18	<0.05	<0.05	0.18
PFHxA	ug/l	200	860	<0.05	0.13	0.17	1.51	1.75	0.07	0.18	<0.05	<0.05	0.07	0.17	<0.05	0.21	<0.05	<0.05	0.15	0.18	0.16	<0.05	<0.05	0.18
PFHpA	ug/l			<0.05	<0.05	<0.05	0.6	1	<0.05	0.09	<0.05	<0.05	<0.05	0.05	<0.05	0.09	<0.05	<0.05	0.06	0.06	0.07	<0.05	<0.05	<0.05
PFOA	ug/l	30	1200	<0.05	0.07	0.1	0.43	0.7	0.06	0.14	<0.05	<0.05	<0.05	0.12	<0.05	0.15	<0.05	<0.05	0.1	0.09	0.11	<0.05	<0.05	0.11
PFNA	ug/l			<0.05	<0.05	<0.05	0.06	0.08	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
PFDA	ug/l			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
PFUnA	ug/l			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
PFDoA	ug/l			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
PFTrDA	ug/l			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
PFTeDA	ug/l			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
PFHxDA	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
PFODA	ug/l			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
PFBS	ug/l	100	3700	<0.05	0.1	0.22	0.13	0.08	<0.05	0.1	<0.05	<0.05	<0.05	0.09	<0.05	0.08	<0.05	<0.05	<0.05	0.06	0.07	<0.05	<0.05	0.06
PFPeS	ug/l			<0.05	0.11	0.2	0.18	0.11	0.05	0.15	<0.05	<0.05	0.08	0.1	<0.05	0.16	<0.05	<0.05	0.08	0.09	0.09	<0.05	<0.05	0.09
PFHxS	ug/l			<0.05	0.46	3.69	1.57	2.94	0.37	1.2	<0.05	<0.05	0.37	0.75	<0.05	1.39	<0.05	<0.05	0.37	0.38	0.4	<0.05	<0.05	0.39
PFHpS	ug/l			<0.05	<0.05	0.13	0.14	0.23	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
PFOS	ug/l	6.50E-04	36	<0.05	0.19	13.67	10.7	13.68	0.14	0.54	<0.05	<0.05	0.19	1.87	<0.05	0.61	<0.05	<0.05	1.75	1.88	2.06	0.1	<0.05	1.71
PFNS	ug/l			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
PFDS	ug/l			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
PFUnDS	ug/l			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
PFDoDS	ug/l			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
PFTrDS	ug/l			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
HFPO-DA (Gen X)	ug/l			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
DONA	ug/l			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
5:3 FTCA	ug/l			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
9CI-PF3ONS	ug/l			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
4:2 FTS	ug/l			<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
6:2 FTS	ug/l			<0.2	<0.2	<0.2	<0.2	0.3	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.2	0.3	0.2	<0.2	<0.2	0.3
8:2 FTS	ug/l			<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
FOSA	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
N-MeFOSA	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
N-EtFOSA	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
N-MeFOSAA	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
N-EtFOSAA	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
8:2diPAP	ug/l			<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
FOUEA	ug/l			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1

Exceeds AA
Exceeds AA&MAC

Sample ID		CC01	CC02	CC03	CC04	CC05	CC06	CC07	CC08				
Sample Type / Depth		Top 5cm Crushed	Top 5cm Crushed	Top 5cm Crushed	Top 5cm Crushed	Top 5cm Crushed	Top 5cm Crushed	Top 5cm Crushed	Top 5cm Crushed				
Sample Date		29/07/2024	29/07/2024	29/07/2024	29/07/2024	30/07/2024	30/07/2024	30/07/2024	30/07/2024				
Analytes	Marine EQS										LOD/LOR	Units	
	AA	MAC											
PFAAS			<0.05	0.0932	<0.05	0.0722	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l	
PFBA	11	110	<0.05	0.0932	<0.05	0.0722	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l	
PFPeA	3.2	320	0.0942	1.3342	0.5374	1.3141	0.4270	0.2544	<0.05	<0.05	<0.05	ug/l	
HFPO-DA			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l	
PFBS	10	370	0.0641	2.0735	0.3924	3.4280	1.4994	0.8103	<0.05	0.1019	<0.05	ug/l	
PFHxA	20	86	0.3097	5.5473	0.6783	6.3978	1.5727	1.1370	<0.05	0.1402	<0.05	ug/l	
4:2 FTS			<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	ug/l	
FPePA			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	
PFPeS			<0.05	1.2888	0.0977	2.9013	0.9275	0.7805	<0.05	<0.05	<0.05	ug/l	
PFHpA			<0.05	0.6609	0.0571	0.7664	0.1627	0.1680	<0.05	<0.05	<0.05	ug/l	
naDONA			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l	
PFHxS			0.0764	2.9596	0.2630	9.2167	3.7623	2.2426	<0.05	0.2750	<0.05	ug/l	
PFOA	3	12	<0.05	0.5187	<0.05	1.1595	0.2026	0.2075	<0.05	<0.05	<0.05	ug/l	
6:2 FTS			0.5584	6.3679	1.5878	3.4661	0.2639	<0.2	<0.2	<0.2	<0.2	ug/l	
PFHpS			<0.05	0.1647	<0.05	0.7101	0.1222	0.1115	<0.05	<0.05	<0.05	ug/l	
FOUEA			<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	
PFNA			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l	
FOSA			<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	
PFOS	1.00E-07	7.2	0.1759	2.7301	0.1331	15.7304	3.3710	1.8173	0.0837	0.1506	<0.05	ug/l	
N-MeFOSA			<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	
PFDA			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l	
N-EtFOSA			<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	
8:2 FTS			<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	ug/l	
9CI-PF3ONS			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l	
PFNS			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l	
PFUna			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l	
N-MeFOSAA			<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	
N-EtFOSAA			<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	
PFDS			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l	
PFDoA			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l	
PFUnDS			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l	
PFTrDA			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l	
PFDoDS			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l	
PFTeDA			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l	
PFTrDS			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l	
PFHxDA			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ug/l	
PFODA			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ug/l	
8:2 diPAP			<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	ug/l	
	Exceeds AA												
	Exceeds MAC & AA												

Table C9: Concrete Screening Results - Solids - Remaining Core (5-20cm)

Analytes	Human Health EQS	Sample ID	CC01	CC02	CC03	CC04	CC05	CC06	CC07	CC08	LOD/LOR	Units
		Sample Type/Depth	5-20cm Crushed	5-20cm Crushed	5-20cm Crushed	5-20cm Crushed	5-20cm Crushed	5-20cm Crushed	5-20cm Crushed	5-20cm Crushed		
		Sample Date	29/07/2024	29/07/2024	29/07/2024	29/07/2024	30/07/2024	30/07/2024	30/07/2024	30/07/2024		
PFBA			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg
PFPeA			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg
HFPO-DA			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg
PFBS			<0.5	<0.5	<0.5	0.8	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg
PFHxA			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg
4:2 FTS			<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/kg
FPePA			<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/kg
PFPeS			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg
PFHpA			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg
naDONA			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg
PFHxS	600		<0.5	<0.5	<0.5	<0.5	0.8	<0.5	<0.5	<0.5	<0.5	ug/kg
PFOA	600		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg
6:2 FTS			<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/kg
PFHpS			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg
FOUEA			<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/kg
PFNA	600		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg
FOSA			<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/kg
PFOS	600		1	<0.5	<0.5	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg
N-MeFOSA			<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/kg
PFDA			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg
N-EtFOSA			<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/kg
8:2 FTS			<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/kg
9CI-PF3ONS			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg
PFNS			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg
PFUnA			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg
N-MeFOSAA			<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/kg
N-EtFOSAA			<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/kg
PFDS			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg
PFDoA			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg
PFUnDS			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg
PFTrDA			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg
PFDoDS			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg
PFTeDA			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg
PFTrDS			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg
PFHxDA			<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	ug/kg
PFODA			<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	ug/kg
8:2 diPAP			<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	ug/kg

Exceeds Human Health GAC

Analysis of crushed core to simulate re-use of concrete on site. Core between 5cm to approx. 20cm depth crushed prior to analysis (i.e. top 5cm not included as tested previously)

Sample ID		CC04	CC05	CC06	CC07	CC08			
Sample Type / Depth		5-20cm Crushed	5-20cm Crushed	5-20cm Crushed	5-20cm Crushed	5-20cm Crushed			
Sample Date		29/07/2024	30/07/2024	30/07/2024	30/07/2024	30/07/2024			
Analytes	Marine EQS							LOD/LOR	Units
	AA	MAC							
PFBA	11	110	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l
PFPeA	3.2	320	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l
HFPO-DA			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l
PFBS	10	370	0.2	0.12	0.06	<0.05	<0.05	<0.05	ug/l
PFHxA	20	86	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l
4:2 FTS			<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	ug/l
FPePA			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l
PFPeS			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l
PFHpA			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l
naDONA			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l
PFHxS			<0.05	0.0564	<0.05	<0.05	<0.05	<0.05	ug/l
PFOA	3	12	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l
6:2 FTS			<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	ug/l
PFHpS			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l
FOUEA			<1	<1	<1	<1	<1	<1	ug/l
PFNA			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l
FOSA			<1	<1	<1	<1	<1	<1	ug/l
PFOS	1.00E-07	7.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l
N-MeFOSA			<1	<1	<1	<1	<1	<1	ug/l
PFDA			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l
N-EtFOSA			<1	<1	<1	<1	<1	<1	ug/l
8:2 FTS			<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	ug/l
9CI-PF3ONS			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l
PFNS			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l
PFUna			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l
N-MeFOSAA			<1	<1	<1	<1	<1	<1	ug/l
N-EtFOSAA			<1	<1	<1	<1	<1	<1	ug/l
PFDS			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l
PFDoA			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l
PFUnDS			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l
PFTTrDA			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l
PFDoDS			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l
PFTTeDA			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l
PFTTrDS			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l
PFHxDA			<0.1	<0.1	<0.1	<0.1	0.6	<0.1	ug/l
PFODA			0.2	<0.1	<0.1	<0.1	1.3	<0.1	ug/l
8:2 diPAP			<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	ug/l
		Exceeds AA							
		Exceeds MAC & AA							

Fully crushed core, 5 to ~20cm depth (i.e. top 5cm not included as tested previously)



APPENDIX D DATA LOGGER INFORMATION

HYDROGRAPHS (LOG TERM DATA LOGGERS)

AQUIFER TEST OUTPUTS (RISING HEAD TESTS)



ERM

TABLE D1: CALCULATED HYDRAULIC CONDUCTIVITIES

Location	Response Zone (m aOD)	Hydraulic Conductivity (m/s)	Hydraulic Conductivity (m/day)	Response Zone Strata
WS203	3.0 to -0.6	3.09E-08	2.67E-03	Sandy silt
WS203	3.0 to -0.6	7.81E-08	6.75E-03	Sandy silt
WS205	3.5 to 0.5	7.83E-07	6.77E-02	Clay over silt over sand
WS205	3.5 to 0.5	8.11E-08	7.01E-03	Clay over silt over sand
WS208	3.6 to -0.6	1.04E-06	8.99E-02	Sandy clay with a layer of sand
WS208	3.6 to -0.6	1.21E-06	1.05E-01	Sandy clay with a layer of sand
WS213	3.8 to -1.2	2.35E-08	2.03E-03	Sandy silty clay over sand
WS213	3.8 to -1.2	4.17E-08	3.60E-03	Sandy silty clay over sand
WS215	3.6 to -0.6	4.20E-08	3.63E-03	Clay over sand
BH160	Unknown but base measured as - 7.625m aOD	4.09E-06	3.53E-01	Unknown



APPENDIX E LABORATORY CERTIFICATES

ERM
4th Floor
One New York Street
Manchester
United Kingdom
M1 4HD



Attention : Peter Bray
Date : 23rd September, 2024
Your reference : Talacre
Our reference : Test Report 24/13153 Batch 1 Schedule H
Location : Talacre
Date samples received : 31st July, 2024
Status : Final Report
Issue : 202409191038

Authorised By:



Paul Boden BSc
Senior Project Manager

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Element Materials Technology

Client Name: ERM
 Reference: Talacre
 Location: Talacre
 Contact: Peter Bray
 EMT Job No: 24/13153

Report : CEN 10:1

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	4	5	6	7	8															
Sample ID	CC04-20240729	CC05-20240730	CC06-20240730	CC07-20240730	CC08-20240730															
Depth																				
COC No / misc																				
Containers	B	B	B	B	B															
Sample Date	29/07/2024	30/07/2024	30/07/2024	30/07/2024	30/07/2024															
Sample Type	Solid	Solid	Solid	Solid	Solid															
Batch Number	1	1	1	1	1															
Date of Receipt	31/07/2024	31/07/2024	31/07/2024	31/07/2024	31/07/2024															
PFAAS																				
PFBA	<0.05	<0.05	<0.05	<0.05	<0.05															
PFPeA	<0.05	<0.05	<0.05	<0.05	<0.05															
HFPO-DA	<0.05	<0.05	<0.05	<0.05	<0.05															
PFBS	0.20	0.12	0.06	<0.05	<0.05															
PFHxA	<0.05	<0.05	<0.05	<0.05	<0.05															
4:2 FTS	<0.2	<0.2	<0.2	<0.2	<0.2															
FPePA	<0.5	<0.5	<0.5	<0.5	<0.5															
PFPeS	<0.05	<0.05	<0.05	<0.05	<0.05															
PFHpA	<0.05	<0.05	<0.05	<0.05	<0.05															
naDONA	<0.05	<0.05	<0.05	<0.05	<0.05															
PFHxS	<0.05	0.0564	<0.05	<0.05	<0.05															
PFOA	<0.05	<0.05	<0.05	<0.05	<0.05															
6:2 FTS	<0.2	<0.2	<0.2	<0.2	<0.2															
PFHpS	<0.05	<0.05	<0.05	<0.05	<0.05															
FOUEA	<1	<1	<1	<1	<1															
PFNA	<0.05	<0.05	<0.05	<0.05	<0.05															
FOSA	<1	<1	<1	<1	<1															
PFOS	<0.05	<0.05	<0.05	<0.05	<0.05															
N-MeFOSA	<1	<1	<1	<1	<1															
PFDA	<0.05	<0.05	<0.05	<0.05	<0.05															
N-EtFOSA	<1	<1	<1	<1	<1															
8:2 FTS	<0.2	<0.2	<0.2	<0.2	<0.2															
9CI-PF3ONS	<0.05	<0.05	<0.05	<0.05	<0.05															
PFNS	<0.05	<0.05	<0.05	<0.05	<0.05															
PFUna	<0.05	<0.05	<0.05	<0.05	<0.05															
N-MeFOSAA	<1	<1	<1	<1	<1															
N-EtFOSAA	<1	<1	<1	<1	<1															
PFDS	<0.05	<0.05	<0.05	<0.05	<0.05															
PFDoA	<0.05	<0.05	<0.05	<0.05	<0.05															
PFUnDS	<0.05	<0.05	<0.05	<0.05	<0.05															
PFTrDA	<0.05	<0.05	<0.05	<0.05	<0.05															
PFDoDS	<0.05	<0.05	<0.05	<0.05	<0.05															
PFTeDA	<0.05	<0.05	<0.05	<0.05	<0.05															
PFTrDS	<0.05	<0.05	<0.05	<0.05	<0.05															
PFHxDA	<0.1	<0.1	<0.1	<0.1	0.6															
PFODA	0.2	<0.1	<0.1	<0.1	1.3															
8:2 diPAP	<0.2	<0.2	<0.2	<0.2	0.9															

Please see attached notes for all abbreviations and acronyms

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 24/13153

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 overestimate 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.

Please include all sections of this report if it is reproduced

All solid results are expressed on a dry weight basis unless stated otherwise.

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-quantitatively, 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.

EMT Job No: 24/13153

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM135	Analysis of PFAS compounds in Water and Soil by LC-MS/MS	PM120	Methanol/NH4OH Extraction for PFAS Analysis by LC-MS - As received solid samples are extracted in Methanol: Ammonium Hydroxide solution by Sonication and End over End shaker.			AR	Yes

ERM
4th Floor
One New York Street
Manchester
United Kingdom
M1 4HD



Attention : Peter Bray
Date : 19th August, 2024
Your reference : Talacre
Our reference : Test Report 24/13153 Batch 1 Schedule A 24/13153 Batch 1 Schedule C 24/13153 Ba:
Location : Talacre
Date samples received : 31st July, 2024
Status : Final Report
Issue : 202408191013

Nine samples were received for analysis on 31st July, 2024 of which nine 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 - 22.878 kg of CO2

Scope 1&2&3 emissions - 54.068 kg of CO2

Authorised By:



Paul Boden BSc
Senior Project Manager

Please include all sections of this report if it is reproduced

24/13153

Total Oxidisable Precursors (TOP) Assay

Background

Thousands of polyfluorinated compounds (PFAA precursors) are used in industrial and consumer products and there is concern that these may overtime biotransform to PFAAs.
TOP Assay is a procedure developed to estimate the effect of these precursors on future PFAAs concentration.

Analysis

A portion of received soil sample was extracted with 0.1% ammonium hydroxide in methanol and the resultant extract treated with potassium persulphate (60mM) and sodium hydroxide (0.125M) before heating at 85C for 6 hours.
Once cool the sample was neutralised with HCl prior to analysis by LC/MS/MS for PFAS suite.
The soil extract was also analysed untreated by LC/MS/MS for PFAS suite.
The difference between the treated and untreated concentrations is the concentration of the non-discrete PFAA precursors.

C13 6:2 FTS added to monitor the efficiency of the oxidation.

These results have been Internal Standard corrected.

Results

Sample	C13 Precursor	Pre-TOP	Post-TOP	% Oxidation
24/13153-11s-HP320-SO-0.4-0.5	C13 6:2 FTS	133.363	<6	100
24/13153-17s-HP321-SO-0.4-0.5	C13 6:2 FTS	109.414	<6	100
24/13153-29s-FM05-SO-0.3-0.4	C13 6:2 FTS	182.432	<6	100
24/13153-35s-HP309-SO-0.3-0.4	C13 6:2 FTS	95.533	<6	100
24/13153-47s-HP310-SO-0.3-0.4	C13 6:2 FTS	142.527	<6	100
24/13153-50s-HP308-SO-0.3-0.4	C13 6:2 FTS	128.285	<6	100
24/13153-86s-FM03-SO-0.3-0.4	C13 6:2 FTS	122.205	<6	100
24/13153-131s-FM09-SO-0.3-0.4	C13 6:2 FTS	115.256	<6	100
24/13153-143s-FM12-SO-0.3-0.4	C13 6:2 FTS	168.449	<6	100

All results are in µg/kg

Sample	24/13153-11s-HP320-SO-0.4-0.5		
	Pre-TOPs	Post-TOPs	Difference
4:2 FTS	<6	<6	-
6:2 FTS	58.535	6.058	-52.477
8:2 FTS	60.634	<6	-60.634
Me-FOSAA	<6	<6	-
Et-FOSAA	<6	<6	-
FOSA	<6	<6	-
PFBA	<6	117.249	117.249
PFPeA	<6	262.806	262.806
HFPO-DA	<6	<6	-
PFBS	<6	<6	-
PFHxA	<6	312.458	312.458
FPePA	<6	<6	-
PFPeS	<6	<6	-
PFHpA	<6	414.951	414.951
DONA	<6	<6	-
PFHxS	<6	10.274	10.274
PFOA	<6	283.347	283.347
PFHpS	<6	<6	-
FOUEA	<6	<6	-
PFNA	<6	326.884	326.884
PFOS	46.179	69.211	23.032
N-MeFOSA	<6	<6	-
PFDA	<6	148.867	148.867
N-EtFOSA	<6	<6	-
9Cl-PF3ONS	<6	<6	-
PFNS	<6	<6	-
PFUna	<6	79.439	79.439
PFDS	11.227	10.416	-0.812
PFDoA	13.914	56.999	43.085
PFUnDS	11.424	9.715	-1.709
PFTrDA	6.863	8.399	1.535
PFDoDs	12.863	8.855	-4.008
PFTeDA	<6	<6	-
PFTrDs	17.924	<6	-17.924
PFHxDA	<6	<6	-
PFODA	<6	<6	-
8:2diPAP	<6	<6	-

Sample	24/13153-17s-HP321-SO-0.4-0.5		
	Pre-TOPs	Post-TOPs	Difference
4:2 FTS	<6	<6	-
6:2 FTS	15.076	<6	-15.076
8:2 FTS	7.712	<6	-7.712
Me-FOSAA	<6	<6	-
Et-FOSAA	<6	<6	-
FOSA	<6	<6	-
PFBA	<6	34.113	34.113
PFPeA	<6	70.436	70.436
HFPO-DA	<6	<6	-
PFBS	<6	<6	-
PFHxA	<6	43.019	43.019
FPePA	<6	<6	-
PFPeS	<6	<6	-
PFHpA	<6	16.113	16.113
DONA	<6	<6	-
PFHxS	<6	<6	-
PFOA	<6	14.651	14.651
PFHpS	<6	<6	-
FOUEA	<6	<6	-
PFNA	<6	7.079	7.079
PFOS	37.564	50.010	12.445
N-MeFOSA	<6	<6	-
PFDA	<6	6.788	6.788
N-EtFOSA	<6	<6	-
9Cl-PF3ONS	<6	<6	-
PFNS	<6	<6	-
PFUna	<6	<6	-
PFDS	<6	<6	-
PFDoA	<6	<6	-
PFUnDS	<6	<6	-
PFTrDA	<6	<6	-
PFDoDs	6.571	<6	-6.571
PFTeDA	<6	<6	-
PFTrDs	<6	<6	-
PFHxDA	<6	<6	-
PFODA	<6	<6	-
8:2diPAP	<6	<6	-

Sample	24/13153-29s-FM05-SO-0.3-0.4		
	Pre-TOPs	Post-TOPs	Difference
4:2 FTS	<6	<6	-
6:2 FTS	<6	<6	-
8:2 FTS	<6	<6	-
Me-FOSAA	<6	<6	-
Et-FOSAA	<6	<6	-
FOSA	<6	<6	-
PFBA	<6	7.499	7.499
PFPeA	<6	12.079	12.079
HFPO-DA	<6	<6	-
PFBS	<6	<6	-
PFHxA	<6	12.977	12.977
PFPePA	<6	<6	-
PFPeS	<6	<6	-
PFHpA	<6	<6	-
DONA	<6	<6	-
PFHxS	<6	<6	-
PFOA	<6	<6	-
PFHpS	<6	<6	-
FOUEA	<6	<6	-
PFNA	<6	<6	-
PFOS	23.059	27.537	4.478
N-MeFOSA	<6	<6	-
PFDA	<6	<6	-
N-EtFOSA	<6	<6	-
9Cl-PF3ONS	<6	<6	-
PFNS	<6	<6	-
PFUna	<6	<6	-
PFDS	<6	<6	-
PFDoA	<6	<6	-
PFUnDS	<6	<6	-
PFTTrDA	<6	<6	-
PFDoDs	<6	<6	-
PFTeDA	<6	<6	-
PFTTrDs	<6	<6	-
PFHxDA	<6	<6	-
PFODA	<6	<6	-
8:2diPAP	<6	<6	-

Sample	24/13153-35s-HP309-SO-0.3-0.4		
	Pre-TOPs	Post-TOPs	Difference
4:2 FTS	<6	<6	-
6:2 FTS	<6	<6	-
8:2 FTS	<6	<6	-
Me-FOSAA	<6	<6	-
Et-FOSAA	<6	<6	-
FOSA	<6	<6	-
PFBA	<6	6.634	6.634
PFPeA	<6	11.071	11.071
HFPO-DA	<6	<6	-
PFBS	<6	<6	-
PFHxA	<6	9.296	9.296
PFPePA	<6	<6	-
PFPeS	<6	<6	-
PFHpA	<6	<6	-
DONA	<6	<6	-
PFHxS	<6	<6	-
PFOA	<6	<6	-
PFHpS	<6	<6	-
FOUEA	<6	<6	-
PFNA	<6	<6	-
PFOS	<6	<6	-
N-MeFOSA	<6	<6	-
PFDA	<6	<6	-
N-EtFOSA	<6	<6	-
9Cl-PF3ONS	<6	<6	-
PFNS	<6	<6	-
PFUna	<6	<6	-
PFDS	<6	<6	-
PFDoA	<6	<6	-
PFUnDS	<6	<6	-
PFTTrDA	<6	<6	-
PFDoDs	<6	<6	-
PFTeDA	<6	<6	-
PFTTrDs	<6	<6	-
PFHxDA	<6	<6	-
PFODA	<6	<6	-
8:2diPAP	<6	<6	-

Sample	24/13153-47s-HP310-SO-0.3-0.4		
	Pre-TOPs	Post-TOPs	Difference
4:2 FTS	<6	<6	-
6:2 FTS	<6	<6	-
8:2 FTS	<6	<6	-
Me-FOSAA	<6	<6	-
Et-FOSAA	<6	<6	-
FOSA	<6	<6	-
PFBA	<6	7.757	7.757
PFPeA	<6	14.745	14.745
HFPO-DA	<6	<6	-
PFBS	<6	<6	-
PFHxA	<6	10.770	10.770
PFPePA	<6	<6	-
PFPeS	<6	<6	-
PFHpA	<6	<6	-
DONA	<6	<6	-
PFHxS	<6	<6	-
PFOA	<6	<6	-
PFHpS	<6	<6	-
FOUEA	<6	<6	-
PFNA	<6	<6	-
PFOS	7.672	6.944	-0.728
N-MeFOSA	<6	<6	-
PFDA	<6	<6	-
N-EtFOSA	<6	<6	-
9Cl-PF3ONS	<6	<6	-
PFNS	<6	<6	-
PFUna	<6	<6	-
PFDS	<6	<6	-
PFDoA	<6	<6	-
PFUnDS	<6	<6	-
PFTTrDA	<6	<6	-
PFDoDs	<6	<6	-
PFTTeDA	<6	<6	-
PFTTrDs	<6	<6	-
PFHxDA	<6	<6	-
PFODA	<6	<6	-
8:2diPAP	<6	<6	-

Sample	24/13153-50s-HP308-SO-0.3-0.4		
	Pre-TOPs	Post-TOPs	Difference
4:2 FTS	<6	<6	-
6:2 FTS	117.235	<6	-117.235
8:2 FTS	15.807	<6	-15.807
Me-FOSAA	<6	<6	-
Et-FOSAA	<6	<6	-
FOSA	<6	<6	-
PFBA	<6	152.395	152.395
PFPeA	7.116	314.589	307.473
HFPO-DA	<6	<6	-
PFBS	<6	<6	-
PFHxA	<6	124.644	124.644
PFPePA	<6	<6	-
PFPeS	<6	<6	-
PFHpA	<6	45.436	45.436
DONA	<6	<6	-
PFHxS	<6	<6	-
PFOA	<6	27.709	27.709
PFHpS	<6	<6	-
FOUEA	<6	<6	-
PFNA	<6	18.478	18.478
PFOS	194.983	188.387	-6.596
N-MeFOSA	<6	<6	-
PFDA	13.051	20.307	7.256
N-EtFOSA	<6	<6	-
9Cl-PF3ONS	<6	<6	-
PFNS	11.081	6.536	-4.544
PFUna	<6	<6	-
PFDS	7.376	<6	-7.376
PFDoA	<6	<6	-
PFUnDS	<6	<6	-
PFTTrDA	<6	<6	-
PFDoDs	<6	<6	-
PFTTeDA	<6	<6	-
PFTTrDs	<6	<6	-
PFHxDA	<6	<6	-
PFODA	<6	<6	-
8:2diPAP	<6	<6	-

Sample	24/13153-86s-FM03-SO-0.3-0.4		
	Pre-TOPs	Post-TOPs	Difference
4:2 FTS	<6	<6	-
6:2 FTS	9.208	<6	-9.208
8:2 FTS	<6	<6	-
Me-FOSAA	<6	<6	-
Et-FOSAA	<6	<6	-
FOSA	<6	<6	-
PFBA	<6	23.375	23.375
PFPeA	<6	46.544	46.544
HFPO-DA	<6	<6	-
PFBS	<6	<6	-
PFHxA	<6	51.850	51.850
PFPePA	<6	<6	-
PFPeS	<6	<6	-
PFHpA	<6	14.840	14.840
DONA	<6	<6	-
PFHxS	<6	8.146	8.146
PFOA	<6	19.318	19.318
PFHpS	<6	<6	-
FOUEA	<6	<6	-
PFNA	<6	6.369	6.369
PFOS	45.441	52.681	7.240
N-MeFOSA	<6	<6	-
PFDA	<6	<6	-
N-EtFOSA	<6	<6	-
9Cl-PF3ONS	<6	<6	-
PFNS	<6	<6	-
PFUna	<6	<6	-
PFDS	<6	<6	-
PFDoA	<6	<6	-
PFUnDS	<6	<6	-
PFTrDA	<6	<6	-
PFDoDs	<6	<6	-
PFTeDA	<6	<6	-
PFTrDs	<6	<6	-
PFHxDA	<6	<6	-
PFODA	<6	<6	-
8:2diPAP	<6	<6	-

Sample	24/13153-131s-FM09-SO-0.3-0.4		
	Pre-TOPs	Post-TOPs	Difference
4:2 FTS	<6	<6	-
6:2 FTS	<6	<6	-
8:2 FTS	<6	<6	-
Me-FOSAA	<6	<6	-
Et-FOSAA	<6	<6	-
FOSA	<6	<6	-
PFBA	<6	6.358	6.358
PFPeA	<6	10.781	10.781
HFPO-DA	<6	<6	-
PFBS	<6	<6	-
PFHxA	<6	8.974	8.974
PFPePA	<6	<6	-
PFPeS	<6	<6	-
PFHpA	<6	<6	-
DONA	<6	<6	-
PFHxS	<6	<6	-
PFOA	<6	<6	-
PFHpS	<6	<6	-
FOUEA	<6	<6	-
PFNA	<6	<6	-
PFOS	<6	<6	-
N-MeFOSA	<6	<6	-
PFDA	<6	<6	-
N-EtFOSA	<6	<6	-
9Cl-PF3ONS	<6	<6	-
PFNS	<6	<6	-
PFUna	<6	<6	-
PFDS	<6	<6	-
PFDoA	<6	<6	-
PFUnDS	<6	<6	-
PFTrDA	<6	<6	-
PFDoDs	<6	<6	-
PFTeDA	<6	<6	-
PFTrDs	<6	<6	-
PFHxDA	<6	<6	-
PFODA	<6	<6	-
8:2diPAP	<6	<6	-

Sample	24/13153-143s-FM12-SO-0.3-0.4		
	Pre-TOPs	Post-TOPs	Difference
4:2 FTS	<6	<6	-
6:2 FTS	<6	<6	-
8:2 FTS	<6	<6	-
Me-FOSAA	<6	<6	-
Et-FOSAA	<6	<6	-
FOSA	<6	<6	-
PFBA	<6	7.536	7.536
PFPeA	<6	14.771	14.771
HFPO-DA	<6	<6	-
PFBS	<6	<6	-
PFHxA	<6	24.123	24.123
PFPePA	<6	<6	-
PFPeS	<6	<6	-
PFHpA	<6	<6	-
DONA	<6	<6	-
PFHxS	9.151	13.880	4.730
PFOA	<6	<6	-
PFHpS	<6	<6	-
FOUEA	<6	<6	-
PFNA	<6	<6	-
PFOS	440.910	440.550	-0.360
N-MeFOSA	<6	<6	-
PFDA	<6	<6	-
N-EtFOSA	<6	<6	-
9Cl-PF3ONS	<6	<6	-
PFNS	<6	<6	-
PFUna	<6	<6	-
PFDS	<6	<6	-
PFDoA	<6	<6	-
PFUnDS	<6	<6	-
PFTrDA	<6	<6	-
PFDoDs	<6	<6	-
PFTeDA	<6	<6	-
PFTrDs	<6	<6	-
PFHxDA	<6	<6	-
PFODA	<6	<6	-
8:2diPAP	<6	<6	-

ERM
4th Floor
One New York Street
Manchester
United Kingdom
M1 4HD



Attention : Peter Bray
Date : 15th August, 2024
Your reference : Talacre
Our reference : Test Report 24/13203 Batch 1
Location : PoA
Date samples received : 1st August, 2024
Status : Final Report
Issue : 1

Two samples were received for analysis on 1st August, 2024 of which two 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 - 10.281 kg of CO2

Scope 1&2&3 emissions - 24.296 kg of CO2

Authorised By:



Paul Boden BSc

Senior Project Manager

Please include all sections of this report if it is reproduced

24/13203

Total Oxidisable Precursors (TOP) Assay

Background

Thousands of polyfluorinated compounds (PFAA precursors) are used in industrial and consumer products and there is concern that these may overtime biotransform to PFAAs.

TOP Assay is a procedure developed to estimate the effect of these precursors on future PFAAs concentration.

Analysis

A portion of received soil sample was extracted with 0.1% ammonium hydroxide in methanol and the resultant extract treated with potassium persulphate (60mM) and sodium hydroxide (0.125M) before heating at 85C for 6 hours.

Once cool the sample was neutralised with HCl prior to analysis by LC/MS/MS for PFAS suite.

The soil extract was also analysed untreated by LC/MS/MS for PFAS suite.

The difference between the treated and untreated concentrations is the concentration of the non-discrete PFAA precursors.

C13 6:2 FTS added to monitor the efficiency of the oxidation.

These results have been Internal Standard corrected.

Results

Sample	C13 Precursor	Pre-TOP	Post-TOP	% Oxidation
24/13203-24s-FM08-SO-0.2-0.3-20240801	C13 6:2 FTS	109.011	<6	100
24/13203-45s-HP302-SO-0.2-0.3-20240801	C13 6:2 FTS	122.285	<6	100

All results are in µg/kg

Sample	24/13203-24s-FM08-SO-0.2-0.3-20240801		
	Pre-TOPs	Post-TOPs	Difference
4:2 FTS	<6	<6	-
6:2 FTS	<6	<6	-
8:2 FTS	<6	<6	-
Me-FOSAA	<6	<6	-
Et-FOSAA	<6	<6	-
FOSA	<6	<6	-
PFBA	<6	16.173	16.173
PFPeA	<6	24.876	24.876
HFPO-DA	<6	<6	-
PFBS	<6	<6	-
PFHxA	<6	94.542	94.542
FPePA	<6	<6	-
PFPeS	<6	<6	-
PFHpA	<6	6.709	6.709
DONA	<6	<6	-
PFHxS	<6	11.877	11.877
PFOA	<6	31.497	31.497
PFHpS	<6	<6	-
FOUEA	<6	<6	-
PFNA	<6	<6	-
PFOS	208.151	149.012	-59.139
N-MeFOSA	<6	<6	-
PFDA	<6	<6	-
N-EtFOSA	<6	<6	-
9Cl-PF3ONS	<6	<6	-
PFNS	7.335	<6	-7.335
PFUna	<6	<6	-
PFDS	8.587	<6	-8.587
PFDoA	<6	<6	-
PFUnDS	10.035	<6	-10.035
PFTTrDA	<6	<6	-
PFDoDs	<6	<6	-
PFTeDA	<6	<6	-
PFTTrDs	<6	<6	-
PFHxDA	<6	<6	-
PFODA	<6	<6	-
8:2diPAP	<6	<6	-

Sample	24/13203-45s-HP302-SO-0.2-0.3-20240801		
	Pre-TOPs	Post-TOPs	Difference
4:2 FTS	<6	<6	-
6:2 FTS	<6	<6	-
8:2 FTS	<6	<6	-
Me-FOSAA	<6	<6	-
Et-FOSAA	<6	<6	-
FOSA	<6	<6	-
PFBA	<6	6.762	6.762
PFPeA	<6	13.797	13.797
HFPO-DA	<6	<6	-
PFBS	<6	<6	-
PFHxA	<6	11.125	11.125
FPePA	<6	<6	-
PFPeS	<6	<6	-
PFHpA	<6	<6	-
DONA	<6	<6	-
PFHxS	<6	<6	-
PFOA	<6	<6	-
PFHpS	<6	<6	-
FOUEA	<6	<6	-
PFNA	<6	<6	-
PFOS	<6	<6	-
N-MeFOSA	<6	<6	-
PFDA	<6	<6	-
N-EtFOSA	<6	<6	-
9Cl-PF3ONS	<6	<6	-
PFNS	<6	<6	-
PFUna	<6	<6	-
PFDS	<6	<6	-
PFDoA	<6	<6	-
PFUnDS	<6	<6	-
PFTTrDA	<6	<6	-
PFDoDs	<6	<6	-
PFTeDA	<6	<6	-
PFTTrDs	<6	<6	-
PFHxDA	<6	<6	-
PFODA	<6	<6	-
8:2diPAP	<6	<6	-

ERM
4th Floor
One New York Street
Manchester
United Kingdom
M1 4HD



Attention : Peter Bray

Date : 19th August, 2024

Your reference : Talacre

Our reference : Test Report 24/13153 Batch 1 Schedule A 24/13153 Batch 1 Schedule C 24/13153 Ba:

Location : Talacre

Date samples received : 31st July, 2024

Status : Final Report

Issue : 202408191013

Seventy three samples were received for analysis on 31st July, 2024 of which forty three 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 - 22.878 kg of CO2

Scope 1&2&3 emissions - 54.068 kg of CO2

Authorised By:



Paul Boden BSc
Senior Project Manager

Please include all sections of this report if it is reproduced

Element Materials Technology

Client Name: ERM
 Reference: Talacre
 Location: Talacre
 Contact: Peter Bray
 EMT Job No: 24/13153

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	9-11	15-17	21-23	27-29	33-35	36-38	45-47	48-50	54-56	60-62	Please see attached notes for all abbreviations and acronyms		
Sample ID	HP320-SO-0.4-0.5-20240729	HP321-SO-0.4-0.5-20240729	HP322-SO-0.4-0.5-20240729	FM05-SO-0.3-0.4-20240729	HP309-SO-0.3-0.4-20240730	HP312-SO-0.3-0.4-20240730	HP310-SO-0.3-0.4-20240730	HP308-SO-0.3-0.4-20240730	HP307-SO-0.3-0.4-20240730	HP305-SO-0.3-0.4-20240730	LOD/LOR	Units	Method No.
Depth	0.40-0.50	0.40-0.50	0.40-0.50	0.30-0.40	0.30-0.40	0.30-0.40	0.30-0.40	0.30-0.40	0.30-0.40	0.30-0.40			
COC No / misc													
Containers	J T	J T	J T	J T	J T	J T	J T	J T	J T	J T			
Sample Date	29/07/2024	29/07/2024	29/07/2024	29/07/2024	30/07/2024	30/07/2024	30/07/2024	30/07/2024	30/07/2024	30/07/2024			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	31/07/2024	31/07/2024	31/07/2024	31/07/2024	31/07/2024	31/07/2024	31/07/2024	31/07/2024	31/07/2024	31/07/2024			
Natural Moisture Content	5.7	5.7	3.9	3.3	21.3	16.2	11.0	15.4	11.8	18.2	<0.1	%	PM4/PM0
PFAAS													
PFBA	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	3.3	0.8	1.2	<0.5	ug/kg	TM135/PM120
PFPeA	1.9	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	18.5	4.1	5.8	<0.5	ug/kg	TM135/PM120
PFHxA	1.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	11.0	1.6	2.8	<0.5	ug/kg	TM135/PM120
PFHpA	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	3.1	1.1	2.5	<0.5	ug/kg	TM135/PM120
PFOA	1.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	5.2	1.1	1.5	<0.5	ug/kg	TM135/PM120
PFNA	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	5.8	2.1	0.7	<0.5	ug/kg	TM135/PM120
PFDA	1.9	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	19.4	0.7	<0.5	<0.5	ug/kg	TM135/PM120
PFUnA	3.9	0.7	<0.5	<0.5	<0.5	<0.5	<0.5	2.0	<0.5	<0.5	<0.5	ug/kg	TM135/PM120
PFDoA	11.4	2.0	0.9	<0.5	<0.5	<0.5	<0.5	2.5	<0.5	<0.5	<0.5	ug/kg	TM135/PM120
PFTrDA	2.6	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.7	<0.5	<0.5	<0.5	ug/kg	TM135/PM120
PFTeDA	4.9	1.0	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg	TM135/PM120
PFHxDA	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	ug/kg	TM135/PM120
PFODA	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	ug/kg	TM135/PM120
PFBS	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg	TM135/PM120
PFPeS	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg	TM135/PM120
PFHxS	0.8	1.7	1.1	0.6	1.2	1.4	0.7	1.6	5.7	2.2	<0.5	ug/kg	TM135/PM120
PFHpS	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg	TM135/PM120
PFOS	20.0	44.4	23.7	16.1	6.1	12.7	6.2	216.8 ^{AA}	139.4 ^{AA}	71.9	<0.5	ug/kg	TM135/PM120
PFNS	2.3	0.6	0.6	<0.5	<0.5	<0.5	<0.5	11.1	2.0	1.3	<0.5	ug/kg	TM135/PM120
PFDS	9.6	3.6	3.5	<0.5	<0.5	<0.5	<0.5	6.7	1.9	0.7	<0.5	ug/kg	TM135/PM120
PFUnDS	11.2	5.2	6.9	<0.5	<0.5	<0.5	<0.5	3.9	1.2	<0.5	<0.5	ug/kg	TM135/PM120
PFDoDS	14.8	7.8	10.9	<0.5	<0.5	<0.5	<0.5	2.8	1.6	<0.5	<0.5	ug/kg	TM135/PM120
PFTrDS	16.6	6.8	11.6	<0.5	<0.5	<0.5	<0.5	2.0	0.8	<0.5	<0.5	ug/kg	TM135/PM120
HFPO-DA (Gen X)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg	TM135/PM120
DONA	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg	TM135/PM120
5:3 FTCA	<1	<1	<1	<1	<1	<1	<1	43	6	1	<1	ug/kg	TM135/PM120
9Cl-PF3ONS	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg	TM135/PM120
4:2 FTS	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/kg	TM135/PM120
6:2 FTS	26	5	2	<1	<1	<1	<1	33	<1	<1	<1	ug/kg	TM135/PM120
8:2 FTS	29	5	4	<1	<1	<1	<1	2	<1	<1	<1	ug/kg	TM135/PM120
FOSA	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/kg	TM135/PM120
N-MeFOSA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/kg	TM135/PM120
N-EtFOSA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/kg	TM135/PM120
N-MeFOSAA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/kg	TM135/PM120
N-EtFOSAA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/kg	TM135/PM120
8:2diPAP	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	ug/kg	TM135/PM120
FOUEA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/kg	TM135/PM120

Element Materials Technology

Client Name: ERM
Reference: Talacre
Location: Talacre
Contact: Peter Bray
EMT Job No: 24/13153

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	66-68	72-74	78-80	84-86	87-89	93-95	99-101	105-107	111-113	117-119	Please see attached notes for all abbreviations and acronyms		
Sample ID	HP303-SO-0.3 0.4-20240730	HP304-SO-0.3 0.4-20240730	FM02-SO-0.3 0.4-20240730	FM03-SO-0.3 0.4-20240730	FM04-SO-0.3 0.4-20240730	HP313-SO-0.3 0.4-20240731	HP315-SO-0.3 0.4-20240731	HP318-SO-0.3 0.4-20240731	HP319-SO-0.3 0.4-20240731	HP306-SO-0.2 0.3-20240731	LOD/LOR	Units	Method No.
Depth	0.30-0.40	0.30-0.40	0.30-0.40	0.30-0.40	0.30-0.40	0.30-0.40	0.30-0.40	0.30-0.40	0.30-0.40	0.20-0.30			
COC No / misc													
Containers	J T	J	J T	J T	J T	J	J	J	J	J			
Sample Date	30/07/2024	30/07/2024	30/07/2024	30/07/2024	30/07/2024	31/07/2024	31/07/2024	31/07/2024	31/07/2024	31/07/2024			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	31/07/2024	31/07/2024	31/07/2024	31/07/2024	31/07/2024	31/07/2024	31/07/2024	31/07/2024	31/07/2024	31/07/2024			
Natural Moisture Content	18.5	20.6	22.5	5.5	11.5	4.5	6.3	2.9	4.9	8.1	<0.1	%	PM4/PM0
PFAAS													
PFBA	<0.5	<0.5	1.2	<0.5	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg	TM135/PM120
PFPeA	1.4	<0.5	3.3	<0.5	2.3	<0.5	<0.5	<0.5	<0.5	0.8	<0.5	ug/kg	TM135/PM120
PFHxA	1.1	<0.5	9.4	<0.5	0.9	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg	TM135/PM120
PFHpA	<0.5	<0.5	4.0	<0.5	0.8	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg	TM135/PM120
PFOA	0.6	<0.5	23.0	<0.5	1.1	<0.5	<0.5	<0.5	<0.5	0.8	<0.5	ug/kg	TM135/PM120
PFNA	<0.5	<0.5	0.9	<0.5	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg	TM135/PM120
PFDA	<0.5	<0.5	2.2	<0.5	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg	TM135/PM120
PFUnA	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg	TM135/PM120
PFDoA	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg	TM135/PM120
PFTTrDA	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg	TM135/PM120
PFTeDA	<0.5	<0.5	<0.5	0.8	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg	TM135/PM120
PFHxDA	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	ug/kg	TM135/PM120
PFODA	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	ug/kg	TM135/PM120
PFBS	0.7	<0.5	8.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg	TM135/PM120
PFPeS	0.9	<0.5	14.8	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg	TM135/PM120
PFHxS	4.1	<0.5	386.1 ^{AA}	1.9	6.2	<0.5	<0.5	<0.5	<0.5	3.4	<0.5	ug/kg	TM135/PM120
PFHpS	<0.5	<0.5	31.6	<0.5	0.8	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg	TM135/PM120
PFOS	7.1	<0.5	1096.3 ^{AB}	24.3	108.7	1.0	15.2	<0.5	1.7	50.8	<0.5	ug/kg	TM135/PM120
PFNS	<0.5	<0.5	15.6	<0.5	1.8	<0.5	<0.5	<0.5	<0.5	1.1	<0.5	ug/kg	TM135/PM120
PFDS	<0.5	<0.5	11.4	0.6	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg	TM135/PM120
PFUnDS	<0.5	<0.5	11.5	1.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg	TM135/PM120
PFDoDS	<0.5	<0.5	14.1	2.4	<0.5	<0.5	<0.5	<0.5	<0.5	2.7	<0.5	ug/kg	TM135/PM120
PFTTrDS	<0.5	<0.5	9.2	3.9	<0.5	<0.5	<0.5	<0.5	<0.5	1.1	<0.5	ug/kg	TM135/PM120
HFPO-DA (Gen X)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg	TM135/PM120
DONA	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg	TM135/PM120
5:3 FTCA	<1	<1	<1	3	1	<1	<1	<1	<1	<1	<1	ug/kg	TM135/PM120
9Cl-PF3ONS	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg	TM135/PM120
4:2 FTS	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/kg	TM135/PM120
6:2 FTS	<1	<1	2	3	<1	<1	<1	<1	<1	<1	<1	ug/kg	TM135/PM120
8:2 FTS	<1	<1	<1	2	<1	<1	<1	<1	<1	<1	<1	ug/kg	TM135/PM120
FOSA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/kg	TM135/PM120
N-MeFOSA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/kg	TM135/PM120
N-EtFOSA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/kg	TM135/PM120
N-MeFOSAA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/kg	TM135/PM120
N-EtFOSAA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/kg	TM135/PM120
8:2diPAP	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	ug/kg	TM135/PM120
FOUEA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/kg	TM135/PM120

Element Materials Technology

Client Name: ERM
Reference: Talacre
Location: Talacre
Contact: Peter Bray
EMT Job No: 24/13153

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
 H=H₂SO₄, Z=ZnAc, N=NaOH, HN=HNO₃

EMT Sample No.	153	154	155	156	157	158	159	160	161			
Sample ID	WS206-WG-20240730	WS205-WG-20240730	WS204-WG-20240730	WS203-WG-20240730	WS202-WG-20240731	WS215-WG-20240731	BH160-WG-20240731	WS210-WG-20240731	WS211-WG-20240731			
Depth												
COC No / misc												
Containers	PF	PF	PF	PF	PF	PF	PF	PF	PF			
Sample Date	30/07/2024	30/07/2024	30/07/2024	30/07/2024	31/07/2024	31/07/2024	31/07/2024	31/07/2024	31/07/2024			
Sample Type	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water			
Batch Number	1	1	1	1	1	1	1	1	1			
Date of Receipt	31/07/2024	31/07/2024	31/07/2024	31/07/2024	31/07/2024	31/07/2024	31/07/2024	31/07/2024	31/07/2024			
										LOD/LOR	Units	Method No.
Chloride #	12.1	9.8	15.4	19.0	13.2	16.5	332.1	18.1	18.5	<0.3	mg/l	TM38/PM0
PFAAS												
PFBA	0.44	0.41	<0.05	<0.05	<0.05	0.05	<0.05	<0.05	<0.05	<0.05	ug/l	TM135/PM121
PFPeA	3.67	3.10	<0.05	0.11	<0.05	0.15	<0.05	<0.05	<0.05	<0.05	ug/l	TM135/PM121
PFHxA	1.75	1.51	0.17	0.13	<0.05	0.17	<0.05	<0.05	<0.05	<0.05	ug/l	TM135/PM121
PFHpA	1.00	0.60	<0.05	<0.05	<0.05	0.05	<0.05	<0.05	<0.05	<0.05	ug/l	TM135/PM121
PFOA	0.70	0.43	0.10	0.07	<0.05	0.12	<0.05	<0.05	<0.05	<0.05	ug/l	TM135/PM121
PFNA	0.08	0.06	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l	TM135/PM121
PFDA	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l	TM135/PM121
PFUnA	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l	TM135/PM121
PFDoA	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l	TM135/PM121
PFTrDA	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l	TM135/PM121
PFTeDA	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l	TM135/PM121
PFHxDA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ug/l	TM135/PM121
PFODA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ug/l	TM135/PM121
PFBS	0.08	0.13	0.22	0.10	<0.05	0.09	<0.05	<0.05	<0.05	<0.05	ug/l	TM135/PM121
PFPeS	0.11	0.18	0.20	0.11	<0.05	0.10	<0.05	<0.05	<0.05	<0.05	ug/l	TM135/PM121
PFHxS	2.94	1.57	3.69	0.46	<0.05	0.75	<0.05	<0.05	<0.05	<0.05	ug/l	TM135/PM121
PFHpS	0.23	0.14	0.13	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l	TM135/PM121
PFOS	13.68	10.70	13.67	0.19	<0.05	1.87	<0.05	<0.05	<0.05	<0.05	ug/l	TM135/PM121
PFNS	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l	TM135/PM121
PFDS	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l	TM135/PM121
PFUnDS	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l	TM135/PM121
PFDoDS	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l	TM135/PM121
PFTrDS	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l	TM135/PM121
HFPO-DA (Gen X)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l	TM135/PM121
DONA	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l	TM135/PM121
5:3 FTCA	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	TM135/PM121
9Cl-PF3ONS	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l	TM135/PM121
4:2 FTS	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	ug/l	TM135/PM121
6:2 FTS	0.3	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	ug/l	TM135/PM121
8:2 FTS	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	ug/l	TM135/PM121
FOSA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM135/PM121
N-MeFOSA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM135/PM121
N-EtFOSA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM135/PM121
N-MeFOSAA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM135/PM121
N-EtFOSAA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM135/PM121
8:2diPAP	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	ug/l	TM135/PM121
FOUEA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM135/PM121

Please see attached notes for all abbreviations and acronyms

Element Materials Technology

Client Name: ERM
Reference: Talacre
Location: Talacre
Contact: Peter Bray
EMT Job No: 24/13153

Report : CEN 10:1 Leachate

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
 H=H2SO4, Z=ZnAc, N=NaOH, HN=HN03

EMT Sample No.	162	164	166	168	170	172	174	176				
Sample ID	CC01	CC02	CC03	CC04	CC05	CC06	CC07	CC08				
Depth	Top 5cm Crushed	Top 5cm Crushed	Top 5cm Crushed	Top 5cm Crushed	Top 5cm Crushed	Top 5cm Crushed	Top 5cm Crushed	Top 5cm Crushed				
COC No / misc												
Containers	T	T	T	T	T	T	T	T				
Sample Date	29/07/2024	29/07/2024	29/07/2024	29/07/2024	30/07/2024	30/07/2024	30/07/2024	30/07/2024				
Sample Type	Solid	Solid	Solid	Solid	Solid	Solid	Solid	Solid				
Batch Number	1	1	1	1	1	1	1	1				
Date of Receipt	31/07/2024	31/07/2024	31/07/2024	31/07/2024	31/07/2024	31/07/2024	31/07/2024	31/07/2024				
										LOD/LOR	Units	Method No.
PFAAS												
PFBA	<0.05	0.0932	<0.05	0.0722	<0.05	<0.05	<0.05	<0.05		<0.05	ug/l	LCMS
PFPeA	0.0942	1.3342	0.5374	1.3141	0.4270	0.2544	<0.05	<0.05		<0.05	ug/l	LCMS
HFPO-DA	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		<0.05	ug/l	LCMS
PFBS	0.0641	2.0735	0.3924	3.4280	1.4994	0.8103	<0.05	0.1019		<0.05	ug/l	LCMS
PFHxA	0.3097	5.5473	0.6783	6.3978	1.5727	1.1370	<0.05	0.1402		<0.05	ug/l	LCMS
4:2 FTS	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		<0.2	ug/l	LCMS
PFPePA	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	ug/l	LCMS
PFPeS	<0.05	1.2888	0.0977	2.9013	0.9275	0.7805	<0.05	<0.05		<0.05	ug/l	LCMS
PFHpA	<0.05	0.6609	0.0571	0.7664	0.1627	0.1680	<0.05	<0.05		<0.05	ug/l	LCMS
naDONA	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		<0.05	ug/l	LCMS
PFHxS	0.0764	2.9596	0.2630	9.2167	3.7623	2.2426	<0.05	0.2750		<0.05	ug/l	LCMS
PFOA	<0.05	0.5187	<0.05	1.1595	0.2026	0.2075	<0.05	<0.05		<0.05	ug/l	LCMS
6:2 FTS	0.5584	6.3679	1.5878	3.4661	0.2639	<0.2	<0.2	<0.2		<0.2	ug/l	LCMS
PFHpS	<0.05	0.1647	<0.05	0.7101	0.1222	0.1115	<0.05	<0.05		<0.05	ug/l	LCMS
FOUEA	<1	<1	<1	<1	<1	<1	<1	<1		<1	ug/l	LCMS
PFNA	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		<0.05	ug/l	LCMS
FOSA	<1	<1	<1	<1	<1	<1	<1	<1		<1	ug/l	LCMS
PFOS	0.1759	2.7301	0.1331	15.7304	3.3710	1.8173	0.0837	0.1506		<0.05	ug/l	LCMS
N-MeFOSA	<1	<1	<1	<1	<1	<1	<1	<1		<1	ug/l	LCMS
PFDA	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		<0.05	ug/l	LCMS
N-EiFOSA	<1	<1	<1	<1	<1	<1	<1	<1		<1	ug/l	LCMS
8:2 FTS	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		<0.2	ug/l	LCMS
9Cl-PF3ONS	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		<0.05	ug/l	LCMS
PFNS	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		<0.05	ug/l	LCMS
PFUua	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		<0.05	ug/l	LCMS
N-MeFOSAA	<1	<1	<1	<1	<1	<1	<1	<1		<1	ug/l	LCMS
N-EiFOSAA	<1	<1	<1	<1	<1	<1	<1	<1		<1	ug/l	LCMS
PFDS	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		<0.05	ug/l	LCMS
PFDoA	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		<0.05	ug/l	LCMS
PFUnDS	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		<0.05	ug/l	LCMS
PFTrDA	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		<0.05	ug/l	LCMS
PFDoDS	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		<0.05	ug/l	LCMS
PFTeDA	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		<0.05	ug/l	LCMS
PFTrDS	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		<0.05	ug/l	LCMS
PFHxDA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	ug/l	LCMS
PFODA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	ug/l	LCMS
8:2 diPAP	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		<0.2	ug/l	LCMS

Please see attached notes for all abbreviations and acronyms

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 24/13153

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 overestimate 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.

Please include all sections of this report if it is reproduced

All solid results are expressed on a dry weight basis unless stated otherwise.

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-quantitatively, 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: 24/13153

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
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: 2013I	PM0	No preparation is required.	Yes			
TM135	Analysis of PFAS compounds in Water and Soil by LC-MS/MS	PM120	Methanol/NH4OH Extraction for PFAS Analysis by LC-MS - As received solid samples are extracted in Methanol: Ammonium Hydroxide solution by Sonication and End over End shaker.			AR	Yes
TM135	Analysis of PFAS compounds in Water and Soil by LC-MS/MS	PM121	Preparation of PFAS liquid samples – As received samples are centrifuged and the supernatant is used for PFAS analysis.				
NONE	No Method Code	PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.			AR	

ERM
4th Floor
One New York Street
Manchester
United Kingdom
M1 4HD



Attention : Peter Bray
Date : 23rd August, 2024
Your reference : Talacre
Our reference : Test Report 24/13153 Batch 1 Schedule B
Location : Talacre
Date samples received : 31st July, 2024
Status : Final Report
Issue : 202408231454

Seventy three samples were received for analysis on 31st July, 2024 of which one was 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 - 0.652 kg of CO2

Scope 1&2&3 emissions - 1.54 kg of CO2

Authorised By:



Paul Boden BSc
Senior Project Manager

Please include all sections of this report if it is reproduced

Element Materials Technology

Client Name: ERM
Reference: Talacre
Location: Talacre
Contact: Peter Bray
EMT Job No: 24/13153

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.										Please see attached notes for all abbreviations and acronyms		
Sample ID	HP323-SO-0.4-0.5-20240731									LOD/LOR	Units	Method No.
Depth	0.40-0.50											
COC No / misc												
Containers	J T											
Sample Date	31/07/2024											
Sample Type	Soil											
Batch Number	1											
Date of Receipt	31/07/2024											
Natural Moisture Content	13.3									<0.1	%	PM4/PM0
PFAAS												
PFBA	0.7									<0.5	ug/kg	TM135/PM120
PFPeA	1.5									<0.5	ug/kg	TM135/PM120
PFHxA	<0.5									<0.5	ug/kg	TM135/PM120
PFHpA	<0.5									<0.5	ug/kg	TM135/PM120
PFOA	0.9									<0.5	ug/kg	TM135/PM120
PFNA	<0.5									<0.5	ug/kg	TM135/PM120
PFDA	0.6									<0.5	ug/kg	TM135/PM120
PFUnA	<0.5									<0.5	ug/kg	TM135/PM120
PFDoA	<0.5									<0.5	ug/kg	TM135/PM120
PFTrDA	<0.5									<0.5	ug/kg	TM135/PM120
PFTeDA	<0.5									<0.5	ug/kg	TM135/PM120
PFHxDA	<2.5									<2.5	ug/kg	TM135/PM120
PFODA	<2.5									<2.5	ug/kg	TM135/PM120
PFBS	<0.5									<0.5	ug/kg	TM135/PM120
PFPeS	<0.5									<0.5	ug/kg	TM135/PM120
PFHxS	5.2									<0.5	ug/kg	TM135/PM120
PFHpS	0.6									<0.5	ug/kg	TM135/PM120
PFOS	62.9									<0.5	ug/kg	TM135/PM120
PFNS	1.2									<0.5	ug/kg	TM135/PM120
PFDS	1.5									<0.5	ug/kg	TM135/PM120
PFUnDS	1.5									<0.5	ug/kg	TM135/PM120
PFDoDS	2.0									<0.5	ug/kg	TM135/PM120
PFTrDS	1.6									<0.5	ug/kg	TM135/PM120
HFPO-DA (Gen X)	<0.5									<0.5	ug/kg	TM135/PM120
DONA	<0.5									<0.5	ug/kg	TM135/PM120
5:3 FTCA	<1									<1	ug/kg	TM135/PM120
9Cl-PF3ONS	<0.5									<0.5	ug/kg	TM135/PM120
4:2 FTS	<1									<1	ug/kg	TM135/PM120
6:2 FTS	<1									<1	ug/kg	TM135/PM120
8:2 FTS	<1									<1	ug/kg	TM135/PM120
FOSA	<1									<1	ug/kg	TM135/PM120
N-MeFOSA	<1									<1	ug/kg	TM135/PM120
N-EtFOSA	<1									<1	ug/kg	TM135/PM120
N-MeFOSAA	<1									<1	ug/kg	TM135/PM120
N-EtFOSAA	<1									<1	ug/kg	TM135/PM120
8:2diPAP	<2.5									<2.5	ug/kg	TM135/PM120
FOUEA	<1									<1	ug/kg	TM135/PM120

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 24/13153

SOILS and ASH

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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 overestimate 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-quantitatively, 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.

EMT Job No: 24/13153

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM135	Analysis of PFAS compounds in Water and Soil by LC-MS/MS	PM120	Methanol/NH4OH Extraction for PFAS Analysis by LC-MS - As received solid samples are extracted in Methanol: Ammonium Hydroxide solution by Sonication and End over End shaker.			AR	Yes

ERM
4th Floor
One New York Street
Manchester
United Kingdom
M1 4HD



Attention : Peter Bray
Date : 9th September, 2024
Your reference : Talacre
Our reference : Test Report 24/13153 Batch 1 Schedule E
Location : Talacre
Date samples received : 31st July, 2024
Status : Final Report
Issue : 202409091345

Seventy three samples were received for analysis on 31st July, 2024 of which two 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 - 1.303 kg of CO2

Scope 1&2&3 emissions - 3.08 kg of CO2

Authorised By:



Paul Boden BSc
Senior Project Manager

Please include all sections of this report if it is reproduced

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 24/13153

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 overestimate 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.

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DEVIATING SAMPLES

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SURROGATES

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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.

Please include all sections of this report if it is reproduced

All solid results are expressed on a dry weight basis unless stated otherwise.

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.

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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

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SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
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+	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.
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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
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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.
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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: 24/13153

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM135	Analysis of PFAS compounds in Water and Soil by LC-MS/MS	PM120	Methanol/NH4OH Extraction for PFAS Analysis by LC-MS - As received solid samples are extracted in Methanol: Ammonium Hydroxide solution by Sonication and End over End shaker.			AR	Yes

ERM
4th Floor
One New York Street
Manchester
United Kingdom
M1 4HD



Attention : Peter Bray
Date : 12th September, 2024
Your reference : Talacre
Our reference : Test Report 24/13153 Batch 1 Schedule F 24/13153 Batch 1 Schedule I
Location : Talacre
Date samples received : 31st July, 2024
Status : Final Report
Issue : 202409120917

Seventy three samples were received for analysis on 31st July, 2024 of which nineteen 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:



Simon Gomery BSc

Senior Project Manager

Please include all sections of this report if it is reproduced

Element Materials Technology

Client Name: ERM
 Reference: Talacre
 Location: Talacre
 Contact: Peter Bray
 EMT Job No: 24/13153

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	12-14	18-20	24-26	30-32	39-41	42-44	51-53	57-59	63-65	69-71	Please see attached notes for all abbreviations and acronyms		
Sample ID	HP320-SO-0.8-0.9-20240729	HP321-SO0.7-0.8-20240729	HP322-SO0.9-1.0-20240729	HP309-SO-0.9-1.0-20240730	HP310-SO-0.9-1.0-20240730	HP312-SO-0.9-1.0-20240730	HP308-SO-0.90-1.0-20240730	HP307-SO-0.9-1.0-20240730	HP305-SO-0.9-1.0-20240730	HP303-SO-0.7-0.8-20240730			
Depth	0.80-0.90	0.70-0.80	0.90-1.00	0.90-1.00	0.90-1.00	0.90-1.00	0.90-1.00	0.90-1.00	0.90-1.00	0.70-0.80			
COC No / misc													
Containers	J T	J T	J T	J T	J T	J T	J T	J T	J T	J			
Sample Date	29/07/2024	29/07/2024	29/07/2024	30/07/2024	30/07/2024	30/07/2024	30/07/2024	30/07/2024	30/07/2024	30/07/2024			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	31/07/2024	31/07/2024	31/07/2024	31/07/2024	31/07/2024	31/07/2024	31/07/2024	31/07/2024	31/07/2024	31/07/2024	LOD/LOR	Units	Method No.
Natural Moisture Content	5.0	3.5	22.4	21.8	8.5	24.9	22.0	4.5	21.3	11.8	<0.1	%	PM4/PM0
PFAAS													
PFBA	0.6	<0.5	0.7	<0.5	<0.5	<0.5	2.2	<0.5	<0.5	<0.5	<0.5	ug/kg	TM135/PM120
PFPeA	4.9	0.9	1.5	<0.5	<0.5	<0.5	16.6	1.5	0.7	0.8	<0.5	ug/kg	TM135/PM120
PFHxA	2.8	<0.5	2.8	<0.5	<0.5	<0.5	10.6	0.9	0.7	0.7	<0.5	ug/kg	TM135/PM120
PFHpA	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	1.6	0.6	<0.5	<0.5	<0.5	ug/kg	TM135/PM120
PFOA	1.2	<0.5	1.6	<0.5	<0.5	<0.5	2.3	0.6	<0.5	<0.5	<0.5	ug/kg	TM135/PM120
PFNA	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.8	<0.5	<0.5	<0.5	ug/kg	TM135/PM120
PFDA	3.3	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg	TM135/PM120
PFUnA	4.8	0.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg	TM135/PM120
PFDoA	11.3	2.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg	TM135/PM120
PFTrDA	2.3	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg	TM135/PM120
PFTeDA	4.2	0.9	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg	TM135/PM120
PFHxDA	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	ug/kg	TM135/PM120
PFODA	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	ug/kg	TM135/PM120
PFBS	<0.5	<0.5	1.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.8	<0.5	ug/kg	TM135/PM120
PFPeS	<0.5	<0.5	1.0	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	0.7	<0.5	ug/kg	TM135/PM120
PFHxS	0.8	0.7	8.7	<0.5	0.8	<0.5	4.6	9.3	1.8	3.9	<0.5	ug/kg	TM135/PM120
PFHpS	<0.5	<0.5	1.2	<0.5	<0.5	<0.5	1.1	0.5	<0.5	<0.5	<0.5	ug/kg	TM135/PM120
PFOS	52.1	19.9	121.8 ^{AA}	<0.5	1.7	3.0	67.8	92.1	7.0	5.8	<0.5	ug/kg	TM135/PM120
PFNS	5.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.7	<0.5	<0.5	<0.5	ug/kg	TM135/PM120
PFDS	13.1	3.9	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg	TM135/PM120
PFUnDS	14.3	6.8	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg	TM135/PM120
PFDoDS	16.6	11.3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg	TM135/PM120
PFTrDS	18.0	8.4	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg	TM135/PM120
HFPO-DA (Gen X)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg	TM135/PM120
DONA	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg	TM135/PM120
5:3 FTCA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/kg	TM135/PM120
9Cl-PF3ONS	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg	TM135/PM120
4:2 FTS	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/kg	TM135/PM120
6:2 FTS	20	4	16	<1	<1	<1	115	<1	<1	<1	<1	ug/kg	TM135/PM120
8:2 FTS	84	8	2	<1	<1	<1	<1	<1	<1	<1	<1	ug/kg	TM135/PM120
FOSA	2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/kg	TM135/PM120
N-MeFOSA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/kg	TM135/PM120
N-EtFOSA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/kg	TM135/PM120
N-MeFOSAA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/kg	TM135/PM120
N-EtFOSAA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/kg	TM135/PM120
8:2diPAP	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	ug/kg	TM135/PM120
FOUEA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/kg	TM135/PM120

Element Materials Technology

Client Name: ERM
 Reference: Talacre
 Location: Talacre
 Contact: Peter Bray
 EMT Job No: 24/13153

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	75-77	90-92	96-98	102-104	108-110	114-116	123-125	132-134	138-140				
Sample ID	HP304-SO-0.9 1.0-20240730	FM04-SO-0.9- 1.0-20240730	HP313-SO-0.9- 1.0-20240731	HP315-SO-0.9- 1.0-20240731	HP318-SO-0.9- 1.0-20240731	HP319-SO-0.9- 1.0-20240731	HP316-SO-0.7- 0.8-20240731	FM09-SO-0.9- 1.0-20240731	FM11-SO-0.9- 1.0-20240731				
Depth	0.90-1.00	0.90-1.00	0.90-1.00	0.90-1.00	0.90-1.00	0.90-1.00	0.70-0.80	0.90-1.00	0.90-1.00				
COC No / misc													
Containers	J	J T	J	J	J	J	J	J	J T				
Sample Date	30/07/2024	30/07/2024	31/07/2024	31/07/2024	31/07/2024	31/07/2024	31/07/2024	31/07/2024	31/07/2024				
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil				
Batch Number	1	1	1	1	1	1	1	1	1				
Date of Receipt	31/07/2024	31/07/2024	31/07/2024	31/07/2024	31/07/2024	31/07/2024	31/07/2024	31/07/2024	31/07/2024				
										LOD/LOR	Units	Method No.	
Natural Moisture Content	18.1	20.6	17.9	18.6	15.2	18.2	3.3	16.0	23.6	<0.1	%	PM4/PM0	
PFAAS													
PFBA	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg	TM135/PM120	
PFPeA	<0.5	1.4	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.5	<0.5	ug/kg	TM135/PM120	
PFHxA	<0.5	0.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.9	<0.5	ug/kg	TM135/PM120	
PFHpA	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg	TM135/PM120	
PFOA	<0.5	1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	2.0	<0.5	ug/kg	TM135/PM120	
PFNA	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg	TM135/PM120	
PFDA	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg	TM135/PM120	
PFUnA	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg	TM135/PM120	
PFDaA	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg	TM135/PM120	
PFTrDA	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg	TM135/PM120	
PFTeDA	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg	TM135/PM120	
PFHxDA	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	ug/kg	TM135/PM120	
PFODA	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	ug/kg	TM135/PM120	
PFBS	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg	TM135/PM120	
PFPeS	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg	TM135/PM120	
PFHxS	<0.5	2.7	<0.5	1.1	<0.5	<0.5	<0.5	<0.5	2.1	<0.5	ug/kg	TM135/PM120	
PFHpS	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg	TM135/PM120	
PFOS	<0.5	37.1	<0.5	<0.5	<0.5	<0.5	<0.5	2.3	61.1	<0.5	ug/kg	TM135/PM120	
PFNS	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg	TM135/PM120	
PFDS	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg	TM135/PM120	
PFUnDS	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg	TM135/PM120	
PFDoDS	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg	TM135/PM120	
PFTrDS	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg	TM135/PM120	
HFPO-DA (Gen X)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg	TM135/PM120	
DONA	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg	TM135/PM120	
5:3 FTCA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/kg	TM135/PM120	
9Cl-PF3ONS	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/kg	TM135/PM120	
4:2 FTS	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/kg	TM135/PM120	
6:2 FTS	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/kg	TM135/PM120	
8:2 FTS	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/kg	TM135/PM120	
FOSA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/kg	TM135/PM120	
N-MeFOSA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/kg	TM135/PM120	
N-EtFOSA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/kg	TM135/PM120	
N-MeFOSAA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/kg	TM135/PM120	
N-EtFOSAA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/kg	TM135/PM120	
8:2diPAP	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	ug/kg	TM135/PM120	
FOUEA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/kg	TM135/PM120	

Please see attached notes for all abbreviations and acronyms

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 24/13153

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 overestimate 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.

Please include all sections of this report if it is reproduced

All solid results are expressed on a dry weight basis unless stated otherwise.

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-quantitatively, 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	x2 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: 24/13153

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM135	Analysis of PFAS compounds in Water and Soil by LC-MS/MS	PM120	Methanol/NH4OH Extraction for PFAS Analysis by LC-MS - As received solid samples are extracted in Methanol: Ammonium Hydroxide solution by Sonication and End over End shaker.			AR	Yes

ERM
4th Floor
One New York Street
Manchester
United Kingdom
M1 4HD



Attention : Peter Bray
Date : 19th September, 2024
Your reference : Talacre
Our reference : Test Report 24/13153 Batch 1 Schedule H
Location : Talacre
Date samples received : 31st July, 2024
Status : Final Report
Issue : 202409191038

Seventy three samples were received for analysis on 31st July, 2024 of which eight 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 - 5.937 kg of CO2

Scope 1&2&3 emissions - 14.03 kg of CO2

Authorised By:



Paul Boden BSc
Senior Project Manager

Please include all sections of this report if it is reproduced

Element Materials Technology

Client Name: ERM
Reference: Talacre
Location: Talacre
Contact: Peter Bray
EMT Job No: 24/13153

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	1	2	3	4	5	6	7	8					
Sample ID	CC01-20240729	CC02-20240729	CC03-20240729	CC04-20240729	CC05-20240730	CC06-20240730	CC07-20240730	CC08-20240730					
Depth													
COC No / misc													
Containers	B	B	B	B	B	B	B	B					
Sample Date	29/07/2024	29/07/2024	29/07/2024	29/07/2024	30/07/2024	30/07/2024	30/07/2024	30/07/2024					
Sample Type	Solid	Solid	Solid	Solid	Solid	Solid	Solid	Solid					
Batch Number	1	1	1	1	1	1	1	1					
Date of Receipt	31/07/2024	31/07/2024	31/07/2024	31/07/2024	31/07/2024	31/07/2024	31/07/2024	31/07/2024					
											LOD/LOR	Units	Method No.
Natural Moisture Content	2.5	1.9	2.9	2.8	3.8	2.9	4.0	3.5			<0.1	%	PM4/PM0
PFAAS													
PFBA	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5			<0.5	ug/kg	TM135/PM120
PFPeA	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5			<0.5	ug/kg	TM135/PM120
PFHxA	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5			<0.5	ug/kg	TM135/PM120
PFHpA	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5			<0.5	ug/kg	TM135/PM120
PFOA	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5			<0.5	ug/kg	TM135/PM120
PFNA	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5			<0.5	ug/kg	TM135/PM120
PFDA	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5			<0.5	ug/kg	TM135/PM120
PFUnA	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5			<0.5	ug/kg	TM135/PM120
PFDoA	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5			<0.5	ug/kg	TM135/PM120
PFTrDA	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5			<0.5	ug/kg	TM135/PM120
PFTeDA	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5			<0.5	ug/kg	TM135/PM120
PFHxDA	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5			<2.5	ug/kg	TM135/PM120
PFODA	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5			<2.5	ug/kg	TM135/PM120
PFBS	<0.5	<0.5	<0.5	0.8	<0.5	<0.5	<0.5	<0.5			<0.5	ug/kg	TM135/PM120
PFPeS	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5			<0.5	ug/kg	TM135/PM120
PFHxS	<0.5	<0.5	<0.5	<0.5	0.8	<0.5	<0.5	<0.5			<0.5	ug/kg	TM135/PM120
PFHpS	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5			<0.5	ug/kg	TM135/PM120
PFOS	1.0	<0.5	<0.5	0.6	<0.5	<0.5	<0.5	<0.5			<0.5	ug/kg	TM135/PM120
PFNS	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5			<0.5	ug/kg	TM135/PM120
PFDS	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5			<0.5	ug/kg	TM135/PM120
PFUnDS	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5			<0.5	ug/kg	TM135/PM120
PFDoDS	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5			<0.5	ug/kg	TM135/PM120
PFTrDS	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5			<0.5	ug/kg	TM135/PM120
HFPO-DA (Gen X)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5			<0.5	ug/kg	TM135/PM120
DONA	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5			<0.5	ug/kg	TM135/PM120
5:3 FTCA	<1	<1	<1	<1	<1	<1	<1	<1			<1	ug/kg	TM135/PM120
9Cl-PF3ONS	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5			<0.5	ug/kg	TM135/PM120
4:2 FTS	<1	<1	<1	<1	<1	<1	<1	<1			<1	ug/kg	TM135/PM120
6:2 FTS	<1	<1	<1	<1	<1	<1	<1	<1			<1	ug/kg	TM135/PM120
8:2 FTS	<1	<1	<1	<1	<1	<1	<1	<1			<1	ug/kg	TM135/PM120
FOSA	<1	<1	<1	<1	<1	<1	<1	<1			<1	ug/kg	TM135/PM120
N-MeFOSA	<1	<1	<1	<1	<1	<1	<1	<1			<1	ug/kg	TM135/PM120
N-EtFOSA	<1	<1	<1	<1	<1	<1	<1	<1			<1	ug/kg	TM135/PM120
N-MeFOSAA	<1	<1	<1	<1	<1	<1	<1	<1			<1	ug/kg	TM135/PM120
N-EtFOSAA	<1	<1	<1	<1	<1	<1	<1	<1			<1	ug/kg	TM135/PM120
8:2diPAP	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5			<2.5	ug/kg	TM135/PM120
FOUEA	<1	<1	<1	<1	<1	<1	<1	<1			<1	ug/kg	TM135/PM120

Please see attached notes for all abbreviations and acronyms

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 24/13153

SOILS and ASH

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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 overestimate when other sulphides such as Barite (Barium Sulphate) are present.

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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.

Please include all sections of this report if it is reproduced

All solid results are expressed on a dry weight basis unless stated otherwise.

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.

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REPORTS FROM THE SOUTH AFRICA LABORATORY

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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).

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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-quantitatively, 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.
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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.

EMT Job No: 24/13153

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35 degrees Celsius or 105 degrees Celsius. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM135	Analysis of PFAS compounds in Water and Soil by LC-MS/MS	PM120	Methanol/NH4OH Extraction for PFAS Analysis by LC-MS - As received solid samples are extracted in Methanol: Ammonium Hydroxide solution by Sonication and End over End shaker.			AR	Yes
NONE	No Method Code	PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35 degrees Celsius or 105 degrees Celsius. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.			AR	

ERM
4th Floor
One New York Street
Manchester
United Kingdom
M1 4HD



4225



Attention : Peter Bray
Date : 19th September, 2024
Your reference : Talacre
Our reference : Test Report 24/13153 Batch 1 Schedule J
Location : Talacre
Date samples received : 31st July, 2024
Status : Final Report
Issue : 202409191054

Seventy three samples were received for analysis on 31st July, 2024 of which nine 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 - 3.258 kg of CO2

Scope 1&2&3 emissions - 7.7 kg of CO2

Authorised By:



Paul Boden BSc
Senior Project Manager

Please include all sections of this report if it is reproduced

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 24/13153

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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 overestimate when other sulphides such as Barite (Barium Sulphate) are present.

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

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SURROGATES

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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.

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REPORTS FROM THE SOUTH AFRICA LABORATORY

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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).

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SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
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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.
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>>	Results above quantitative calibration range. The result should be considered the minimum value and is indicative only. The actual result could be significantly higher.
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ME	Matrix Effect
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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.
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#1	EH_Total but with humics mathematically subtracted
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MS	Mass Spectrometry.

EMT Job No: 24/13153

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil.	PM24	Preparation of Soil and Marine Sediment Samples for Total Organic Carbon.	Yes		AD	Yes

ERM
4th Floor
One New York Street
Manchester
United Kingdom
M1 4HD



Attention : Peter Bray
Date : 2nd October, 2024
Your reference : Talacre
Our reference : Test Report 24/13153 Batch 1 Schedule K
Location : Talacre
Date samples received : 31st July, 2024
Status : Final Report
Issue : 202410021106

Seventy three samples were received for analysis on 31st July, 2024 of which three 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 - 2.172 kg of CO2

Scope 1&2&3 emissions - 5.133 kg of CO2

Authorised By:



Paul Boden BSc
Senior Project Manager

Please include all sections of this report if it is reproduced

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 24/13153

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EMT Job No: 24/13153

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PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35 degrees Celsius or 105 degrees Celsius. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM135	Analysis of PFAS compounds in Water and Soil by LC-MS/MS	PM121	Preparation of PFAS liquid samples – As received samples are centrifuged and the supernatant is used for PFAS analysis.			AR	Yes
NONE	No Method Code	PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35 degrees Celsius or 105 degrees Celsius. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.			AR	

ERM
4th Floor
One New York Street
Manchester
United Kingdom
M1 4HD



4225



Attention : Peter Bray

Date : 13th August, 2024

Your reference : Talacre

Our reference : Test Report 24/13203 Batch 1 Schedule A 24/13203 Batch 1 Schedule C

Location : PoA

Date samples received : 1st August, 2024

Status : Final Report

Issue : 202408130926

Twenty six samples were received for analysis on 1st August, 2024 of which twenty 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 - 10.281 kg of CO2

Scope 1&2&3 emissions - 24.296 kg of CO2

Authorised By:



Paul Boden BSc
Senior Project Manager

Please include all sections of this report if it is reproduced

Element Materials Technology

Client Name: ERM
Reference: Talacre
Location: PoA
Contact: Peter Bray
EMT Job No: 24/13203

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	14-16	20-22	23-25	29-31	32-34	35-37	38-40	44-46					
Sample ID	FM06-SO-0.3-0.4-20240801	FM07-SO-0.3-0.4-20240801	FM08-SO-0.2-0.3-20240801	FM10-SO-0.4-0.5-20240801	HP301-SO-0.2-0.3-20240801	HP311-SO-0.4-0.5-20240801	HP314-SO-0.3-0.4-20240801	HP302-SO-0.2-0.3-20240801					
Depth	0.30-0.40	0.30-0.40	0.20-0.30	0.40-0.50	0.20-0.30	0.40-0.50	0.30-0.40	0.20-0.30					
COC No / misc													
Containers	J T	J T	J T	J T	J T	J T	J T	J T					
Sample Date	01/08/2024	01/08/2024	01/08/2024	01/08/2024	01/08/2024	01/08/2024	01/08/2024	01/08/2024					
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil					
Batch Number	1	1	1	1	1	1	1	1					
Date of Receipt	01/08/2024	01/08/2024	01/08/2024	01/08/2024	01/08/2024	01/08/2024	01/08/2024	01/08/2024					
										LOD/LOR	Units	Method No.	
Natural Moisture Content	10.0	4.0	4.6	3.4	10.6	7.9	14.2	4.3		<0.1	%	PM4/PM0	
PFAAS													
PFBA	1.2	<0.5	<0.5	<0.5	0.9	<0.5	<0.5	<0.5		<0.5	ug/kg	TM135/PM120	
PFPeA	1.1	<0.5	<0.5	<0.5	4.4	0.8	<0.5	<0.5		<0.5	ug/kg	TM135/PM120	
PFHxA	0.7	<0.5	<0.5	<0.5	4.6	<0.5	<0.5	<0.5		<0.5	ug/kg	TM135/PM120	
PFHpA	<0.5	<0.5	<0.5	<0.5	1.7	<0.5	<0.5	<0.5		<0.5	ug/kg	TM135/PM120	
PFOA	1.5	<0.5	<0.5	<0.5	4.3	<0.5	<0.5	<0.5		<0.5	ug/kg	TM135/PM120	
PFNA	<0.5	<0.5	<0.5	<0.5	2.9	<0.5	<0.5	<0.5		<0.5	ug/kg	TM135/PM120	
PFDA	<0.5	<0.5	<0.5	<0.5	11.1	<0.5	<0.5	<0.5		<0.5	ug/kg	TM135/PM120	
PFUnA	<0.5	<0.5	<0.5	<0.5	5.0	<0.5	<0.5	<0.5		<0.5	ug/kg	TM135/PM120	
PFDoA	<0.5	<0.5	<0.5	<0.5	12.8	<0.5	<0.5	<0.5		<0.5	ug/kg	TM135/PM120	
PFTrDA	<0.5	<0.5	<0.5	<0.5	1.3	<0.5	<0.5	<0.5		<0.5	ug/kg	TM135/PM120	
PFTeDA	<0.5	<0.5	<0.5	<0.5	3.1	<0.5	<0.5	<0.5		<0.5	ug/kg	TM135/PM120	
PFHxDA	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5		<2.5	ug/kg	TM135/PM120	
PFODA	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5		<2.5	ug/kg	TM135/PM120	
PFBS	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	ug/kg	TM135/PM120	
PFPeS	2.4	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	ug/kg	TM135/PM120	
PFHxS	28.8	<0.5	2.7	1.0	7.2	1.5	<0.5	<0.5		<0.5	ug/kg	TM135/PM120	
PFHpS	10.7	<0.5	<0.5	<0.5	1.3	<0.5	<0.5	<0.5		<0.5	ug/kg	TM135/PM120	
PFOS	1537.9 ^{AB}	1.9	101.4 ^{AA}	16.6	239.2 ^{AA}	147.6 ^{AA}	<0.5	3.9		<0.5	ug/kg	TM135/PM120	
PFNS	15.7	<0.5	6.2	0.9	4.3	3.1	<0.5	<0.5		<0.5	ug/kg	TM135/PM120	
PFDS	6.5	<0.5	5.8	0.8	3.8	1.5	<0.5	0.5		<0.5	ug/kg	TM135/PM120	
PFUnDS	4.6	<0.5	6.8	<0.5	2.3	<0.5	<0.5	0.6		<0.5	ug/kg	TM135/PM120	
PFDoDS	6.4	<0.5	8.6	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	ug/kg	TM135/PM120	
PFTrDS	0.9	<0.5	1.2	<0.5	3.1	<0.5	<0.5	<0.5		<0.5	ug/kg	TM135/PM120	
HFPO-DA (Gen X)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	ug/kg	TM135/PM120	
DONA	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	ug/kg	TM135/PM120	
5:3 FTCA	<1	<1	<1	<1	2	<1	<1	<1		<1	ug/kg	TM135/PM120	
9Cl-PF3ONS	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	ug/kg	TM135/PM120	
4:2 FTS	<1	<1	<1	<1	<1	<1	<1	<1		<1	ug/kg	TM135/PM120	
6:2 FTS	<1	<1	<1	<1	81	<1	<1	<1		<1	ug/kg	TM135/PM120	
8:2 FTS	<1	<1	<1	<1	39	<1	<1	<1		<1	ug/kg	TM135/PM120	
FOSA	<1	<1	2	<1	<1	<1	<1	<1		<1	ug/kg	TM135/PM120	
N-MeFOSA	<1	<1	<1	<1	<1	<1	<1	<1		<1	ug/kg	TM135/PM120	
N-EtFOSA	<1	<1	<1	<1	<1	<1	<1	<1		<1	ug/kg	TM135/PM120	
N-MeFOSAA	<1	<1	<1	<1	<1	<1	<1	<1		<1	ug/kg	TM135/PM120	
N-EtFOSAA	<1	<1	<1	<1	<1	<1	<1	<1		<1	ug/kg	TM135/PM120	
8:2diPAP	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5		<2.5	ug/kg	TM135/PM120	
FOUEA	<1	<1	<1	<1	<1	<1	<1	<1		<1	ug/kg	TM135/PM120	

Please see attached notes for all abbreviations and acronyms

Element Materials Technology

Client Name: ERM
Reference: Talacre
Location: PoA
Contact: Peter Bray
EMT Job No: 24/13203

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
 H=H₂SO₄, Z=ZnAc, N=NaOH, HN=HNO₃

EMT Sample No.	1	2	3	4	5	6	8	9	10	11	Please see attached notes for all abbreviations and acronyms			
Sample ID	STOREBUND-WG-20240801	WS209-WG-20240801	WS208-WG-20240801	WS213-WG-20240801	DUP-WG-20240801	FIREPOND-WG-20240801	DISCHARGEU P-WG-20240801	DISCHARGED OWN-WG-20240801	BROOKEAST-WG-20240801	OUTLET-WG-20240801				
Depth														
COC No / misc														
Containers	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF				
Sample Date	01/08/2024	01/08/2024	01/08/2024	01/08/2024	01/08/2024	01/08/2024	01/08/2024	01/08/2024	01/08/2024	01/08/2024				
Sample Type	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water				
Batch Number	1	1	1	1	1	1	1	1	1	1				
Date of Receipt	01/08/2024	01/08/2024	01/08/2024	01/08/2024	01/08/2024	01/08/2024	01/08/2024	01/08/2024	01/08/2024	01/08/2024	LOD/LOR	Units	Method No.	
Chloride #	-	22.5	18.4	20.8	21.3	-	-	1082.5	1097.5	92.0	<0.3	mg/l	TM38/PM0	
PFAAS														
PFBA	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l	TM135/PM121	
PFPeA	<0.05	0.14	0.08	0.09	0.15	<0.05	0.15	0.16	0.18	<0.05	<0.05	ug/l	TM135/PM121	
PFHxA	<0.05	0.18	0.07	0.07	0.21	<0.05	0.15	0.18	0.16	<0.05	<0.05	ug/l	TM135/PM121	
PFHpA	<0.05	0.09	<0.05	<0.05	0.09	<0.05	0.06	0.06	0.07	<0.05	<0.05	ug/l	TM135/PM121	
PFOA	<0.05	0.14	0.06	<0.05	0.15	<0.05	0.10	0.09	0.11	<0.05	<0.05	ug/l	TM135/PM121	
PFNA	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l	TM135/PM121	
PFDA	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l	TM135/PM121	
PFUnA	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l	TM135/PM121	
PFDoA	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l	TM135/PM121	
PFTrDA	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l	TM135/PM121	
PFTeDA	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l	TM135/PM121	
PFHxDA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ug/l	TM135/PM121	
PFODA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ug/l	TM135/PM121	
PFBS	<0.05	0.10	<0.05	<0.05	0.08	<0.05	<0.05	0.06	0.07	<0.05	<0.05	ug/l	TM135/PM121	
PFPeS	<0.05	0.15	0.05	0.08	0.16	<0.05	0.08	0.09	0.09	<0.05	<0.05	ug/l	TM135/PM121	
PFHxS	<0.05	1.20	0.37	0.37	1.39	<0.05	0.37	0.38	0.40	<0.05	<0.05	ug/l	TM135/PM121	
PFHpS	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l	TM135/PM121	
PFOS	<0.05	0.54	0.14	0.19	0.61	<0.05	1.75	1.88	2.06	0.10	<0.05	ug/l	TM135/PM121	
PFNS	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l	TM135/PM121	
PFDS	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l	TM135/PM121	
PFUnDS	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l	TM135/PM121	
PFDoDS	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l	TM135/PM121	
PFTrDS	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l	TM135/PM121	
HFPO-DA (Gen X)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l	TM135/PM121	
DONA	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l	TM135/PM121	
5:3 FTCA	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	TM135/PM121	
9Cl-PF3ONS	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	ug/l	TM135/PM121	
4:2 FTS	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	ug/l	TM135/PM121	
6:2 FTS	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.2	0.3	0.2	<0.2	<0.2	ug/l	TM135/PM121	
8:2 FTS	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	ug/l	TM135/PM121	
FOSA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM135/PM121	
N-MeFOSA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM135/PM121	
N-EtFOSA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM135/PM121	
N-MeFOSAA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM135/PM121	
N-EtFOSAA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM135/PM121	
8:2diPAP	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	ug/l	TM135/PM121	
FOUEA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM135/PM121	

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 24/13203

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 overestimate 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-quantitatively, 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	x25 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: 24/13203

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
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: 2013I	PM0	No preparation is required.	Yes			
TM135	Analysis of PFAS compounds in Water and Soil by LC-MS/MS	PM120	Methanol/NH4OH Extraction for PFAS Analysis by LC-MS - As received solid samples are extracted in Methanol: Ammonium Hydroxide solution by Sonication and End over End shaker.			AR	Yes
TM135	Analysis of PFAS compounds in Water and Soil by LC-MS/MS	PM121	Preparation of PFAS liquid samples – As received samples are centrifuged and the supernatant is used for PFAS analysis.				

ERM
4th Floor
One New York Street
Manchester
United Kingdom
M1 4HD



4225



Attention : Peter Bray

Date : 9th September, 2024

Your reference : Talacre

Our reference : Test Report 24/13203 Batch 1 Schedule D 24/13203 Batch 1 Schedule E

Location : PoA

Date samples received : 1st August, 2024

Status : Final Report

Issue : 202409091348

Twenty six samples were received for analysis on 1st August, 2024 of which three 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 - 0.941 kg of CO₂

Scope 1&2&3 emissions - 2.224 kg of CO₂

Authorised By:



Paul Boden BSc
Senior Project Manager

Please include all sections of this report if it is reproduced

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 24/13203

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 overestimate 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.

Please include all sections of this report if it is reproduced

All solid results are expressed on a dry weight basis unless stated otherwise.

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-quantitatively, 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.
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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: 24/13203

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
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: 2013I	PM0	No preparation is required.	Yes			
TM135	Analysis of PFAS compounds in Water and Soil by LC-MS/MS	PM120	Methanol/NH4OH Extraction for PFAS Analysis by LC-MS - As received solid samples are extracted in Methanol: Ammonium Hydroxide solution by Sonication and End over End shaker.			AR	Yes

ERM
4th Floor
One New York Street
Manchester
United Kingdom
M1 4HD



Attention : Peter Bray
Date : 13th September, 2024
Your reference : Talacre
Our reference : Test Report 24/13203 Batch 1 Schedule F 24/13203 Batch 1 Schedule G
Location : PoA
Date samples received : 1st August, 2024
Status : Final Report
Issue : 202409131250

Twenty six samples were received for analysis on 1st August, 2024 of which four 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 - 2.751 kg of CO2

Scope 1&2&3 emissions - 6.502 kg of CO2

Authorised By:



Paul Boden BSc
Senior Project Manager

Please include all sections of this report if it is reproduced

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 24/13203

SOILS and ASH

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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.

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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 overestimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

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

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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.

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DEVIATING SAMPLES

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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.

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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).

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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-quantitatively, with a matrix specific limit of detection.

Note, other compounds may be present but are not reported.

ABBREVIATIONS and ACRONYMS USED

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HWOL ACRONYMS AND OPERATORS USED

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#1	EH_Total but with humics mathematically subtracted
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_	Operator - underscore to separate acronyms (exception for +).
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry.

ERM
4th Floor
One New York Street
Manchester
United Kingdom
M1 4HD



4225



Attention : Peter Bray
Date : 19th September, 2024
Your reference : Talacre
Our reference : Test Report 24/13203 Batch 1 Schedule H
Location : PoA
Date samples received : 1st August, 2024
Status : Final Report
Issue : 202409191044

Twenty six samples were received for analysis on 1st August, 2024 of which one was 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 - 0.362 kg of CO2

Scope 1&2&3 emissions - 0.856 kg of CO2

Authorised By:



Paul Boden BSc
Senior Project Manager

Please include all sections of this report if it is reproduced

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 24/13203

SOILS and ASH

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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.

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DEVIATING SAMPLES

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REPORTS FROM THE SOUTH AFRICA LABORATORY

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

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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.

ERM
4th Floor
One New York Street
Manchester
United Kingdom
M1 4HD



Attention : Peter Bray
Date : 3rd October, 2024
Your reference : Talacre
Our reference : Test Report 24/13203 Batch 1 Schedule I 24/13203 Batch 1 Schedule J
Location : PoA
Date samples received : 1st August, 2024
Status : Final Report
Issue : 202410031419

Twenty six samples were received for analysis on 1st August, 2024 of which three 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 - 2.317 kg of CO2

Scope 1&2&3 emissions - 5.475 kg of CO2

Authorised By:



Paul Boden BSc
Senior Project Manager

Please include all sections of this report if it is reproduced

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 24/13203

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 overestimate 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.

Please include all sections of this report if it is reproduced

All solid results are expressed on a dry weight basis unless stated otherwise.

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-quantitatively, 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.

SUMMARY METHOD		Method: PM120/121/122 TM 135
	ELEMENT MATERIALS TECHNOLOGY	Issue number: 4
		Issue date: 26/02/2024
		Issued by: PD
		Approved by: CL
<u>Analysis of PFAS compounds in water and soil by LC-MS/MS</u>		Page 1 of 4

Scope

This procedure outlines the liquid chromatography - tandem mass spectrometry (LC-MS/MS) method for determining selected per- and poly-fluorinated compounds, collectively known as PFAS, in waters, soils and other solid matrices.

Per- and polyfluoroalkyl substances (PFAS) are a group of >4000 man-made chemicals that include PFOA, PFOS, GenX (HFPO-DA), and more. They have been widely used in industry and manufacturing since the 1940s, including applications such as non-stick cookware, stain-repellent clothing, food packaging materials, detergents, cleaning products, and firefighting foams.

The carbon-fluorine bonds in PFAS impart high thermal stability and resistance to degradation, making them useful in a variety of products. However, they are persistent and bio-accumulative, meaning they don't break down in the environment.

The effect that PFAS have on the human body is still not entirely known but studies have shown that they can have a wide range of effects e.g. decrease in fertility, decrease hormone levels, increase cancer risk and cause immune system problems. These effects are a cause for concern and have resulted in regulatory guidance for waters and soil, as well as accelerated monitoring and identification.

Accreditation

Low Level PFAS analysis of groundwater, surface water and drinking water (non-regulated) holds ISO17025 accreditation for 15 of the 50 compounds.

Holding Time

The recommended holding time for waters is 21 days (in-house study).

The recommended holding time for soils is 28 days.

Sample Containers

Both soil and water samples must be collected in plastic containers e.g. HDPE and/or polypropylene.

Sample containers and lids must NOT contain Teflon (PTFE) or low-density polyethylene (LDPE) materials.

For waters, a 'PFAS Only' container is recommended, to be filled with minimum headspace.

Transference of sample from container to container must be kept to a minimum to avoid losses.

Principle of Preparation

Preparation of samples prior to analysis is in accordance with sample matrix type or required limits of detection:

For waters, a portion of 'as received' water sample is centrifuged, and an aliquot of the supernatant liquid is taken and mixed with methanol in a 50:50 ratio for analysis by direct injection.

For Low Level PFAS analysis of waters, the samples are pre-concentrated via solid phase extraction to give a concentration of 250 x 'as received' sample. Here an aliquot of 'as received' sample is extracted using a weak anion exchange SPE cartridge which is eluted and concentrated to produce a 50:50 MeOH: H₂O mix for analysis.

For soils, a portion of 'as received' soil is extracted with basic methanol via sonification and end-over-end extraction. A 'clean-up' stage is then performed on the resultant extract using SPE to produce a 50:50 MeOH: H₂O mix for analysis.

Principle of Analysis

A known volume of prepared sample is injected into the LC system for analysis by reverse phase LC and triple quadrupole mass spectrometry.

Identification of PFAS is carried out in dMRM, with majority of compounds having two monitored transitions, the most specific of which is used for quantification and the other used to confirm the peak identification.


Internal Standards are employed and are added at the same concentration to the calibration and the samples once extracted. These correct for potential injection differences as well as sample matrix effect but won't be linked to the extraction process efficiency. Instead, surrogate standards are employed to provide information as to the efficiency of the extraction process.

A process blank is prepared and analysed alongside the sample to confirm no contamination during sample preparation and/or analysis.

A quality control sample plus addition of surrogates to the sample ensures the sample preparation has no impact on the recovery.

Results are internally standard corrected.

The compounds which are determined by this procedure and their relevant limits of detection (LOD) are listed in the table below.

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<u>Analysis of PFAS compounds in water and soil by LC-MS/MS</u>		Page 2 of 4

Precautions

Due to the persistent and ubiquitous nature of PFAS compounds, precautions must be taken to minimize contamination during sample preparation and analysis:

Items which are known to contain, or may contain, PFAS are kept away from any area where samples are being processed or collected.

Hands should be washed thoroughly with warm water and a PFAS free soap/decontamination solution before undertaking any sample handling.

PFAS standards, extracts and samples are prevented from coming into contact with any glass containers or pipettes.

Interferences may arise from contaminants present in solvents, reagents, bottles, caps, as well as the LC system itself which contains a number of PTFE parts. PTFE and similar materials have been known to leach PFAS and can lead to increased baseline noise or discrete peaks making peak selection tricky. It should be demonstrated regularly that these possible interferences are not affecting the results. To prevent contamination by the LC system, a delay column is employed. This is placed after the pump and will delay any potential PFAS leaching from the mobile phase or the system. The PFAS is still present but elutes later and is therefore separated from the PFAS associated with the samples.

Contamination by carryover can occur whenever high-level and low-level samples are sequentially analysed. As part of the auto-sampling sequence of the LC-MSMS, the syringe is rinsed between samples. Should carry-over be suspected, repeat analysis of the affected sample will be undertaken.

Interferences

Contaminants that are extracted from the matrix along with the target compounds may cause either ion suppression or ion enhancement. This will vary from sample to sample depending on the source and nature of the matrix being analysed. These matrix effects are monitored, and are corrected for, within set criteria, by the addition of mass-labelled Internal Standards. When outside set criteria, samples can be diluted to try and minimize the suppression or enhancement of the target ions, as long as the dilution factors reflect these changes.

References

- Waters: Modified ISO21675: 2019-10
Modified ASTM7979-20, Sept'20
Modified EPA Method 533, Dec'19
Modified EPA Method 537.1, Rev.2, April'20
Modified EPA Method 8327 v0 June 2019
- Soils: Modified ASTM 7968-17A, Sept'17



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<u>Analysis of PFAS compounds in water and soil by LC-MS/MS</u>		Page 3 of 4

Table of Compounds plus associated Limits of Detection:

Formula	CAS No.	Name	Waters		Soils (ug/kg)
			Direct (ug/L)	Low Level (ug/L)	
PFBA	375-22-4	Perfluoro-n-butanoic acid	0.05	0.001	0.5
PFPeA	2706-90-3	Perfluoro-n-pentanoic acid	0.05	0.001	0.5
HFPO-DA (Gen-X)	13252-13-6	Hexafluoropropylene Oxide Dimer Acid	0.05	0.001	0.5
PFBS	375-73-5	Perfluoro-1-butanefulfonic acid	0.05	0.001	0.5
PFHxA	307-24-4	Perfluoro-n-hexanoic acid	0.05	0.001	0.5
4:2 FTS	757124-72-4	4:2 fluorotelomersulfonic acid	0.2	0.005	1
5:3 FTCA	914637-49-3	3-Perfluoropentyl propanoic acid	0.5	0.01	1
PFPeS	2706-91-4	Perfluoro-1-pentanesulfonic acid	0.05	0.001	0.5
PFHpA	375-85-9	Perfluoro-n-heptanoic acid	0.05	0.001	0.5
DONA	919005-14-4	Dodecafluoro-3H-4,8-dioxanonanoic acid	0.05	0.001	0.5
PFHxS	355-46-4	Perfluoro-1-hexanesulfonic acid	0.05	0.001	0.5
PFOA	335-67-1	Perfluoro-n-octanoic acid	0.05	0.00065	0.5
6:2 FTS	27619-97-2	6:2 fluorotelomersulfonic acid	0.2	0.005	1
PFHpS	375-92-8	Perfluoro-1-heptanesulfonic acid	0.05	0.001	0.5
FOUEA	70887-84-2	2H-Perfluoro-2-decenoic acid	1	0.005	1
PFNA	375-95-1	Perfluoro-n-nonanoic acid	0.05	0.001	0.5
FOSA	754-91-6	Perfluoro-1-octanesulfonamide	1	0.005	1
PFOS	1763-23-1	Perfluoro-1-octanesulfonic acid	0.05	0.00065	0.5
N-MeFOSA	31506-32-8	N-methylperfluoro-1-octanesulfonamide	1	0.005	1
PFDA	335-76-2	Perfluoro-n-decanoic acid	0.05	0.001	0.5
N-EtFOSA	4151-50-2	N-ethylperfluoro-1-octanesulfonamide	1	0.005	1
8:2 FTS	39108-34-4	8:2 fluorotelomersulfonic acid	0.2	0.005	1
9Cl-PF3ONS	756426-58-1	9-chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (F-53B Major)	0.05	0.001	0.5
PFNS	68259-12-1	Perfluoro-1-nonanesulfonic acid	0.05	0.001	0.5
PFUnA	2058-94-8	Perfluoro-n-undecanoic acid	0.05	0.001	0.5
N-MeFOSAA	2355-31-9	N-methylperfluoro-1-octanesulfonamidoacetic acid	1	0.005	1
N-EtFOSAA	2991-50-6	N-ethylperfluoro-1-octanesulfonamidoacetic acid	1	0.005	1
PFDS	335-77-3	Perfluoro-1-decanesulfonic acid	0.05	0.001	0.5
PFDoA	307-55-1	Perfluoro-n-dodecanoic acid	0.05	0.001	0.5
PFUnDS	749786-16-1	Perfluoroundecane sulfonic acid	0.05	0.001	0.5
PFTTrDA	72629-94-8	Perfluoro-n-tridecanoic acid	0.05	0.006	0.5
PFDoDS	79780-39-5	Perfluorododecane sulfonic acid	0.05	0.001	0.5
PFTeDA	376-06-7	Perfluoro-n-tetradecanoic acid	0.05	0.001	0.5
PFTTrDS	791563-89-8	Perfluorotridecane sulfonic acid	0.05	0.001	0.5
PFHxDA	67905-19-5	Perfluoro-n-hexadecanoic acid	0.1	0.01	2.5

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PFODA	16517-11-6	Perfluoro-n-octadecanoic acid	0.1	0.025	2.5
8:2diPAP	678-41-4	Bis(1H,1H,2H,2H-perfluorodecyl)phosphate	0.2	0.005	2.5
PFMOPrA	377-73-1	Perfluoro-3-methoxy propanoic acid	0.05	0.001	0.5
3:3 FTCA	356-02-5	3:3 Fluorotelomer carboxylic acid	0.1	0.1	1
PFMOBA	863090-89-5	Perfluoro-4-methoxy butanoic acid	0.05	0.001	0.5
NFDHA	151772-58-6	Perfluoro-3,6-dioxaheptanoic acid	0.1	0.001	0.5
FBSA	30334-69-1	Perfluoro-butane sulfonamide	0.05	0.05	1
PFEESA	113507-82-7	Perfluoro-2-ethoxyethane sulfonic acid	0.05	0.001	0.5
FHxSA	41997-13-1	Perfluorohexane sulfonamide	0.05	0.05	1
7:3 FTCA	812-70-4	7:3 Fluorotelomer carboxylic acid	0.1	0.1	1
PFECHS	133201-07-7	Perfluoro-4-ethyl cyclohexanesulfonic acid	0.05	0.001	0.5
HFPO-TA	13252-14-7	Hexafluoropropylene Oxide Trimer Acid	1	1	0.5
Me-FOSE	24448-09-7	N-methyl perfluorooctane sulfonamide ethanol	0.1	0.1	1
11Cl-PF3OUdS	763051-92-9	11-chloroeicosafuoro-3-oxanone-1-sulfonic acid (F-53B Minor)	0.05	0.001	0.5
Et-FOSE	1691-99-2	N-ethyl perfluorooctane sulfonamide ethanol	0.1	0.1	1



APPENDIX F CW DQRA INFORMATION



TABLE F1 LEVEL 3 ASSESSMENT INPUTS

Parameter	Unit	Value	Source
Water filled porosity	Unitless	0.22	Assumed 50% of porosity for sand/silt from McWhorter and Sunada (1977)
Air filled porosity	Unitless	0.22	Assumed 50% of porosity for sand/silt from McWhorter and Sunada (1977)
Bulk density	g/cm ³	1.76	Mean of sand/silt/clay from ConSim helpfile
Henry's Law Constant	Unitless	1.36E-07	Calculated from vapour presser and RMM from EA (2004)
Kd		39	Site specific see 'Calculation of Kd Value'
Length of contaminant source in direction of groundwater flow	M	100	Site specific
Saturated aquifer thickness	M	10	Estimated from site data
Hydraulic Conductivity of aquifer in which dilution occurs	m/day	0.0154	Site specific – geometric mean from the risk head tests
Hydraulic gradient of water table	Unitless	0.005	EA (2014) where hydraulic gradient is not known
Infiltration	m/day	0.0005	Based on 20% of the daily average from 2020 – 2023 Met Historical data for the Valley Station ¹
Half life	Days	1E100	Assumed no degradation
Effective porosity	Unitless	0.265	Mean effective porosity sand/silt from McWhorter and Sunada (1977)
Time since pollutant entered groundwater	Days	365,000	Modelled for 1000 years in line with RTM

McWhorter and Sundada (1977) Groundwater hydrology and hydraulics: Fort Collins, Colo, Water Resources Publications, D.B. McWhorter and D.K. Sunada, 1977

EA (2004) Environmental Risk Evaluation Report: Perfluorooctanesulphonate (PFOS), D Brook, A Footitt, TA Nwagou,, Environment Agency, 2004

EA (2014) Groundwater risk assessment for treated effluent discharges to infiltration systems, Annex J5: Infiltration Worksheet User Manual v2.0, December 2014

¹ metoffice.gov.uk/pub/data/weather/uk/climate/stationdata/valleydata.txt



CALCULATION OF KD VALUE

The soil adsorption coefficient (Kd) is the amount of chemical substance adsorbed onto soil per amount of water. For organic compounds the Kd can be calculated using the organic carbon-water partition co-efficient (koc – usually a literature value is used) and the fraction of organic carbon (foc) within the soil.

A site specific Kd value can be calculated where the concentration of a substance in the soil and in the pore water at the same location is known using the equation¹:

$$Kd = \frac{Csb}{Cw}$$

Where: Kd is the soil adsorption coefficient in cm³/g

Csb is the chemical concentration in the soil in mg/g

Cw is the chemical concentration in the soil-leachate in mg/cm

Soil leachate testing was undertaken at six locations where the concentration of PFOS was known in the soil. Using the chemical analysis results at these locations the Kd value at each location was calculated. The results are presented in Table F2. The range of Kd values calculated was 13 – 101 with a mean of 39. The mean Kd value of 39 was then used to determine the Level 3 remedial targets for a range of increasing distances between the source and the receptor.

TABLE F2 KD VALUE CALCULATIONS

Soil Concentration (mg/g)	Soil Leachate Concentration (mg/cm ³)	Kd
1.54E-03	8.06E-05	19.09
1.29E-04	3.23E-06	40.06
1.52E-05	1.14E-06	13.33
7.10E-06	7.00E-08	101.43
6.10E-06	1.90E-07	32.11

¹ Updated technical background to the CLEA model, Science Report: SC050021/SR3, Environment Agency January 2009



LEVEL 4 ASSESSMENT

$$DF = \frac{Q_c + Q_u}{Q_c}$$

Where DF = dilution factor

Q_c = Groundwater flow below the site (m^3/day)

Q_u = Surface water flow upstream (m^3/day)

$Q_c = KiWmz$

K = Hydraulic conductivity (m/day)

i = Groundwater gradient

W = Width of contaminated zone at right angles to groundwater flow (m)

Assumed values:

$K = 0.0154m/day$ – based on site specific rising head tests

$W = 300m$ – based on the site boundary towards the Estuary

$mz = 10m$ – estimate of sand layer

$i = 0.005$ – EA guidance if the hydraulic gradient is not known¹

$Q_c = 0.0154 \times 300 \times 10 \times 0.005 = 0.231m^3/day$

$Q_u = 443,232m^3/day$ (taken from the Centre for Ecology and Hydrology Q95 value for the River Dee at Chester Suspension Bridge, upstream of the Site 1994-2013)

$$DF = \frac{0.231+443,232}{0.231} = 1,918,752$$

¹ Groundwater risk assessment for treated effluent discharges to infiltration systems, Annex J5: Infiltration Worksheet User Manual v2.0, December 2014



APPENDIX G DISCHARGE CALCULATION



Based on the EA guidance: *Surface water pollution risk assessment for your environmental permit, Environment Agency, 25 February 2022* ([Surface water pollution risk assessment for your environmental permit - GOV.UK](#))

Process Contribution (PC)

$$\text{Calculate the PC where } PC = \frac{(EFR \times RC)}{(EFR + RFR)}$$

Where:

Effluent flow rate (EFR) = 456.87m³/day (average daily volume released)

Release concentration of the pollutant in the effluent (RC) = 1.71ug/l = 1.71 mg/m³

River flow rate (RFR) = 443,232m³/day (Q95 River Dee at Chester)

$$PC = \frac{(456.87 \times 1.71)}{(456.87 + 443232)} = 1.76E-3$$

Predicted environmental concentration (PEC)

Calculate the predicted environmental concentration (PEC)

$$PEC = PC + BC$$

Where BC = background concentration = 0.0056ng/l = 0.0000056mg/m³ ¹

$$PEC = 1.76E-3 + 0.0000056 = 1.77E-3$$

For the PEC < EQS then then the RC must be <0.12ug/l

¹ Taken from average PFOS concentration in the Mersey from 2020 (nearest available data of industrial estuary)



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