Remediation Strategy

Sladen Mill, Littleborough



SOIL AND
STRUCTURES

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Report Status

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Annex Supporting documents

Annex 1: 'Phase 2 Site Investigation & Risk Assessment ; Phase 3 Remediation Statement' (ref. rep-tjba-mere-grp-sladen mill-Ph2+3 Env-250322 Rev. 5) prepared by T J Booth Associates

Annex 2: 'Supplementary Geo-Environmental Report – Hydrogeology and potential Contaminant Transport' (ref. rep-tjba-mere-grp-sladen mill-hydrogeology-150424 Rev. 0 and relevant appendices prepared by T J Booth Associates

Annex 3: Controlled Waters Risk Assessment prepared by Soil and Structures Ltd, ref. 20403-R-001-V07

***Units**: Throughout this Report chemical concentrations or target concentrations are reported in: parts per million (ppm) milligrams per kilogram (mg/kg) for solids; and, parts per billion (ppb) micrograms per litre (ug/l) for liquids.*

Appointment

Soil and Structures Ltd were instructed by Mere Development Group (*the Client*) in June 2024 to prepare a Remediation Strategy (*the Report*) to support the re-development of a parcel of land formerly occupied by Sladen Mill, Littleborough (*the Site*).

Development proposals include for construction of 25 no. dwellings and associated hardstanding, including access roads, and soft landscaping areas under reserved matters planning application ref. 21/00950/REM pursuant to outline permission ref. 15/0125/OUT.

Reliance on the advice presented herein rests solely with the Client.

Scope and Context

The Report has been prepared in support of the discharge of parts i) and ii) of Condition 5 of the outline permission ref. 15/0125/OUT.

The more specific, legal context of the advice given in this Report relates to an assessment of:

i) The suitability of the Site for its proposed end use that is rooted within planning practice guidance (and the National Planning Policy Framework; 2024) that is governed by planning law (various acts). The assessment of 'suitability' relates specifically to ground-related hazards of contamination, pollution and ground gases as set out within both the Environment Protection Act 1990 : Part 2A (2012) and Environment Agency guidance 'Land Contamination Risk Management' (LCRM) (2020).

In this context, the Site would be deemed 'suitable for use' if residual risk is reduced to acceptably low levels for: two historical hazards; potentially harmful material and potentially polluting material; and, one geological hazard; radon gas.

Background to this Report

This Report is preceded by two, existing ground-related reports prepared by T J Booth Associates and Soil and Structures Ltd details of which are listed under the 'Supporting documents' annex to the left.

Alongside this existing reporting, extended consultations with the Environment Agency have taken place that are discussed more fully within the Controlled Waters Risk Assessment prepared by Soil and Structures Ltd.

References

The Remediation Strategy has been written with reference to various sources of information including; design drawings (appended); and, existing ground-related report referenced above (annexed to this Report).

Reference is also made to the 'Engineer' within this Report that relates to the appointed design engineer (structural and/or civil) who is most likely to be the main point of contact within the design team.

Peer Review

This Remediation Strategy has been developed with input from Land Quality Management's Paul Nathanial, the lead author of the CIRIA guidance on PFAS and of BS18504:2017 Sustainable Remediation.

Executive Summary

Sladen Mill is the site of a former textile mill (since demolished) occupying a parcel of land approximately 1.30 ha in area located 175 m north of the A58 (Halifax Road), Littleborough, Lancashire.

Given its land use history Condition (*Condition 5 of planning decision notice 15/0125/OUT reproduced here*) requires land contamination matters to be managed to demonstrably ensure the site is in a condition that is safe and suitable for its new residential use.

Environmental testing of soils and groundwater across the Site identified risks to the Castle Brook (a *main river that flows along the border of the Site and groundwater beneath the Site mainly from contaminants originating uphill from outside the site*). In addition, generic assessment criteria for some hydrocarbons and PFAS have been exceeded, and asbestos fibres have been detected in Made Ground.

Rather than proceed to a detailed quantitative risk assessment the applicants propose to undertake remediation to remove risks to people and Brook.

This Remediation Strategy summarises the proposed actions to break source-pathway-receptor linkages to enable the Site to be demonstrably safe and suitable for use as required by the Planning Condition.

- Groundwater carrying dissolved PFAS, from an offsite source uphill of the Site, enters the site on its eastern boundary. This groundwater will be captured in a drain and taken through a treatment process to remove the PFAS before it is discharged under a relevant permit into the Brook.
- Soils impacted by contamination in the upper level of the site will be excavated and removed from the Site, not least to ensure the correct site levels.
- The development on the lower level of the Site will be capped with 600mm of suitable material both to ensure good growing medium and to prevent access to any underlying contaminant.
- Local hotspots of hydrocarbon contamination will be excavated and removed from the site.

The effectiveness of the above strategy will be demonstrated with a validation report documenting the works carried out and how the contaminant linkages have been broken.

This strategy is intended to fulfil the requirement for a duly approved remediation strategy as required in Part (iii) of Condition 5.

Planning Condition 5 of planning decision notice 15/0125/OUT

No development shall take place until an investigation and risk assessment, in addition to any assessment provided with the planning application, has been submitted to and approved in writing by the Local Planning Authority. The assessment shall investigate the nature and extent of any contamination on the site (whether or not it originates on the site). The assessment shall be undertaken by competent persons and a written report of the findings submitted to and approved in writing by the Local Planning Authority before any development takes place. The submitted report shall include:

i) a survey of the extent, scale and nature of contamination

ii) an assessment of the potential risks to:

- *human health,*
- *property (existing or proposed) including buildings, crops, livestock, pets, woodland, and service lines and pipes,*
- *adjoining land,*
- *Groundwaters*
- *water courses to include Greenvale Brook and the canal drain which runs parallel with the eastern boundary of the site*
- *ecological systems,*
- *archaeological sites and ancient monuments;*

iii) where unacceptable risks are identified, an appraisal of remedial options and proposal of the preferred option(s) to form a remediation strategy for the site. The development shall thereafter be carried out in full accordance with the duly approved remediation strategy and a verification report submitted to and approved in writing by the Local Planning Authority before any of the dwellings hereby approved are first occupied.

Reason: *To prevent pollution of the water environment and to ensure the safe development of the site in the interests of the amenity of future occupiers in accordance with Policy G9 of the adopted Rochdale Core Strategy, saved Policy EM/8 of the adopted Rochdale Unitary Development Plan and the National Planning Policy Framework.*

1.0 The Site and Proposed Development

1.1 The Site

Location and size: The Site (the planning boundary) comprises a parcel of land approximately 1.30 ha in area located 175 m north of the A58 (Halifax Road), Littleborough, Lancashire - Figure 1.

Access: The main body of the Site is accessed on foot and by vehicle via a fenced entrance in the south-eastern corner and the upper level of the Site openly accessible on foot and by vehicle midway along the eastern boundary.

Topography: is characterised by two distinct areas as illustrated on Figure 2 with general westerly and north-westerly fall in levels (within the Castle Brook valley). The first area, or 'main body' of the Site that lies between 165 and 174 mAOD and occupies roughly 80 % of the land area. The second area the 'upper level' that is present midway along the eastern boundary of the Site that lies between 176.5 and 177 mAOD.

The upper level of the Site is separated from the main body of the Site by a steep embankment (slope angles of between. 45 to 80 degrees) that, half way down the eastern boundary, becomes a retaining wall (vertical) that continues south to form the eastern boundary of the Site.

Castle Brook (watercourse; 'main river') wraps around the southern and western boundaries of the Site flowing in a generally north-westerly direction – Figure 1.

Utilities: Below ground utilities are expected to be present beneath the Site with evidence of overhead lines on Site.

Existing structures: At the time of issue of this document various structures were noted on Site including: a sandstone retaining walls in varied conditions along the eastern edge of the Site and locally to the bridge in the southern portion of the Site; and, localised areas of residual concrete hardstanding.

1.2 The Proposed Development

Development proposals: Development proposals (Figure 2) include for construction of 25 no. dwellings and associated hardstanding, including access roads, and soft landscaping areas.

ⓘ ***Development works and risk:*** *An appreciation of the construction processes is essential for development-related risk assessments given the groundworks stand to meaningfully alter the level of risk, e.g. unstable slopes being removed by earthworks, or unsuitable material being exposed or removed as part of the works.*

To enable this development, the following groundworks are anticipated to be required, N.B. listing is outline only.

> Preparation: at the point of inspection Site clearance and preparation appears to have been partially completed with remaining works including: demolition of the remaining structures (detailed above); and, removal of remaining hardstanding surfaces.

> Earthworks (cut and fill): Are expected to be required to suit development levels. The existing Made Ground deposits are not anticipated to be suitable for re-use as a general fill in their current condition.

> Utility Excavations: Excavation of any drainage and other utility alignments.

> Foundations: Subject to the selected foundation solution, construction of sub-structures (foundations).

> Surfacing: Formation soft landscaping and hardstanding surfaces.

ⓘ ***Risk profile of the proposed development for Human Health and 'Controlled Waters' [1]:*** *The proposed development would see a former industrial site that has been subject to multiple uses (land associated with coal mining, woollen mill, cotton raising and finishing mill, and more recently the manufacture of LDPE products) developed for a residential use.*

This change of use represents a shift from a land use with low sensitivity and high pollution potential (various industrial uses) to a high sensitivity and low pollution potential (residential). Remediation is required ensure the development will be safe and suitable for use. This Report details the nature and extent of this remediation work.

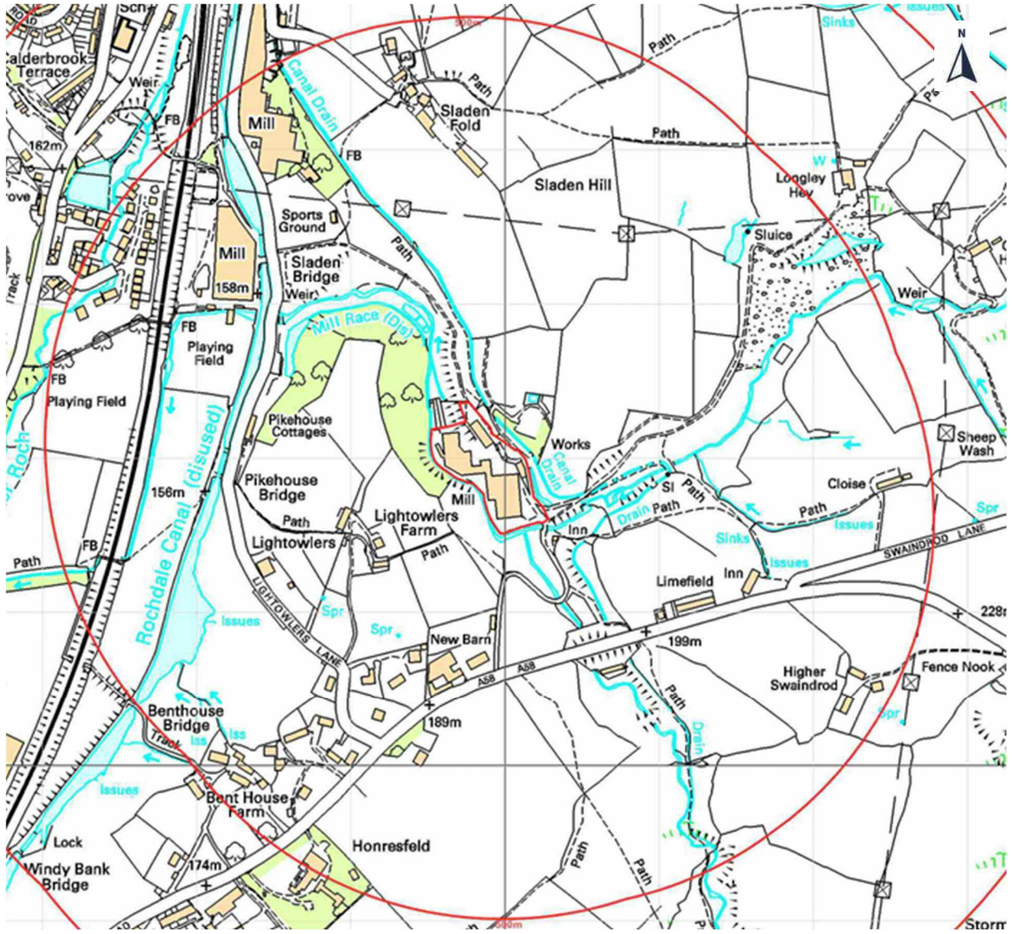


Figure 1: Location Plan

> *Site approximately centred on 394983 417383*
> *Central red line = outline planning application (ref. 15/0125/OUT) boundary; outer red line = 500 m buffer*

[1] *Water Resources Act 1991*



Figure 2 – Development Plan
> *Extract from appended drawing*
> *'Main river' as proscribed by the Environment Agency https://environment.maps.arcgis.com/apps/webappviewer/index.html?id=17cd53dfc524433980cc333726a56386*

2.0 **Risk Assessments** – Summary Table

The following table presents a summary of the risk assessments for: i) human health as presented within the *Phase 2 Site Investigation & Risk Assessment – Phase 3 Remediation Statement* report dated February 2024 (Revision 5) prepared by T J Booth & Associates [the 'TJB&A reporting']; and, ii) Controlled Waters as presented within the *Controlled Waters Risk Assessment* prepared by Soil and Structures Ltd, ref. 20403-R-001-V07 [the 'Soil and Structures reporting'].

Hazard			Where is the risk assessed?	In summary, what is the pollutant linkage requiring remediation?
Contamination (on-site 'sources')	Asbestos containing soils	→	Section 2.4.1.1 of TJB&A reporting (Annex 1)	Environmental sampling and analysis of the Made Ground soils on Site (the *source*) revealed the presence of asbestos fibres in thirteen of the twenty-two locations it was sampled for that, without risk mitigation, stand to present an unacceptable risk of harm to end users of the Site and any visitors (the *receptors*). This harm could arise through a single *pathway* – inhalation of fibres (either directly from the soil or as tracked-back dust).
	Arsenic, lead and benzo[a]pyrene, benzo[b]fluoranthene, & dibenz[ah]anthracene in soils		Section 2.4.1.1 of TJB&A reporting (Annex 1)	Environmental sampling and analysis of the Made Ground soils on Site (the *source*) revealed the presence of arsenic, lead and polycyclic aromatic hydrocarbon compounds at concentrations that, without risk mitigation, stand to present an unacceptable risk of harm to end users of the Site and any visitors (the *receptors*). This harm could arise through various *pathways* including; direct contact with the soil, ingestion of soil, track-back of soil dust.
	Per and Poly-Fluoroalkyl Substances (PFAS) Specifically Perfluorooctanic acid (PFOA) and Perfluorooctanesulfonic acid (PFOS)		Within this Report as an addendum to the human health risk assessment presenting within the TJB&A reporting (Annex 1)	PFAS were detected within the Made Ground soils on Site at low concentrations that, apart from a localised region of the upper portion of the Site (TP206) were found to be below the Generic Assessment Criteria for a residential with home-grown end use (interim Category 4 Screening Level of 0.0076 mg/kg) with a Hazard Index >1 (sum of PFOA PFOA PFNA and PFHxS). This commentary is included for completeness noting that inherent remediation will be completed through the planned reduced level excavation across this portion of the Site together with the provision of hardstanding (noting that localised areas of managed soft landscaping also included for).
Contamination (off-site 'sources')	Per and Poly-Fluoroalkyl Substances (PFAS) Specifically Perfluorooctanic acid (PFOA)	→	Section 6.0 of Soil and Structures' Controlled Waters Risk Assessment (Annex 3)	Groundwater has been temporarily exposed along the eastern boundary of the Site. When tested in two discrete locations ('Spring 1' and 'Spring 2') the water was found to contain elevated concentrations of PFAS (PFOA up to 1.26 ug/l) and is therefore serving as a *source* of both potentially harmful and polluting material. Without remedial action this spring water stands to present an unacceptable risk to end users of the Site and any visitors (the *receptors*). Whilst PFAS containing soils and groundwater have been confirmed on Site, there are multiple lines of evidence establishing this primary groundwater source of PFAS being located off Site. This evidence includes, but is not limited to, testing of surface water quality within Castle Brook upstream of the Site that confirms concentrations of PFAS within the watercourse are more elevated to those recorded within Castle Brook as is passes the Site and the relative position of both sampling locations ('Spring 1' and 'Spring 2') to the eastern boundary of the Site During the most recent consultation with the Environment Agency (in-person; 05 June 2025), they confirmed that no groundwater remediation with respect to PFAS would be sought.
Pollution (waters)	Free-phase hydrocarbons (mainly >C16; aliphatic / aromatic)	→	Section 6.0 of Soil and Structures' Controlled Waters Risk Assessment (Annex 3)	Discrete areas of the Site included evidence of free-phase, diesel and oil-range hydrocarbons (the *source*; Made Ground locally to TH2, TH7 and TH18; as illustrated by the red hatched areas on Figure 3) that, without risk mitigation, stand to present an unacceptable risk of harm to Controlled Water; Castle Brook (the *receptor*). This harm could arise through a single *pathway;* lateral migration of hydrocarbon impacted groundwater into Castle Brook. Vertical migration into the underlying bedrock aquifer is also identified as a potential pollutant linkage however, in this hydrogeological setting, lateral migration towards Castle Brook is identified as the primary pathway. The chemical concentrations of diesel and oil range hydrocarbons in the soils and groundwater within these 'source' locations was found to be relatively 'low' despite evidence of free-product existing suggesting the impact (volume of hydrocarbons) is limited.
Ground gas (all types)		→	Section 2.4.1.2 of TJB&A reporting (Annex 1)	Apart from radon, the risk presented by ground gases was assessed to be low. The Site is located within an area where between 5 and 10 % of dwellings are predicted to be above the 'Action Level' for radon that, as currently set, represents half of a person's annual average radiation dose; thereby necessitating remediation

3.0 Remedial Works

Remediation is needed to remove risk to human health from asbestos, arsenic and various polycyclic aromatic hydrocarbons and to prevent pollution of Castle Brook by PFAS and hydrocarbons.

Five specific remedial actions are recommended as detailed within this Section and as illustrated on Figure 3 and Figure 4 at the end of this Section. These are:

1. Excavation and off-Site disposal of PFAS impacted soils present on the upper level of the Site;
2. Provision of a toe-drain to collect PFAS impacted groundwater originating from off-Site that is taken through a treatment process and discharged, under a relevant permit to Castle Brook;
3. Provision of a clean capping to soft landscaping areas;
4. Excavation and off-Site disposal of hydrocarbon impacted soils; and,
5. Provision of radon protection measures to the new dwellings.

ⓘ ***Context of the Remedial Works***

Groundwater crossing the eastern boundary of the Site is bringing with it dissolved phase PFAS (PFOA dominated) from an off-Site source. The Made Ground deposits beneath the Site are therefore serving as both a 'pathway' and 'receptor' for this PFAS impacted groundwater. The groundwater flows beneath the Site and thereafter, discharges laterally into Castle Brook, the receptor.

Management of this PFAS impacted groundwater (Remedial Action 2) is key to both the management of risk on Site, i.e. reducing the likelihood of end users being exposed to shallow flows of PFAS impacted groundwater and PFAS impacted groundwater degrading the quality of the groundwater beneath the Site, as well as the risk to Castle Brook, the primary Controlled Waters 'receptor'.

Treatment of this groundwater will protect and prevent a deterioration of water quality within Castle Brook by limiting the discharge of poisonous, noxious or polluting matter (PFAS impacted groundwater).

When the PFAS loading within the groundwater reduces, either through the passage of time or through third-party action to implement active treatment of the off-Site source of PFAS, the requirement for treatment of this PFAS impacted water as part of the Site's drainage strategy will reduce until it is no longer needed to ensure permitted discharge concentrations are met (to be agreed and set out within the Discharge Consent). Beyond such time, the groundwater management system would remain in place serving various secondary functions, e.g. reducing the potential for flooding on the Site.

3.1 **Remedial Action 1 –** Excavation and removal of PFAS impacted soils

Source(s)	Pathway(s)	Receptor(s)	Risk Management Strategy(s)
PFAS impacted soils	Various including direct contact, indigestion	End users of the Site (using the upper level of the Site)	Source removal (excavation and off-Site disposal) Pathway intervention (provision of hardstanding)

The objective of this remedial action: is to reduce the risk presented to end users of the Site from PFAS impacted soils present in a single localised area of the Site (upper level), as illustrated on Figure 3 and Figure 4.

This remedial action can be achieved through: excavation and off-Site disposal of the PFAS impacted soils locally to TP206 on the upper level of the Sit, as illustrated on Figure 3 and Figure 4.

This remedial action is inherent to the development process and the requirement to reduce levels across the full width of the access road resulting in complete removal of soils to depths of up to 1.0 m depth across this area, as illustrated on Figure 3 and Figure 4.

3.2 **Remedial Action 2 –** Groundwater management system

Source(s)	Pathway(s)	Receptor(s)	Risk Management Strategy(s)
Groundwater that includes dissolved phase PFAS the source of which is off-Site	1. The bedrock aquifer that emerges at ground level along the eastern boundary of the Site 2. The Made Ground and superficial soils beneath the Site	1. Castle Brook 2. End users of the Site (direct contact – secondary pathway)	Pathway intervention (intercepting groundwater); and, Treatment prior to discharge into Castle Brook

The objective of this remedial action is to: include an active groundwater management scheme to: i) limit pollution loading of the Site's soils and groundwater by dissolved phase PFAS is originating from an off-Site 'source'; and, ii) limit the flux of PFAS (some of which are classed as hazardous substances) into Castle Brook thereby achieving a betterment of water quality within this Controlled Water body.

This remedial action can be achieved through: the provision of a toe-drain at the base of the proposed upper embankment/retaining wall, to then pass collected through a Granular Activated Carbon (GACarbon) filter before discharge in line with a permit issued by the Environment Agency at the outfall, as illustrated on Figure 3 and Figure 4.

This remedial action has been selected given: i) it is the only viable means to reduce pollution loading to the Site soils and groundwater from the off-Site impacted groundwater source(s); and, ii) the inclusion of the GACarbon filter to treat PFA impacted groundwater entering the Site from an uphill off-Site 'source'.

Full details of this groundwater management system are set out within the development's drainage strategy prepared by T J Booth & Associates and with outfall concentrations of PFAS to be agreed as part of the Discharge Consent. In overview, the system will comprise:

> A toe-drain with an invert level below the base of the embankment with;

> A Granular Activated Carbon filtration system upstream of the outfall to reduce concentrations of PFAS to levels to comply with the Discharge Consent.

ⓘ The final design of the toe-drain should be led by the project's drainage / civil engineer that will need to be confirmed as part of the Discharge Consent.

Pollution loading within the groundwater flows emerging on the Site's eastern boundary is expected to vary seasonally with the main control being rainfall rates and groundwater levels. It is therefore recommended that the GACarbon filter at the outfall is designed on a modular basis allowing for additional 'modules' to be added if and where required.

In practice, this would be a staged process.

> Stage 0 (pre-construction) bench testing: delivery of groundwater sample to the supplier of the GACarbon to optimise the filter, e.g. volume of GACarbon and flow rates.

> Stage 1 of Granular Activated Carbon filter deployment: installation of the filter module based on the bench scale testing and permitted discharge concentrations of PFAS.

  The filter will be gravity-driven for ease of maintenance / serviceability.

  The performance of the filter which will again need to be validated through a programme of 'outfall', 'upstream' and 'downstream' monitoring the details of which (duration, intervals and compounds tested) should be agreed based on the bench testing as part of the Discharge Consent.

> Stage 2 (post-construction): as a contingency measure, installation of additional filter modules will be completed if and where the filter's performance on Site is found to be limiting.

It is noted that within Castle Brook, upstream concentrations of PFOA have been recorded at 0.1 µg/l with concentrations within Castle Brook locally to the Site recorded in the range of 0.02 and 0.04 µg/l.

3.3 Remedial Action 3 – Excavation and removal of hydrocarbon impacted soils

Source(s)	Pathway(s)	Receptor(s)	Risk Management Strategy(s)
Hydrocarbon impacted soils (primarily >C16 aliphatic / aromatic hydrocarbons)	Vertical migration of hydrocarbons through effective infiltration	Groundwater beneath the Site	Source removal (excavation and off-Site disposal)

The objective of this remedial action: is to reduce the pollution potential of hydrocarbon impacted soils present in localised 'hotspot' areas of the Site as illustrated on the Ground Model plan in Section 3.0.

This remedial action can be achieved through: excavation and off-Site disposal of the hydrocarbon impacted soils.

This option has been selected responding to the groundwater regime on Site.

Whilst development of the Site will reduce the infiltration potential and thus the reduce the vertical transport of all chemicals present within the soil into the groundwater beneath the Site, this action is recommended to reduce the overall mass of clearly identifiable, potential pollutants (the hydrocarbon stained soils) in this groundwater regime that is characterised by high fluxes (volumes and rates).

3.4 Remedial Action 4 – Provision of radon protection measures

Source(s)	Pathway(s)	Receptor(s)	Risk Management Strategy(s)
Radon gas emitted from natural geologies	Vertical migration into habitable spaces	End users of the Site	Pathway intervention (provision of 'full' radon protection measures)

The objective of this remedial action: is to reduce the potential (and therefore the risk) for radon gas to enter the proposed dwellings.

This remedial action can be achieved through: the provision of 'full radon protection measures' to all dwellings.

3.5 Remedial Action 5 – Clean capping to soft landscaping areas

Source(s)	Pathway(s)	Receptor(s)	Risk Management Strategy(s)
Arsenic, lead and polycyclic aromatic hydrocarbon impacted soils	Various, e.g. direct contact, ingestion, track-back dust	End users of the Site	Pathway intervention (suitable capping layer)

The objective of this remedial action: is to prevent end users of the Site being exposed to the Made Ground deposits present across the Site that is physically and chemically unsuitable for use as a soil forming material within soft landscaping areas on Site.

This remedial action can be achieved through: the provision of a suitable thickness of 'clean capping' to any areas where the Made Ground is present beneath soft-landscaping areas.

This remedial action has been selected given there is a requirement for importing soil-forming material to soft landscaping areas regardless of the requirement for remedial action.

> *Function:* A 'cover system' is designed to serve as a dedicated barrier between harmful material (Made Ground deposits that have been found to be chemically unsuitable for use within soft landscaping areas) and end users (residents and visitors).

> *Extent*: The clean capping is only required if and where residual Made Ground (non-natural soils) are present beneath planned soft landscaping areas.

In this scenario, this is expected to apply to all soft landscaping areas.

> *Thickness (Table 1):* The recommended thicknesses and composition are set out within Table 1 below.

This thickness aligns with the likely usage of the soft landscaping areas and current guidance[2].

The inclusion of a no-fines, crushed stone layer of at least 100 mm thickness is intended to serve as a visual demarcation (that is not a plastic geotextile) acting as a 'no-dig' layer, limiting the potential for end uses of the Site to excavate through the capping into the underlying Made Ground soils.

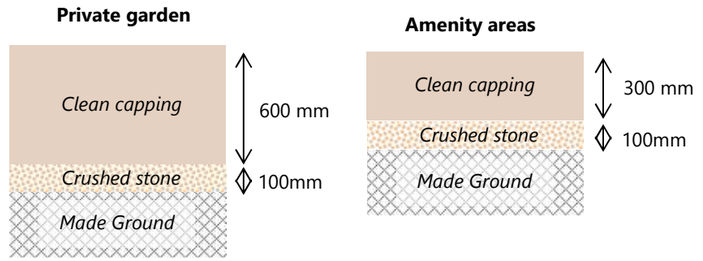
For tree and shrub planting areas, the advice of the landscape architect should be sought with respect to capping thicknesses with minimum thicknesses of 600 mm.

Table 1: Clean capping design

Soft Landscaping Area	Clean Capping Component and Thickness			Total Depth Required
	Topsoil	Subsoil	Other	
Private garden areas	Min. 150 mm*	450 mm	100 mm 'no fines' crushed stone	700 mm
Amenity areas	Min. 150 mm*	150 mm	100 mm 'no fines' crushed stone	400 mm

** In general, the provision of topsoil thicknesses greater than 300 mm is liable to induce a collapse of the soil structure (compression or collapse)*

[2] https://claire.co.uk/home/news/1934-nclog-publishes-guide-to-cover-systems-and-their-verification



> *Material sourcing:* Topsoil and other imported soils should be sourced from a reputable supplier who can confirm the source of the material as well as its chemical and physical properties prior to being imported onto Site.

> *Quality:* The soft landscaping soils' quality should be verified for suitability against both; the relevant British Standards, e.g. BS3882:2015 for topsoil and BS8601:2013 for subsoil, and Local Planning Authority (LPA) guidance[3].

The LPA guidance is hyperlinked below and reference should be made to Section 6.0 for the specific frequencies and suites of testing that are required for imported soils.

The frequency and suite of testing varies depending on the nature of the source, e.g. Greenfield or manufactured.

Imported soils shall therefore be defined as 'suitable for use' if the verification testing falls below the Generic Assessment Criteria that are detailed on the appended Material Suitability – Chemical Screening sheet.

3.6 Response plan for 'Unforeseen Contamination'

Examples of 'unforeseen contamination' could include visibly stained or odorous soils.

If any materials are encountered on Site that differ physically or in colour from those described within the TJBA or Soil and Structures reporting (Annex 1 and 3) or are suspected as being potentially harmful or polluting, then the advice of the Engineer or the author of this Report should be sought.

The Engineer should in turn notify Rochdale Borough Council's Contaminated Land Team of the encounter and, given the groundwater regime and proximity of the Site to Castle Brook, the Environment Agency.

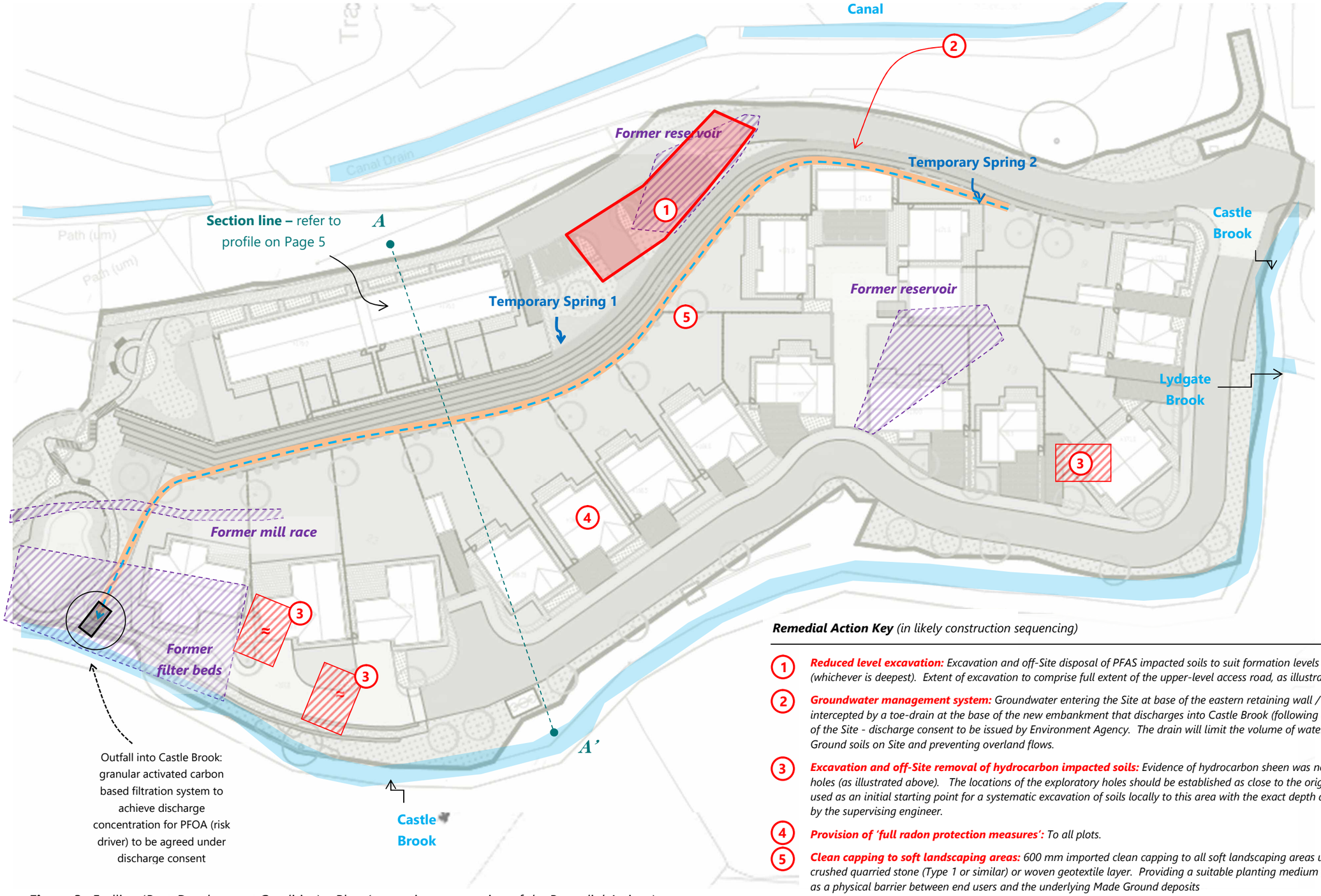
If and where the unforeseen contamination requires remedial action that differs from the actions detailed herein, then a revised Remediation Strategy should be submitted to Rochdale Borough Council's Contaminated Land Team and, where relating to Controlled Waters risk, the Environment Agency.

3.7 Other Actions

New water supply pipes are expected to be laid in Made Ground sub-soils that include chemicals that may pose a risk of fouling to the water supply pipes.

It is recommended that water supply pipes are constructed using 'barrier pipe' (PE/AL/PE) in line with local water supplier's guidance[4].

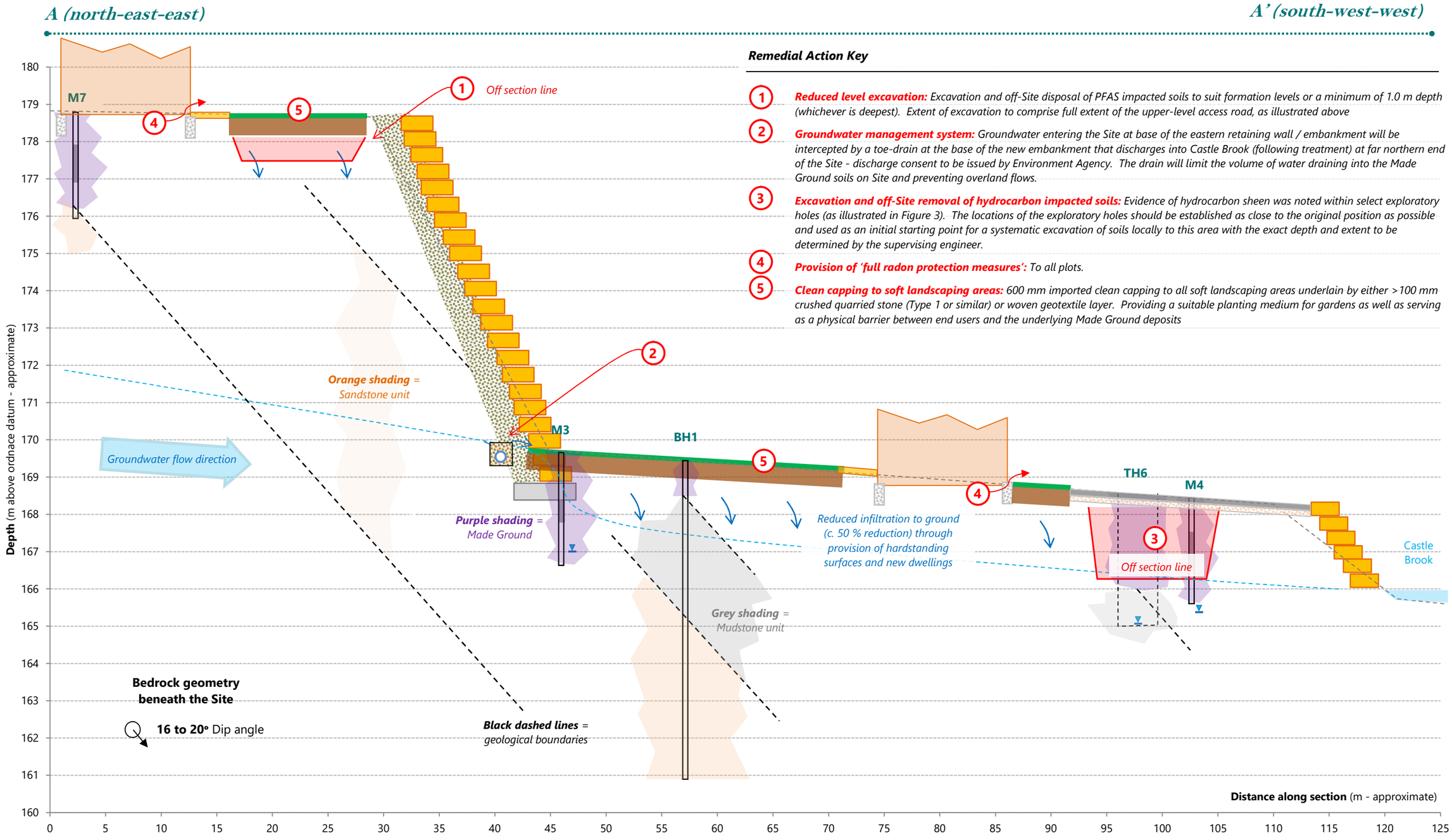
[3] https://www.manchester.gov.uk/downloads/download/1460/contaminated_land *(Greater Manchester guidance)*
[4] https://www.unitedutilities.com/globalassets/documents/builders--developers-docs/9017b-developer-services-guidance-for-builders-and-developers-v7-2024-web-acc.pdf



Remedial Action Key *(in likely construction sequencing)*

1. ***Reduced level excavation:*** *Excavation and off-Site disposal of PFAS impacted soils to suit formation levels or a minimum of 1.0 m depth (whichever is deepest). Extent of excavation to comprise full extent of the upper-level access road, as illustrated above*
2. ***Groundwater management system:*** *Groundwater entering the Site at base of the eastern retaining wall / embankment will be intercepted by a toe-drain at the base of the new embankment that discharges into Castle Brook (following treatment) at far northern end of the Site - discharge consent to be issued by Environment Agency. The drain will limit the volume of water draining into the Made Ground soils on Site and preventing overland flows.*
3. ***Excavation and off-Site removal of hydrocarbon impacted soils:*** *Evidence of hydrocarbon sheen was noted within select exploratory holes (as illustrated above). The locations of the exploratory holes should be established as close to the original position as possible and used as an initial starting point for a systematic excavation of soils locally to this area with the exact depth and extent to be determined by the supervising engineer.*
4. ***Provision of 'full radon protection measures':*** *To all plots.*
5. ***Clean capping to soft landscaping areas:*** *600 mm imported clean capping to all soft landscaping areas underlain by either >100 mm crushed quarried stone (Type 1 or similar) or woven geotextile layer. Providing a suitable planting medium for gardens as well as serving as a physical barrier between end users and the underlying Made Ground deposits*

Figure 3– Endline (*Post-Development Condition*) – Plan *(presenting an overview of the Remedial Actions)*



Illustrative / conceptual only – do not scale from drawing – note compressed axes

Figure 4– Endline (*Post-Development Condition*) – Profile *(presenting an overview of the Remedial Actions)*

4.0 Validation Plan

On completion of the development works (and the recommended remedial works) a Validation Report should be prepared in accordance with core guidance[5] and submitted to the Local Planning Authority for approval.

The Validation Report should set out the lines of evidence that demonstrate, or validate, how the recommended remedial works have been completed satisfactorily and have achieved their stated aim which is to demonstrably render the site safe and suitable for its intended use as a residential area adjacent to a brook.

4.1 **Validation of Remedial Action 1 –** Groundwater Management System

Beyond construction phase records, including a photographic diary, the validation of the groundwater management system is to be agreed as part of the Discharge Consent.

4.2 **Validation of Remedial Action 2 –** Excavation and removal of PFAS impacted soils

The following lines of evidence should be sought to demonstrate the PFAS impacted soils present on the upper-level of the Site have been removed:

> Photographic record of the works;

> Level survey before and after the works; and,

> Waste Transfer Notes confirming removal of the soils and disposal at a suitably licensed facility.

Based on the availability of existing soil analysis data from this region of the Site (delineating the vertical extend of the PFAS impacted soils) and the general requirement for a reduction in ground levels across this wider area, sampling of side walls and base of the excavation is not considered necessary.

4.3 **Validation of Remedial Action 3 –** Removal of hydrocarbon impacted soils

The following lines of evidence should be sought to demonstrate that the hydrocarbon impacted soils have been removed as recommended:

> Photographic record of the works prepared by the suitably qualified supervisor of the works illustrating through visual inspection and photo-ionisation detector (PID) 'sniff-tests' the extent of hydrocarbon impacted soils has been chased out fully.

> Side-wall and base (x2) sampling and testing of soils for Total Petroleum Hydrocarbons CWG Banding with Aliphatic / Aromatic split to provide an additional line of evidence is also recommended

4.4 **Validation of Remedial Action 4 –** Provision of radon protection measures

The following lines of evidence should be sought to demonstrate that radon protection measures have been installed as recommended:

> *For the radon protection design:*

Detailed design drawings shall be prepared by the Architect in line with current guidance (BRE 211 {2023}).

> *For the radon protection installation*:

The installation of radon protection shall be completed by the main contractor.

This approach is considered appropriate for this development type (low-rise residential developments with ventilated void) under current good practice guidance[6].

For radon gas, the inspection and verification of protection measures is commonly not a regulated activity despite the higher background threat this gas presents compared to other gases. National schemes[7] have emerged intended to draw greater attention to this hazard as part of the broader mix of ground gas hazards.

It is therefore recommended that:

- *For properties where radon gas protection is installed*: that the provision of suitable radon protection measures is verified by an independent consultant or qualified and experienced installer for at least 3 plots.

The appointed 'verifier' shall be a *competent, experienced and suitably trained* individual.

Signed inspection report (example report[8]) shall be prepared by the 'verifier', confirming that the agreed radon protection has been installed correctly in line with the design and current guidance[5,6].

Any non-conformances, e.g. inadequate sealing of service penetrations or multiple punctures, shall be immediately identified by the 'verifier' and, where not able to be rectified adequately on the inspection visit, an additional visit scheduled to demonstrate that appropriate steps have been taken to address the non-conformance.

ⓘ ***Follow-on trades*** *should be made aware that any damage to the membrane is unacceptable and stands to compromise the gas protection.*

4.5 **Validation of Remedial Action 4 –** Clean capping to soft landscaping areas

The following lines of evidence should be sought to demonstrate Made Ground deposits are covered by a suitable thickness of 'clean capping':

> *For the clean capping thickness*:

- Hand excavated trial pits on a plot-by-plot basis or one per every 50 m^2 of soft landscaping illustrating (through photographic evidence) how, the required thickness of clean capping has been provided over the Made Ground.

  Guidance on the requirement for photographic evidence can be found in Local Planning Authority guidance [9].

  Hand pits should be taken down onto the 'no-dig' stone layer but no deeper to maintain the integrity of this layer and limit mixing with the underlying Made Ground deposits.

- Relative comparisons of reduced and final level surveys are not considered suitable however photographic evidence of the reduced level surface, prior to clean capping placement can be used to supplement the validation works.

> *For the clean capping quality:*

- As detailed within Section 4.1, the chemical suitability of soil forming materials should be confirmed in line with local planning authority guidance.

[5] https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm/lcrm-stage-3-remediation-and-verification#remediation-and-verification-reporting-requirements

[6] Hazardous Ground Gas - An essential guide for housebuilders - NHBC
[7] https://claire.co.uk/overview-of-gpvs-scheme
[8] https://claire.co.uk/overview-of-gpvs-scheme?start=7
[9] Contaminated Land | Manchester City Council

4.6 Validation of Unforeseen material

If and where potentially harmful or polluting material is unexpectedly encountered in the ground, then a pre-agreed response plan should be developed in consultation with the relevant regulatory authorities as discussed in Section 3.7.

As part of the Validation Report, confirmation of any pre-agreed response plan(s) having been completed satisfactorily should be included within the Validation Report.

4.7 Validation of Other Actions

Provision of suitable pipe material should be confirmed through either photographic evidence or order sheets.

5.0 Recommendations

Recommended follow-on work:

1. Distribution of this Remediation Strategy to the wider engineering design team.
2. Submission of this Remediation Strategy to the Local Planning Authority.
3. Partial planning condition discharge of Part iii) of Condition 5 of Decision Notice ref. 15/01235/OUT.
4. Submission of the recommended Validation Report; and,

Subject to the satisfactory completion of the recommended remedial works and approval of the Validation Report by the relevant regulatory authorities;

5. Full discharge of Condition 5 of Decision Notice ref. 15/01235/OUT will be possible and the Site deemed 'safe and suitable for use'.

Schedule of Accommodation:

Plot	Accommodation	sqm	sqft
1	3 Bedroom House	96	1032
2	3 Bedroom House	96	1032
3	3 Bedroom House	96	1032
4	3 Bedroom House	96	1032
5	3 Bedroom House	96	1032
6	3 Bedroom House	96	1032
7	3 Bedroom House	96	1032
8	3 Bedroom House	96	1032
9	4 Bedroom House	138	1484
10	4 Bedroom House	138	1484
11	4 Bedroom House	218	2346
12	4 Bedroom House	162	1744
13	4 Bedroom House	130	1398
14	4 Bedroom House	130	1398
15	4 Bedroom House	130	1398
16	4 Bedroom House	160	1722
17	4 Bedroom House	180	1937
18	5 Bedroom House	182	1959
19	5 Bedroom House	182	1959
20	5 Bedroom House	182	1959
21	3 Bedroom House	103	1108
22	3 Bedroom House	103	1108
23	5 Bedroom House	260	2800
24	5 Bedroom House	260	2800
25	5 Bedroom House	278	3000

See landscaping plan for full detail for green space

0m 10m 20m 30m 40m 50m

Visual Scale - 1:300

N



materials palette

rainwater goods to be black gutters, downpipes and waste pipes
fascias where applicable to be s/w painted black
doors: composite high security frong and rear entrance doors. Garage doors to be aluminium in finish to match main entrance doors

- Hedge with 1000mm metal wired fence seperating rear gardens
- Low level hedge to front garden
- Grass
- Green space
- Tegular Paviours/setts Vehicle Use
- Tegula Paviours/setts (Pedestrian use Contrasting)
- Tarmac Driveways/parking
- Tarmac Road
- Stone Wall - varies
  - -900mm to front gardens
  - -1000mm high to rear of retaining wall
  - -1800mm when creating a privacy garden wall
- Timber fence
  - -1800mm to plot perimeter
  - -1500mm division to gardens(where hedging not proposed)
- 600mmx600mm Pavers
- Tegula Paviours/setts public footpath
- Pond

nicol thomas

Rev	Date	Description
N	02.12.22	pond changed to engineers drawing
O	06.12.22	Revised to EA comments
P	05.01.23	structual detail infomation included
Q	17.01.23	wall length increased
R	19.01.23	Wall decreased
S	24.01.23	Tim Booth revisions
T	13.02.23	Patio area updated

nicol thomas

architects project managers construction cost consultants CDM co-ordinators
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Client	Mainly Mere
Job	Sladen Mill, Littleborough
Drawing title	Site Layout
Project number	M4856 (PL)02 Rev T
Scale	As indicated@ A1
Date	01/30/23
Drawn by	KS Checked by GRF

13.02.23

Material Suitability
Chemical Screening

SOIL AND STRUCTURES

Notes on Generic Assessment Criteria
1. Assumes sandy loam soil (default soil type)
2. Assumes 6% SOM
3. Assumes small terraced house
4. S4UL = Suitable 4 Use Levels (LQM/CIEH) - minimal risk
5. C4SL = Category 4 Screening Levels (DEFRA) - acceptably low risk
6. Bold GACs derived from SGV report input parameters in CLEA v1.071

Material Description	Topsoil (imported)	Topsoil (imported)	Topsoil (imported)	Topsoil (imported)	Topsoil (imported)
Lab Sample Number					
Sample Reference					
Sample Number					
Depth (m)					
Date Sampled					
Time Taken					

Generic Assessment Criteria	*Exceeds by more than x2*	*Exceeds by less than x2*

Analytical Parameter (Soil Analysis)	**Units**	**Detection**	**Accredit?**						
Stone Content	%	0.1	NONE	Not applicable					
Moisture Content	%	N/A	NONE	Not applicable					
Total mass of sample received	kg	0.001	NONE	Not applicable					
Asbestos in Soil	Type	N/A	ISO 17025	Type Detected or not? Analyst					

General Inorganics									
pH - Automated	pH Units	N/A	MCERTS	Review when <5 or >9					
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	Not applicable					
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	Not applicable					
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	Not applicable					
Organic Matter	%	0.1	MCERTS	GSV variable					

Speciated PAHs				**S4UL**	**C4SL**					
Naphthalene	mg/kg	0.05	MCERTS	>	Surrogate Marker					
Acenaphthylene	mg/kg	0.05	MCERTS	>	Surrogate Marker					
Acenaphthene	mg/kg	0.05	MCERTS	>	Surrogate Marker					
Fluorene	mg/kg	0.05	MCERTS	>	Surrogate Marker					
Phenanthrene	mg/kg	0.05	MCERTS	>	Surrogate Marker					
Anthracene	mg/kg	0.05	MCERTS	>	Surrogate Marker					
Fluoranthene	mg/kg	0.05	MCERTS	>	Surrogate Marker					
Pyrene	mg/kg	0.05	MCERTS	>	Surrogate Marker					
Benzo(a)anthracene	mg/kg	0.05	MCERTS	>	Surrogate Marker					
Chrysene	mg/kg	0.05	MCERTS	>	Surrogate Marker					
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	>	Surrogate Marker					
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	>	Surrogate Marker					
Benzo(a)pyrene	mg/kg	0.05	MCERTS	>	5					
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	>	Surrogate Marker					
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	>	Surrogate Marker					
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	>	Surrogate Marker					
Coronene	mg/kg	0.05	NONE		-					

Total PAH									
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	Not available					

Phenols				**S4UL**	**C4SL**				
Total - Monohydric	mg/kg	1	MCERTS	420	<				

Heavy Metals / Metalloids				**S4UL**	**C4SL**					
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	>	37					
Boron (water soluble)	mg/kg	0.2	MCERTS	290	<					
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	>	22					
Chromium (hexavalent)	mg/kg	1.2	MCERTS	21	<					
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	910	<					
Copper (aqua regia extractable)	mg/kg	1	MCERTS	2400	<					
Lead (aqua regia extractable)	mg/kg	1	MCERTS	>	200					
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	1	<					
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	130	<					
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	350	<					
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	3700	<					

Monoaromatics & Oxygenates				**S4UL**	**C4SL**					
Benzene	µg/kg	1	MCERTS	>	0.87					
Toluene	µg/kg	1	MCERTS	610	<					
Ethylbenzene	µg/kg	1	MCERTS	350	<					
p & m-xylene	µg/kg	1	MCERTS	230	<					
o-xylene	µg/kg	1	MCERTS	230	<					
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS							

Petroleum Hydrocarbons										
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	160	<					
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	530	<					
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	150	<					
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	760	<					
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	4300	<					
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	11000	<					
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS							
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS							
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	300	<					
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	660	<					
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	190	<					
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	380	<					
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	660	<					
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	930	<					
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	1700	<					
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS							

T J BOOTH ASSOCIATES

CONSULTING CIVIL & GEOTECHNICAL ENGINEERS

GEO-ENVIRONMENTAL AUDIT

PHASE 2 Site Investigation & Risk Assessment

PHASE 3 Remediation Statement

Proposed Residential Development

Former Sladen Mill

Littleborough

Rochdale

Author: Daniel Slattery

Client: Mere group

Reference: rep-tjba-mere grp-sladen mill-Phs 2+3 Env-250322.docx

Revision	Date	Reason
0	April 2022	Original.
1	June 2022	Format, remediation statement & Phase 2 descriptions edit. Ex soil analysis edits.
2	Oct 2022	Updated with detailed site history, conceptual model & risk assessment, demolition records.
3	Nov 2022	Minor amendments.
4	Dec 2023	Additional investigations, BHs, water & soil samples after improved access & EA consultation.
5	Feb 2024	Update Preliminary Conceptual Model (sect 1.8), Final Contaminant Risk Assessment (sect 2.4), Final Conceptual Model (sect 2.5), and Remediation Statement (sect 3); to include specific wording of planning condition.

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1. INTRODUCTION & PHASE 1 PRA REVIEW.

1.1. Introduction.

T. J. Booth Associates have been appointed by Mere Development Group to undertake a Phase 2 & 3 Geo-environmental Audit & associated Site investigations & final risk assessment to the former Sladen Mill Site, to support a Town & Country Planning permission for a residential end use.

The Application Site was previously occupied by Alderburgh Ltd, manufacturers of uPVC products for civil engineering applications. Historical records indicate the Site has been used for industrial purposes prior to 1850, with multiple phases of redevelopment being undertaken between then and the present day.

The current pre-development Site comprised predominantly masonry buildings and steel frame/clad warehouses & storage buildings.

Outline planning approval for the Site was granted in October 2015, application, ref No: 18/01235/OUT, for the: 'Outline planning permission for residential development (including access) and demolition of the existing buildings on site'.

A Phase I Preliminary Risk Assessment (PRA) was undertaken by Brownfield Solutions Ltd (BSL) in April 2015 to accompany the application (refer to separate report ref: *JMC/C2740/5117)*.

The planning permission notice was granted in June 2018. Condition No.5 on the approval related to land contamination, and is detailed below:

5 No development shall take place until an investigation and risk assessment, in addition to any assessment provided with the planning application, has been submitted to and approved in writing by the Local Planning Authority. The assessment shall investigate the nature and extent of any contamination on the site (whether or not it originates on the site). The assessment shall be undertaken by competent persons and a written report of the findings submitted to and approved in writing by the Local Planning Authority before any development takes place. The submitted report shall include:

i) a survey of the extent, scale and nature of contamination
ii) an assessment of the potential risks to:
- human health,
- property (existing or proposed) including buildings, crops, livestock, pets, woodland, and service lines and pipes,
- adjoining land,
- groundwaters
- water courses to include Greenvale Brook and the canal drain which runs parallel with the eastern boundary of the site
- ecological systems,
- archaeological sites and ancient monuments;

iii) where unacceptable risks are identified, an appraisal of remedial options and proposal of the preferred option(s) to form a remediation strategy for the site. The development shall thereafter be carried out in full accordance with the duly approved remediation strategy and a verification report submitted to and approved in writing by the Local Planning Authority before any of the dwellings hereby approved are first occupied.

Between 2018-2019, the Site buildings were subsequently demolished as part of the planning approval by the previous owners. In 2021 the Application Site was obtained by the current owner.

In June 2021, a reserved matters application, ref: 21/00950/REM was submitted to the Rochdale MBC. This report is to be used to accompany the application and address Condition 5 above from the earlier application.

This report provides a desk-based study & intrusive ground investigation based on current UK guidance for environmental investigation within the construction industry. Principal to the assessment is the potential for contamination pollutant linkages via the CLR-11 source-pathway-receptor methodology. Assessment of potential pollution linkages is undertaken in strict accordance with BS5930:2015, BS 10175:2011+A2:2017, CIRIA C665, and BS 8485:2015+A1:2019 et al.

1.2. Proposed Development.

The proposed development has been revised in the reserved matters application to comprise 25No. residential dwellings. Rochdale MBC have specified changes in the layout as well as insisting on an attenuation pond to the north side of the development.

The Application Site is split into upper and lower parts: The upper part is accessed via an existing lane to the east, and will have 8No. terraced dwellings with associated communal parking area and private gardens. The lower section of the Site will have

17No. detached residential dwellings with private parking/drives & garden areas. This part of the Site will be accessed via a new access road.

Refer to Proposed Site Plan in the Appendix.

1.3. Detailed Site History.

For corresponding mapping, information & supporting documentation, refer to Appendix C under 'Historic Maps & Supporting Documentation' which is ordered according to the following timeline:

1848. Historic records indicate the presence of a mill at this time, albeit smaller than ones that were to be built later in the Site history. The mill was noted as Sladen Mill (Woollen), and structures were nominally central to the lower western part of the Site. There were also additional structures to the north-eastern elevated part of the Site which appear to be separate buildings, perhaps residential cottages, or a farmhouse & outbuildings; and a small mill pond in this area at the top of the access road above & feeding the mill.

The south and west Site perimeter was defined by a watercourse (Castle Brook). A tributary to Castle Brook is noted nominally central to the south boundary (Lydgate Brook).

Off-site there were other mills upstream of the Site including: Wellfield Mill (Fulling) 400m northeast upstream on Castle Brook, and Oil Mill (woollen) 1km south on Lydgate Brook.

1854. The 1850s map shows that the mill noted in 1848 had been demolished & replaced by a substantially larger woollen mill. The new mill was typical of 19th century mill construction in the area and comprised the main weaving/spinning building central to the western part of the Site. There was an associated mill pond (raised bund construction), and chimney to the south side of the main building. An office block was noted to the east side of the main building adjacent to the access road, as well as small mill pond noted in 1848. The former residential farmhouse to the north of the Site is now demolished and replaced by two blocks of what appear to be residential back-to-back cottages named Sladen Mill Fold.

An additional mill, Lydgate Mill (woollen), is noted upstream of the Site (approx 800m southwest) on Lydgate Clough.

1905. The mill retained this layout until it was destroyed by fire c1905. The damage was severe with only the external walls surviving, and all internal floors, machinery, and roofs lost.

c1910. By 1910, the Site is noted as Sladen Mill (Woollen & Cotton), and shows a new mill extension erected on the northwest part of the Site. All building structures in the wider area are hatched in this map, with the old fire damaged section of the mill outline unhatched suggesting the was left as a ruin. Some filter beds were also built to the northwest part of the Site. Sladen Mill Fold remains to the northeast, although the southernmost cottage block appears to have been incorporated into the Sladen Mill complex.

Oil Mill (woollen) 1km south is now disused.

1930. The Application Site is now recorded as Sladen Mill (Cotton Raising & Finishing). Upper mill ponds on the east access road are now removed from Site.

At this time Wellfield Mill was noted as a bleaching & dying mill and Lydgate Mill was still noted as a woollen mill. Oil Mill now partly demolished and noted as terrace cottages.

1950. Maps from this period show the mill works to be concentrated to the north part of the Site. The former mill building central to the Site is now shown to be demolished, with a dotted road between the former mill building outline and a small 'refuse tip' to the southeast Site corner. It is proposed that the refuse tip is formed partly from the demolition material from the former fire damaged mill structure as well as an ash tip, and map features indicate this material is stockpiled on the ground surface beside the access road.

In the wider area, the upstream Lydgate Mill & Wellfield Mill remain shown on maps.

1980. Site remains as above. In the wider area, the upstream Lydgate Mill & Wellfield Mill remain shown on maps.

1985. Site remains as above.

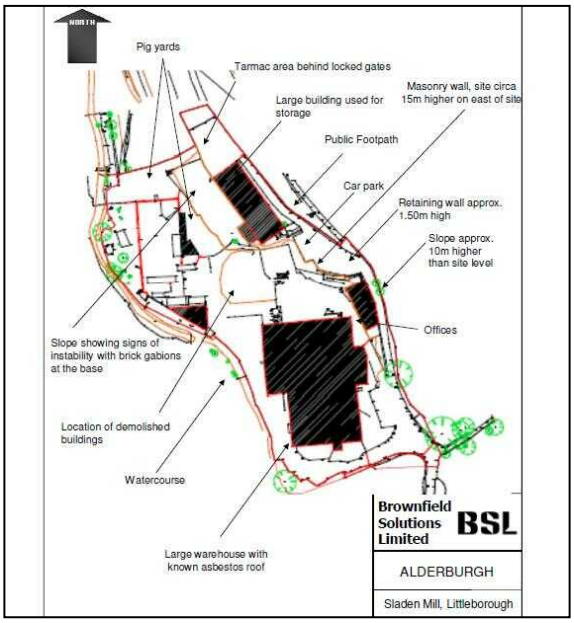
1989-90. The two mill structures to the north side of the lower northwest Site were retained in this period. However, all former buildings to the lower central and south areas were demolished including the remaining parts of the former mill and chimney. At this time a new substation was erected adjacent the watercourse & two new steel-clad warehouses to the south side of the Site. There is also a new warehouse shown to the northeast elevated part of the Site nominally in the position of the former cottages.

In the wider area, the upstream Lydgate Mill was partially demolished and turned into housing. The upstream Wellfield Mill is demolished showing only made ground/filled areas on maps.

1996. First mention of Alderburgh ltd associated with the Site. Alderburgh ltd are a Rochdale based company who are involved in the moulding of plastic products.

2014. The Site remained as above until 2014 when the former boiler house central to it was proposed for demolition under a building notice, ref: *14/00179/DEM, 'Prior notification of proposed demolition of mill'*. The former boiler house was known at the time to contain asbestos. Documentation for the demolition is included in the Appendix: Section 80 LABC Building Notice; the C Smith & Sons (Contractor) Method Statement excerpts; and the Dunelm Asbestos Survey Report excerpt. These documents indicate that the asbestos had been surveyed, managed, risk assessed, and removed prior to demolition. The building was subsequently demolished.

2015. An outline planning application for the demolition of all Site buildings, and construction of a residential housing development was submitted in 2015, ref: *18/01235/OUT, for the: 'Outline planning permission for residential development (including access) and demolition of the existing buildings on site'*.



As part of the application pack for development, and prior to any further demolition, the Brownfield Solutions Ltd PRA report and associated Site walkover was undertaken. The report detailed the layout and risks to the Site on the BSL Pertinent Site Features & Potential Constraints Plan (see inset image). At the time of the walkover, the Site layout and remaining structures were as follows:

- The warehouses to the south side included an older asbestos cement wall & roof clad storage shed, with a connected and more recent plastisol cladded steel shed. These were the buildings that were erected in the late 1980s.
- To the east side was a masonry office block adjacent the access road, which was the original office block built in the 1850s.
- To the northeast (on the elevated part of the Site) was a masonry storage warehouse with asbestos cement sheet panel roof (erected late 1980s).
- To the centre west side of the Site adjacent the watercourse was a masonry building understood to have been used as a control/utility building for Site electrics etc, and is adjacent to the masonry substation to the south side. It was formerly part of the larger masonry mill building erected to the northwest side of the Site in the aftermath of the 1905 fire. At the time of the BSL PRA, the majority of this structure had previously had its roof removed and part of the walls to the southeast corner. The remaining walls and ground slab were left intact, essentially turning it into a walled storage yard.
- In addition to the above, the Site access roads, yards and loading bay remained. No 'natural' ground surfaces remained on-site.

2015-2016. It is estimated that Alderburgh Ltd vacated the Site c2015-2016.

2017. The remaining Site buildings except for the substation & utility part of the former mill to the northwest were proposed for demolition under a building notice, ref: DEM/17/0122, *'Demolition of Existing Buildings'*. The buildings were numbered as per the inset image.



Documentation for the demolition is included in the Appendix: Section 80 LABC Building Notice; the C Smith & Sons (Contractor) Method Statement & risk assessment excerpts; as well as the EA hazardous consignment note. An asbestos survey was carried out and referred to in the documentation (ref: S.J.01410).

Building 1 was noted to have an asbestos cement roof, and Building 2 to comprise cladded asbestos cement sheet walls & roof. Building 3 was also noted to contain asbestos cement sheeting. Documentation indicates that asbestos had been surveyed, managed, risk assessed, and removed prior to demolition.

2018. Buildings 1, 2, 3 & 4 were subsequently demolished under the above building notice. All materials were separated for recycling and salvage where possible. Remaining demolition material was crushed on-site and stockpiled close to the Site entrance to the south corner of the Site for later removal (supported by photographic evidence in the Appendix C).

2021. The Site was subsequently sold for development to the current owner. The stockpiled demolition crush had been previously removed from Site. A reserved matters application, ref: 21/00950/REM, was submitted to the LPA.

1.4. Brownfield Solutions Phase 1 Recommendations.

The BSL conceptual model identified the following potential pollutant linkages with regards to general ground contamination:

Potential Source	Potential Pathway	Potential Receptor	Likelihood	Severity	Level of Risk
		ON-SITE			
Mill including chimney	Ingestion, direct contact, inhalation of dusts.	End-users	Likely	Medium to Severe	High
Made ground	Ingestion, direct contact, inhalation of dusts.	End-users	Likely	Medium to Severe	High
Made ground from landfill and filter tanks Ground Gas	Migration of gas into confined spaces.	End-users	Likely	Severe	High
Filter tanks	Ingestion, direct contact, inhalation of vapours	End Users	Likely	Medium	Moderate/High
Tanks	Ingestion, direct contact, inhalation of dusts/vapours	End-users	Likely	Medium	Moderate
Substation	Ingestion, direct contact, inhalation of dusts/vapours	End-users	Unlikely	Mild	Very Low

The Brownfield Solutions conceptual model identified the following potential pollutant linkages with regards to controlled waters:

Mill including chimney	Leaching, migration through groundwater or granular soils	Controlled waters	Likely	Severe	High
Made ground	Leaching, migration through groundwater or granular soils	Controlled waters	Likely	Severe	High
Tanks	Leaching, migration through groundwater or granular soils	Controlled waters	Likely	Medium	Moderate
Substation	Leaching, migration through groundwater or granular soils	Controlled waters	Unlikely	Mild	Very Low

The current Site owner and T J Booth Associates became involved with the Site in 2021, when the demolition had been completed and the associated pollutant sources such as the tanks/chimney/old mills had been removed. Due to this, many of the contaminant sources in the conceptual model would remain as residual risk in the existing Site made ground.

1.5. TJBA Site Reconnaissance – Jan 2021.

A brief reconnaissance was undertaken regarding coal mining legacy. Coal adits were noted in the west bank of the river (opposite the Site), and have been added to the Site Investigation Plan.

1.6. TJBA Site Reconnaissance – May 2021.

Details of Existing Structures:	**Upper northeast Site corner**: The upper part of the Site comprised a macadam access rd/car park/unmade yard area (~80%), and a concrete ground slab to the former warehouse (~20%). A retaining wall supported this part of the Site and access road from the lower Site, and was made up of a mix of concrete & masonry walls, and rough steep inclined earth banks.

	Lower part of the Site (northwest to south): At the time of the Site reconnaissance, all buildings apart from the electricity substation, and associated former mill utility building to the north side had been demolished. All slabs and other structures had been removed, apart from the former mill walls which act as retaining walls to the adjacent lane (east side). The macadam access track around the south and west of the Site boundary, immediately adjacent the neighbouring watercourse remained.
Adjacent Properties:	The Site is in a steep sided river valley. The only buildings in the local area are either off-site farmhouses or agricultural and commercial buildings.
Water Levels, Directions of Flow and Rates in Rivers:	Castle Brook flows past the south and west boundary of the Site ultimately flowing north. Castle Brook has a tributary, which shares a confluence with Lydgate Brook nominally central to the south boundary.
Areas of Discoloured Soil, Polluted Water, Vegetation, and Significant Odours:	The Site was generally cleared of structures (apart from those noted above) and comprised a made ground surface which had been locally reprofiled awaiting construction.
Other comments:	Coal seam adits were noted in the west bank of the river (opposite the Site), and have been added to the Site Investigation Plan.

1.7. Identification of Source-Pathway-Receptor.

1.7.1. Summary & Discussion.

Risks in the PRA were built around sources in the former & historic Site buildings/structures/storage tanks, most of which have been removed from Site.

With regard to the recent demolition processes, many of the inert materials have been recycled such as usable brick, stone, slate, steel & timbers etc. Specific sources of hazardous materials such as asbestos etc, were removed prior to demolition. Remaining building materials that are not classified as hazardous, but that may have low level contaminants including plasters/mortars/hardstanding planings / ash, as well as other materials that couldn't be reclaimed directly such as broken brick/stone, concrete, glass & slate; were all crushed into usable materials and transported off Site.

The BSL PRA report considered specific historic parts of the Site and the associated risk into a conceptual model. However, since T J Booth Associates have undertaken a detailed history of the Site, some of these risks are considered to have been removed, mitigated, or contained now within other present 'sources' such as the existing & historic made ground profile. The discussion of the BSL conceptual model sources is indicated below:

General Made ground. There is a risk from existing phases of construction, demolition, fire, & infilling now contained within the general made ground.

Chimney & Mill. The mill chimney was demolished c1985 when the south side of the Site was redeveloped. Any contaminative material, (most likely PAH & metals from demolition material and ash), will now only be found as residual elements in the existing made ground. Regarding ash in particular – the inclusion of a 'refuse tip' to the north side of the Site is a likely candidate location for disposal, which is more often the case than not on mill sites.

Much of the historic mill structure demolished before c1985, could have been used to raise levels historically, and if so, are likely to contribute low level contamination to on-site made ground. Asbestos materials from the 1980s built mill buildings prior to demolition was removed from Site. However, there may be some residual dust from all activities in the upper made ground, and deeper contamination from historic demolition & infilling.

Made ground from refuse & filter tanks. The original report indicates a 'landfill' on-site. However, historic records indicate the 'refuse tip' between the 1950s & 1980s mapping was likely in part, demolition material from the former 1850s woollen mill, which was demolished and stored near the Site entrance above the existing ground profile as evidenced by map contours/features. Not only would this material have been inert, but the stockpiled position above the ground surface mitigates the risk (from a gas risk perspective). As indicated above, ash is also likely in this location.

Filter beds. The filter beds are to the northern most part of the Site. The tanks were relatively small, brick built with concrete base and possibly contained ash or similar material as a filter medium. Where ash does contain contaminants of concern, ash itself is relatively stable and contaminants generally immobile. The filter tanks have not been used for c40 years and appear now to be partially infilled.

Tanks. Tanks were noted on historic plans nominally to the centre northwest. The fact that the tanks were noted on maps suggests these were above ground features which where historically removed from Site prior to 1930. No other tanks are noted on Site after this date, and none were noted in the BSL PRA Site walkover. Any residual risk from former tanks will only be found in the made ground profile and associated contaminants are expected in this location.

Substation. The Site substation was built in the late 1980s and is unlikely to contain hazardous PCBs etc, banned prior to construction.

External landfill Sites. There are three landfill Sites noted within the Brownfield Solutions data search: Sladen Bridge 115m west, inert fill; Greenvale 185m northwest, inert fill; and Wellfield Mill 325m northeast, inert & industrial fill. Of the two Sites that are within 250m of the development, Sladen & Greenvale are at much higher level than the Application Site and therefore the pathway does not exist.

General conclusions. Due to the above reasoning, the existing on-site historic made ground will have to be assessed in accordance with the risks identified, with the associated contaminants of concern, and in targeted & random locations.

Subsequent discussion with the Environment Agency has highlighted the emerging group of contaminants such as persistent organic pollutants (POPs), and in particular per/polyfluoroalkyl substances (PFAS), especially when considering former industrial sites with a history of manufacturing textiles, plastics and waterproof coatings.

Two specific PFAS substances are currently regulated in the UK due to studies highlighting adverse effects on humans & animals at high exposure levels: perfluorooctanoic acid (PFOA), and perfluorooctane sulfonic acid (PFOS).

Controlled waters such as the underlying aquifers & watercourse surrounding the Site can be considered pathways which chemicals of concern can move through or to, affecting end use receptors such as humans, as well as surface water biota & associated habitats.

There is no registered superficial aquifer locally, and the bedrock aquifer designation is Secondary A (permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers).

The Site is not in a Drinking Water Protected Area (Surface Water), nor a Drinking Water Safeguard Zone (Surface Water).

The Site is not in a Drinking Water Safeguard Zone (Groundwater); the closest Source Protection Zone is approximately 7km southwest of the Application Site.

There are no groundwater abstraction licences within 811m of the Site, and the closest are as follows:

- 811m west relating to a point source brick lined catchpit (general use) on the opposite (western side) of the Roch Valley/separate catchment area.
- 1372m north relating to a point source spring (general use) on the opposite (western side) of the Roch Valley/separate catchment area, and at higher elevation.
- 1495m north relating to a point source spring (general use) on the opposite (western side) of the Roch Valley/separate catchment area, and at higher elevation.
- 1773m south relating to a point source borehole (drinking & general use) on the separate Ealees Brook minor catchment area, and at higher elevation.

1.7.2. Potential Contaminants.

CURRENT SOURCE/S	ORIGINAL ASSOCIATED SOURCE	CONTAMINANT/S
Existing historic made ground – exists across the Site from multiple phases of historic demolition & construction.	Mill & chimney demolition materials, mortars & plasters, cladding, heat resistant fixings/fittings/insulation, other material such as hardcore & planings etc.	Metals, PAHs, sulphates, asbestos.
	Former tanks – most notably to the north of the current substation from old maps.	Hydrocarbons.
	Former mill ponds – potential for infill.	Metals, PAHs, CH4, CO2.
	Landfill (refuse heap) & filter tanks.	Metals, PAHs, CH4, CO2.
	Historic industrial processes.	PFAS.
	Substation.	PCBs.
Site geology.	Existing Namurian and Coal Measures formations.	Radon (Rn).
	Coal seams	CH4, CO2.

1.7.3. Potential Pathways.

The potential pathways to/from the Development Site include (not an exhaustive list but a summary of the main points):

PATHWAY	MEDIA
Soil and dust ingestion	Soil and indoor dust
Consumption of home-grown fruit and vegetables	Produce
Skin contact (indoors)	Indoor dust
Skin contact (outdoors)	Soil
Inhalation of dust (indoors)	Air
Inhalation of dust (outdoors)	Air
Vapours (indoors)	Air
Vapours (outdoors)	Air
Controlled waters	Groundwater, surface waters

1.7.4. Potential Receptors.

Receptors mainly comprise human (workers) in the construction phase, and human (residential) for the proposed end use.

Existing human exposure in the wider area & river biota.

1.8. Preliminary Conceptual Model.

Current source/s		Original associated usage / location / source	Contaminant type	Pathway	Receptor	Pollution linkage	Consequence	Probability	Risk
CHEMICAL (SOLID)	Existing made ground - surface/sub-soil.	Mill & chimney demolition materials, mortars & plasters, cladding, heat resistant fixings/fittings/insulation , other material such as hardcore & planings etc.	Metals, PAHs, asbestos.	Direct ingestion, aerial ingestion, dermal contact, drinking water. Crops. Water pipes/services.	Primarily human - Site construction operatives & future residential Site occupants. Pets. Ecological systems.	There are multiple phases of historical demolition, fires, and placement of historical made ground, as well as the potential for degradation of asbestos cladding sheet etc, and although it was in situ externally, it could now be in place in the upper made ground profile.	Medium.	High likelihood.	High risk.
		Former tanks – most notably to the north of the current substation from old maps.	Hydrocarbons.			Historical records noted on-site tanks, which due to inclusion on the maps, must have been above ground, although there were no tanks recorded in the Site walkover. Any historical spills would now be evident in the Site made ground in localised areas.			
		Former mill ponds – potential for infill.	Metals, PAHs, asbestos.			Photographic evidence suggests the mill ponds were primarily above ground storage structures & small in area. However, concerning dry chemical contamination particularly, the former pond areas are likely to comprise the same contamination as the rest of the Site.			
		Landfill (refuse heap) & filter beds.	Metals, PAHs, asbestos.			The refuse heap is assumed to comprising the demolition rubble from the former woollen mill built in the 1850s, as well as ash from on-site processes. Although considered inert from a gas risk perspective, the source is likely to comprise chemical contamination & potential to have been spread over the Site locally.			
		Substation.	PCBs.			Substation construction was post-ban on PCBs so source is considered mitigated.	Medium.	Unlikely.	Low risk.
		Former buildings, fill, mortars & plasters.	Sulphates.	Contact with underground structures.	Building structures /concrete. Archaeological sites & ancient monuments	Potential for sulphates in the soil, which could leach into groundwater and negatively impact existing or proposed foundations.	Minor.	Likely.	Low risk.
GROUND GAS RISK	Geological ground gas.	Coal seams from Coal Measures.	CH4, CO2, other trace gases.	Diffusion through permeable soil/subsoil,	Human - future residential Site	There are potential coal seams beneath the Site, according to BGS maps. A separate coal mining risk assessment has concluded that shallow coal seams do not underly the Site & therefore risks are mitigated. It was approved by the Coal Authority.	Medium.	Unlikely.	Low risk.

		Radon sources in Namurian deposits.	Rn.	building substructures, aerial inhalation.	occupants. Explosion, suffocation.	The Site is within a 5-10% radon potential area classed as medium risk and a gas membrane will be required in the construction of foundations/slab.	Medium.	Likely.	Moderate risk.
	Anthropogenic ground gas sources.	Refuse heap.	CH4, CO2, other trace gases.			The refuse heap is assumed to comprise the demolition rubble from the former woollen mill built in the 1850s, as well as ash from on-site processes. The inert waste was stockpiled & stored above ground mitigating any risks.	Mild.	Unlikely.	Very low risk.
		Filter tanks				Former filter tanks to the northwest corner of the Site were small in area, and open structures which generally comprise ash as a filter medium. The tanks have been disused for approximately 40years due to a pump house being incorporated into the Site.			
		Former mill ponds.				Unlikely to contribute to ground gas generation. Mill ponds were small, and photographic evidence indicates these structures were bunded/above ground.			
CHEMICAL (LIQUID)	Groundwater/ surface water.	Former tanks – most notably to the north of the current substation from old maps.	Hydrocarbons.	Controlled Waters: specifically groundwater & aquifers.	Human - future residential Site occupants, user in the wider area. Pets. Ecological systems. Adjoining land /woodland.	There is not considered to be a pollutant linkage regarding groundwater/aquifers and subsequent human receptors for the following reasons: • The Site is not in a Drinking Water Protected Area (Surface Water), nor a Drinking Water Safeguard Zone (Surface Water). • The Site is not in a Drinking Water Safeguard Zone (Groundwater); the closest Source Protection Zone is approximately 7km southwest of the Application Site. • There are no groundwater abstraction licences within 250m of the Site, and more distant extractions are not at risk due to lack of pathway at the locations.	Medium.	Unlikely.	Low risk.
		Mill & chimney demolition materials, mortars & plasters, other material such as hardcore & planings etc.	Metals, PAHs.						
		Former industrial processes.	PFAS – PFOA & PFOS.						
		Former buildings, fill, mortars & plasters.	Sulphates.		Building structures /concrete. Archaeological sites & ancient monuments	Potential for sulphates in the groundwater, which could negatively impact existing or proposed foundations.	Minor.	Likely.	Low risk.
		Former tanks – most notably to the north of the current substation from old maps.	Hydrocarbons.	Controlled Waters: specifically surface waters such as Greenvale Brook	Aquatic habitats & biota. Ecological systems.	There is a potential pollutant linkage that the relative contaminant source may have made its way into the ground profile, and subsequently from ground to surface water pathways where it can reach surface water biota receptors.	Mild.	Likely.	Moderate to low risk.
		Mill & chimney demolition materials, mortars & plasters, other	Metals, PAHs.						

		material such as hardcore & planings etc.		& the Canal Drain.	Adjoining land /woodland.				
		Former industrial processes.	PFAS – PFOA & PFOS.						

2. PHASE 2 SITE INVESTIGATIONS & RISK ASSESSMENT.

2.1. Site Investigations.

2.2. Investigation Summary.

Below is a timetable of the investigations undertaken to date:

Date	Company	Report Reference	Investigation Type	Sample Suite	Investigation/Sample ID
06.05.2021	TJBA	n/a	coal workings recce	n/a	adits
03.06.2021	TJBA/DANBAR	Sladen Mill BH Log	borehole (rotary)	n/a	BH1
24.03.2022	TJBA	n/a	trial holes	n/a	THs 1-10
24.03.2022	TJBA	22-11596-2	soil samples	general suite	S1-S10
24.03.2022	TJBA	22-12266-1	soil samples	general suite	S8
07.03.2023	TJBA	n/a	trial holes	n/a	THs 11-15
20.07.2023	TJBA	n/a	trial holes	n/a	THs 16-18
20.07.2023	TJBA	23-07360-1	groundwater samples	general suite	GWS1-3
20.07.2023	TJBA	23-07360-1	river samples	general suite	WS1-3
07-08.08.2023	SUBSURFACE	7782 Factual Report - 4.10.23	boreholes (mini percussive)	n/a	M1-M8
08.08.2023	SUBSURFACE	23-20667	soil samples	general suite	M1 - M8 - 2.0m
08.08.2023	TJBA	23-07983-1	soil samples (WAC)	WAC & general suite	WAC#S1-2
22.08.2023	SUBSURFACE	23-20666	groundwater samples	general suite	M1, M2, M3, M4, M6, M8
07.09.2023	SUBSURFACE	230907-56-MCERTS-COMPLETE-2023-09-12	groundwater samples	PFAS	M1, M2, M3, M4, M6, M8
06.10.2023	SUBSURFACE	7782A GROUND INVESTIGATION RPRT 29.11.23	boreholes (mini percussive)	n/a	M9, M10, M11, M12, M14
06.10.2023	SUBSURFACE	23-24776	soil samples	general suite	M9 - M12, M14
13.10.2023	SUBSURFACE	7782A GROUND INVESTIGATION RPRT 29.11.23	borehole (mini percussive)	n/a	M13
13.10.2023	SUBSURFACE	23-25441	soil samples	general suite	M13
19.10.2023	SUBSURFACE	23-24926	groundwater samples	general suite	M9/WSH9, M10/WSH10, M14/WSH14
20.10.2023	SUBSURFACE	231020-53-MCERTS-COMPLETE-2023-11-02	groundwater samples	PFAS	M9/WSH9, M10/WSH10, M14/WSH14
07.11.2023	SUBSURFACE	23-26479	groundwater samples	general suite	M1, M2, M3, M4, M6, M9, M10, M14
07.11.2023	SUBSURFACE	23-26479	river samples	general suite	WS4, WS5, WS6, WS7
09.11.2023	SUBSURFACE	231109-61-MCERTS-COMPLETE-2023-11-24	groundwater samples	PFAS	M1, M2, M3, M4, M6, M9, M10, M14
09.11.2023	SUBSURFACE	231109-61-MCERTS-COMPLETE-2023-11-24	river samples	PFAS	WS4, WS5, WS6, WS7

2.2.1. Rotary Borehole Investigation (Coal) 03.06.2021.

Site investigations were undertaken to identify the stratigraphy of the underlying coal measures & confirm the presence/absence of coal seams. The investigation comprised a single borehole (BH1), and was located in the central area of the Site to the E side of a fault line passing NNW – SSE through the area.

Due to the predicted absence of coal seams/workings and the remote location, the use of air flushed open hole drilling was selected for speed and economy.

The surface arisings and drill progress rate were used to establish the rock type and hardness.

The borehole identified no coal seams beneath the Site, and the results have been included in a separate Coal Mining Risk Assessment subsequently approved by the Coal Authority.

No risk to the Site is understood to remain due to coal mining legacy.

The borehole log is appended.

2.2.2. Trial Hole & Soil Sampling Investigation 24.03.2022.

Site investigations were undertaken by T J Booth Associates with a 13t back acting excavator, and comprised 10No. machine excavated trial holes (THs 1-10).

Trial holes were located around the Site to gain an understanding of the geology for future foundation design, and also located in and around particular former source areas noted in historic data search, such as former tanks, ponds, and refuse heaps.

Regarding these areas in particular; TH1 was located in the old refuse heap, TH3 in the location of the historic mill pond, and trial holes TH6, TH7 & TH8 in and around the location which the former tanks were situated.

Made ground across the Site generally comprised historic fill made up of coarse brick/stone/concrete fill in a finer clayey/silty and occasionally sand & gravel matrix. It is assumed this fill was historically imported to Site to build up levels as required, or used to infill (cut & fill) as successive phases of the mill & associated buildings were demolished throughout is evolution.

At the location of the historic reservoir, trial hole TH3 revealed no exceptional fill type or depth varying from the general Site make-up. Exceptions to the general site-wide made ground were:

- TH1 around the old refuse tip. Made ground comprised predominantly of gravel & sand sized brick, stone, glass & ash.

- TH4 around the location of the historic part of the mill. Depths in excess of 4m of brick & stone rubble fill was noted without reaching bedrock noted everywhere else across the Site. The depth is assumed to be due to basements within the historic mill dating back to & built in the 1850s.
- TH7 to the northwest corner of the Site (lower site) noted hydrocarbon contamination at depth which appeared to be local only. No visual or olfactory evidence of contamination was noted in either TH6 or TH8, both close by. The location is of TH7 was local to the former tanks.

Soil sampling was also undertaken in each of the trial holes, and 10No. soil samples (S1-10) were taken representative of the made ground horizons to assess the potential ground contamination both in specific locations identified above, and also to get general background contamination levels across the Site.

Samples were analysed for metals, speciated PAH, inorganics & sulphates, SOM, & asbestos screening in accordance with the conceptual model. Further hydrocarbon TPH(CWG) & BTEX analysis was undertaken in TH7 around the local of the former tanks, and in locations where hydrocarbons were suspected.

The trial hole logs & soil sample certification are appended.

2.2.3. Trial Hole Investigation 07.03.2023.

Site investigations were undertaken by T J Booth Associates with a 13t back acting excavator, and comprised a further 5No. machine excavated trial holes (THs 11-15).

The trial holes were located adjacent to the existing access road/lane adjacent to the east side retaining walls, and were undertaken primarily to assess the retaining wall foundation positions & depths; but to also give further insight into geo-environmental aspects of the fill in this location.

In particular, trial holes 11, 12, 13 were located within the former 'refuse tip' area with trial hole 14 just on the boundary. A loose sand & gravel made ground (sand & gravel of brick, stone, concrete, ash) was noted confirming earlier investigations that the fill in this area is generally inert demolition fill.

Trial hole 15 was a shallow excavation down the face of the embankment between the upper and lower Sites (north), which confirmed interbedded sandstone and mudstone (general Coal Measures).

The trial hole logs are appended.

2.2.4. Trial Hole & Preliminary Ground/Surface Water Investigation 20.07.2023.

Site investigations were undertaken by T J Booth Associates with a 13t back acting excavator, and comprised a further 3No. machine excavated trial holes (THs 16-18).

The trial holes were located adjacent/close to the west Site boundary with the watercourse (nominally upstream to downstream) to assess the ground conditions close to the watercourse and take preliminary groundwater samples.

The trial holes recorded stratigraphy similar to previous trial holes close to the watercourse – nominally clayey rubble MADE GROUND on top of SAND & GRAVEL, over mudstone BEDROCK.

Preliminary groundwater samples (GWS1-3) were taken in each trial hole.

Surface water samples (WS1-3) were also taken in the watercourse, downstream, at a midpoint, and at the confluence with Lydgate Brook.

The trial hole logs and water sample certification are appended.

2.2.5. Borehole & Soil Sampling Investigation 07.08.2023 - 08.08.2023.

Site investigations were undertaken by Subsurface Ltd using a Dart Mini Sampling Rig fitted with windowless sample tubes. The investigations comprised 8No. mini boreholes (M1-8) to depths of between 2.00 and 4.00 metres. The boreholes were specified to be taken down through any made ground horizons & virgin superficial cover to bedrock.

On completion the mini boreholes were converted to standpipes, and installed with 50mm HDPE pipe with a geotextile membrane surrounding the slotted sections. The standpipes were then surrounded by filter gravel in the slotted sections of the standpipe and capped off with a bentonite seal. A metal flush cover was installed to ground level over the standpipe using concrete.

Soil sampling (24No.) was also undertaken in each of the boreholes, nominally at change in strata/depth as tabulated below:

Borehole/Standpipe No.	Total Depth (m)	Response Zone (m)	Soil Sample Depths (m)
M1	2.80	1.00-2.80	M1 - 1.2m, M1 - 2.0m, M1 - 2.6m, M2 - 1.2m
M2	3.00	1.00-3.00	M2 - 2.0m, M2 - 3.0m
M3	3.00	1.00-3.00	M3 - 1.2m, M3 - 2.0m

M4	2.70	1.00-2.70	M4 - 1.2m, M4 - 2.0m, M4 - 2.7m
M5	4.00	1.00-4.00	M5 - 1.2m, M5 - 2.0m, M5 - 3.0m, M5 - 3.75m
M6	4.00	1.00-4.00	M6 - 1.2m, M6 - 2.0m, M6 - 3.0m, M6 - 3.7m
M7	2.80	1.00-2.80	M7 - 1.2m, M7 - 2.0m, M7 - 2.6m
M8	2.00	1.00-2.00	M8 - 1.2m, M8 - 2.0m

Samples were analysed for metals, speciated PAH, inorganics & sulphates, SOM, asbestos screen/quantification (as required), and hydrocarbon TPH(CWG) & BTEX in accordance with the conceptual model.

The borehole logs & soil sample certification are appended.

2.2.6. Soil Sampling Investigation 08.08.2023.

Soil sampling was undertaken by T J Booth Associates and comprised some minor sampling for waste acceptance criteria (WAC) to enable the tendering process regarding proposed earthworks.

2No. soil samples were taken of upper made ground to the north of the Site, and samples are as follows:

- WACS1 Dense dark brown very gravelly silty sand MADE GROUND. Gravel is brick, concrete, macadam.
- WACS2 Medium dense dark brown gravelly silty sand MADE GROUND. Gravel is brick, concrete, macadam.

For reference, the samples tested below the inert landfill thresholds for all relevant determinands, apart from TOC which was noted to trigger the inert landfill threshold.

The samples were also analysed for metals, speciated PAH, inorganics, SOM, & asbestos screening in accordance with the conceptual model.

The soil sample (contamination) certification is appended.

2.2.7. Groundwater Sampling Investigation 22.08.2023 - 07.09.2023.

Groundwater sampling was undertaken by Subsurface Ltd on borehole standpipes (M1-8).

A summary of groundwater levels recorded during monitoring visits are tabulated below:

Borehole/Standpipe No.	Standpipe Depth (m)	Response Zone (m)	Depth to Groundwater (m)
M1	2.80	1.00-2.80	0.40
M2	3.00	1.00-3.00	1.80
M3	3.00	1.00-3.00	1.54
M4	2.70	1.00-2.70	2.11
M5	4.00	1.00-4.00	Unable to locate
M6	4.00	1.00-4.00	2.62
M7	2.80	1.00-2.80	DRY
M8	2.00	1.00-2.00	1.57

6No. samples of groundwater taken from the standpipes installed in M1, M2, M3, M4, M6 and M8.

Contamination analyses were specified as: pH, sulphate, sulphide, cyanide, arsenic, boron (soluble), cadmium, chromium, hexavalent chromium, copper, lead, mercury, molybdenum, nickel, selenium, zinc, speciated TPHs, the speciated PAHs suite, the BTEX suite and phenols, PFOS and PFOA.

Limited groundwater was noted in M3, M4, and M8, and so reduced contamination analysis was undertaken.

M5 could not be located by the contractor at the time of sampling, and M7 was dry, so no groundwater sampling and subsequent analysis was undertaken on these borehole/standpipes.

The groundwater certification is appended.

2.2.8. Borehole & Soil Sampling Investigation 06.10.2023-13.10.2023.

Site investigations were undertaken by Subsurface Ltd using a Dart Mini Sampling Rig fitted with windowless sample tubes. The investigations comprised a further 6No. mini boreholes (M9-14) to depths of between 2.00 and 4.00 metres. The boreholes were specified to be taken down through any made ground horizons & virgin superficial cover to bedrock.

On completion the mini boreholes were converted to standpipes, and installed with 50mm HDPE pipe with a geotextile membrane surrounding the slotted sections. The standpipes were then surrounded by filter gravel in the slotted sections of the standpipe and capped off with a bentonite seal. A metal flush cover was installed to ground level over the standpipe using concrete.

Soil sampling (16No.) was also undertaken in each of the boreholes, nominally at change in strata/depth as tabulated below:

Borehole/Standpipe No.	Total Depth (m)	Response Zone (m)	Soil Sample Depths (m)
M9	2.40	1.00-2.40	M9 - 1.2m, M9 - 2.0m
M10	2.00	1.00-2.00	M10 - 1.2m, M10 - 1.8m
M11	1.40	0.50-1.40	M11 - 0.3m,
M12	4.00	1.00-4.00	M12 - 1.2m, M12 - 2.2m, M12 - 3.7m
M13	4.00	1.00-4.00	M13 - 1.0m, M13 - 1.6m, M13 - 2.5m, M13 - 3.5m
M14	4.00	1.00-4.00	M14 - 1.4m, M14 - 1.8m, M14 - 2.4m, M14 - 3.7m

Samples were analysed for metals, speciated PAH, inorganics & sulphates, SOM, asbestos screen/quantification (as required), and hydrocarbon TPH(CWG) & BTEX in accordance with the conceptual model.

The borehole logs & soil sample certification are appended.

2.2.9. Groundwater Sampling Investigation 19.10.2023 – 20.10.2023.

Groundwater sampling was undertaken by Subsurface Ltd on borehole standpipes (M9-14).

A summary of groundwater levels recorded during monitoring visits are tabulated below:

Borehole/Standpipe No.	Standpipe Depth (m)	Response Zone (m)	Depth to Groundwater (m)
M9	2.40	1.00-2.40	1.71
M10	2.00	1.00-2.00	0.65
M11	1.40	0.50-1.40	1.30
M12	4.00	1.00-4.00	DRY
M13	4.00	1.00-4.00	DRY
M14	4.00	1.00-4.00	2.82

3No. groundwater samples were taken from the following standpipes: M9, M10, and M14.

Contamination analyses were specified as: pH, sulphate, sulphide, cyanide, arsenic, boron (soluble), cadmium, chromium, hexavalent chromium, copper, lead, mercury, molybdenum, nickel, selenium, zinc, speciated TPHs, the speciated PAHs suite, the BTEX suite and phenols, PFOS and PFOA.

Limited groundwater was noted in M9 & M14, and so reduced contamination analysis was undertaken.

M12 & M13 were dry, and there was not enough groundwater in M11, and no groundwater sampling and subsequent analysis was undertaken on these borehole/standpipes.

The groundwater certification is appended.

2.2.10. Ground/Surface Water Sampling Investigation 07.11.2023-09.11.2023.

Groundwater sampling was undertaken by Subsurface Ltd on borehole standpipes (M1-14).

A summary of groundwater levels recorded during monitoring visits are tabulated below:

Borehole/Standpipe No.	Standpipe Depth (m)	Response Zone (m)	Depth to Groundwater (m)
M1	2.80	1.00-2.80	0.05
M2	3.00	1.00-3.00	1.46
M3	3.00	1.00-3.00	1.80
M4	2.70	1.00-2.70	2.90
M5	4.00	1.00-4.00	Unable to locate
M6	4.00	1.00-4.00	2.32

M7	2.80	1.00-2.80	DRY
M8	2.00	1.00-2.00	Submerged
M9	2.40	1.00-2.40	0.34
M10	2.00	1.00-2.00	0.59
M11	1.40	0.50-1.40	DRY
M12	4.00	1.00-4.00	DRY
M13	4.00	1.00-4.00	DRY
M14	3.00	1.00-4.00	2.30

8No. groundwater samples were taken from the following standpipes: M1, M2, M3, M4, M6, M9, M10, and M14.

Contamination analyses were specified as: pH, sulphate, sulphide, cyanide, arsenic, boron (soluble), cadmium, chromium, hexavalent chromium, copper, lead, mercury, molybdenum, nickel, selenium, zinc, speciated TPHs, the speciated PAHs suite, the BTEX suite and phenols, PFOS and PFOA.

M5 wasn't located, M7 & M11-M13 were dry, and M8 was submerged, and so these boreholes were unable to be sampled.

Due to the lack of water in M14, reduced testing was undertaken.

Surface water samples (WS4-7) were also taken in the watercourse, downstream, at a midpoint, at the confluence with Lydgate Brook, and upstream of the Application Site.

The ground & surface water certification is appended.

2.3. Site Stratigraphy.

Following on from Site investigations, the made ground profile, superficial & bedrock depths have been identified.

Generally, the Site is covered with between 1-3m of historic made ground generally comprising inert fill made up of coarse brick, stone, slate, glass, with other inclusions such as concrete/mortars etc; generally all contained within a finer clayey/silty and occasionally sand & gravel matrix. The general exception to this is around the former 'refuse tip' area which comprises sand/sand & gravel sized ash. It is assumed the fill was either historically imported to Site to build up levels, or used to infill as successive phases of the mill & associated buildings were demolished throughout is evolution.

The investigations have also delineated the bedrock types, generally comprising a light brown sandstone lithology to the east, becoming overlain by dark grey/black mudstone nominally to the centre of the Site.

UPPER SITE: The upper level of the Site (northeast area) was generally underlain by approximately 1m of made ground, a thin band of silt to approximately 1.4m, and sand & gravels to 2.5m with weathered bedrock below.

LOWER SITE: Site investigations have shown that the lower part of the Site is underlain by approximately 1-2.5m of made ground (south area), generally directly on top of weathered bedrock. This increases to approximately 3m depth in the north section. Below the made ground in the north section and close to the river in the southwest section (only adjacent to the watercourse) is approximately 1m of coarse flood gravel deposits on top of weathered bedrock.

2.4. Final Contaminant Risk Assessment.

2.4.1. Human Health.

2.4.1.1. Shallow soil contamination.

Samples were analysed for metals, speciated PAH, inorganics & sulphates, SOM, asbestos screen/quantification (as required), and hydrocarbon TPH(CWG) & BTEX in accordance with the conceptual model.

On return, soil samples were assessed by TJ Booth Associates to common threshold comparison data, specifically the Defra Category 4 Screening Levels (C4SLs), then to LQM/CIEH (S4ULs).

All contaminants of concern that tested above threshold levels are identified in the table below:

Lab Job No:		22-11596	22-11596	22-11596	22-11596	22-11596	22-11596	22-12266	22-11596	22-11596	23-20667	23-20667	23-20667	23-20667	23-20667	23-20667	23-20667	23-20667	23-20667	23-20667	23-24776	23-24776	23-24776	23-24776	23-25441-0	23-25441-0
TJBA Sample ID:		S1	S3	S4	S5	S6	S7	S8	S9	S10	M2	M2	M3	M4	M5	M5	M5	M6	M6	M9	M10	M14	M14	M13	M13		
Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL		
Depth:		0.5	0.5	0.5	0.5	0.5	0.5	2.5	0.5	0.5	2	3	1.2	1.2	1.2	2	3	1.2	2	2.00	1.2	1.35	1.8	1.61	2.47		
Date:		24.03.22	24.03.22	24.03.22	24.03.22	24.03.22	24.03.22	24.03.22	24.03.22	24.03.22	07.08.23	07.08.23	07.08.23	07.08.23	07.08.23	07.08.23	07.08.23	07.08.23	07.08.23	06.10.23	13.10.23	13.10.23	13.10.23	13.10.23	13.10.23		
Analyte	**Units**																										
Arsenic as As, dry weight	mg/kg	66.00	15.00	10.00	11.00	14.00	13.00		17.00	21.00	8.50	14.00	20.00	9.40	36.00	21.00	45.00	14.00	11.00	94.00	44.00	12.00	6.70	9.20	10.00		
Lead, as Dry Weight	mg/kg	70.00	170.00	170.00	3900.00	220.00	110.00		27.00	29.00	37.00	50.00	190.00	210.00	240.00	220.00	260.00	100.00	120.00	1100.00	190.00	190.00	68.00	110.00	120.00		
Nickel as Ni, dry weight	mg/kg	56.00	25.00	20.00	24.00	22.00	21.00		43.00	49.00	35.00	22.00	24.00	22.00	27.00	22.00	22.00	22.00	13.00	79.00	46.00	21.00	400.00	25.00	25.00		
Asbestos quantification	%	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.011	0.003	0.007	0.000	0.290	0.002	0.002	0.002	0.004	0.018	0.002	0.002	0.580	0.007	0.001		
benz[a]anthracene	mg/kg	2.70	0.88	4.90	0.10	1.50	7.80		3.30	1.10	2.20	0.10	0.10	0.30	0.20	0.60	0.10	0.80	0.30	0.10	0.80	0.40	0.20	63.00	8.30		
benzo[a]pyrene	mg/kg	1.40	0.73	8.30	0.10	1.20	8.40		3.10	0.89	2.10	0.10	0.30	0.20	0.20	0.60	0.10	0.70	0.30	0.10	1.10	0.60	0.50	53.00	7.40		
benzo[b]fluoranthene	mg/kg	1.80	1.20	8.00	0.10	0.99	9.40		3.50	1.60	1.70	0.10	0.30	0.50	0.20	0.50	0.10	0.60	0.30	0.10	0.70	0.30	0.40	42.00	6.80		
chrysene	mg/kg	3.10	1.20	5.80	0.10	1.60	9.00		3.90	1.00	2.10	0.10	0.10	0.30	0.20	0.50	0.10	0.80	0.10	0.10	0.80	0.50	0.70	67.00	8.70		
dibenz[ah]anthracene	mg/kg	0.13	0.35	1.10	0.10	0.66	1.30		0.64	0.36	0.20	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	5.70	0.70		
indeno[123-cd]pyrene	mg/kg	0.77	0.75	4.60	0.10	1.30	4.90		1.70	0.91	0.10	0.10	0.10	0.10	0.10	0.30	0.10	0.40	0.10	0.10	0.80	0.70	0.60	33.00	5.00		
napthalene	mg/kg	0.10	0.10	0.43	0.10	0.10	1.40		0.69	0.10	1.10	0.10	0.10	0.10	0.10	0.20	0.10	0.10	0.10	0.10	0.10	0.10	0.10	8.30	0.60		
aromatic EC 16-21	mg/kg							2800.00			20.00	0.60	0.60	14.00	0.60	0.60	2.10	4.10	12.00	7.20	0.60	0.60	0.60	29.00	0.60		
aromatic EC 21-35	mg/kg							6100.00			190.00	1.40	1.40	56.00	1.40	1.40	5.00	15.00	62.00	41.00	1.40	1.40	74.00	43.00	1.40		

When soil samples were analysed against residential threshold levels, out of a total of 52 samples, 28 were found not to be contaminated above residential thresholds.

Of the 24 remaining samples that were above thresholds, most were marginal. 6 samples in particular: M2-2m, M2-3m, M3-1.2m, M6-1.2m, M6-2m, M14-1.35m only contained marginal asbestos which isn't a mobile contaminant.

The one sample with Nickel (M14-1.8m) noted above the residential limit can be considered an outlier, as the Site t95 is below the threshold.

The one exceedance of benzo[a]anthracene (M13-1.61m) noted above the residential limit can be considered an outlier, as the Site t95 is below the threshold.

The one exceedance of chrysene (M13-1.61m) noted above the residential limit can be considered an outlier, as the Site t95 is below the threshold.

However, due to above elevated levels noted, existing Site soil is considered unsuitable for the proposed end, and will need remediation/mitigation measures in order to protect human receptors from arsenic, lead, asbestos, benzo[a]pyrene, benzo[b]fluoranthene, & dibenz[ah]anthracene.

As part of Site proposals, the finished ground level is to be raised from existing, allowing encapsulation and adequate cover of mildly contaminated existing soil to protect the end users.

2.4.1.2. Ground Gas.

2.4.1.2.1. Historic landfill Sites.

There are 3No. local historic landfill sites: Sladen Bridge 115m west; Greenvale 185m northwest; and Wellfield Mill 325m northeast; but these are all filled with inert waste and generally at higher level than the Application Site – so little risk of ground gas is attributed to these sources & any pathways are considered mitigated.

2.4.1.2.2. On-site refuse tips/infilled ponds/infilled land.

Investigations have revealed the general Site is infilled with inert clayey made ground with the following exceptions:

- The refuse area to the southeast corner of the Site is relatively thin (approx 2m) & comprises ash, brick, stone & glass fill. Historic maps show the refuse tip built up above the ground profile which has been predominantly removed leaving the depth found. The investigations appear to corroborate the assumption that the made ground in this location was formed from tipping of boiler ash & demolition of the remaining parts of the historic mill building destroyed by fire.
- The former reservoir central to the Site was of raised bund design, above the general level of the Site ground level at that time (retaining head for hydraulic power & washing). This is evident on historic maps, historic photographs; and is again corroborated by the trial hole investigations which found the same depth & type of made ground in this area to the rest of the Site.
- There was a deeper section of fill associated with the historic mill basement, but the type of fill was inert coarse building rubble - generally brick & stone.
- No putrescible material was found in the above areas, and there is little risk of ground gas from these areas/sources.
- General made ground across the Site is noted to be clay fill.

No credible risk is attributed to this source.

2.4.1.2.3. Radon.

New radon maps indicate the Application Site is within an area where the radon potential is 5-10%. The general risk is medium and the proposed Site buildings will require a radon gas membrane incorporated into the foundations. Due to the risk category, standard protection is required (radon membrane only).

2.4.1.2.4. Alluvium.

N/A – only minor alluvial materials were noted as thin deposits local to the watercourse areas. Much of the Application Site is directly onto bedrock.

2.4.2. Property (existing or proposed).

2.4.2.1. Buildings.

There are no contaminants of concern, nor hazardous risks arising from environmental issues noted in the risk assessment to buildings or structures.

Sulphate was recorded below action level (DS1) for all soil samples taken across the Site.

Sulphate was recorded below action level (DS1) for all borehole groundwater samples taken across the Site.

Although not a risk to the buildings specifically (ie explosion), the risk from radon will need to be mitigated within the building foundations to the ensure radon gas does not enter enclosed spaces, where it could ultimately cause harm to human receptors as discussed above in the Human Health/Ground Gas section.

There are no risks to offsite buildings or structures from the Site.

2.4.2.2. Crops.

Crops can be considered a pathway for the purposes of the assessment. The offsite/wider area is upland agricultural/pastoral and not suitable for arable farming. There is no receptor in this case and therefore no offsite pollutant linkage or risk.

Only minor contamination of the existing onsite soil was noted in the soil sampling results.

While there may be minor crops in gardens or greenhouses, it is the human end user that is the ultimate receptor in the case of the Application Site, and Site soil has been deemed unsuitable for the end use and requires mitigation/remediation as described in the above sections.

Excavations are unlikely to be deeper than 600 mm in typical gardening activities, and root systems are typically up to 600 mm. Encapsulating existing minor contamination of Site soil with a suitable cover will mitigate the risk to crops and human receptors, whilst providing a suitable growing medium for plants.

2.4.2.3. Livestock.

The Site is residential and not suitable for to livestock.

Pollution of groundwater/surface water is considered mitigated (refer to next section), and development would prevent pollution of the water environment including to offsite receptors.

There is no pathway in this case and therefore no pollutant linkage or risk.

2.4.2.4. Pets.

Pets are highly likely on the Site, and can be considered to share the same risks as human receptors for the purposes of the assessment.

Excavations by children or pets are unlikely to exceed 600 mm. Encapsulating existing minor contamination of Site soil with a suitable cover will mitigate the risk to pets as well as human receptors.

2.4.2.5. Woodland.

There is no on-site woodland to consider. However, there is woodland to the north side of the Site, offsite, on adjacent land which follows the Greenvale Brook Valley down towards Summit village.

Pollution of groundwater/surface water is considered mitigated (refer to next section), and development would prevent pollution of the water environment including to offsite receptors.

There is no pathway in this case and therefore no pollutant linkage or risk.

2.4.2.6. Service lines & pipes.

There is no risk to general service lines or pipes, except for potable water supplies serving the development only.

Soil sampling across the Site has recorded levels above those given in the United Utilities PSRAS table.

Where potable water pipes are to be laid in existing ground, suitable protection will be required in the form of barrier pipe.

Should potable water pipes be laid in inert engineered fill above the existing ground material, then standard PE pipe will suffice.

2.4.3. Adjoining Land.

Pollution of groundwater/surface water is considered mitigated (refer to next section), and development would prevent pollution of the water environment including to offsite receptors.

2.4.4. Controlled Waters.

2.4.4.1. Groundwater.

On return the samples were assessed by TJ Booth Associates to common threshold comparison data. Groundwater samples are generally compared against the Environmental Quality Standards (EQS) & also drinking water standards (UK DWI 2016 & WHO 2022).

The following table indicates all samples noted as elevated when compared to the relevant drinking water supply guidelines for common groundwater pollutants. All other contaminants of concern that passed the chemical analysis have been omitted:

Groundwater Risk To Aquifers					
Contaminant of Concern	UK DWI Water Supply Regulations 2016		WHO Drinking Water Quality 2017		MITIGATION
	REMEDIAL ACTION	Samples Above Trigger Value	Samples Above Trigger Value	Samples Above Trigger Value	
Selenium	FURTHER ACTION OR MITIGATION	M2-1.8m, M14-2.3m, M14-2.82m	n/a	n/a	Limited pathways & no receptor, therefore no risk
Sulphate	FURTHER ACTION OR MITIGATION	TH16-GWS1, TH18-GWS3	n/a	n/a	Limited pathways & no receptor, therefore no risk
benzo[a]pyrene	FURTHER ACTION OR MITIGATION	TH18-GWS3, M2-1.8m, M6-2.62m, M10-0.59m, ALL OTHER SAMPLES <LOD	n/a	n/a	Limited pathways & no receptor, therefore no risk
perfluorooctanoic acid (PFOA)	n/a	n/a	FURTHER ACTION OR MITIGATION	M1-0.05m, M1-0.3m, M2-1.46m, M2-1.5m, M3-2.0m, M4, M4-1.9m, M6, M9-0.34m, M9-1.71m, M10-0.59m, M10-0.65m, M14-2.82m	Limited pathways & no receptor, therefore no risk
Per/polyfluoroalkyl substances (PFAS) total	FURTHER ACTION OR MITIGATION	M1-0.05m, M1-0.3m, M2-1.46m, M2-1.5m, M3-2.0m, M4, M4-1.9m, M6, M9-0.34, M9-1.71, M10-0.59, M10-0.65m, M14-2.82m	n/a	n/a	Limited pathways & no receptor, therefore no risk

Groundwater sampling was undertaken to assess the potential for groundwater contamination across the Site. Groundwater has a potential impact through extended pathways such as underlying aquifers, and the nearby watercourses, where mobile contaminants can harm relative ecosystems or the end users.

When considered in the context of aquifer pathways and human end users, the earlier desk study and risk assessment has found that the risk is considered mitigated by lack of end use receptors.

The environmental database identified the underlying aquifer as being only capable of supporting water supplies at a local rather than strategic scale.

Regarding offsite receptors, the Application Site & local area are not in a Drinking Water Safeguard Zone (Groundwater)/Source Protection Zone, and there are no groundwater abstraction licences in the local area. Of licences that do exist, the location is in different catchment areas over 800m distant.

Regarding on-site receptors, the proposed dwellings will have dedicated potable water supplies from the United Utilities water mains so will not rely on groundwater sources for drinking etc.

Of the contaminants that were elevated, most were marginal, and elevations were noted only in specific boreholes (ie not uniformly spread through the groundwater) suggesting minor local elevations to point source contamination. As the risk isn't spread uniformly through the Site, there is little risk of widespread contamination away from it.

Also, without end use receptors, there is no pollutant linkage as per the UK source-pathway-receptor methodology, and therefore no relevant risk.

2.4.4.2. Surface Water.

Surface water/river sampling results are generally compared against the Environment Quality Standards for Freshwater (EQS). The results are also compared to the corresponding groundwater EQS results to infer potential impacts from that source.

2.4.4.2.1. Greenvale Brook.

The following table indicates all samples noted as elevated when compared to the relevant EQS guidelines for common pollutants. All other contaminants of concern that passed the chemical analysis have been omitted:

Surface Water

Contaminant of Concern	Surface Water EQS Freshwater AA		Groundwater Elevation agaist EQS AA	EQS Freshwater MAX		Groundwater Elevation agaist EQS MAX	MITIGATION OF SURFACE WATER SAMPLES ABOVE EQS
	REMEDIAL ACTION	Samples Above Trigger Value		REMEDIAL ACTION	Samples Above Trigger Value		
Cadmium	FURTHER ACTION	triggered values all <LOD, all others <REGS	NO	PASS	n/a	NO	NO FURTHER ACTION. All samples below LOD. EQS MAX is OK. Relevant drinking water standards OK.
Chromium VI	FURTHER ACTION	all <LOD	YES	n/a	n/a	n/a	NO FURTHER ACTION. All samples below LOD. Relevant drinking water standards OK.
Copper	FURTHER ACTION	WS4, WS5, WS6, WS7	YES	n/a	n/a	n/a	NO FURTHER ACTION. Appears to be a general background reading, sample concentrations similar upstream to downstream. Relevant drinking water standards OK.
Lead	FURTHER ACTION	WS4, WS5, WS6, WS7	NO	PASS	n/a	NO	NO FURTHER ACTION. Potential for upstream sources? Sample concentrations were higher upstream & at the confluence with Lydgate Brook than within or downstream of the Site. Relevant drinking water standards OK.
Mercury	n/a	n/a	n/a	FURTHER ACTION	triggered values all <LOD, all others <REGS	YES	NO FURTHER ACTION. All samples below LOD. Relevant drinking water standards OK.
Zinc	FURTHER ACTION	WS2, WS4, WS5, WS6, WS7	YES	n/a	n/a	n/a	NO FURTHER ACTION. Potential for upstream sources? Sample concentrations were higher upstream & at the confluence with Lydgate Brook than within or downstream of the Site. Relevant drinking water standards OK.
Cyanide (Total)	FURTHER ACTION	all <LOD	YES	FURTHER ACTION	all <LOD	YES	NO FURTHER ACTION. All samples below LOD. Relevant drinking water standards OK.
benzo[a]pyrene	FURTHER ACTION	all <LOD	YES	PASS	n/a	NO	NO FURTHER ACTION. All samples below LOD, EQS MAX is OK. Relevant drinking water standards OK.
benzo[g,h,i]perylene	n/a	n/a	n/a	FURTHER ACTION	all <LOD	YES	NO FURTHER ACTION. All samples below LOD. Relevant drinking water standards OK.
fluoranthene	FURTHER ACTION	all <LOD	YES	PASS	n/a	NO	NO FURTHER ACTION. All samples below LOD, EQS MAX is OK.
phenol	FURTHER ACTION	all <LOD	YES	FURTHER ACTION	all <LOD	YES	NO FURTHER ACTION. All samples below LOD.
perfluorooctane sulfonate (PFOS) total	FURTHER ACTION	ALL SAMPLES >REGS	YES	PASS	n/a	NO	NO FURTHER ACTION. All samples below LOD. EQS MAX is OK. Relevant drinking water standards OK.
Per/polyfluoroalkyl substances (PFAS) total	FURTHER ACTION	ALL SAMPLES >REGS	YES	PASS	n/a	NO	NO FURTHER ACTION. Appears to be a general background reading, sample concentrations got lower from upstream of the Application Site to downstream. EQS MAX is OK. Relevant drinking water standards OK.

Most of the contaminants of concern were either below current EQS AA guideline trigger values. Of those that were above the EQS AA, most were below the relevant EQS MAX.

Of the contaminants of concern that were above the EQS MAX, all were below the lab LOD and relevant drinking water standards.

Some of the contaminants of concern were also upstream of the Site, suggesting upstream contaminants sources (old mills, historic infilled land, agriculture etc).

2.4.4.2.2. Canal Drain.

The Canal Drain is a semi dry channel, only conveying minor flows in extreme runoff events. It is between 13-15m higher than the lower part of the Application Site, and 7m higher than the upper part.

It is against the hydraulic gradient, pollution of groundwater is considered mitigated, and development would prevent pollution of the water environment including to offsite receptors.

There is no pathway in this case and therefore no pollutant linkage or risk.

2.4.5. Ecological Systems.

The Site was formerly fully covered with buildings, concrete & macadam hardstandings. There were no significant onsite ecological systems or habitats.

As discussed in the Human Health section, existing Site soil is considered unsuitable for the proposed end and comprises minor contamination in the form of arsenic, lead, asbestos, benzo[a]pyrene, benzo[b]fluoranthene, & dibenz[ah]anthracene.

Root systems for shrubs are typically up to 600 mm, and bioturbation is typically limited to the top 600 mm of the soil profile. Encapsulating existing minor contamination of Site soil with a suitable cover will mitigate the contamination risk while providing a healthy environment for ecological systems, both above and below ground level.

Pollution of groundwater/surface water is considered mitigated, and development would prevent pollution of the water environment including to offsite receptors (which includes offsite ecological systems).

2.4.6. Archaeological Sites and Ancient Monuments.

There are no onsite designated or non-designated assets.

Designated assets in the wider area & relatively local to the Site include:

- Lightowlers Cottage, 170m west;
- Sladen Fold Farmhouse, 500m north.
- Nos. 4 and 5, Sladen Fold, 500m north.
- No. 3 Sladen Fold & adjoining barn, 500m north.

Non-designated assets in the wider area & relatively local to the Site include:

- Lightowlers Barn, 170m west.
- Rochdale Canal and Structures, adjacent & 400m northwest.
- Greenvale Mill, Todmorden Road, 400m northwest.
- Fothergill Rock Nook Mill, Todmorden Road, 500m northwest.
- Sladen Wood Mill, Todmorden Road, OL15 9EW, 600m northwest.

There are other designated and no-designated assets in the wider area, but all are further than the above noted distances and not considered relevant. The Sites are considered too distant to be impacted by the Application Site.

Pollution of groundwater/surface water is considered mitigated, and development would prevent pollution of the water environment including to offsite receptors.

No other risks from the Site are considered appropriate.

2.5. Final Conceptual Model.

Current source/s		Original associated usage / location / source	Contaminant type	Pathway	Receptor	Pollution linkage	Consequence	Probability	Risk	Mitigation proposed
CHEMICAL (SOLID)	Existing made ground - surface/ sub-soil.	Mill & chimney demolition materials, mortars & plasters, cladding, heat resistant fixings/fittings/insulation, other material such as hardcore & planings etc.	Metals, PAHs, asbestos.	Direct ingestion, aerial ingestion, dermal contact, drinking water. Crops. Water pipes/services.	Primarily human - Site construction operatives & future residential Site occupants. Pets. Ecological systems.	Metals, PAH, asbestos have been identified in the made ground profile at shallow depth which can pose a risk to human receptors in a residential end use. There is some hydrocarbon contamination local only to trial hole TH7 as identified in the original trial holes. It has not been noted above guidance levels in general Site groundwater. Although the contamination is above that for a residential end use, it is not a risk to end use receptors due to depth and hasn't led groundwater becoming contaminated above regulations. While contamination can remain in situ, human end use receptors & pets will need protection from underlying soils by remedial measures. The remedial measures will also be of benefit to ecological systems on-site.	Medium.	High likelihood.	High risk.	REQUIRES REMEDIATION. Site remediation should take the form of cover soils to protect human, pet, and ecological receptors. Potable water supplies through made ground will need to be protected ie barrier pipe.
		Former tanks – most notably to the north of the current substation from old maps.	Hydrocarbons.							
		Former mill ponds – potential for infill.	Metals, PAHs, asbestos.							
		Landfill (refuse heap) & filter tanks.	Metals, PAHs, asbestos.							
		Substation.	PCBs.			Substation construction was post-ban on PCBs so source is considered mitigated.	Medium.	Unlikely.	Low risk.	NO REMEDIATION REQUIRED.
		Former buildings, fill, mortars & plasters.	Sulphates.	Contact with underground structures.	Building structures /concrete.	Site soils noted at DS1, no risk to foundations.	Minor.	Unlikely.	Very low risk.	NO REMEDIATION REQUIRED.
GROUND GAS RISK (VAPOURS)	Geological ground gas.	Coal seams from Coal Measures.	CH4, CO2, other trace gases.	Diffusion through permeable soil/subsoil, building substructures, aerial inhalation.	Human - future residential Site occupants.	A separate coal mining risk assessment has concluded that shallow coal seams do not underly the Site & therefore risks are mitigated. It was approved by the Coal Authority.	Medium.	Unlikely.	Low risk.	NO REMEDIATION REQUIRED.
		Radon sources in Namurian deposits.	Rn.			The Site is within a 5-10% radon potential area classed as medium risk and a gas membrane will be required in the construction of foundations/slab.	Medium.	Likely.	Moderate risk.	REQUIRES REMEDIATION. Radon membranes should be incorporated

										in the foundations & ground floor slabs.
	Anthropogenic ground gas sources.	Refuse heap.	CH4, CO2, other trace gases.			The refuse heap is assumed to comprise the demolition rubble from the former woollen mill built in the 1850s, as well as ash from on-site processes. The inert waste was stockpiled & stored above ground mitigating any risks.	Mild.	Unlikely.	Very low risk.	NO REMEDIATION REQUIRED.
		Filter tanks				Former filter tanks to the northwest corner of the Site were small in area, and open structures which generally comprise ash as a filter medium. The tanks have been disused for approximately 40years due to a pump house being incorporated into the Site.				
		Former mill ponds.				Unlikely to contribute to ground gas generation. Mill ponds were small, and photographic evidence indicates these structures were bunded/above ground.				
CHEMICAL (LIQUID)	Ground water/ surface water.	Former tanks – most notably to the north of the current substation from old maps.	Hydrocarbons.	Controlled Waters: specifically groundwater & aquifers.	Human - future residential Site occupants, user in the wider area. Pets. Ecological systems. Adjoining land /woodland.	Metals, PAH & PFAS have been identified in groundwater, however, the pathways are considered mitigated due to lack of permeability for mass consumption in the wider areas, and the Application Site and local area are not within ground or surface water protection zones. There are also a lack of relevant receptors in the local area. Hydrocarbon contamination is below guidance values and is not a risk.	Medium.	Unlikely.	Low risk.	NO REMEDIATION REQUIRED.
		Mill & chimney demolition materials, mortars & plasters, other material such as hardcore & planings etc.	Metals, PAHs.							
		Former industrial processes.	PFAS – PFOA & PFOS.							
		Former buildings, fill, mortars & plasters.	Sulphates.		Building structures /concrete. Archaeological sites & ancient monuments	All groundwater BHs noted at DS1, no risk to foundations.	Minor.	Unlikely.	Very low risk.	NO REMEDIATION REQUIRED.
		Former tanks – most notably to the north of the	Hydrocarbons.	Controlled Waters: specifically		Metals, PAH & PFAS have been identified in groundwater, but the relevant groundwater contaminants of concern have not been linked	Mild.	Unlikely.		NO REMEDIATION REQUIRED.

		current substation from old maps.		surface waters such as Greenvale Brook & the Canal Drain.	Aquatic habitats & biota. Ecological systems. Adjoining land /woodland.	to relevant contaminants of concern in the surface water environments. Surface water contaminants of concern have been found to be below regulations, below the relevant LOD, or contaminants have been identified upstream/off-site. Hydrocarbon contamination is below guidance values and is not a risk.			Very low risk.	
		Mill & chimney demolition materials, mortars & plasters, other material such as hardcore & planings etc.	Metals, PAHs.							
		Former industrial processes.	PFAS – PFOA & PFOS.							

3. PHASE 3 – REMEDIATION STATEMENT.

3.1. Basic Site Details.

Full details included in the Phase 2 Site Investigation Introduction & subsequent sections.

3.2. Site & Remedial Objectives.

Site investigations comprised trial holes, boreholes, soil/groundwater/surface water sampling methods, with historic made ground recorded over the Site.

There are currently two remedial objectives:

- The protection of Site receptors as identified in the Final Risk Assessment & Final Conceptual Model sections from contamination in existing Site soil/made ground above that allowed for a residential end use.
- The protection of on-site human end users from radon gas.

3.3. Conceptual Model (Final) & Relevant Pollution Linkages.

Refer to Phase 2 Site Investigation and Assessment section of the report for Final Conceptual Model.

To break the pollution linkages, either the source must be removed or the pathways mitigated. It is not appropriate in this case to modify behaviour of or remove receptors.

A pollutant linkage was identified regarding the minor contamination of Site made ground with metals, PAH & asbestos noted. To break the pollutant linkage, a minimum 600mm cover must be used in the external soft landscaping which will remove any potential pathway to end use receptors.

Additionally, barrier pipe will be needed IF potable water pipes are routed through existing made ground.

A pollutant linkage was also identified with regard to radon gas. To break the relevant pollutant linkage, a radon membrane will be required in the proposed building slab/foundations. The inclusion of the membrane will remove potential pathways to the end use receptor.

3.4. Recommended Remediation.

3.4.1. Shallow soil remediation.

While made ground may remain on Site beneath permanent hardstandings such as buildings, roads, pavements & pathways etc; to mitigate the risk to receptors, it is advised that a cover layer of clean inert soil is imported for garden and soft landscaping areas ONLY.

Dependent on the final finished levels, existing made ground within proposed soft landscaping areas, should either be covered with 600mm of imported soil, or excavated to 600mm from finish levels (or to clean virgin material if shallower than this) and replaced with imported soil to suit finishes. The 600mm cover system is adopted for the following reasons:

Root systems for shrubs are typically up to 600 mm;

Excavations are unlikely to be deeper than 600 mm in typical gardening activities;

Bioturbation is typically limited to the top 600 mm of the soil profile;

Excavations by children or pets are unlikely to exceed 600 mm.

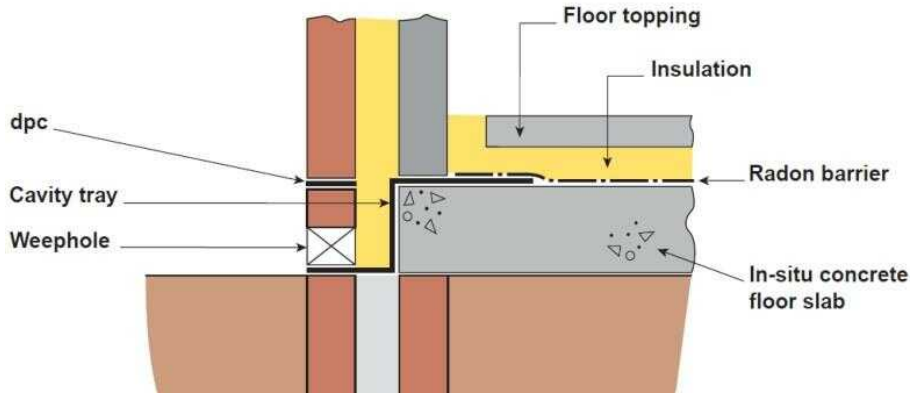
The cover level can be further reduced to 450mm in common or public open space areas.

Imported soil should be clean/inert and free from deleterious materials, and should be suitable for use in a residential end use setting. It should be able to pass testing of metals, speciated PAH, inorganics & sulphates, SOM, and asbestos screening to current Defra Category 4 Screening Levels (C4SLs) where available, and then to the LQM/CIEH (S4ULs), for use in a residential end use setting.

3.4.2. Ground gas remediation.

To ensure the protection of Site end users, ground gas remediation will be required.

A radon membrane should be included in all building foundations. The membrane will need to comprise a robust construction, suitably lapped and sealed as per manufacturers guidance, with proprietary top hat seals to all incoming slab penetrations. Refer to typical floor slab:



3.5. Verification (Phase 4 requirements).

Verification of the imported soil may be required for Planning or Building Control/Building Regulations submission. Should this be required, it will need to be undertaken by suitably qualified consultants and comprise the following:

- Import source material.
- Characterisation & suitability of material.
- Soil sampling should be undertaken as per YALPAG Guidelines as per the following ratios:

Virgin quarried materials, 1-2 samples to confirm inert nature.

Crushed hardcore, stone, brick, min 1 sample per 500cum.

Greenfield/manufactured, generally 1 sample per 250cum (min 3 samples).

Brownfield, generally 1 sample per 50cum (min 6 samples).

- Samples should be tested for the following contamination suites: metals, inorganics, PAH USEPA16 speciated, and asbestos screening. Results will be analysed against Defra Category 4 Screening Levels (C4SLs) where available, and then to the LQM/CIEH (S4ULs), for use in a residential end use setting.
- Verification Depth.
- Reporting (including photographic evidence).

3.6. Additional Notes.

Before any further work is undertaken, this report should be submitted to and agreed by the Local Planning Authority Contaminated Land Department/Building Control Department as necessary.

We trust that the above clear, but should you require further advice please contact the undersigned.

Signed…… 

D.S.Slattery BSc (Hons).

T J Booth Associates.

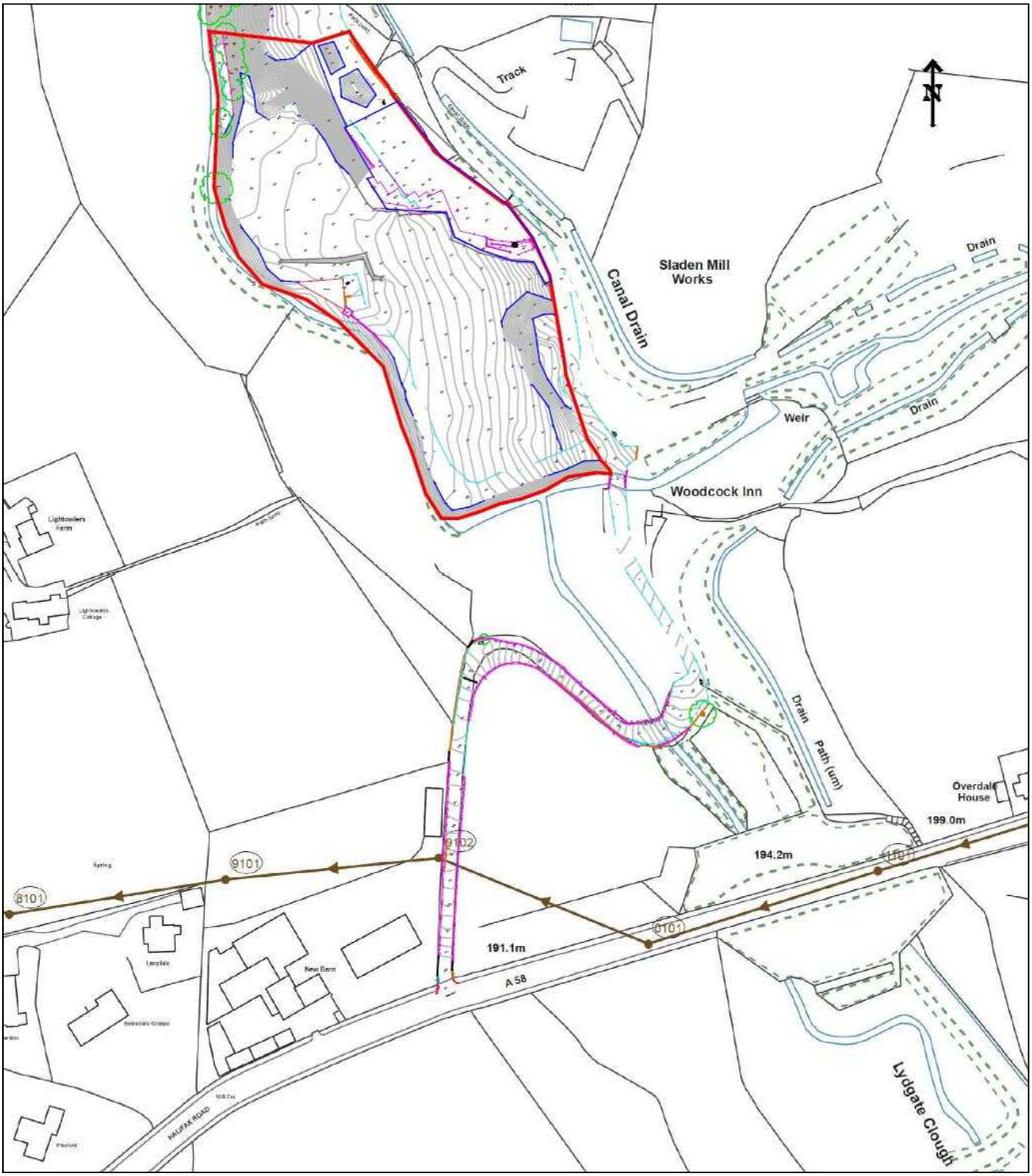
Authorised… 

T J Booth BSc (Hons), C. Eng. C. Env. MICE.

T J Booth Associates.

4. APPENDIX A: PLANS, FIGURES, ASSESSMENTS & CERTIFICATION.

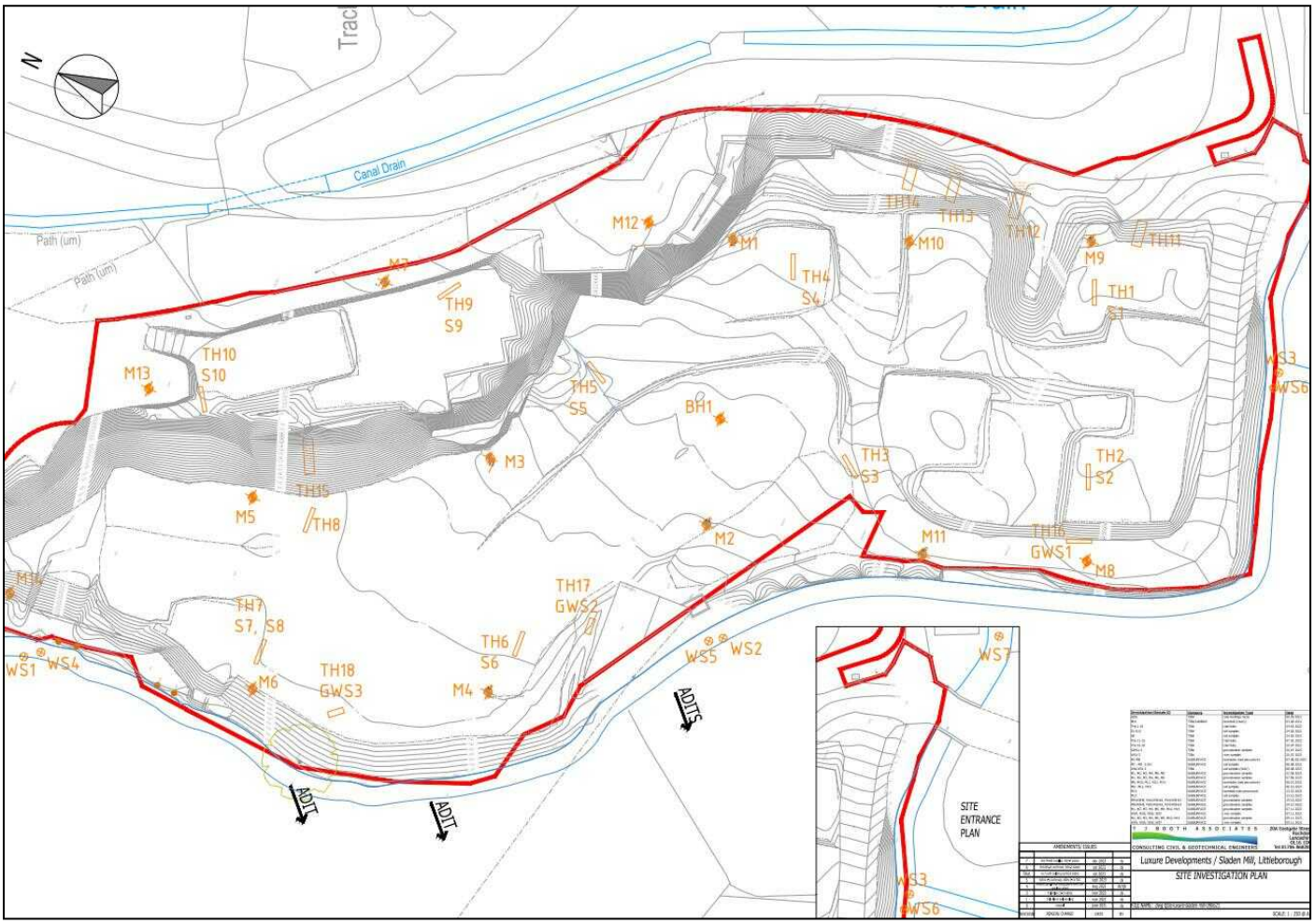
4.1. Location Plan.



4.2. Proposed Development.



4.3. Site Investigation Plan.



4.4. Rotary Borehole Investigation Log 03.06.2021.

Borehole reference BH1				Sheet 1 of 1
Water	Reduced Level (m)	Legend	Depth (m)	Description
	168.75			
	167.45	X X X X X X	(1.30) 1.30	Loose heterogeneous MADE GROUND
v	166.75	X X X X X X X X X X	(2.70)	Weathered grey MUDSTONE
	164.75		4.00	
	160.25	X X X X X X X X X X	(4.50) 8.50	Yellow SANDSTONE
	159.75	X X	9.00	Grey SANDSTONE
	158.55	X X X X X X	(1.20) 10.20	Yellow SANDSTONE
	155.75	X X X X X X X X X X	(2.80) 13.00	Grey SANDSTONE
	148.75	X X X X X X X X X X X X X X	(7.00) 20.00	Grey & yellow SANDSTONE
		X X X X X X X X X X X X X X	(10.00)	Grey SANDSTONE

	138.75	X X X X X X X X X X X X X X X X X X	30.00	
				Borehole ends

Not shown to scale

Additional notes: coal measures exploration, no coal seams or voids encountered

4.5. Trial Hole Investigation Logs 24.03.2022.

Trial pit reference TH1 Sheet 1 of 1

Water	Reduced Level (m)	Legend	Depth (m)	Description
	171.50			
	171.20	X X X X	(0.30) 0.30	Light brown very gravelly, clayey MADE GROUND (topsoil). Gravel sized brick, stone, glass & ash.
	169.50	X X X X X X X X	(1.70) 2.00	Compact dark brown/black sand sized ash MADE GROUND occasional cobble size brick & stone. (S1)
	169.45	X X	2.05	Light brown SANDSTONE BEDROCK
				Trial pit ends

Not shown to scale

Additional notes: No groundwater encountered.

Trial pit reference TH2 Sheet 1 of 1

Water	Reduced Level (m)	Legend	Depth (m)	Description
	169.50			
	169.10	X X X X	(0.40) 0.40	Brown slightly sandy very gravelly clay MADE GROUND, gravel sized brick, concrete, stone, occasional timber.
v	167.50	X X X X X X X X	(1.60) 2.00	Dark brown/black very gravelly clay MADE GROUND, gravel sized brick, stone, concrete, occasional timber, with abundant cobble sized brick, stone, and concrete. Hydrocarbon odour (S2).
	167.30	X X	2.20	Dark grey-black MUDSTONE BEDROCK
				Trial pit ends

Not shown to scale

Additional notes: Groundwater noted was a very slight seepage on top of the shale bedrock only.

Trial pit reference TH3 Sheet 1 of 1

Water	Reduced Level (m)	Legend	Depth (m)	Description
	168.80			
		X X X X X X X X	(2.60)	Light brown slightly sandy very gravelly clay MADE GROUND. Coarse gravel sized brick, stone, mortar, occasional shale & coal. Large cobbles of brick & stone - very loose to bottom 600mm. (S3)
v	166.25	X X		
	166.20	X X	2.60	
	165.90	X X	2.90	Dark grey-black MUDSTONE BEDROCK
				Trial pit ends

Not shown to scale

Additional notes: Groundwater noted immediately above shale bedrock only. Due to excavation in impermeable bedrock, the water filled and pooled up to the top of bedrock only (166.25).

Trial pit reference TH4 Sheet 1 of 1

Water	Reduced Level (m)	Legend	Depth (m)	Description
	170.50			
		X X X X X X X X	(2.30)	Brown very sandy very gravelly silty MADE GROUND. Occasional clay. Gravel sized brick, stone, concrete, rare coal, ash & vitrified clay. (S4)
	168.20	X X	2.30	
	167.90	X X	2.60	Orange/brown very clayey sand MADE GROUND.
		X X		Very loose very coarse cobble sized brick & stone (demolition rubble fill) MADE GROUND.
v	167.30	X X	(1.40)	
	166.50	X X	4.00	
				Trial pit ends

Not shown to scale

Additional notes: Groundwater encountered and standing at 167.30.

Trial pit reference TH5 Sheet 1 of 1

Water	Reduced Level (m)	Legend	Depth (m)	Description
	169.30			
		X X	(0.35)	Dark brown gravelly sandy MADE GROUND. Gravel sized stone, brick, shale & coal. Cobble sized brick & stone. (S5)
	168.95	X X	0.35	
		: o : o : o : o : o	(1.65)	Loose to medium dense orange/brown silty SAND AND GRAVEL
v	167.80	: o : o :		
	167.30	o : o : o	2.00	
	166.95	X X	2.35	Light brown SANDSTONE BEDROCK (weathered)
	166.90	X X	2.40	Light brown SANDSTONE BEDROCK
				Trial pit ends

Not shown to scale

Additional notes: Groundwater noted seeping through sand & gravel at 167.80.

Trial pit reference TH6 Sheet 1 of 1

Water	Reduced Level (m)	Legend	Depth (m)	Description
	167.80			
	166.10	X X X X X X X X	(1.70) 1.70	(firm) brown gravelly clay MADE GROUND. Occasional cobbles. Gravel & cobble sized stone, brick, slate, plastic. (S6)
v	164.95 164.90	X : X : : X : X : X : X :	(1.20) 2.90	Soft to firm orange/brown slightly sandy SHALE BEDROCK becoming soft & damp towards the bottom with occasional sandstone boulders.
	164.50	X X	3.30	Dark grey-black MUDSTONE BEDROCK (weathered)
	164.10	X X	3.70	Dark grey-black MUDSTONE BEDROCK
				Trial pit ends

Not shown to scale

Additional notes: Groundwater seepage noted on top of the shale bedrock only.

Trial pit reference TH7 Sheet 1 of 1

Water	Reduced Level (m)	Legend	Depth (m)	Description
	167.50			
	164.50	X X X X X X X X X X	(3.00) 3.00	Black sandy, gravelly clay MADE GROUND with abundant cobbles. Gravel & cobbles of stone, brick & concrete. Rare cable, fabric (plastic) & timber. (S7). Hydrocarbon odour noted at 2500mm. (S7)
v	163.80 163.00	o o o o o o o o o	(1.50) 4.50	Loose orange/brown GRAVEL with occasional large boulders & very coarse to bottom. Very wet & hydrocarbon sheen to groundwater.
				Trial pit ends

Not shown to scale

Additional notes: Groundwater noted in gravels as above.

Trial pit reference TH8 Sheet 1 of 1

Water	Reduced Level (m)	Legend	Depth (m)	Description
	167.80			
	166.80	X X X X	(1.00) 1.00	Orange/brown clayey sand & gravel MADE GROUND
	164.80	X X X X X X X X	(2.00) 3.00	Dark grey/black clayey sand & gravel MADE GROUND with abundant cobble sized brick. Rare vitrified clay pipe, fabric (plastic) & timber.
v	163.75 163.70	o o o o o o o o o	(1.10) 4.10	Loose orange/brown coarse GRAVEL with abundant cobbles & occasional large boulders.
	163.65	X X	4.15	Orange/brown SANDSTONE BEDROCK (weathered)
				Trial pit ends

Not shown to scale

Additional notes: Groundwater noted standing at 163.75 immediately above bedrock interface.

Trial pit reference TH9				Sheet 1 of 1
Water	Reduced Level (m)	Legend	Depth (m)	Description
	167.00			
	166.15	X X X X	(0.85) 0.85	Dark brown/black very slightly silty slightly gravelly MADE GROUND. Gravel & cobble sized brick. Occasional cobble sized stone. (S9).
	165.65	x x x	1.35	Orange/brown very fine sandy SILT
	164.40	: o : o : o : o : o : o :	(1.25) 2.60	Light brown SAND AND GRAVEL with abundant sandstone cobbles.
	163.40	X X X X	(1.00) 3.60	Light brown SANDSTONE BEDROCK (highly weathered)
	163.35	X X	3.65	Light brown SANDSTONE BEDROCK
				Trial pit ends
Not shown to scale Additional notes: No groundwater noted.				

Trial pit reference TH10				Sheet 1 of 1
Water	Reduced Level (m)	Legend	Depth (m)	Description
	176.85			
	175.70	X X X X X X	(1.15) 1.15	Black very sandy slightly gravelly MADE GROUND with gravel & cobble size brick, & occasional cobble sized stone. (S10). Macadam & MOT to upper 200mm.
	175.45	x : x : x	1.40	Orange/brown sandy SILT
	174.45	: o : o : o : o : o : o	(1.00) 2.40	Light brown SAND AND GRAVEL with abundant cobbles.
	173.70	X X X X	(0.75) 3.15	Light brown SANDSTONE BEDROCK (highly weathered)
	173.65	X X	3.20	Light brown SANDSTONE BEDROCK
				Trial pit ends
Not shown to scale Additional notes: No groundwater noted.				

4.6. Trial Hole Investigation Logs 07.03.2023.

Trial pit reference TH11				Sheet 1 of 1
Water	Reduced Level (m)	Legend	Depth (m)	Description
	174.40			
	171.80	X X X X X X X X X X	(2.60) 2.60	Very loose dark brown sand & gravel MADE GROUND (gravel is brick, stone, concrete, ash etc).
	171.20	X X X X	(0.60) 3.20	Orange/brown SANDSTONE BEDROCK (weathered)
	170.70	X X	3.70	Orange/brown SANDSTONE BEDROCK
				Trial pit ends
Not shown to scale Additional notes: No groundwater noted.				

Trial pit reference TH12 Sheet 1 of 1

Water	Reduced Level (m)	Legend	Depth (m)	Description
	174.65			
	173.55	X X X X X X	(1.10) 1.10	Very loose dark brown sand & gravel MADE GROUND (gravel is brick, stone, concrete, ash etc).
	173.10	X X X X	(0.45) 1.55	Orange/brown SANDSTONE BEDROCK (weathered). Retaining wall founded on top.
				Trial pit ends

Not shown to scale

Additional notes: No groundwater noted.

Trial pit reference TH13 Sheet 1 of 1

Water	Reduced Level (m)	Legend	Depth (m)	Description
	175.25			
	173.55	X X X X X X	(1.70) 1.70	Very loose dark brown sand & gravel MADE GROUND (gravel is brick, stone, concrete, ash etc).
	172.65	X X X X	(0.90) 2.60	Orange/brown SANDSTONE BEDROCK. Retaining wall founded on top.
				Trial pit ends

Not shown to scale

Additional notes: No groundwater noted.

Trial pit reference TH14 Sheet 1 of 1

Water	Reduced Level (m)	Legend	Depth (m)	Description
	175.80			
	173.40	X X X X X X X X X X	(2.40) 2.40	Very loose dark brown sand & gravel MADE GROUND (gravel is brick, stone, concrete, ash etc).
	172.50	X X X X	(0.90) 3.30	Orange/brown SANDSTONE BEDROCK. Retaining wall founded on top.
				Trial pit ends

Not shown to scale

Additional notes: No groundwater noted.

Trial pit reference TH15				Sheet 1 of 1
Water	Reduced Level (m)	Legend	Depth (m)	Description
	174.50			
	169.00	X X X X X X X X X X X X X X X X X X	(5.50) 5.50	Light brown interbedded sandstone & mudstone BEDROCK
				Trial pit ends
Not shown to scale Additional notes: Surface excavation down side of bank between upper & lower parts of Site. No groundwater noted.				

4.7. Trial Hole Investigation Logs 20.07.2023.

Trial pit reference TH16				Sheet 1 of 1
Water	Reduced Level (m)	Legend	Depth (m)	Description
	168.84			
	167.74	X X X X X X	(1.10) 1.10	Dark brown/grey clayey sand & gravel MADE GROUND. Sand & gravel is brick, stone, slate, concrete, rare macadam, with the upper 300mm comprising MOT road base/macadam.
v	166.94 166.54	X - X - - X - X - X - X -	(1.20) 2.30	Loose to medium dense light brown clayey SAND & GRAVEL. Occasional large cobbles & boulders noted. (GWS1)
	166.14	X X	2.70	Dark grey-black MUDSTONE BEDROCK.
				Trial pit ends
Not shown to scale Additional notes: Groundwater noted in sand & gravel.				

Trial pit reference TH17				Sheet 1 of 1
Water	Reduced Level (m)	Legend	Depth (m)	Description
	167.40			
	166.20	X X X X X X	(1.20) 1.20	Dark brown clayey sand & gravel MADE GROUND. Sand & gravel is brick, stone, slate, concrete, mortar etc.
v	165.30 165.20	X x X x x X x X	(1.00) 2.20	Medium dense light brown silty SAND & GRAVEL. Occasional large cobbles & boulders. (GWS2)
	164.90	X X	2.50	Dark grey-black MUDSTONE BEDROCK.
				Trial pit ends
Not shown to scale Additional notes: Groundwater noted just above bedrock only in sand & gravel.				

Trial pit reference TH18 Sheet 1 of 1

Water	Reduced Level (m)	Legend	Depth (m)	Description
	167.40			
	166.60	X X X X	(0.80) 0.80	Light brown silty sand & gravel MADE GROUND
	164.90	X X X X X X X X	(1.70) 2.50	Dark brown/grey clayey sand & gravel MADE GROUND. Sand & gravel is generally brick & stone with rare timber noted. Slight hydrocarbon odour.
v	164.50 163.40	: o : o : o : o : o : o : o :	(1.50) 4.00	Loose to medium dense orange/brown silty SAND AND GRAVEL (GWS3)
	163.20	X X	4.20	Dark grey-black MUDSTONE BEDROCK.
				Trial pit ends

Not shown to scale

Additional notes: Groundwater noted in sand & gravel.

4.8. Borehole Investigation Logs 07.08.2023 - 08.08.2023

SUB SURFACE
SITE INVESTIGATION, GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
3 Peel Street, Preston, PR2 2QS. Tel. (01772) 561135 Fax (01772) 204907

Site SLADEN MILL, HALIFAX ROAD, LITTLEBOROUGH, OL15 0LB			**Number** M1
Excavation Method MINI PERCUSSIVE	**Dimensions**	**Ground Level (mOD)**	**Client** MERE DEVELOPMENT GROUP LIMITED	**Job Number** 7782
	Location AS PLAN	**Dates** 08/08/2023	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.00-0.30	B				(0.30) 0.30	MADE GROUND: brown occasionally yellowish brown gravelly silty clayey fine to coarse sand. Gravel sized fragments are subangular to subrounded fine to coarse of mixed lithologies including sandstone.			
0.30-1.20	B					MADE GROUND: greyish brown and occasionally yellowish brown gravelly silty clayey fine to medium sand. Gravel sized fragments are fine to coarse sandstone.			
1.20-2.00	C		1.20m to 2.00m - 100% recovery		(1.70)	...at 1.80m: becoming very clayey			
2.00-2.80	C		2.00m to 2.80m - 63% recovery		2.00 (0.80)	MADE GROUND: brown and occasionally yellowish brown gravelly silty clayey fine to medium sand. Gravel sized fragments are fine to coarse sandstone.			
			08/08/2023:DRY		2.80	Complete at 2.80m			

Remarks
Hand dug inspection pit to 1.20m to check for buried services
On completion the borehole was installed with a 50mm dia HDPE standpipe with a gravel surround to 2.8m, a bentonite seal from 0.20m to 1.0m and secured with a steel flush cover concreted to ground level.
No groundwater encountered.
Core diameter: 86mm to 2.0m, 76mm to 2.8m.

Scale (approx)	Logged By
1:25	WJP/JB

Figure No. 7782.M1

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Site SLADEN MILL, HALIFAX ROAD, LITTLEBOROUGH, OL15 0LB			**Number** M2
Excavation Method MINI PERCUSSIVE	**Dimensions**	**Ground Level (mOD)**	**Client** MERE DEVELOPMENT GROUP LIMITED	**Job Number** 7782
	Location AS PLAN	**Dates** 07/08/2023	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.00-0.40	B				(0.40) 0.40	MADE GROUND: brown very sandy silty clay. Sand is fine to coarse.			
0.40-1.20	B				(0.80) 1.20	MADE GROUND: soft brown gravelly sandy clayey silt with rare rootlets up to 2mm present. Sand is fine to coarse. Gravel sized fragments are angular to subrounded fine to coarse of stone and sandstone.			
1.20-2.00	C		1.20m to 2.00m - 100% recovery		(1.20) 2.40	MADE GROUND: greyish brown occasionally dark brown and brown gravelly silty clayey fine to medium sand. Gravel sized fragments are fine to coarse stone, brick and clinker.			
2.00-3.00	C		2.00m to 3.00m - 60% recovery 07/08/2023:DRY		(0.60) 3.00	MADE GROUND: dark brown and dark grey gravelly slightly silty slightly clayey fine to medium sand. Gravel sized fragments are fine to coarse brick, stone and clinker.			
						Complete at 3.00m			

Remarks
Hand dug inspection pit from GL to 1.20m to check for services.
No groundwater encountered.
On completion,the borehole was installed with a 50mm dia HDPE standpipe with a gravel surround to 3.0m, a bentonite seal from 0.20m to 1.0m and secured with a steel flush cover concreted to ground level.
Core diameter: 86mm to 2.0m, 76mm to 3.0m.

Scale (approx)	Logged By
1:25	WJP/JB

Figure No. 7782.M2

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Site	Number
SLADEN MILL, HALIFAX ROAD, LITTLEBOROUGH, OL15 0LB	M3

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
MINI PERCUSSIVE			MERE DEVELOPMENT GROUP LIMITED	7782
	Location AS PLAN	**Dates** 07/08/2023	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.00-1.20	B				(1.20)	MADE GROUND: brown and dark grey gravelly silty clayey fine to medium sand. Gravel sized fragments are angular to subrounded fine to coarse of stone, clinker and brick.			
1.20-2.00	C		1.20m to 2.00m - 40% recovery		1.20 (0.80)	MADE GROUND: greyish brown and occasionally brown and dark grey gravelly sandy silty clay. Gravel sized fragments are angular to subrounded fine to coarse stone, brick and coal.			
2.00-3.00	C		2.00m to 3.00m - 35% recovery		2.00 (1.00)	MADE GROUND: brown and occasionally dark grey gravelly slightly silty slightly clayey fine to medium sand with occasional cobble sized fragments of brick. Gravel sized fragments are fine to coarse of brick and stone.			
3.00	D		07/08/2023:DRY		3.00	Complete at 3.00m			

Remarks

Hand dug inspection pit to 1.20m to check for buried services.
On completion,the borehole was installed with a 50mm dia HDPE standpipe with a gravel surround to 3.0m, a bentonite seal from 0.20m to 1.0m and secured with a steel flush cover concreted to ground level.
No groundwater encountered.
Core diameter: 86mm to 2.0m, 76mm to 3.0m.

Scale (approx)	Logged By
1:25	WJP/JB

Figure No. 7782.M3

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Site	Number
SLADEN MILL, HALIFAX ROAD, LITTLEBOROUGH, OL15 0LB	M4

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
MINI PERCUSSIVE			MERE DEVELOPMENT GROUP LIMITED	7782
	Location AS PLAN	**Dates** 07/08/2023	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.05-1.20	B				(1.20)	MADE GROUND: turf over greyish brown and brown gravelly silty clayey fine to coarse sand. Gravel sized fragments are angular to subrounded fine to coarse of brick, stone and sandstone.			
1.20-2.00	C		1.20m to 2.00m - 100% recovery		1.20 (0.80)	MADE GROUND: dark brown gravelly silty clayey fine to medium sand. Gravel sized fragments are subangular to subrounded fine to coarse stone and brick.			
2.00-2.70	C		2.00m to 2.70m - 70% recovery 07/08/2023:DRY		2.00 (0.70) 2.70	MADE GROUND: dark brown gravelly silty very clayey fine to medium sand with low cobble sized fragments of sandstone. Gravel sized fragments are subangular to subrounded fine to coarse sandstone. Complete at 2.70m			

Remarks
Hand dug inspection pit to 1.20m to check for buried services.
On completion the borehole was installed with a 50mm dia HDPE standpipe with a gravel surround to 2.7m, a bentonite seal from 0.20m to 1.0m and secured with a steel flush cover concreted to ground level.
No groundwater encountered.
Core diameter: 86mm to 2.0m, 76mm to 2.7m.

Scale (approx)	Logged By
1:25	SS/JB

Figure No. 7782.M4

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Site SLADEN MILL, HALIFAX ROAD, LITTLEBOROUGH, OL15 0LB			**Number** M5
Excavation Method MINI PERCUSSIVE	**Dimensions**	**Ground Level (mOD)**	**Client** MERE DEVELOPMENT GROUP LIMITED	**Job Number** 7782
	Location AS PLAN	**Dates** 07/08/2023	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.00-0.50	B				(0.50) 0.50	MADE GROUND: light brown occasionally orange gravelly very silty clayey fine to coarse sand with low cobble sized fragments of brick and sandstone. Gravel sized fragments are angular to subrounded fine to coarse of sandstone and brick. Occasional rootlets up to 2mm in size and plastic are present.			
0.50-1.20	B				(0.70) 1.20	MADE GROUND: light brown, yellowish brown and orange gravelly very silty clayey fine to coarse sand. Gravel sized fragments are angular to subangular fine to coarse of stone, brick and sandstone.			
1.20-2.00	C		1.20m to 2.00m - 100% recovery						
2.00-3.00	C		2.00m to 3.00m - 45% recovery		(1.80) 3.00	MADE GROUND: dark brown gravelly sandy slightly silty clay. Sand is fine to coarse. Gravel sized fragments are angular to subrounded fine to coarse stone, brick, coal and tiles.			
3.00-4.00	C		3.00m to 4.00m - 75% recovery		(0.30) 3.30	MADE GROUND: brownish grey and dark grey gravelly sandy clayey silt. Sand is fine to coarse. Gravel sized fragments are subangular to subrounded fine to medium of stone and brick.			
					(0.70) 4.00	MADE GROUND: dark grey slightly clayey silty sandy subangular to subrounded fine to coarse gravel of stone. Sand is fine to medium.			
			07/08/2023:DRY			Complete at 4.00m			

Remarks
Hand dug inspection pit to 1.20m to check for buried services.
On completion,the borehole was installed with a 50mm dia HDPE standpipe with a gravel surround to 4.0m, a bentonite seal from 0.20m to 1.0m and secured with a steel flush cover concreted to ground level.
No groundwater encountered.
Core diameter: 86mm to 2.0m, 76mm to 3.0m, 66mm to 4.0m.

Scale (approx)	Logged By
1:25	WJP/JB

Figure No. 7782.M5

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Site SLADEN MILL, HALIFAX ROAD, LITTLEBOROUGH, OL15 0LB			**Number** M6
Excavation Method MINI PERCUSSIVE	**Dimensions**	**Ground Level (mOD)**	**Client** MERE DEVELOPMENT GROUP LIMITED	**Job Number** 7782
	Location AS PLAN	**Dates** 07/08/2023	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.05-1.20	B				(1.20)	MADE GROUND: turf over dark grey gravelly silty clayey fine to coarse sand. Gravel sized fragments are angular to subrounded fine to coarse of brick and stone.			
1.20-2.00	C		1.20m to 2.00m - 100% recovery		1.20 (0.80)	MADE GROUND: dark grey gravelly silty clayey medium sand with low cobble sized fragments of stone. Gravel sized fragments are fine to coarse stone, brick and coal. Occasional rootlets present.			
2.00-3.00	C		2.00m to 3.00m - 80% recovery		2.00 (0.40) 2.40	MADE GROUND: dark grey gravelly silty slightly clayey fine to medium sand. Gravel sized fragments are fine to coarse brick, stone, coal and glass. ...below 2.30m: becoming greyish brown and brown.			
					(0.40) 2.80	MADE GROUND: greyish brown, grey and orangish brown gravelly silty slightly clayey medium sand with occasional cobble sized fragments of stone. Gravel sized fragments are subangular to subrounded fine to coarse stone and coal.			
3.00-4.00	C		3.00m to 4.00m - 70% recovery		(1.20)	MADE GROUND: brownish grey very gravelly silty clayey fine to medium sand. Gravel sized fragments are fine to coarse sandstone with occasional plant matter. Strong organic odour present.			
			07/08/2023:DRY		4.00	Complete at 4.00m			

Remarks
Hand dug inspection pit to 1.20m to check for buried services.
On completion,the borehole was installed with a 50mm dia HDPE standpipe with a gravel surround to 4.0m, a bentonite seal from 0.20m to 1.0m and secured with a steel flush cover concreted to ground level.
No groundwater encountered.
Core diameter: 86mm to 2.0m, 76mm to 3.0m, 66mm to 4.0m.

Scale (approx)	Logged By
1:25	WJP/JB

Figure No. 7782.M6

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Site	Number
SLADEN MILL, HALIFAX ROAD, LITTLEBOROUGH, OL15 0LB	M7

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
MINI PERCUSSIVE			MERE DEVELOPMENT GROUP LIMITED	7782
	Location AS PLAN	**Dates** 08/08/2023	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.00-0.10	B				(0.10) 0.10	MADE GROUND: bituminous macadam			
0.10-1.20	B					MADE GROUND: orangish brown, brown and orange gravelly silty fine to coarse sand with occasional pockets of soft very sandy silt. Gravel sized fragments are angular to subrounded fine to coarse brick and sandstone.			
					(1.10)				
1.20-2.00	C		1.20m to 2.00m - 100% recovery		1.20	MADE GROUND: yellowish brown and brown slightly silty very sandy subangular to subrounded fine to coarse gravel of sandstone. Sand is fine to coarse. ...between 1.20m to 2.00m: cobble sized fragments of sandstone present			
					(1.40)				
2.00-2.80	C		2.00m to 2.80m - 100 recovery		2.60				
					(0.20)	Light brown sandy subangular to subrounded fine to coarse GRAVEL of sandstone. Sand is fine to coarse.			
			08/08/2023:DRY		2.80	Complete at 2.80m			

Remarks

Hand dug inspection pit to 1.20m to check for buried services.
On completion,the borehole was installed with a 50mm dia HDPE standpipe with a gravel surround to 2.8m, a bentonite seal from 0.20m to 1.0m and secured with a steel flush cover concreted to ground level.
No groundwater encountered.
Core diameter: 86mm to 2.0m, 76mm to 2.8m

Scale (approx)	Logged By
1:25	WJP/JB

Figure No. 7782.M7

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Site	Number
SLADEN MILL, HALIFAX ROAD, LITTLEBOROUGH, OL15 0LB	M8

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
MINI PERCUSSIVE			MERE DEVELOPMENT GROUP LIMITED	7782
	Location AS PLAN	**Dates** 08/08/2023	**Engineer**	**Sheet** 1/1

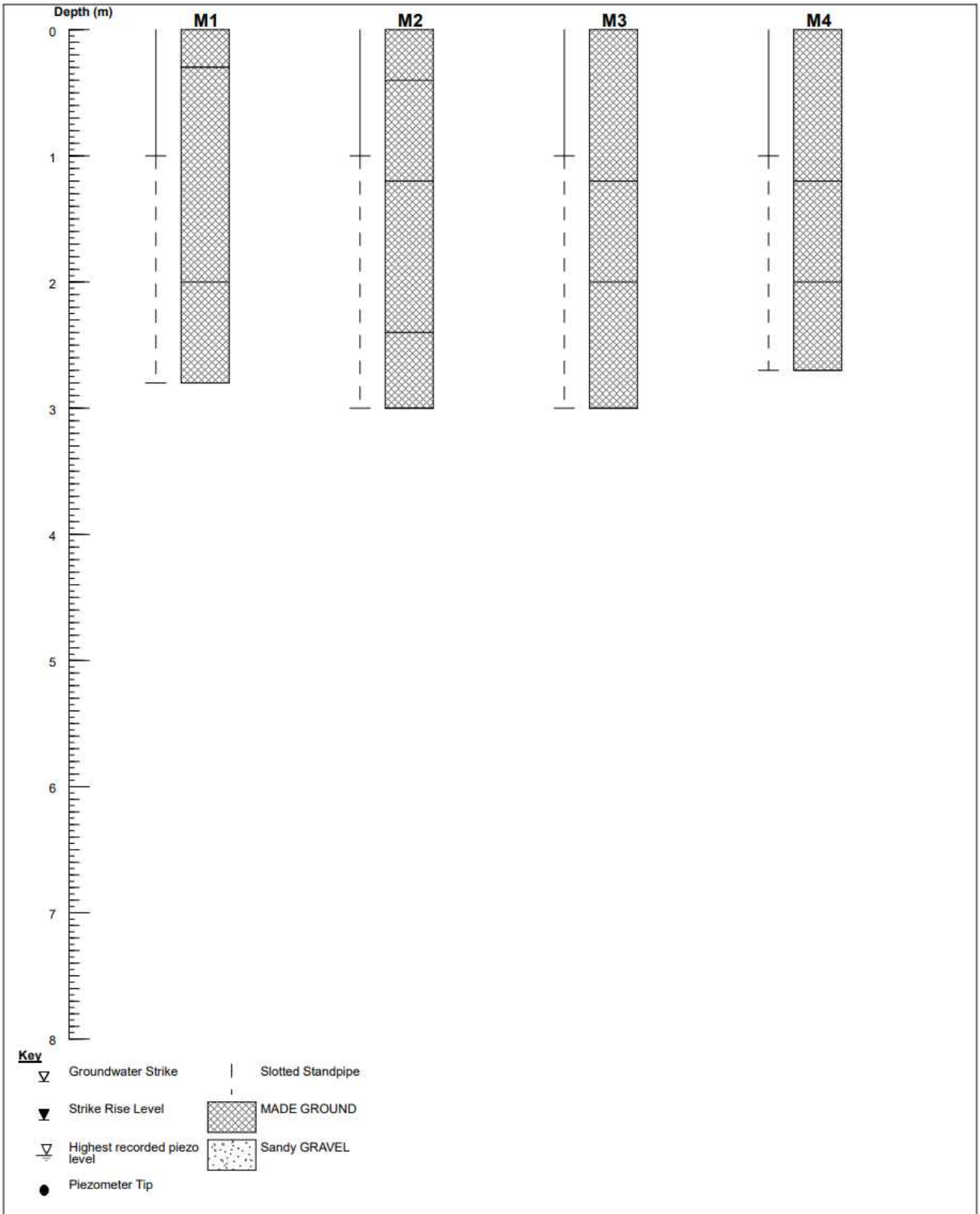
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
					(0.10) 0.10	MADE GROUND: bituminous macadam			
0.10-0.30	B				(0.20)	MADE GROUND: dark brown, orange and yellowish brown gravelly silty fine to coarse sand. Gravel sized fragments are angular to subangular fine to coarse of brick.			
0.30-1.20	B				0.30	MADE GROUND: dark brown and yellowish brown very gravelly silty fine to coarse sand. Gravel is angular to subangular fine to coarse of brick and sandstone.			
					(0.90)				
1.20-2.00	C		1.20m to 2.00m - 100% recovery		1.20 (0.20)	MADE GROUND: dark grey slightly gravelly silty fine to medium sand. Gravel sized fragments are fine to coarse brick and stone.			
					1.40 (0.30)	MADE GROUND: dark grey slightly sandy silt. Sand is fine to coarse. Organic odour present.			
					1.70 (0.30)	MADE GROUND: dark grey slightly clayey slightly silty sandy subangular to subrounded fine to coarse gravel of sandstone. Sand is fine to coarse.			
			18/08/2023:DRY		2.00	Complete at 2.00m			

Remarks
Hand dug inspection pit to 1.20m to check for services.
On completion,the borehole was installed with a 50mm dia HDPE standpipe with a gravel surround to 2.0m, a bentonite seal from 0.20m to 1.0m and secured with a steel flush cover concreted to ground level.
No groundwater encountered.
Core diameter: 86mm to 2.0m.

Scale (approx)	Logged By
1:25	WJP/JB

Figure No. 7782.M8

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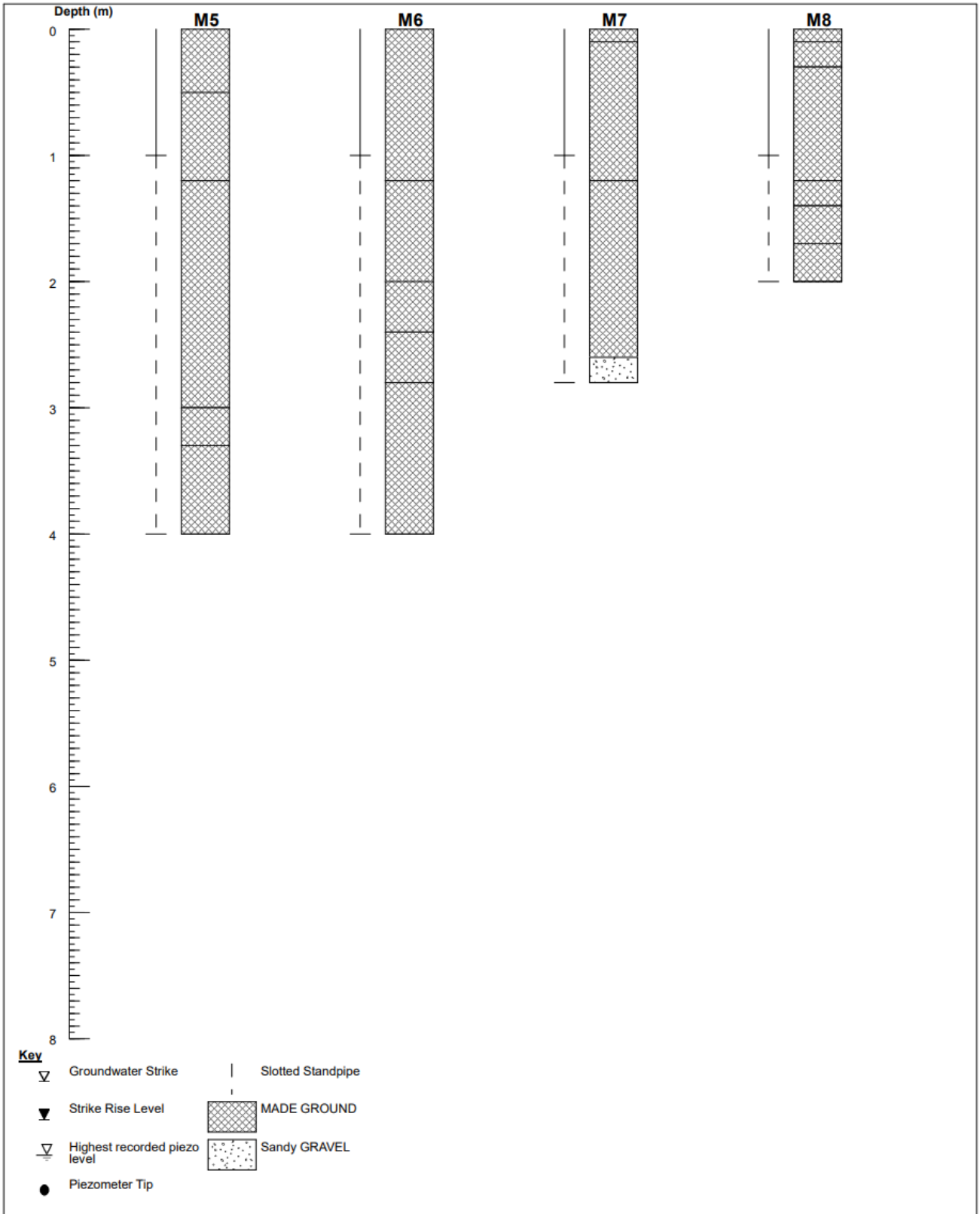


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3 Peel Street, Preston, PR2 2QS. Tel. (01772) 561135 Fax (01772) 204907

Nominal Section

Site	Date Drawn	Date Checked	Sheet	Job Number
SLADEN MILL, HALIFAX ROAD, LITTLEBOROUGH, OL15 0LB	04/10/2023		1/2	7782
Client	**Drawn By**	**Checked By**	**Scale**	**Figure No.**
MERE DEVELOPMENT GROUP LIMITED			1:40[V]	7782.1

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Nominal Section

Site	Date Drawn	Date Checked	Sheet	Job Number
SLADEN MILL, HALIFAX ROAD, LITTLEBOROUGH, OL15 0LB	04/10/2023		2/2	7782
Client	**Drawn By**	**Checked By**	**Scale**	**Figure No.**
MERE DEVELOPMENT GROUP LIMITED			1:40[V]	7782.1

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4.9. Borehole Investigation Logs 06.10.2023 - 13.10.2023

SUB SURFACE
SITE INVESTIGATION SPECIALISTS, GEOTECHNICAL & ENVIRONMENTAL CONSULTANTS
3 Peel Street, Preston, Lancashire, PR2 2QS. Tel: (01772) 561135 Fax: (01772) 204907

Site SLADEN MILL, HALIFAX ROAD, LITTLEBOROUGH, OL15 0LB			**Borehole Number** M09
Boring Method MINI PERCUSSIVE	**Casing Diameter**	**Ground Level (mOD)**	**Client** MERE DEVELOPMENT GROUP LIMITED	**Job Number** 7782A
	Location AS PLAN	**Dates** 06/10/2023	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.00-0.30	B			06/10/2023:0.00m		(0.30) 0.30	MADE GROUND : greyish brown rarely speckled orange sandy gravelly clayey silt with frequent rootlets present. Sand is fine to coarse. Gravel sized fragments are angular to rounded fine to coarse of sandstone, stone and occasionally brick.			
0.30-1.20	B						MADE GROUND : dark brown, black and orangish red sandy silty angular to rounded fine to coarse gravel sized fragments of brick, stone and sandstone with medium cobble sized fragments of brick present. Sand is fine to coarse. ...0.30m to 1.20m becoming sandy very silty gravel			
1.20-2.00	B					(2.10)	...1.20m to 2.00m becoming very sandy silty gravel with occasional metal nails and glass fragments present.			
2.00-2.40	C			2.00m to 2.40m - 100% Recovery		2.40	...2.30m to 2.40m gravel sized fragments are angular to subrounded fine to coarse of sandstone.			
							Complete at 2.40m			

Remarks
Hand dug inspection pit from GL to 1.20m to check for services.
Core diameter: 86mm to 2.40m.
Groundwater rose to ground level during drilling works.
On completion, the borehole was installed using a slotted 50mm dia HDPE standpipe with a gravel surround to 2.40m, a bentonite seal from 0.20m to 1.40m and secured with a metal flush cover concreted from 0.20m to ground level.

Scale (approx)	Logged By
1:25	DB/HB

Figure No. 7782A.M9

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Site	Borehole Number
SLADEN MILL, HALIFAX ROAD, LITTLEBOROUGH, OL15 0LB	M10

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
MINI PERCUSSIVE			MERE DEVELOPMENT GROUP LIMITED	7782A
	Location AS PLAN	**Dates** 06/10/2023	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.00-0.30	B			06/10/2023:0.60m			MADE GROUND : dark greyish brown, dark brown speckled orange and yellowish brown sandy silty angular to subrounded fine to coarse gravel sized fragments of brick, stone and sandstone. Low cobble sized fragments of brick present.			
0.30-1.20	B					(1.20)	...0.30m to 1.20m becoming very sandy very silty gravel.			
1.20-2.00	C			1.20m to 2.00m - 100% Recovery		1.20	MADE GROUND : black, grey, orange and brown sandy silty angular to subrounded fine to coarse gravel sized fragments of brick, stone and sandstone. Occasional fragments of glass, clay tiling, plastic wiring and metal present.			
						(0.59)				
						1.79	Light brown very silty very sandy subangular to rounded fine to coarse GRAVEL sized fragments of sandstone. Sand is fine to coarse.			
						(0.21)				
						2.00	Complete at 2.00m			

Remarks
Hand dug inspection pit from GL to 1.20m to check for services.
Core diameter: 86mm to 2.00m.
Groundwater rose to 0.60m during drilling works.
On completion, the borehole was installed using a slotted 50mm dia HDPE standpipe with a gravel surround to 2.00m , a bentonite seal from 0.20m to 1.00m and secured with a metal flush cover concreted from 0.20m to ground level.

Scale (approx)	Logged By
1:25	DB/HB

Figure No. 7782A.M10

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Site	Borehole Number
SLADEN MILL, HALIFAX ROAD, LITTLEBOROUGH, OL15 0LB	M11

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
MINI PERCUSSIVE			MERE DEVELOPMENT GROUP LIMITED	7782A
	Location AS PLAN	**Dates** 06/10/2023	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.00-0.20	B					(0.30) 0.30	MADE GROUND : brown speckled orange gravelly very sandy clayey silt. Sand is fine to coarse. Gravel sized fragments are angular to subrounded fine to coarse, predominantly fine to medium of brick, sandstone and stone. Rare rootlets present.			
0.30-1.30	B					(1.00) 1.30	MADE GROUND : dark brown, light brown and dark orangish red very sandy clayey angular to subrounded fine to coarse gravel sized fragments of brick, sandstone and stone. Sand is fine to coarse. Occasional pockets of soft brown gravelly clay present. High cobble sized fragments of brick present.			
1.40	D			06/10/2023:DRY		(0.10) 1.40	Light orangish brown speckled black and brownish grey COBBLE sized fragments of fine to to coarse grained sandstone and angular to subrounded fine to coarse GRAVEL sized fragments of sandstone.			
							Complete at 1.40m			

Remarks
Hand dug inspection pit from GL to 1.20m to check for services.
Borehole remained dry during drilling works.
On completion, the borehole was installed using a slotted 50mm dia HDPE standpipe with a gravel surround to 1.40m, a bentonite seal from 0.20m to 0.50m and secured with a metal flush cover concreted from 0.20m to ground level.

Scale (approx)	Logged By
1:25	DB/HB

Figure No. 7782A.M11

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SUB SURFACE
SITE INVESTIGATION SPECIALISTS, GEOTECHNICAL & ENVIRONMENTAL CONSULTANTS
3 Peel Street, Preston, Lancashire, PR2 2QS. Tel: (01772) 561135 Fax: (01772) 204907

Site	Borehole Number
SLADEN MILL, HALIFAX ROAD, LITTLEBOROUGH, OL15 0LB	M12

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
MINI PERCUSSIVE			MERE DEVELOPMENT GROUP LIMITED	7782A
	Location AS PLAN	**Dates** 06/10/2023	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.00-0.70	B					(0.10) 0.10	MADE GROUND : dark grey bituminous macadam hardstanding.			
						(0.60)	MADE GROUND : dark brown speckled orange very sandy silty angular to subrounded fine to coarse gravel sized fragments of brick, sandstone and stone. Sand is fine to coarse.			
0.70-1.20	B					0.70 (0.50)	MADE GROUND : soft grey mottled yellowish brown speckled reddish brown slightly sandy very gravelly silty clay. Sand is fine. Gravel sized fragments are angular to subrounded fine to coarse of brick and stone.			
1.20-2.00	C			1.20m to 2.00m - 77% Recovery HV at 1.31m c=30kPa HV at 1.48m c= 28kPa		1.20 (0.41)	POSSIBLE MADE GROUND : soft low strength light brown and orangish brown speckled black and grey gravelly silty clay. Gravel sized fragments are angular to subrounded fine to coarse of sandstone and mudstone.			
						1.61 (0.20)	POSSIBLE MADE GROUND : soft dark brown, black and dark reddish brown peaty organic silt. Rare partially decomposing rootlets present and no water present on squeezing.			
						1.81 (0.19)	POSSIBLE MADE GROUND : soft brown, orangish brown, greyish brown and black sandy very gravelly silty clay.			
2.00-3.00	C			2.00m to 3.00m - 75% Recovery HV at 2.15m c=16kPa		2.00 (0.17)	POSSIBLE MADE GROUND : gravelly sandy peaty organic silt.			
						2.17 (0.53)	POSSIBLE MADE GROUND : soft very low strength brown, dark grey and light brown gravelly sandy silty clay with occasional silty sand lenses up to 10mm in thickness present. Sand is fine to coarse. Gravel sized fragments are angular to predominantly subrounded fine to coarse of sandstone.			
				HV at 2.60m c=16kPa		2.70 (0.30)	POSSIBLE MADE GROUND : soft dark grey organic silt.			
3.00-4.00	C			3.00m to 4.00m - 37% Recovery		3.00 (0.64)	NO RECOVERY			
						3.64 (0.36)	Light brown and dark reddish brown COBBLE sized fragments of fine to medium grained sandstone and soft slightly gravelly very sandy silty CLAY. Sand is fine to coarse. Gravel sized fragments are subangular to subrounded fine to coarse of sandstone.			
				06/10/2023:DRY		4.00	Complete at 4.00m			

Remarks
Hand dug inspection pit from GL to 1.20m to check for services.
HV = Hand Shear Vane Test
Core diameter: 86mm to 2.00m, 76mm to 3.00m and 66mm to 4.00m.
Borehole remained dry during drilling works.
On completion, the borehole was installed using a slotted 50mm dia HDPE standpipe with a gravel surround to 4.00m, a bentonite seal from 0.20m to 1.00m and secured with a metal flush cover concreted from 0.20m to ground level.

Scale (approx)	Logged By
1:25	DB/HB

Figure No. 7782A.M12

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Site	Borehole Number
SLADEN MILL, HALIFAX ROAD, LITTLEBOROUGH, OL15 0LB	M13

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
MINI PERCUSSIVE			MERE DEVELOPMENT GROUP LIMITED	7782A
	Location AS PLAN	**Dates** 13/10/2023	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
						(0.10) 0.10	MADE GROUND : dark grey bituminous macadam hardstanding.			
0.10-1.00	C			0.10m to 1.00m - 88% Recovery		(0.28) 0.38	MADE GROUND : dark greyish brown slightly sandy silty angular to subrounded predominantly angular fine to coarse gravel sized fragments of mixed lithologies including sandstone, siltstone and stone. Sand is fine to coarse.			
				HV at 0.80m c=18kPa		(0.62)	MADE GROUND : soft very low strength greyish brown speckled orangish brown and rarely black gravelly very sandy silty clay. Sand is fine to coarse. Gravel sized fragments are angular to subrounded fine to coarse of sandstone.			
				HV at 0.96m c=20kPa		1.00				
1.00-2.00	C			1.00m to 2.00m - 75% Recovery		(0.33)	MADE GROUND : soft greyish brown and light brown gravelly sandy silty clay with low cobble sized fragments of sandstone. Sand is fine to coarse. Gravel sized fragments are angular to subrounded fine to coarse of stone and sandstone.			
						1.33	...between 1.22m to 1.33m light orangish brown and brown cobble sized fragments of medium to coarse grained sandstone.			
						(0.46)	MADE GROUND : soft to firm low strength greyish brown speckled orange very gravelly sandy silty clay. Sand is fine to coarse. Gravel sized fragments are subangular to subrounded fine to coarse of sandstone, stone and brick.			
				HV at 1.60m c=26kPa		1.79	...between 1.61m to 1.79m: slightly sandy with occasional fragments of clinker and coal present			
2.00-3.00	C			2.00m to 3.00m - 53% Recovery		(0.68)	NO RECOVERY			
						2.47				
				HV at 2.58m c=16kPa		(0.53)	MADE GROUND : soft very low strength dark greyish brown, dark brown and light brown gravelly sandy silty clay. Sand is fine to coarse. Gravel sized fragments are angular to rounded fine to coarse of mixed lithologies including stone, brick and sandstone. Occasional pieces of textile fabric and rare fragments of glass present.			
				HV at 2.88m c=16kPa		3.00	...between 2.96m to 3.00m low cobble sized fragment of concrete.			
3.00-4.00	C			3.00m to 4.00m - 57% Recovery		(0.43)	NO RECOVERY			
						3.43				
						(0.28)	POSSIBLE MADE GROUND : light brown, light greyish brown occasionally speckled dark orangish brown very gravelly slightly silty fine to coarse sand. Gravel sized fragments are subangular to rounded fine to coarse of sandstone.			
						3.71	...between 3.43m to 3.50m: soft to firm gravelly sandy silty clay.			
				HV at 3.79m c=14kPa		(0.29)				
				HV at 3.96m c=12kPa		4.00	Soft very low strength locally stiff brown and light brown speckled orangish brown gravelly sandy silty CLAY. Sand is fine to coarse. Gravel sized fragments are subangular to rounded fine to coarse of sandstone.			
				13/10/2023:DRY			...between 3.84m to 3.89m thin band of very sandy subangular to subrounded fine to coarse gravel of sandstone.			
							Complete at 4.00m			

Remarks
Hand dug inspection pit from GL to 1.20m to check for services.
HV = Hand Shear Vane Test
Core diameter: 86mm to 1.00m, 86mm to 2.00m, 76mm to 3.00m and 66mm to 4.00m.
Borehole remained dry during drilling works.
On completion, the borehole was installed using a slotted 50mm dia HDPE standpipe with a gravel surround to 4.00m, a bentonite seal from 0.20m to 1.00m and secured with a metal flush cover concreted from 0.20m to ground level.

Scale (approx)	Logged By
1:25	DB/HB

Figure No. 7782A.M13

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Site	Borehole Number
SLADEN MILL, HALIFAX ROAD, LITTLEBOROUGH, OL15 0LB	M14

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
MINI PERCUSSIVE			MERE DEVELOPMENT GROUP LIMITED	7782A
	Location AS PLAN	**Dates** 06/10/2023	**Engineer**	**Sheet** 1/1

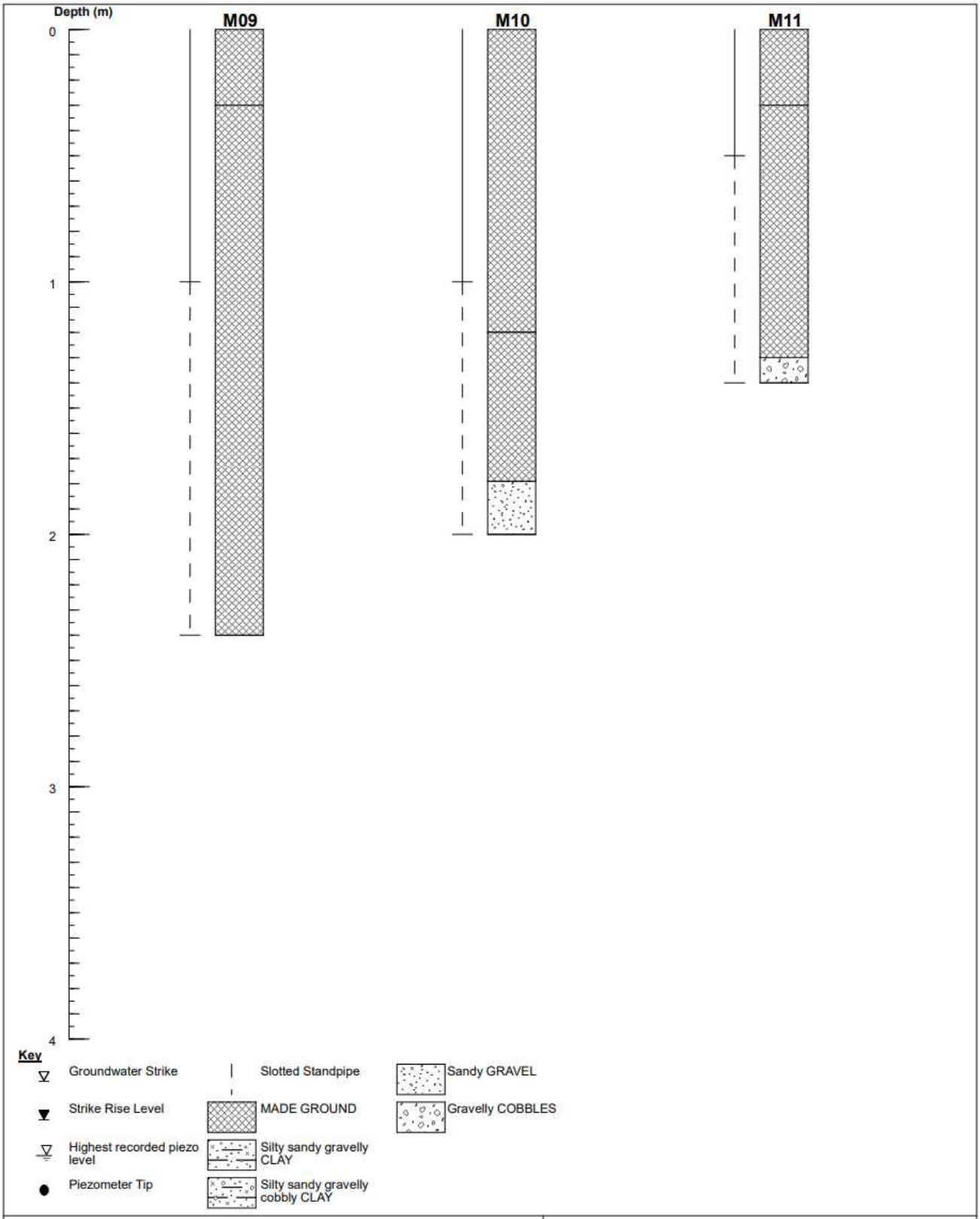
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.00-0.50	B			06/10/2023:3.00m			MADE GROUND : soft dark greyish brown mottled light brown speckled reddish brown slightly sandy gravelly clayey silt. Sand is fine. Gravel sized fragments are angular to subrounded fine to coarse of brick, sandstone and stone. Rare pieces of metal wiring present.			
0.50-1.20	B					(1.20)	... between 0.50m to 1.20m: dark brown speckled orange sandy very gravelly clayey silt.			
1.20-2.00	C			1.20m to 2.00m - 66% Recovery		1.20	MADE GROUND : brown, red and grey very sandy very clayey angular to subrounded fine to coarse gravel sized fragments of brick and stone. Sand is fine to coarse.			
						(0.57)				
						1.77	MADE GROUND : brown, light orangish brown and white very sandy clayey angular to subrounded fine to coarse gravel sized fragments of stone, sandstone and possible white asbestos (chrysotile) present. Sand is fine to coarse.			
						(0.23)				
2.00-3.00	C			2.00m to 3.00m - 60% Recovery		2.00	NO RECOVERY			
						(0.40)				
						2.40	MADE GROUND : dark brownish grey, brown and orangish red very sandy clayey gravel.			
						(0.24)				
						2.64	MADE GROUND : soft dark greyish brown speckled orange slightly sandy slightly gravelly clayey organic silt. Sand is fine to coarse. Gravel sized fragments are subangular to subrounded fine to coarse of brick, stone and sandstone. ...between 2.64m to 2.79m: silty very sandy. Rare glass. ...between 2.79m to 2.88m: abundant metal wiring.			
						(0.36)				
3.00-4.00	C			3.00m to 4.00m - 73% Recovery		3.00	NO RECOVERY			
						(0.30)				
						3.30	MADE GROUND : soft brown and orangish red very gravelly sandy silty clay. Sand is fine to coarse. Gravel sized fragments are angular to subrounded fine to coarse of brick and stone.			
						(0.24)				
						3.54	POSSIBLE MADE GROUND : dark grey and greenish grey slightly sandy gravelly organic silt. Sand is fine to coarse. Gravel sized fragments are subangular to subrounded fine to coarse of sandstone. Strong organic odour.			
						(0.46)				
						4.00	Complete at 4.00m			

Remarks
Hand dug inspection pit from GL to 1.20m to check for services.
Core diameter: 86mm to 2.00m, 76mm to 3.00m and 66mm to 4.00m.
Groundwater stabilised at 3.00m during drilling.
On completion, the borehole was installed using a slotted 50mm dia HDPE standpipe with a gravel surround to 4.00m, a bentonite seal from 0.20m to 1.00m and secured with a metal flush cover concreted fom 0.20m to ground level.

Scale (approx)	Logged By
1:25	DB/HB

Figure No. 7782A.M14

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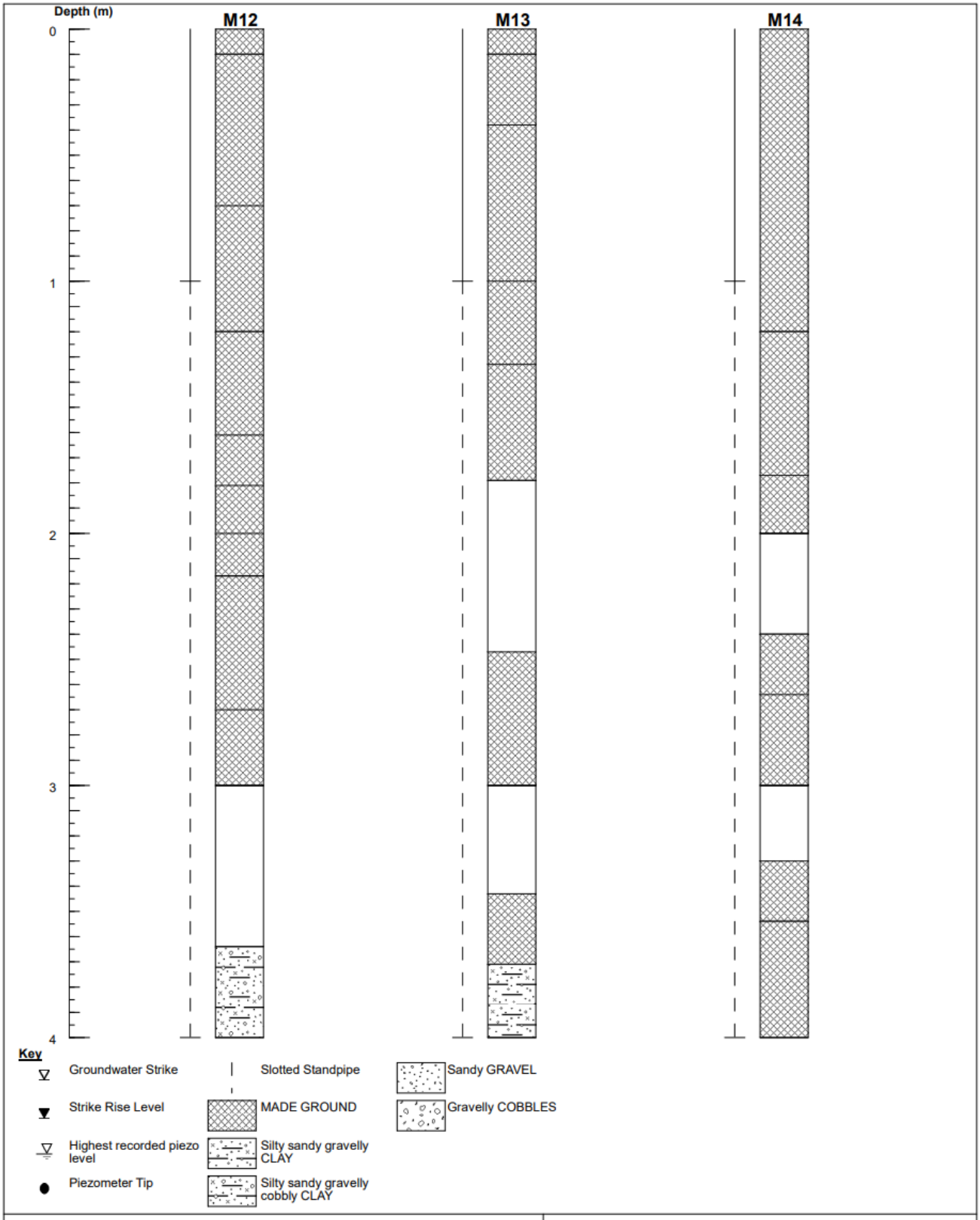


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Nominal Section

Site	Date Drawn	Date Checked	Sheet	Job Number
SLADEN MILL, HALIFAX ROAD, LITTLEBOROUGH, OL15 0LB	29/11/2023		1/2	7782A
Client	**Drawn By**	**Checked By**	**Scale**	**Figure No.**
MERE DEVELOPMENT GROUP LIMITED			1:20[V]	7782A

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Nominal Section

Site	Date Drawn	Date Checked	Sheet	Job Number
SLADEN MILL, HALIFAX ROAD, LITTLEBOROUGH, OL15 0LB	29/11/2023		2/2	7782A
Client	**Drawn By**	**Checked By**	**Scale**	**Figure No.**
MERE DEVELOPMENT GROUP LIMITED			1:20[V]	7782A

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4.10. Certification - Trial Hole & Soil Sampling Investigation 24.03.2022

eurofins | Chemtest
Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

UKAS TESTING 2183

Amended Report

Report No.:	22-11596-2		
Initial Date of Issue:	01-Apr-2022	**Date of Re-Issue:**	01-Apr-2022
Client	TJ Booth Associates		
Client Address:	20a Eastgate Street Rochdale Lancs OL16 1DH		
Contact(s):	Daniel Slattery		
Project	Mainly - Sladen Mill		
Quotation No.:	Q22-27132	**Date Received:**	28-Mar-2022
Order No.:		**Date Instructed:**	28-Mar-2022
No. of Samples:	9		
Turnaround (Wkdays):	5	**Results Due:**	01-Apr-2022
Date Approved:	01-Apr-2022		
Approved By:			
Details:	Stuart Henderson, Technical Manager		

Page 1 of 5

Results - Soil

Project: Mainly - Sladen Mill

Client: TJ Booth Associates				Chemtest Job No.:	22-11596	22-11596	22-11596	22-11596	22-11596	22-11596	22-11596	22-11596	22-11596
Quotation No.: Q22-27132				Chemtest Sample ID.:	1399858	1399859	1399860	1399861	1399862	1399863	1399864	1399865	1399866
				Client Sample ID.:	S1	S2	S3	S4	S5	S6	S7	S9	S10
				Sample Location:	TH1	TH2	TH3	TH4	TH5	TH6	TH7	TH9	TH10
				Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):	0.5	1.20	0.5	0.5	0.5	0.5	0.5	0.5	0.5
				Date Sampled:	24-Mar-2022	24-Mar-2022	24-Mar-2022	24-Mar-2022	24-Mar-2022	24-Mar-2022	24-Mar-2022	24-Mar-2022	24-Mar-2022
				Asbestos Lab:	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
ACM Type	U	2192		N/A	-	-	-	-	-	-	-	Fibres/Clumps	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	Chrysotile	No Asbestos Detected
Moisture	N	2030	%	0.020	18	14	11	13	14	15	12	8.0	16
pH	U	2010		4.0	8.4	8.5	8.9	8.8	9.0	8.6	8.8	8.9	8.7
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	1.7	0.84	0.47	1.1	0.72	1.4	1.0	0.93	1.5
Sulphur (Elemental)	U	2180	mg/kg	1.0	77	140	14	23	3.4	27	35	10	8.4
Cyanide (Total)	U	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	1.2	1.1	< 0.50	0.90
Thiocyanate	U	2300	mg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50	29	23	21	13	6.4	6.8	7.7	4.5	3.8
Sulphate (Total)	U	2430	mg/kg	100	2200	1500	1500	970	1500	2100	1400	1200	1200
Arsenic	U	2450	mg/kg	1.0	66	4.6	15	10	11	14	13	17	21
Cadmium	U	2450	mg/kg	0.10	0.35	0.34	0.37	0.29	0.28	0.29	0.30	0.72	0.81
Chromium	U	2450	mg/kg	1.0	18	15	20	10	14	14	13	28	29
Copper	U	2450	mg/kg	0.50	95	25	39	32	71	50	46	47	48
Mercury	U	2450	mg/kg	0.10	0.19	0.14	0.38	0.11	0.18	0.32	0.24	< 0.10	< 0.10
Nickel	U	2450	mg/kg	0.50	56	17	25	20	24	22	21	43	49
Lead	U	2450	mg/kg	0.50	70	76	170	170	3900	220	110	27	29
Selenium	U	2450	mg/kg	0.20	1.5	0.31	0.50	0.36	0.24	0.35	0.35	0.24	0.22
Zinc	U	2450	mg/kg	0.50	63	99	120	90	120	100	82	120	140
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Organic Matter	U	2625	%	0.40	28	5.2	7.4	11	11	9.0	11	8.6	21
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0		< 1.0							
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0		5.2							
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0		110							
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0		160							
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0		1100							
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0		1500							
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0		710							
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0		< 1.0							
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0		3600							
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0		< 1.0							
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0		< 1.0							
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0		30							
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0		16							
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0		200							
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0		200							
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0		500							

T J BOOTH ASSOCIATES
CONSULTING CIVIL & GEOTECHNICAL ENGINEERS

Results - Soil

Project: Mainly - Sladen Mill

Client: TJ Booth Associates					Chemtest Job No.:	22-11596	22-11596	22-11596	22-11596	22-11596	22-11596	22-11596	22-11596	22-11596
Quotation No.: Q22-27132					Chemtest Sample ID.:	1399858	1399859	1399860	1399861	1399862	1399863	1399864	1399865	1399866
					Client Sample ID.:	S1	S2	S3	S4	S5	S6	S7	S9	S10
					Sample Location:	TH1	TH2	TH3	TH4	TH5	TH6	TH7	TH9	TH10
					Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
					Top Depth (m):	0.5	1.20	0.5	0.5	0.5	0.5	0.5	0.5	0.5
					Date Sampled:	24-Mar-2022	24-Mar-2022	24-Mar-2022	24-Mar-2022	24-Mar-2022	24-Mar-2022	24-Mar-2022	24-Mar-2022	24-Mar-2022
					Asbestos Lab:	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**										
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0		< 1.0								
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0		940								
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0		4600								
Naphthalene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.43	< 0.10	< 0.10	1.4	0.69	< 0.10	
Acenaphthylene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.27	< 0.10	< 0.10	0.28	0.19	< 0.10	
Acenaphthene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.69	< 0.10	< 0.10	1.6	1.7	< 0.10	
Fluorene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.71	< 0.10	< 0.10	1.4	1.3	< 0.10	
Phenanthrene	U	2700	mg/kg	0.10	1.5	< 0.10	0.56	2.6	< 0.10	2.1	8.7	8.6	0.99	
Anthracene	U	2700	mg/kg	0.10	1.1	< 0.10	0.21	1.8	< 0.10	0.84	2.8	2.1	0.25	
Fluoranthene	U	2700	mg/kg	0.10	2.7	1.5	1.2	9.3	0.35	3.6	16	7.2	1.5	
Pyrene	U	2700	mg/kg	0.10	3.2	2.3	1.4	10	0.43	3.2	19	8.2	1.7	
Benzo[a]anthracene	U	2700	mg/kg	0.10	2.7	1.3	0.88	4.9	< 0.10	1.5	7.8	3.3	1.1	
Chrysene	U	2700	mg/kg	0.10	3.1	1.7	1.2	5.8	< 0.10	1.6	9.0	3.9	1.0	
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	1.8	1.4	1.2	8.0	< 0.10	0.99	9.4	3.5	1.6	
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	0.67	0.44	0.39	3.4	< 0.10	0.27	3.7	1.3	0.50	
Benzo[a]pyrene	U	2700	mg/kg	0.10	1.4	0.88	0.73	8.3	< 0.10	1.2	8.4	3.1	0.89	
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	0.77	0.78	0.75	4.6	< 0.10	1.3	4.9	1.7	0.91	
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	0.13	0.16	0.35	1.1	< 0.10	0.66	1.3	0.64	0.36	
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	1.1	1.2	0.90	4.5	< 0.10	2.2	4.5	2.2	1.1	
Total Of 16 PAH's	U	2700	mg/kg	2.0	20	12	9.8	67	< 2.0	20	100	50	12	
Benzene	U	2760	µg/kg	1.0		< 1.0								
Toluene	U	2760	µg/kg	1.0		< 1.0								
Ethylbenzene	U	2760	µg/kg	1.0		< 1.0								
m & p-Xylene	U	2760	µg/kg	1.0		< 1.0								
o-Xylene	U	2760	µg/kg	1.0		< 1.0								
Methyl Tert-Butyl Ether	U	2760	µg/kg	1.0		< 1.0								
Total Phenols	U	2920	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	

T J BOOTH ASSOCIATES
CONSULTING CIVIL & GEOTECHNICAL ENGINEERS

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2180	Sulphur (Elemental) in Soils by HPLC	Sulphur	Dichloromethane extraction / HPLC with UV detection
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Allkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2325	Sulphide in Soils	Sulphide	Steam distillation with sulphuric acid / analysis by 'Aquakem 600' Discrete Analyser, using N,N–dimethyl-p-phenylenediamine.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.

Report Information

Key

U	UKAS accredited
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U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

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The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
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A - Date of sampling not supplied
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Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

eurofins | Chemtest
Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

UKAS TESTING 2183

Final Report

Report No.:	22-12266-1		
Initial Date of Issue:	05-Apr-2022		
Client	TJ Booth Associates		
Client Address:	20a Eastgate Street Rochdale Lancs OL16 1DH		
Contact(s):	Daniel Slattery		
Project	Mainly - Sladen Mill		
Quotation No.:	Q22-27132	**Date Received:**	31-Mar-2022
Order No.:		**Date Instructed:**	31-Mar-2022
No. of Samples:	1		
Turnaround (Wkdays):	5	**Results Due:**	06-Apr-2022
Date Approved:	05-Apr-2022		
Approved By:			
Details:	Stuart Henderson, Technical Manager		

Results - Soil

Project: Mainly - Sladen Mill

Client: TJ Booth Associates			Chemtest Job No.:		22-12266
Quotation No.: Q22-27132			Chemtest Sample ID.:		1403086
			Client Sample ID.:		S8
			Sample Location:		TH7
			Sample Type:		SOIL
			Top Depth (m):		2.50
			Date Sampled:		24-Mar-2022
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
Moisture	N	2030	%	0.020	16
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0	13
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0	14
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0	1400
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0	26000
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	46
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	27000
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0	92
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	2800
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0	6100
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	330
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	9400
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	37000
Benzene	U	2760	µg/kg	1.0	< 1.0
Toluene	U	2760	µg/kg	1.0	< 1.0
Ethylbenzene	U	2760	µg/kg	1.0	< 1.0
m & p-Xylene	U	2760	µg/kg	1.0	< 1.0
o-Xylene	U	2760	µg/kg	1.0	< 1.0
Methyl Tert-Butyl Ether	U	2760	µg/kg	1.0	< 1.0

T J BOOTH ASSOCIATES
CONSULTING CIVIL & GEOTECHNICAL ENGINEERS

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2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.

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customerservices@chemtest.com

4.11. Certification - Trial Hole & Preliminary Ground/Surface Water Investigation 20.07.2023

envirolab
Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 23/07360
Issue Number: 1 **Date:** 07 August, 2023

Client:
T J Booth Associates
20a East Gate Street
Rochdale
Rochdale
Greater Manchester
UK
OL16 1DH

Project Manager: Daniel Slattery
Project Name: Mere Group - Sladen Mill
Project Ref: Not specified
Order No: N/A
Date Samples Received: 21/07/23
Date Instructions Received: 24/07/23
Date Analysis Completed: 07/08/23

Approved by:

Richard Wong
Client Manager

UKAS TESTING
1247

envirolab

Envirolab Job Number: 23/07360

Client Project Name: Mere Group - Sladen Mill

Client Project Ref: Not specified

Lab Sample ID	23/07360/1	23/07360/2	23/07360/3	23/07360/4	23/07360/5	23/07360/6		Units	Limit of Detection	Method ref
Client Sample No	GWS1	GWS2	GWS3	WS1	WS2	WS3				
Client Sample ID	TH16	TH17	TH18	River	River	River				
Depth to Top	2.10	2.10	3.00							
Depth To Bottom										
Date Sampled	20-Jul-23	20-Jul-23	20-Jul-23	20-Jul-23	20-Jul-23	20-Jul-23				
Sample Type	WATER - GW	WATER - GW	WATER - GW	WATER - EW	WATER - EW	WATER - EW				
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A				
pH (w)$_A^\#$	7.30	7.48	7.21	7.12	7.01	6.93		pH	0.01	A-T-031w
Hardness Total$_A^\#$	664	303	697	31	30	27		mg/l Ca CO3	2	A-T-049w
Sulphate (w)$_A^\#$	414	114	473	9	9	9		mg/l	1	A-T-026w
Cyanide (total) (w)$_A^\#$	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		mg/l	0.005	A-T-042wTCN
Phenols - Total by HPLC (w)$_A$	<0.01	<0.01	<0.10	<0.01	<0.01	<0.01		mg/l	0.01	A-T-050w
DOC - Dissolved Organic Carbon (w)$_A^\#$	6.2	6.3	10.7	6.1	6.3	6.6		mg/l	2	A-T-032w
Arsenic (dissolved)$_A^\#$	<1	<1	1	<1	<1	<1		µg/l	1	A-T-025w
Cadmium (dissolved)$_A^\#$	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		µg/l	0.2	A-T-025w
Copper (dissolved)$_A$	<4	<4	<4	<4	<4	<4		µg/l	4	A-T-025w
Chromium (dissolved)$_A^\#$	6	<1	<1	6	6	3		µg/l	1	A-T-025w
Chromium (hexavalent) (w)$_A^\#$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		mg/l	0.01	A-T-040w
Lead (dissolved)$_A^\#$	<1	<1	<1	<1	<1	<1		µg/l	1	A-T-025w
Mercury (dissolved)$_A^\#$	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		µg/l	0.1	A-T-025w
Nickel (dissolved)$_A^\#$	4	<2	9	2	3	2		µg/l	2	A-T-025w
Selenium (dissolved)$_A^\#$	<1	<1	<1	<1	<1	<1		µg/l	1	A-T-025w
Sulphur, Total (dissolved)$_A$	152	43	177	5	4	4		mg/l	1	A-T-072w
Zinc (dissolved)$_A^\#$	16	2	81	3	23	4		µg/l	2	A-T-025w

envirolab

Envirolab Job Number: 23/07360

Client Project Name: Mere Group - Sladen Mill

Client Project Ref: Not specified

Lab Sample ID	23/07360/1	23/07360/2	23/07360/3	23/07360/4	23/07360/5	23/07360/6		Units	Limit of Detection	Method ref
Client Sample No	GWS1	GWS2	GWS3	WS1	WS2	WS3				
Client Sample ID	TH16	TH17	TH18	River	River	River				
Depth to Top	2.10	2.10	3.00							
Depth To Bottom										
Date Sampled	20-Jul-23	20-Jul-23	20-Jul-23	20-Jul-23	20-Jul-23	20-Jul-23				
Sample Type	WATER - GW	WATER - GW	WATER - GW	WATER - EW	WATER - EW	WATER - EW				
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A				
PAH 16MS (w)										
Acenaphthene (w)$_A^*$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		µg/l	0.01	A-T-019w
Acenaphthylene (w)$_A^*$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		µg/l	0.01	A-T-019w
Anthracene (w)$_A^*$	<0.01	<0.01	0.01	<0.01	<0.01	<0.01		µg/l	0.01	A-T-019w
Benzo(a)anthracene (w)$_A^*$	<0.01^U	<0.01^U	0.07^U	<0.01^U	<0.01^U	<0.01^U		µg/l	0.01	A-T-019w
Benzo(a)pyrene (w)$_A^*$	0.01	<0.01	0.09	<0.01	<0.01	<0.01		µg/l	0.01	A-T-019w
Benzo(b)fluoranthene (w)$_A^*$	<0.01	<0.01	0.09	<0.01	<0.01	<0.01		µg/l	0.01	A-T-019w
Benzo(ghi)perylene (w)$_A^*$	<0.01	<0.01	0.05	<0.01	<0.01	<0.01		µg/l	0.01	A-T-019w
Benzo(k)fluoranthene (w)$_A^*$	<0.01	<0.01	0.03	<0.01	<0.01	<0.01		µg/l	0.01	A-T-019w
Chrysene (w)$_A^*$	<0.01	<0.01	0.09	<0.01	<0.01	<0.01		µg/l	0.01	A-T-019w
Dibenzo(ah)anthracene (w)$_A^*$	<0.01	<0.01	0.01	<0.01	<0.01	<0.01		µg/l	0.01	A-T-019w
Fluoranthene (w)$_A^*$	0.01	<0.01	0.16	<0.01	<0.01	<0.01		µg/l	0.01	A-T-019w
Fluorene (w)$_A^*$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		µg/l	0.01	A-T-019w
Indeno(123-cd)pyrene (w)$_A^*$	<0.01	<0.01	0.06	<0.01	<0.01	<0.01		µg/l	0.01	A-T-019w
Naphthalene (w)$_A^*$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		µg/l	0.01	A-T-019w
Phenanthrene (w)$_A^*$	<0.01	<0.01	0.05	<0.01	<0.01	<0.01		µg/l	0.01	A-T-019w
Pyrene (w)$_A^*$	0.01	<0.01	0.15	<0.01	<0.01	<0.01		µg/l	0.01	A-T-019w
Total PAH 16MS (w)$_A^*$	0.03	<0.01	0.86	<0.01	<0.01	<0.01		µg/l	0.01	A-T-019w

envirolab

Envirolab Job Number: 23/07360

Client Project Name: Mere Group - Sladen Mill

Client Project Ref: Not specified

Lab Sample ID	23/07360/1	23/07360/2	23/07360/3	23/07360/4	23/07360/5	23/07360/6		Units	Limit of Detection	Method ref
Client Sample No	GWS1	GWS2	GWS3	WS1	WS2	WS3				
Client Sample ID	TH16	TH17	TH18	River	River	River				
Depth to Top	2.10	2.10	3.00							
Depth To Bottom										
Date Sampled	20-Jul-23	20-Jul-23	20-Jul-23	20-Jul-23	20-Jul-23	20-Jul-23				
Sample Type	WATER - GW	WATER - GW	WATER - GW	WATER - EW	WATER - EW	WATER - EW				
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A				
TPH UKCWG (w) with Clean Up										
Ali >C5-C6 (w)$_A^*$	<1	<1	<1	<1	<1	<1		µg/l	1	A-T-022w
Ali >C6-C8 (w)$_A^*$	<1	<1	<1	<1	<1	<1		µg/l	1	A-T-022w
Ali >C8-C10 (w)$_A^*$	<10	<10	<10	<10	<10	<10		µg/l	5	A-T-058w
Ali >C10-C12 (w)$_A^*$	<10	<10	<10	<10	<10	<10		µg/l	5	A-T-058w
Ali >C12-C16 (w)$_A^*$	<10	<10	<10	<10	<10	<10		µg/l	5	A-T-058w
Ali >C16-C21 (w)$_A^*$	<10	<10	25	<10	<10	<10		µg/l	5	A-T-058w
Ali >C21-C35 (w)$_A^*$	<10	<10	214	<10	<10	<10		µg/l	5	A-T-058w
Ali >C35-C44 (w)$_A$	<10	<10	29	<10	<10	<10		µg/l	5	A-T-058w
Total Aliphatics (w)$_A$	<10	<10	268	<10	<10	<10		µg/l	5	Calc-As Recd
Aro >C5-C7 (w)$_A^*$	<1	<1	<1	<1	<1	<1		µg/l	1	A-T-022w
Aro >C7-C8 (w)$_A^*$	<1	<1	<1	<1	<1	<1		µg/l	1	A-T-022w
Aro >C8-C10 (w)$_A$	<10	<10	12	<10	<10	<10		µg/l	5	A-T-058w
Aro >C10-C12 (w)$_A^*$	<10	<10	11	<10	<10	<10		µg/l	5	A-T-058w
Aro >C12-C16 (w)$_A^*$	<10	<10	31	<10	<10	<10		µg/l	5	A-T-058w
Aro >C16-C21 (w)$_A^*$	<10	<10	50	<10	<10	<10		µg/l	5	A-T-058w
Aro >C21-C35 (w)$_A$	<20	<20	33	<20	<20	<20		µg/l	10	A-T-058w
Aro >C35-C44 (w)$_A$	<10	<10	<10	<10	<10	<10		µg/l	5	A-T-058w
Total Aromatics (w)$_A$	<20	<20	137	<20	<20	<20		µg/l	10	Calc-As Recd
TPH (Ali & Aro >C5-C44) (w)$_A$	<20	<20	405	<20	<20	<20		µg/l	10	Calc-As Recd
BTEX - Benzene (w)$_A^*$	<1	<1	<1	<1	<1	<1		µg/l	1	A-T-022w
BTEX - Toluene (w)$_A^*$	<1	<1	<1	<1	<1	<1		µg/l	1	A-T-022w
BTEX - Ethyl Benzene (w)$_A^*$	<1	<1	<1	<1	<1	<1		µg/l	1	A-T-022w
BTEX - m & p Xylene (w)$_A^*$	<1	<1	<1	<1	<1	<1		µg/l	1	A-T-022w
BTEX - o Xylene (w)$_A^*$	<1	<1	<1	<1	<1	<1		µg/l	1	A-T-022w
MTBE (w)$_A^*$	<1	<1	<1	<1	<1	<1		µg/l	1	A-T-022w

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Report Notes

General
This report shall not be reproduced, except in full, without written approval from Envirolab.
The results reported herein relate only to the material supplied to the laboratory.
The residue of any samples contained within this report, and any received within the same delivery, will be disposed of **six weeks** after the initial scheduling. For samples tested for Asbestos we will retain a portion of the dried sample for a minimum of **six months** after the initial Asbestos testing is completed.
Analytical results reflect the quality of the sample at the time of analysis only.
Opinions and Interpretations expressed are outside our scope of accreditation.
The client Sample No, Client Sample ID, Depth to top, Depth to Bottom and Date Sampled are all provided by the client.
A deviating sample report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

Key

Superscript "#"	Accredited to ISO 17025
Superscript "M"	Accredited to MCertS
Superscript "U"	Individual result not accredited
None of the above symbols	Analysis unaccredited
Subscript "A"	Analysis performed on as-received Sample
Subscript "D"	Analysis performed on the dried sample, crushed to pass 2mm sieve.
Subscript "^"	Analysis has dependant options against results. Details appear in the comments of your Sample receipt
IS	Insufficient Sample for analysis
US	Unsuitable Sample for analysis
NDP	No Determination Possible
NAD	No Asbestos Detected
N/A	Not applicable

Asbestos
Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.
Stones etc. are not removed from the sample prior to analysis
Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing, and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Assigned Matrix Codes

1	SAND	6	CLAY/LOAM	A	Contains Stones
2	LOAM	7	OTHER	B	Contains Construction Rubble
3	CLAY	8	Asbestos Bulk (Only Asbestos ID accredited)	C	Contains visible hydrocarbons
4	LOAM/SAND	9	Incinerator Ash (some Metals accredited)	D	Contains glass / metal
5	SAND/CLAY			E	Contains roots / twigs
Note: 7,8,9 matrices are not covered by our ISO 17025 or MCertS accreditation, unless stated above.					

Soil Chemical Analysis:
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.
For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts
All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH by method A-T-007:
For waters, free and visible oils are excluded from the sample used for analysis, so the reported result represents the dissolved phase only.
Results "with Clean up" indicates samples cleaned up with Silica during extraction.

EPH CWG (method A-T-055) from TPH CWG:
EPH CWG results have humics mathematically subtracted through instrument calculation.
Where these humic substances have been identified in any IDs from "TPH CWG with clean up" please note that the concentration is **NOT** included in the quantified results but present in the ID for information.

Electrical Conductivity of water by method A-T-037:
Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the accreditation range and as such are unaccredited.

Please contact your client manager if you require any further information.

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Envirolab Deviating Samples Report

Units 7&8 Sandpits Business Park, Mottram Road, Hyde, SK14 3AR
Tel. 0161 368 4921 email. ask@envlab.co.uk

Client: T J Booth Associates, 20a East Gate Street, Rochdale, Rochdale, Greater Manchester, UK, OL16 1DH

Project: Mere Group - Sladen Mill

Clients Project No:

Project No: 23/07360

Date Received: 24/07/2023 (am)

Cool Box Temperatures (°C): 15.4

Lab Sample ID	23/07360/1	23/07360/2	23/07360/3	23/07360/4	23/07360/5	23/07360/6
Client Sample No	GWS1	GWS2	GWS3	WS1	WS2	WS3
Client Sample ID/Depth	TH16 2.10m	TH17 2.10m	TH18 3.00m	River	River	River
Date Sampled	20/07/23	20/07/23	20/07/23	20/07/23	20/07/23	20/07/23
Deviation Code						
B1 (no VPH)	✓	✓	✓	✓		✓
A7 (no HNO3)	✓	✓	✓	✓	✓	✓
A9 (no H2SO4)	✓	✓	✓	✓	✓	✓

Key

B1 (no VPH)	*Separate container not supplied for VPH/BTEX analysis*
A7 (no HNO3)	*No HNO3 preserved bottle provided (dissolved metals will be deviating)*
A9 (no H2SO4)	*No H2SO4 preserved bottle provided (phenols, ammonia, DOC, COD will be deviating)*

Note: If, at any point before reaching the laboratory, the temperature of the samples has breached those set in published standards, e.g. BS-EN 5667-3 (for water samples 5 ± 3°C), ISO 18400-105:2017, then the concentration of any affected analytes may differ from that at the time of sampling.

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Envirolab Analysis Dates

Lab Sample ID	23/07360/1	23/07360/2	23/07360/3	23/07360/4	23/07360/5	23/07360/6
Client Sample No	GWS1	GWS2	GWS3	WS1	WS2	WS3
Client Sample ID/Depth	TH16 2.10m	TH17 2.10m	TH18 3.00m	River	River	River
Date Sampled	20/07/23	20/07/23	20/07/23	20/07/23	20/07/23	20/07/23
A-T-019w	31/07/2023	31/07/2023	31/07/2023	31/07/2023	31/07/2023	31/07/2023
A-T-022w	28/07/2023	28/07/2023	28/07/2023	28/07/2023	28/07/2023	28/07/2023
A-T-025w	31/07/2023	31/07/2023	31/07/2023	31/07/2023	31/07/2023	31/07/2023
A-T-026w	27/07/2023	27/07/2023	27/07/2023	27/07/2023	27/07/2023	27/07/2023
A-T-031w	27/07/2023	27/07/2023	27/07/2023	27/07/2023	27/07/2023	27/07/2023
A-T-032w	27/07/2023	27/07/2023	27/07/2023	27/07/2023	27/07/2023	27/07/2023
A-T-040w	27/07/2023	27/07/2023	27/07/2023	27/07/2023	27/07/2023	27/07/2023
A-T-042wTCN	27/07/2023	27/07/2023	27/07/2023	27/07/2023	27/07/2023	27/07/2023
A-T-049w	31/07/2023	31/07/2023	31/07/2023	31/07/2023	31/07/2023	31/07/2023
A-T-050w	04/08/2023	04/08/2023	07/08/2023	07/08/2023	07/08/2023	07/08/2023
A-T-055w	27/07/2023	27/07/2023	27/07/2023	27/07/2023	27/07/2023	27/07/2023
A-T-072w	31/07/2023	31/07/2023	31/07/2023	31/07/2023	31/07/2023	31/07/2023
Calc-As Recd	28/07/2023	28/07/2023	28/07/2023	28/07/2023	28/07/2023	28/07/2023

The above dates are the analysis completion dates, please note that these are not necessarily the date that the analysis was weighed/extracted.

End of Report

4.12. Certification - Borehole & Soil Sampling Investigation 07.08.2023 - 08.08.2023.

DETS

Certificate of Analysis

Certificate Number	23-20667-0-1	*Issued:*	08-Dec-23
Client	Sub Surface Laboratories Ltd 3 Peel Street Preston Lancashire PR2 2QS		
Our Reference	23-20667-0-1		
Client Reference	7782		
Order No	(not supplied)		
Contract Title	SLADEN MILL, HALIFAX ROAD, LITTLEBOROUGH		
Description	24 Soil samples.		
Date Received	30-Aug-23		
Date Started	30-Aug-23		
Date Completed	08-Dec-23		
Test Procedures	Identified by prefix DETSn (details on request).		
Notes	**This report supersedes 23-20667, amendments made** Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.		

Approved By

Kirk Bridgewood
General Manager

ilac-MRA UKAS TESTING 2139

Derwentside Environmental Testing Services Limited
Unit 2, Park Road Industrial Estate South, Consett, Co Durham, DH8 5PY
Tel: 01207 582333 • email: info@dets.co.uk • www.dets.co.uk

DETS

Summary of Chemical Analysis
Soil Samples

Our Ref 23-20667-0-1
Client Ref 7782
Contract Title SLADEN MILL, HALIFAX ROAD, LITTLEBOROUGH

			Lab No	2225790	2225791	2225792	2225793	2225794	2225795
			.Sample ID	M1	M1	M1	M2	M2	M2
			Depth	1.20	2.00	2.60	1.20	2.00	3.00
			Other ID	898	898	899	902	902	903
			Sample Type	C	C	C	C	C	C
			Sampling Date	08/08/2023	08/08/2023	08/08/2023	08/08/2023	08/08/2023	08/08/2023
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Asbestos Quantification	DETSC 1102	0.001	%				< 0.001	0.011	0.003
Preparation									
Stones >10mm	DETSC 1003*	1	% m/m	6.0	4.0	7.0	11	23	20
Moisture Content	DETSC 1004	0.1	%	14	13	15	7.9	11	14
Metals									
Arsenic	DETSC 2301#	0.2	mg/kg	5.7	5.5	5.7	12	8.5	14
Boron, Water Soluble (2.5:1)	DETSC 2311#	0.2	mg/kg	< 0.2	< 0.2	< 0.2	0.2	0.3	0.5
Cadmium	DETSC 2301#	0.1	mg/kg	0.2	0.2	0.2	0.5	0.3	0.3
Chromium	DETSC 2301#	0.15	mg/kg	13	14	16	15	21	14
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	25	14	20	37	43	40
Lead	DETSC 2301#	0.3	mg/kg	50	9.8	15	84	37	50
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05	< 0.05	0.12	< 0.05	0.05
Molybdenum	DETSC 2301#	0.4	mg/kg	0.8	1.4	1.1	1.1	2.2	2.1
Nickel	DETSC 2301#	1	mg/kg	14	15	16	19	35	22
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	55	71	45	78	78	67
Inorganics									
pH	DETSC 2008#		pH	7.4	5.4	6.1	7.8	8.6	9.0
Cyanide, Total	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	< 0.1	0.2	< 0.1	< 0.1
Organic matter	DETSC 2002#	0.1	%	1.0	1.3	0.9	2.0	2.7	2.4
Sulphide	DETSC 2024*	10	mg/kg	16	< 10	16	< 10	24	24
Sulphur (free)	DETSC 3049#	0.75	mg/kg	< 0.75	< 0.75	< 0.75	< 0.75	< 0.75	< 0.75
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.11	0.11	0.03	0.03	0.05	0.07
Petroleum Hydrocarbons									
Aliphatic C5-C6: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16: EH_CU_1D_AL	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Aliphatic C16-C21: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	9.0	< 1.5
Aliphatic C21-C35: EH_CU_1D_AL	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4	< 3.4	< 3.4	120	< 3.4
Aliphatic C35-C44: EH_CU_1D_AL	DETSC 3072*	3.4	mg/kg	< 3.4	< 3.4	< 3.4	< 3.4	65	< 3.4
Aliphatic C10-C44: EH_CU_1D_AL	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	190	< 10
Aromatic C5-C7: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C8-C10: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C10-C12: EH_CU_1D_AR	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16: EH_CU_1D_AR	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	1.6	< 0.5	3.3	< 0.5
Aromatic C16-C21: EH_CU_1D_AR	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6	10	< 0.6	20	< 0.6
Aromatic C21-C35: EH_CU_1D_AR	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4	46	< 1.4	190	< 1.4
Aromatic C35-C44: EH_CU_1D_AR	DETSC 3072*	1.4	mg/kg	< 1.4	< 1.4	30	< 1.4	130	< 1.4

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

DETS

Summary of Chemical Analysis
Soil Samples

Our Ref 23-20667-0-1
Client Ref 7782
Contract Title SLADEN MILL, HALIFAX ROAD, LITTLEBOROUGH

				Lab No	2225790	2225791	2225792	2225793	2225794	2225795
				.Sample ID	M1	M1	M1	M2	M2	M2
				Depth	1.20	2.00	2.60	1.20	2.00	3.00
				Other ID	898	898	899	902	902	903
				Sample Type	C	C	C	C	C	C
				Sampling Date	08/08/2023	08/08/2023	08/08/2023	08/08/2023	08/08/2023	08/08/2023
				Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**							
Aromatic C10-C44: EH_CU_1D_AR	DETSC 3072*	10	mg/kg	< 10	< 10	88	< 10	340	< 10
Ali/Aro C10-C44: EH_CU_1D_Total	DETSC 3072*	10	mg/kg	< 10	< 10	88	< 10	530	< 10
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
m+p Xylene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
o Xylene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
MTBE	DETSC 3321	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PAHs										
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	1.1	< 0.1
Acenaphthylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	0.1	< 0.1
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	1.1	< 0.1
Fluorene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	1.0	< 0.1
Phenanthrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	6.0	< 0.1
Anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	1.2	< 0.1
Fluoranthene	DETSC 3301	0.1	mg/kg	0.3	< 0.1	< 0.1	0.1	5.7	< 0.1
Pyrene	DETSC 3301	0.1	mg/kg	0.2	< 0.1	< 0.1	< 0.1	5.0	< 0.1
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	2.2	< 0.1
Chrysene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	2.1	< 0.1
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	1.7	< 0.1
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	1.2	< 0.1
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	2.1	< 0.1
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	0.2	< 0.1
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	0.9	< 0.1
PAH 16 Total	DETSC 3301	1.6	mg/kg	< 1.6	< 1.6	< 1.6	< 1.6	32	< 1.6
Phenols										
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

DETS

Summary of Chemical Analysis
Soil Samples

Our Ref 23-20667-0-1
Client Ref 7782
Contract Title SLADEN MILL, HALIFAX ROAD, LITTLEBOROUGH

			Lab No	2225796	2225797	2225798	2225799	2225800	2225801
			.Sample ID	M3	M3	M4	M4	M4	M5
			Depth	1.20	2.00	1.20	2.00	2.70	1.20
			Other ID	905	906	909	909	910	917
			Sample Type	C	C	C	C	C	C
			Sampling Date	08/08/2023	08/08/2023	08/08/2023	08/08/2023	08/08/2023	08/08/2023
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Asbestos Quantification	DETSC 1102	0.001	%	0.007			< 0.001		0.29
Preparation									
Stones >10mm	DETSC 1003*	1	% m/m	12	9.0	14	8.0	27	10
Moisture Content	DETSC 1004	0.1	%	18	21	12	16	9.5	15
Metals									
Arsenic	DETSC 2301#	0.2	mg/kg	20	7.3	9.4	21	7.8	36
Boron, Water Soluble (2.5:1)	DETSC 2311#	0.2	mg/kg	0.3	0.2	< 0.2	< 0.2	0.3	0.5
Cadmium	DETSC 2301#	0.1	mg/kg	0.6	0.2	0.3	0.4	0.4	0.5
Chromium	DETSC 2301#	0.15	mg/kg	18	13	16	18	13	23
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	72	22	65	74	26	110
Lead	DETSC 2301#	0.3	mg/kg	190	35	210	170	31	240
Mercury	DETSC 2325#	0.05	mg/kg	0.29	0.07	0.05	0.16	< 0.05	0.39
Molybdenum	DETSC 2301#	0.4	mg/kg	3.9	2.0	1.7	2.9	1.6	2.6
Nickel	DETSC 2301#	1	mg/kg	24	12	22	27	19	27
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	230	59	90	120	94	190
Inorganics									
pH	DETSC 2008#		pH	8.0	7.6	7.8	8.3	7.6	7.9
Cyanide, Total	DETSC 2130#	0.1	mg/kg	1.0	0.4	0.4	1.6	< 0.1	0.8
Organic matter	DETSC 2002#	0.1	%	3.2	1.3	2.3	4.5	3.5	4.5
Sulphide	DETSC 2024*	10	mg/kg	12	32	12	56	12	48
Sulphur (free)	DETSC 3049#	0.75	mg/kg	< 0.75	< 0.75	< 0.75	< 0.75	< 0.75	< 0.75
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.17	0.08	0.03	0.15	0.28	0.07
Petroleum Hydrocarbons									
Aliphatic C5-C6: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16: EH_CU_1D_AL	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Aliphatic C16-C21: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	6.6	4.4	< 1.5	< 1.5
Aliphatic C21-C35: EH_CU_1D_AL	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4	25	23	< 3.4	< 3.4
Aliphatic C35-C44: EH_CU_1D_AL	DETSC 3072*	3.4	mg/kg	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4
Aliphatic C10-C44: EH_CU_1D_AL	DETSC 3072*	10	mg/kg	< 10	< 10	32	28	< 10	< 10
Aromatic C5-C7: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C8-C10: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C10-C12: EH_CU_1D_AR	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16: EH_CU_1D_AR	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	4.5	< 0.5	< 0.5	< 0.5
Aromatic C16-C21: EH_CU_1D_AR	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6	14	< 0.6	< 0.6	< 0.6
Aromatic C21-C35: EH_CU_1D_AR	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4	56	< 1.4	< 1.4	< 1.4
Aromatic C35-C44: EH_CU_1D_AR	DETSC 3072*	1.4	mg/kg	< 1.4	< 1.4	44	< 1.4	< 1.4	< 1.4

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Summary of Chemical Analysis
Soil Samples

Our Ref 23-20667-0-1
Client Ref 7782
Contract Title SLADEN MILL, HALIFAX ROAD, LITTLEBOROUGH

			Lab No	2225796	2225797	2225798	2225799	2225800	2225801
			.Sample ID	M3	M3	M4	M4	M4	M5
			Depth	1.20	2.00	1.20	2.00	2.70	1.20
			Other ID	905	906	909	909	910	917
			Sample Type	C	C	C	C	C	C
			Sampling Date	08/08/2023	08/08/2023	08/08/2023	08/08/2023	08/08/2023	08/08/2023
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Aromatic C10-C44: EH_CU_1D_AR	DETSC 3072*	10	mg/kg	< 10	< 10	120	< 10	< 10	< 10
Ali/Aro C10-C44: EH_CU_1D_Total	DETSC 3072*	10	mg/kg	< 10	< 10	150	28	< 10	< 10
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
m+p Xylene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
o Xylene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
MTBE	DETSC 3321	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PAHs									
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	DETSC 3301	0.1	mg/kg	0.3	< 0.1	0.1	0.1	< 0.1	0.2
Anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	0.1	< 0.1	< 0.1
Fluoranthene	DETSC 3301	0.1	mg/kg	0.6	0.3	0.3	0.4	0.2	0.4
Pyrene	DETSC 3301	0.1	mg/kg	0.5	0.2	0.2	0.3	0.1	0.3
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	0.3	0.4	< 0.1	0.2
Chrysene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	0.3	0.2	< 0.1	0.2
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	0.3	0.1	0.5	0.8	< 0.1	0.2
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	0.4	0.4	0.4	0.4	< 0.1	0.4
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	0.3	0.1	0.2	0.2	< 0.1	0.2
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	0.2	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
PAH 16 Total	DETSC 3301	1.6	mg/kg	2.8	< 1.6	2.2	2.8	< 1.6	2.1
Phenols									
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	0.6	0.5	0.5	< 0.3	0.5	< 0.3

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DETS

Summary of Chemical Analysis
Soil Samples

Our Ref 23-20667-0-1
Client Ref 7782
Contract Title SLADEN MILL, HALIFAX ROAD, LITTLEBOROUGH

				Lab No	2225802	2225803	2225804	2225805	2225806	2225807
				.Sample ID	M5	M5	M5	M6	M6	M6
				Depth	2.00	3.00	3.75	1.20	2.00	3.00
				Other ID	917	918	919	912	912	913
				Sample Type	C	C	C	C	C	C
				Sampling Date	08/08/2023	08/08/2023	08/08/2023	08/08/2023	08/08/2023	08/08/2023
				Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**							
Asbestos Quantification	DETSC 1102	0.001	%	0.002	0.002		0.002	0.004	
Preparation										
Stones >10mm	DETSC 1003*	1	% m/m	6.0	5.0	9.0	18	15	8.0
Moisture Content	DETSC 1004	0.1	%	18	18	14	15	11	19
Metals										
Arsenic	DETSC 2301#	0.2	mg/kg	21	45	10	14	11	4.3
Boron, Water Soluble (2.5:1)	DETSC 2311#	0.2	mg/kg	0.5	0.6	0.5	0.4	0.4	0.3
Cadmium	DETSC 2301#	0.1	mg/kg	0.5	0.6	0.3	0.5	0.3	0.1
Chromium	DETSC 2301#	0.15	mg/kg	23	24	16	17	13	11
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	120	91	60	71	84	20
Lead	DETSC 2301#	0.3	mg/kg	220	260	28	100	120	18
Mercury	DETSC 2325#	0.05	mg/kg	0.30	0.44	0.07	0.12	0.09	< 0.05
Molybdenum	DETSC 2301#	0.4	mg/kg	2.0	3.3	2.0	2.4	1.7	1.3
Nickel	DETSC 2301#	1	mg/kg	22	22	20	22	13	10
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	140	150	80	120	110	36
Inorganics										
pH	DETSC 2008#		pH	7.8	7.7	6.8	8.0	7.7	7.3
Cyanide, Total	DETSC 2130#	0.1	mg/kg	0.3	6.7	0.4	0.4	0.3	0.2
Organic matter	DETSC 2002#	0.1	%	4.9	5.0	4.4	4.5	5.5	3.7
Sulphide	DETSC 2024*	10	mg/kg	32	40	16	36	< 10	< 10
Sulphur (free)	DETSC 3049#	0.75	mg/kg	< 0.75	< 0.75	< 0.75	< 0.75	< 0.75	< 0.75
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.09	0.07	0.09	0.06	0.19	0.08
Petroleum Hydrocarbons										
Aliphatic C5-C6: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16: EH_CU_1D_AL	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Aliphatic C16-C21: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	16	< 1.5
Aliphatic C21-C35: EH_CU_1D_AL	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4	< 3.4	< 3.4	51	< 3.4
Aliphatic C35-C44: EH_CU_1D_AL	DETSC 3072*	3.4	mg/kg	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4
Aliphatic C10-C44: EH_CU_1D_AL	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	67	< 10
Aromatic C5-C7: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C8-C10: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C10-C12: EH_CU_1D_AR	DETSC 3072#	0.9	mg/kg	< 0.9	11	15	15	11	< 0.9
Aromatic C12-C16: EH_CU_1D_AR	DETSC 3072#	0.5	mg/kg	< 0.5	6.4	11	8.9	6.4	< 0.5
Aromatic C16-C21: EH_CU_1D_AR	DETSC 3072#	0.6	mg/kg	< 0.6	2.1	7.1	4.1	12	< 0.6
Aromatic C21-C35: EH_CU_1D_AR	DETSC 3072#	1.4	mg/kg	< 1.4	5.0	15	15	62	32
Aromatic C35-C44: EH_CU_1D_AR	DETSC 3072*	1.4	mg/kg	< 1.4	< 1.4	< 1.4	37	< 1.4	< 1.4

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DETS

Summary of Chemical Analysis
Soil Samples

Our Ref 23-20667-0-1
Client Ref 7782
Contract Title SLADEN MILL, HALIFAX ROAD, LITTLEBOROUGH

			Lab No	2225802	2225803	2225804	2225805	2225806	2225807
			.Sample ID	M5	M5	M5	M6	M6	M6
			Depth	2.00	3.00	3.75	1.20	2.00	3.00
			Other ID	917	918	919	912	912	913
			Sample Type	C	C	C	C	C	C
			Sampling Date	08/08/2023	08/08/2023	08/08/2023	08/08/2023	08/08/2023	08/08/2023
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Aromatic C10-C44: EH_CU_1D_AR	DETSC 3072*	10	mg/kg	< 10	25	49	80	91	32
Ali/Aro C10-C44: EH_CU_1D_Total	DETSC 3072*	10	mg/kg	< 10	25	49	80	160	32
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
m+p Xylene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
o Xylene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
MTBE	DETSC 3321	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PAHs									
Naphthalene	DETSC 3301	0.1	mg/kg	0.2	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	0.1	< 0.1	< 0.1
Fluorene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	0.1	< 0.1	< 0.1
Phenanthrene	DETSC 3301	0.1	mg/kg	0.8	0.1	< 0.1	1.0	0.4	< 0.1
Anthracene	DETSC 3301	0.1	mg/kg	0.2	< 0.1	< 0.1	0.2	0.1	< 0.1
Fluoranthene	DETSC 3301	0.1	mg/kg	1.1	0.3	< 0.1	1.4	0.6	< 0.1
Pyrene	DETSC 3301	0.1	mg/kg	1.0	0.2	< 0.1	1.4	0.5	< 0.1
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	0.6	0.1	< 0.1	0.8	0.3	< 0.1
Chrysene	DETSC 3301	0.1	mg/kg	0.5	0.1	< 0.1	0.8	< 0.1	< 0.1
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	0.5	< 0.1	< 0.1	0.6	0.3	< 0.1
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	0.5	< 0.1	< 0.1	0.6	0.5	< 0.1
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	0.6	< 0.1	< 0.1	0.7	0.3	< 0.1
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	0.3	< 0.1	< 0.1	0.4	< 0.1	< 0.1
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	0.1	< 0.1	< 0.1	0.1	< 0.1	< 0.1
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	0.4	< 0.1	< 0.1	0.5	0.2	< 0.1
PAH 16 Total	DETSC 3301	1.6	mg/kg	6.7	< 1.6	< 1.6	8.9	3.3	< 1.6
Phenols									
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	0.7	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3

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DETS

Summary of Chemical Analysis
Soil Samples

Our Ref 23-20667-0-1
Client Ref 7782
Contract Title SLADEN MILL, HALIFAX ROAD, LITTLEBOROUGH

			Lab No	2225808	2225809	2225810	2225811	2225812	2225813
			.Sample ID	M6	M7	M7	M7	M8	M8
			Depth	3.70	1.20	2.00	2.60	1.20	2.00
			Other ID	914	894	895	895	922	922
			Sample Type	C	C	C	C	C	C
			Sampling Date	08/08/2023	08/08/2023	08/08/2023	08/08/2023	08/08/2023	08/08/2023
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Asbestos Quantification	DETSC 1102	0.001	%						
Preparation									
Stones >10mm	DETSC 1003*	1	% m/m	7.0	21	28	23	3.0	24
Moisture Content	DETSC 1004	0.1	%	15	7.4	7.1	8.1	13	16
Metals									
Arsenic	DETSC 2301#	0.2	mg/kg	5.4	4.8	2.2	3.8	5.8	9.5
Boron, Water Soluble (2.5:1)	DETSC 2311#	0.2	mg/kg	0.3	< 0.2	< 0.2	< 0.2	0.7	0.9
Cadmium	DETSC 2301#	0.1	mg/kg	0.3	< 0.1	0.1	0.1	0.5	0.4
Chromium	DETSC 2301#	0.15	mg/kg	18	6.9	4.2	11	10	17
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	22	9.3	9.0	15	38	31
Lead	DETSC 2301#	0.3	mg/kg	15	13	3.7	9.0	52	130
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05	0.07	< 0.05
Molybdenum	DETSC 2301#	0.4	mg/kg	1.1	0.9	0.5	< 0.4	1.8	4.5
Nickel	DETSC 2301#	1	mg/kg	24	8.0	15	14	12	21
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	64	20	19	26	94	86
Inorganics									
pH	DETSC 2008#		pH	5.7	8.2	5.8	5.1	7.7	6.6
Cyanide, Total	DETSC 2130#	0.1	mg/kg	0.1	< 0.1	< 0.1	< 0.1	0.1	0.4
Organic matter	DETSC 2002#	0.1	%	4.2	1.7	1.8	1.2	4.3	4.0
Sulphide	DETSC 2024*	10	mg/kg	24	32	12	140	< 10	12
Sulphur (free)	DETSC 3049#	0.75	mg/kg	7.9	< 0.75	< 0.75	< 0.75	< 0.75	< 0.75
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.06	0.07	0.11	0.12	0.09	0.09
Petroleum Hydrocarbons									
Aliphatic C5-C6: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16: EH_CU_1D_AL	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Aliphatic C16-C21: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	4.7	< 1.5	4.9	< 1.5
Aliphatic C21-C35: EH_CU_1D_AL	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4	89	< 3.4	51	< 3.4
Aliphatic C35-C44: EH_CU_1D_AL	DETSC 3072*	3.4	mg/kg	< 3.4	< 3.4	35	< 3.4	21	< 3.4
Aliphatic C10-C44: EH_CU_1D_AL	DETSC 3072*	10	mg/kg	< 10	< 10	130	< 10	77	< 10
Aromatic C5-C7: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C8-C10: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C10-C12: EH_CU_1D_AR	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	1.1	< 0.9	< 0.9	< 0.9
Aromatic C12-C16: EH_CU_1D_AR	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	4.7	< 0.5	< 0.5	< 0.5
Aromatic C16-C21: EH_CU_1D_AR	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6	9.8	< 0.6	2.4	< 0.6
Aromatic C21-C35: EH_CU_1D_AR	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4	140	< 1.4	120	< 1.4
Aromatic C35-C44: EH_CU_1D_AR	DETSC 3072*	1.4	mg/kg	< 1.4	< 1.4	86	< 1.4	86	< 1.4

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

DETS

Summary of Chemical Analysis
Soil Samples

Our Ref 23-20667-0-1
Client Ref 7782
Contract Title SLADEN MILL, HALIFAX ROAD, LITTLEBOROUGH

			Lab No	2225808	2225809	2225810	2225811	2225812	2225813
			.Sample ID	M6	M7	M7	M7	M8	M8
			Depth	3.70	1.20	2.00	2.60	1.20	2.00
			Other ID	914	894	895	895	922	922
			Sample Type	C	C	C	C	C	C
			Sampling Date	08/08/2023	08/08/2023	08/08/2023	08/08/2023	08/08/2023	08/08/2023
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Aromatic C10-C44: EH_CU_1D_AR	DETSC 3072*	10	mg/kg	< 10	< 10	240	< 10	210	< 10
Ali/Aro C10-C44: EH_CU_1D_Total	DETSC 3072*	10	mg/kg	< 10	< 10	370	< 10	280	< 10
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
m+p Xylene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
o Xylene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
MTBE	DETSC 3321	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PAHs									
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	0.1	< 0.1
Anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	0.2	< 0.1
Pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	0.1	< 0.1
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	0.1	< 0.1
Chrysene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	0.4	< 0.1
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	0.3	< 0.1
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	0.1	< 0.1
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
PAH 16 Total	DETSC 3301	1.6	mg/kg	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6
Phenols									
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

DETS

Summary of Asbestos Analysis
Soil Samples

Our Ref 23-20667-0-1
Client Ref 7782
Contract Title SLADEN MILL, HALIFAX ROAD, LITTLEBOROUGH

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
2225790	M1 898 1.20	SOIL	NAD	none	Vicky Convery
2225791	M1 898 2.00	SOIL	NAD	none	Vicky Convery
2225792	M1 899 2.60	SOIL	NAD	none	Vicky Convery
2225793	M2 902 1.20	SOIL	Amosite Chrysotile	Amosite and Chrysotile present in microscopic board debris	Vicky Convery
2225794	M2 902 2.00	SOIL	Amosite Chrysotile	Amosite and Chrysotile present as fibre bundles	Vicky Convery
2225795	M2 903 3.00	SOIL	Chrysotile	Chrysotile present as fibre bundles	Vicky Convery
2225796	M3 905 1.20	SOIL	Chrysotile	Chrysotile present as fibre bundles	Vicky Convery
2225797	M3 906 2.00	SOIL	NAD	none	Vicky Convery
2225798	M4 909 1.20	SOIL	NAD	none	Vicky Convery
2225799	M4 909 2.00	SOIL	Chrysotile	Chrysotile present as fibre bundles	Vicky Convery
2225800	M4 910 2.70	SOIL	NAD	none	Vicky Convery
2225801	M5 917 1.20	SOIL	Amosite Chrysotile	Amosite and Chrysotile present in visible and microscopic board fragments	Vicky Convery
2225802	M5 917 2.00	SOIL	Chrysotile Amosite	Chrysotile and Amosite present in microscopic board fragment	Vicky Convery
2225803	M5 918 3.00	SOIL	Chrysotile	Chrysotile present as fibre bundles	Vicky Convery
2225804	M5 919 3.75	SOIL	NAD	none	Vicky Convery
2225805	M6 912 1.20	SOIL	Chrysotile	Chrysotile present as fibre bundles	Vicky Convery
2225806	M6 912 2.00	SOIL	Chrysotile	Chrysotile present as fibre bundles	Vicky Convery
2225807	M6 913 3.00	SOIL	NAD	none	Vicky Convery
2225808	M6 914 3.70	SOIL	NAD	none	Vicky Convery
2225809	M7 894 1.20	SOIL	NAD	none	Vicky Convery
2225810	M7 895 2.00	SOIL	NAD	none	Vicky Convery
2225811	M7 895 2.60	SOIL	NAD	none	Vicky Convery
2225812	M8 922 1.20	SOIL	NAD	none	Vicky Convery
2225813	M8 922 2.00	SOIL	NAD	none	Vicky Convery

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * -not included in laboratory scope of accreditation.

DETS

Summary of Asbestos Quantification Analysis

Soil Samples

Our Ref 23-20667-0-1
Client Ref 7782
Contract Title SLADEN MILL, HALIFAX ROAD, LITTLEBOROUGH

		Lab No	2225793	2225794	2225795	2225796
		.Sample ID	M2	M2	M2	M3
		Depth	1.20	2.00	3.00	1.20
		Other ID	902	902	903	905
		Sample Type	C	C	C	C
		Sampling Date	08/08/2023	08/08/2023	08/08/2023	08/08/2023
		Sampling Time				
Test	**Method**	**Units**				
Total Mass% Asbestos (a+b+c)	DETSC 1102	Mass %	**< 0.001**	**0.011**	**0.003**	**0.007**
Gravimetric Quantification (a)	DETSC 1102	Mass %	0.001	na	na	na
Detailed Gravimetric Quantification (b)	DETSC 1102	Mass %	na	0.011	0.003	0.007
Quantification by PCOM (c)	DETSC 1102	Mass %	na	na	na	na
Potentially Respirable Fibres (d)	DETSC 1102	Fibres/g	na	na	na	na
Breakdown of Gravimetric Analysis (a)						
Mass of Sample		g	731.63	822.25	657.38	922.86
ACMs present*		type	Board			
Mass of ACM in sample		g	0.01			
% ACM by mass		%	0.00			
% asbestos in ACM		%	40			
% asbestos in sample		%	0.001			
Breakdown of Detailed Gravimetric Analysis (b)						
% Amphibole bundles in sample		Mass %	na	0.001	na	na
% Chrysotile bundles in sample		Mass %	na	0.009	0.003	0.007
Breakdown of PCOM Analysis (c)						
% Amphibole fibres in sample		Mass %	na	na	na	na
% Chrysotile fibres in sample		Mass %	na	na	na	na
Breakdown of Potentially Respirable Fibre Analysis (d)						
Amphibole fibres		Fibres/g	na	na	na	na
Chrysotile fibres		Fibres/g	na	na	na	na

* Denotes test or material description outside of UKAS accreditation.
% asbestos in Asbestos Containing Materials (ACMs) is determined by by reference to HSG 264.
Recommended sample size for quantification is approximately 1kg
denotes deviating sample

DETS

Summary of Asbestos Quantification Analysi

Soil Samples

Our Ref 23-20667-0-1
Client Ref 7782
Contract Title SLADEN MILL, HALIFAX ROAD, LITTLEBOROUGH

		Lab No	2225799	2225801		2225802
		.Sample ID	M4	M5		M5
		Depth	2.00	1.20		2.00
		Other ID	909	917		917
		Sample Type	C	C		C
		Sampling Date	08/08/2023	08/08/2023		08/08/2023
		Sampling Time				
Test	**Method**	**Units**				
Total Mass% Asbestos (a+b+c)	DETSC 1102	Mass %	**< 0.001**	**0.289**		**0.002**
Gravimetric Quantification (a)	DETSC 1102	Mass %	na	0.289		0.002
Detailed Gravimetric Quantification (b)	DETSC 1102	Mass %	<0.001	na		na
Quantification by PCOM (c)	DETSC 1102	Mass %	na	na		na
Potentially Respirable Fibres (d)	DETSC 1102	Fibres/g	na	na		na
Breakdown of Gravimetric Analysis (a)						
Mass of Sample		g	646.63	710.81		552.83
ACMs present*		type		Board	Cement	Board
Mass of ACM in sample		g		2.32	7.51	0.03
% ACM by mass		%		0.33	1.06	0.01
% asbestos in ACM		%		40	15	40
% asbestos in sample		%		0.131	0.158	0.002
Breakdown of Detailed Gravimetric Analysis (b)						
% Amphibole bundles in sample		Mass %	na	na		na
% Chrysotile bundles in sample		Mass %	<0.001	na		na
Breakdown of PCOM Analysis (c)						
% Amphibole fibres in sample		Mass %	na	na		na
% Chrysotile fibres in sample		Mass %	na	na		na
Breakdown of Potentially Respirable Fibre Analysis (d)						
Amphibole fibres		Fibres/g	na	na		na
Chrysotile fibres		Fibres/g	na	na		na

* Denotes test or material description outside of UKAS accreditation.
% asbestos in Asbestos Containing Materials (ACMs) is determined by by reference to HSG 264.
Recommended sample size for quantification is approximately 1kg
denotes deviating sample

DETS

Summary of Asbestos Quantification Analysi

Soil Samples

Our Ref 23-20667-0-1
Client Ref 7782
Contract Title SLADEN MILL, HALIFAX ROAD, LITTLEBOROUGH

		Lab No	2225803	2225805	2225806
		.Sample ID	M5	M6	M6
		Depth	3.00	1.20	2.00
		Other ID	918	912	912
		Sample Type	C	C	C
		Sampling Date	08/08/2023	08/08/2023	08/08/2023
		Sampling Time			
Test	**Method**	**Units**			
Total Mass% Asbestos (a+b+c)	DETSC 1102	Mass %	**0.002**	**0.002**	**0.004**
Gravimetric Quantification (a)	DETSC 1102	Mass %	na	na	na
Detailed Gravimetric Quantification (b)	DETSC 1102	Mass %	0.002	0.002	0.004
Quantification by PCOM (c)	DETSC 1102	Mass %	na	na	na
Potentially Respirable Fibres (d)	DETSC 1102	Fibres/g	na	na	na
Breakdown of Gravimetric Analysis (a)					
Mass of Sample		g	620.17	691.32	837.47
ACMs present*		type			
Mass of ACM in sample		g			
% ACM by mass		%			
% asbestos in ACM		%			
% asbestos in sample		%			
Breakdown of Detailed Gravimetric Analysis (b)					
% Amphibole bundles in sample		Mass %	na	na	na
% Chrysotile bundles in sample		Mass %	0.002	0.002	0.004
Breakdown of PCOM Analysis (c)					
% Amphibole fibres in sample		Mass %	na	na	na
% Chrysotile fibres in sample		Mass %	na	na	na
Breakdown of Potentially Respirable Fibre Analysis (d)					
Amphibole fibres		Fibres/g	na	na	na
Chrysotile fibres		Fibres/g	na	na	na

* Denotes test or material description outside of UKAS accreditation.
% asbestos in Asbestos Containing Materials (ACMs) is determined by by reference to HSG 264.
Recommended sample size for quantification is approximately 1kg
denotes deviating sample

Information in Support of the Analytical Results

Our Ref 23-20667-0-1
Client Ref 7782
Contract SLADEN MILL, HALIFAX ROAD, LITTLEBOROUGH

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2225790	M1 1.20 SOIL	08/08/23	GJ 250ml, GJ 60ml, PT 1L		
2225791	M1 2.00 SOIL	08/08/23	GJ 250ml, GJ 60ml, PT 1L		
2225792	M1 2.60 SOIL	08/08/23	GJ 250ml, GJ 60ml, PT 1L		
2225793	M2 1.20 SOIL	08/08/23	GJ 250ml, GJ 60ml, PT 1L		
2225794	M2 2.00 SOIL	08/08/23	GJ 250ml, GJ 60ml, PT 1L		
2225795	M2 3.00 SOIL	08/08/23	GJ 250ml, GJ 60ml, PT 1L		
2225796	M3 1.20 SOIL	08/08/23	GJ 250ml, GJ 60ml, PT 1L		
2225797	M3 2.00 SOIL	08/08/23	GJ 250ml, GJ 60ml, PT 1L		
2225798	M4 1.20 SOIL	08/08/23	GJ 250ml, GJ 60ml, PT 1L		
2225799	M4 2.00 SOIL	08/08/23	GJ 250ml, GJ 60ml, PT 1L		
2225800	M4 2.70 SOIL	08/08/23	GJ 250ml, GJ 60ml, PT 1L		
2225801	M5 1.20 SOIL	08/08/23	GJ 250ml, GJ 60ml, PT 1L		
2225802	M5 2.00 SOIL	08/08/23	GJ 250ml, GJ 60ml, PT 1L		
2225803	M5 3.00 SOIL	08/08/23	GJ 250ml, GJ 60ml, PT 1L		
2225804	M5 3.75 SOIL	08/08/23	GJ 250ml, GJ 60ml, PT 1L		
2225805	M6 1.20 SOIL	08/08/23	GJ 250ml, GJ 60ml, PT 1L		
2225806	M6 2.00 SOIL	08/08/23	GJ 250ml, GJ 60ml, PT 1L		
2225807	M6 3.00 SOIL	08/08/23	GJ 250ml, GJ 60ml, PT 1L		
2225808	M6 3.70 SOIL	08/08/23	GJ 250ml, GJ 60ml, PT 1L		
2225809	M7 1.20 SOIL	08/08/23	GJ 250ml, GJ 60ml, PT 1L		
2225810	M7 2.00 SOIL	08/08/23	GJ 250ml, GJ 60ml, PT 1L		
2225811	M7 2.60 SOIL	08/08/23	GJ 250ml, GJ 60ml, PT 1L		
2225812	M8 1.20 SOIL	08/08/23	GJ 250ml, GJ 60ml, PT 1L		
2225813	M8 2.00 SOIL	08/08/23	GJ 250ml, GJ 60ml, PT 1L		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

DETS

Information in Support of the Analytical Results

List of HWOL Acronyms and Operators

Acronym	Description
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
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total

Det	Acronym
Aliphatic C5-C6	HS_1D_AL
Aliphatic C6-C8	HS_1D_AL
Aliphatic C8-C10	HS_1D_AL
Aliphatic C10-C12	EH_CU_1D_AL
Aliphatic C12-C16	EH_CU_1D_AL
Aliphatic C16-C21	EH_CU_1D_AL
Aliphatic C21-C35	EH_CU_1D_AL
Aliphatic C35-C44	EH_CU_1D_AL
Aliphatic C10-C44	EH_CU_1D_AL
Aromatic C5-C7	HS_1D_AR
Aromatic C7-C8	HS_1D_AR
Aromatic C8-C10	HS_1D_AR
Aromatic C10-C12	EH_CU_1D_AR
Aromatic C12-C16	EH_CU_1D_AR
Aromatic C16-C21	EH_CU_1D_AR
Aromatic C21-C35	EH_CU_1D_AR
Aromatic C35-C44	EH_CU_1D_AR
Aromatic C10-C44	EH_CU_1D_AR
Ali/Aro C10-C44	EH_CU_1D_Total

End of Report

4.13. Certification - Soil Sampling Investigation 08.08.2023

envirolab
Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 23/07983
Issue Number: 1 **Date:** 23 August, 2023

Client:
T J Booth Associates
20a East Gate Street
Rochdale
Rochdale
Greater Manchester
UK
OL16 1DH

Project Manager: Daniel Slattery
Project Name: Sladen Mill, Littleborough
Project Ref: Not specified
Order No: N/A
Date Samples Received: 09/08/23
Date Instructions Received: 14/08/23
Date Analysis Completed: 23/08/23

Approved by:

Richard Wong
Client Manager

mCERTS
UKAS TESTING
1247

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Envirolab Job Number: 23/07983

Client Project Name: Sladen Mill, Littleborough

Client Project Ref: Not specified

Lab Sample ID	23/07983/1	23/07983/2						Units	Limit of Detection	Method ref
Client Sample No	S1	S2								
Client Sample ID	WAC#1	WAC#2								
Depth to Top	0.20	0.20								
Depth To Bottom	0.40	0.40								
Date Sampled	08-Aug-23	08-Aug-23								
Sample Type	SOIL	SOIL								
Sample Matrix Code	6ABE	4AE								
% Stones >10mm$_A$	<0.1	<0.1						% w/w	0.1	A-T-044
pH$_D^{M\#}$	9.25	7.97						pH	0.01	A-T-031s
Sulphate (acid soluble)$_D^{M\#}$	1500	840						mg/kg	200	A-T-028s
Cyanide (total)$_A^{M\#}$	<1	<1						mg/kg	1	A-T-042sTCN
Phenols - Total by HPLC$_A$	<0.2	<0.2						mg/kg	0.2	A-T-050s
Sulphide$_A$	38	22						mg/kg	5	A-T-043-s
Sulphur (elemental)$_D^{M\#}$	12	16						mg/kg	5	A-T-029s
Organic Matter$_D^{M\#}$	6.6	7.6						% w/w	0.1	A-T-032s
Arsenic$_D^{M\#}$	14	9						mg/kg	1	A-T-024s
Boron (water soluble)$_D^{M\#}$	<1.0	<1.0						mg/kg	1	A-T-027s
Cadmium$_D^{M\#}$	1.0	1.0						mg/kg	0.5	A-T-024s
Copper$_D^{M\#}$	40	45						mg/kg	1	A-T-024s
Chromium$_D^{M\#}$	23	23						mg/kg	1	A-T-024s
Chromium (hexavalent)$_D$	<1	<1						mg/kg	1	A-T-040s
Lead$_D^{M\#}$	62	58						mg/kg	1	A-T-024s
Mercury$_D$	0.91	0.43						mg/kg	0.17	A-T-024s
Nickel$_D^{M\#}$	21	24						mg/kg	1	A-T-024s
Selenium$_D^{M\#}$	<1	<1						mg/kg	1	A-T-024s
Zinc$_D^{M\#}$	106	117						mg/kg	5	A-T-024s

envirolab

Envirolab Job Number: 23/07983

Client Project Name: Sladen Mill, Littleborough

Client Project Ref: Not specified

Lab Sample ID	23/07983/1	23/07983/2						Units	Limit of Detection	Method ref
Client Sample No	S1	S2								
Client Sample ID	WAC#1	WAC#2								
Depth to Top	0.20	0.20								
Depth To Bottom	0.40	0.40								
Date Sampled	08-Aug-23	08-Aug-23								
Sample Type	SOIL	SOIL								
Sample Matrix Code	6ABE	4AE								
Asbestos in Soil (inc. matrix)										
Asbestos in soil[D#]	NAD	NAD								A-T-045
Asbestos Matrix (visual)[D]	-	-								A-T-045
Asbestos Matrix (microscope)[D]	-	-								A-T-045
Asbestos ACM - Suitable for Water Absorption Test?[D]	N/A	N/A								A-T-045

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Envirolab Job Number: 23/07983

Client Project Name: Sladen Mill, Littleborough

Client Project Ref: Not specified

Lab Sample ID	23/07983/1	23/07983/2						Units	Limit of Detection	Method ref
Client Sample No	S1	S2								
Client Sample ID	WAC#1	WAC#2								
Depth to Top	0.20	0.20								
Depth To Bottom	0.40	0.40								
Date Sampled	08-Aug-23	08-Aug-23								
Sample Type	SOIL	SOIL								
Sample Matrix Code	6ABE	4AE								
PAH-16MS										
Acenaphthene$_{A}^{M\#}$	0.16	0.06						mg/kg	0.01	A-T-019s
Acenaphthylene$_{A}^{M\#}$	0.08	0.02						mg/kg	0.01	A-T-019s
Anthracene$_{A}^{M\#}$	0.25	0.16						mg/kg	0.02	A-T-019s
Benzo(a)anthracene$_{A}^{M\#}$	0.99	0.71						mg/kg	0.04	A-T-019s
Benzo(a)pyrene$_{A}^{M\#}$	0.90	0.73						mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene$_{A}^{M\#}$	1.06	0.88						mg/kg	0.05	A-T-019s
Benzo(ghi)perylene$_{A}^{M\#}$	0.48	0.48						mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene$_{A}^{M\#}$	0.40	0.32						mg/kg	0.07	A-T-019s
Chrysene$_{A}^{M\#}$	1.00	0.79						mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene$_{A}$	0.14	0.12						mg/kg	0.04	A-T-019s
Fluoranthene$_{A}^{M\#}$	1.84	1.38						mg/kg	0.08	A-T-019s
Fluorene$_{A}^{M\#}$	0.11	0.05						mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene$_{A}^{M\#}$	0.63	0.57						mg/kg	0.03	A-T-019s
Naphthalene $_{A}^{M\#}$	0.19	0.04						mg/kg	0.03	A-T-019s
Phenanthrene$_{A}^{M\#}$	0.97	0.61						mg/kg	0.03	A-T-019s
Pyrene$_{A}^{M\#}$	1.84	1.25						mg/kg	0.07	A-T-019s
Total PAH-16MS$_{A}$	11	8.17						mg/kg	0.01	A-T-019s

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Report Notes

General
This report shall not be reproduced, except in full, without written approval from Envirolab.
The results reported herein relate only to the material supplied to the laboratory.
The residue of any samples contained within this report, and any received within the same delivery, will be disposed of **six weeks** after the initial scheduling. For samples tested for Asbestos we will retain a portion of the dried sample for a minimum of **six months** after the initial Asbestos testing is completed.
Analytical results reflect the quality of the sample at the time of analysis only.
Opinions and Interpretations expressed are outside our scope of accreditation.
The client Sample No, Client Sample ID, Depth to top, Depth to Bottom and Date Sampled are all provided by the client.
A deviating sample report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

Key

Superscript "#"	Accredited to ISO 17025
Superscript "M"	Accredited to MCertS
Superscript "U"	Individual result not accredited
None of the above symbols	Analysis unaccredited
Subscript "A"	Analysis performed on as-received Sample
Subscript "D"	Analysis performed on the dried sample, crushed to pass 2mm sieve.
Subscript "^"	Analysis has dependant options against results. Details appear in the comments of your Sample receipt
IS	Insufficient Sample for analysis
US	Unsuitable Sample for analysis
NDP	No Determination Possible
NAD	No Asbestos Detected
N/A	Not applicable

Asbestos
Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.
Stones etc. are not removed from the sample prior to analysis
Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing, and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Assigned Matrix Codes

1	SAND	6	CLAY/LOAM	A	Contains Stones
2	LOAM	7	OTHER	B	Contains Construction Rubble
3	CLAY	8	Asbestos Bulk (Only Asbestos ID accredited)	C	Contains visible hydrocarbons
4	LOAM/SAND	9	Incinerator Ash (some Metals accredited)	D	Contains glass / metal
5	SAND/CLAY			E	Contains roots / twigs
Note: 7,8,9 matrices are not covered by our ISO 17025 or MCertS accreditation, unless stated above.					

Soil Chemical Analysis:
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.
For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts
All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH by method A-T-007:
For waters, free and visible oils are excluded from the sample used for analysis, so the reported result represents the dissolved phase only.
Results "with Clean up" indicates samples cleaned up with Silica during extraction.

EPH CWG (method A-T-055) from TPH CWG:
EPH CWG results have humics mathematically subtracted through instrument calculation.
Where these humic substances have been identified in any IDs from "TPH CWG with clean up" please note that the concentration is **NOT** included in the quantified results but present in the ID for information.

Electrical Conductivity of water by method A-T-037:
Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the accreditation range and as such are unaccredited.

Please contact your client manager if you require any further information.

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Envirolab Deviating Samples Report

Units 7&8 Sandpits Business Park, Mottram Road, Hyde, SK14 3AR
Tel. 0161 368 4921 email. ask@envlab.co.uk

Client: T J Booth Associates, 20a East Gate Street, Rochdale, Rochdale, Greater Manchester, UK, OL16 1DH

Project: Sladen Mill, Littleborough

Clients Project No:

Project No: 23/07983

Date Received: 14/08/2023 (am)

Cool Box Temperatures (°C): 18.8

Lab Sample ID	23/07983/1	23/07983/2
Client Sample No	S1	S2
Client Sample ID/Depth	WAC#1 0.20-0.40m	WAC#2 0.20-0.40m
Date Sampled	08/08/23	08/08/23
Deviation Code		
F	✓	✓

Key
F *Maximum holding time exceeded between sampling date and analysis for analytes listed below*

HOLDING TIME EXCEEDANCES

Lab Sample ID	23/07983/1	23/07983/2
Client Sample No	S1	S2
Client Sample ID/Depth	WAC#1 0.20-0.40m	WAC#2 0.20-0.40m
Date Sampled	08/08/23	08/08/23
Sulphide	✓	✓

Note: If, at any point before reaching the laboratory, the temperature of the samples has breached those set in published standards, e.g. BS-EN 5667-3 (for water samples 5 ± 3°C), ISO 18400-105:2017, then the concentration of any affected analytes may differ from that at the time of sampling.

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Envirolab Analysis Dates

Lab Sample ID	23/07983/1	23/07983/2
Client Sample No	S1	S2
Client Sample ID/Depth	WAC#1 0.20-0.40m	WAC#2 0.20-0.40m
Date Sampled	08/08/23	08/08/23
A-T-004s	18/08/2023	18/08/2023
A-T-007s	21/08/2023	21/08/2023
A-T-019s	23/08/2023	23/08/2023
A-T-022s	18/08/2023	18/08/2023
A-T-024s	22/08/2023	22/08/2023
A-T-025w	23/08/2023	23/08/2023
A-T-026w	23/08/2023	23/08/2023
A-T-026w (F)	23/08/2023	23/08/2023
A-T-027s	22/08/2023	22/08/2023
A-T-028s	22/08/2023	22/08/2023
A-T-029s	21/08/2023	21/08/2023
A-T-031s	21/08/2023	21/08/2023
A-T-031w	23/08/2023	23/08/2023
A-T-032s	22/08/2023	22/08/2023
A-T-032w	23/08/2023	23/08/2023
A-T-037w	23/08/2023	23/08/2023
A-T-040s	21/08/2023	21/08/2023
A-T-042sTCN	18/08/2023	18/08/2023
A-T-043-s	21/08/2023	21/08/2023
A-T-044	18/08/2023	18/08/2023
A-T-045	18/08/2023	18/08/2023
A-T-050s	21/08/2023	21/08/2023
A-T-050w	23/08/2023	23/08/2023
Calc-no stones	23/08/2023	23/08/2023
Probe (w)	23/08/2023	23/08/2023

The above dates are the analysis completion dates, please note that these are not necessarily the date that the analysis was weighed/extracted.

End of Report

4.14. Certification - Groundwater Sampling Investigation 22.08.2023 - 07.09.2023.

DETS

Certificate of Analysis

Certificate Number	23-20666	*Issued:*	15-Sep-23
Client	Sub Surface Laboratories Ltd 3 Peel Street Preston Lancashire PR2 2QS		
Our Reference	23-20666		
Client Reference	7782		
Order No	(not supplied)		
Contract Title	SLADEN MILL, HALIFAX ROAD, LITTLEBORUGH		
Description	6 Water samples.		
Date Received	30-Aug-23		
Date Started	30-Aug-23		
Date Completed	15-Sep-23		
Test Procedures	Identified by prefix DETSn (details on request).		
Notes	Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.		

Approved By

Kirk Bridgewood
General Manager

ilac-MRA UKAS TESTING 2139

Derwentside Environmental Testing Services Limited
Unit 2, Park Road Industrial Estate South, Consett, Co Durham, DH8 5PY
Tel: 01207 582333 • email: info@dets.co.uk • www.dets.co.uk

DETS

Summary of Chemical Analysis
Water Samples

Our Ref 23-20666
Client Ref 7782
Contract Title SLADEN MILL, HALIFAX ROAD, LITTLEBORUGH

			Lab No	2225784	2225785	2225786	2225787	2225788	2225789
			.Sample ID	M2	M6	M3	M4	M8	M1
			Depth	1.80	2.62	1.45	2.11	1.57	0.40
			Other ID	551-553	560-561	556	559	547	548-550
			Sample Type	WATER	WATER	WATER	WATER	WATER	WATER
			Sampling Date	22/08/2023	22/08/2023	22/08/2023	22/08/2023	22/08/2023	22/08/2023
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Metals									
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	3.8	3.3	0.53	2.4	2.0	0.23
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	0.06	< 0.03	< 0.03	0.12	< 0.03	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25	0.38	0.26	0.33	< 0.25	< 0.25
Chromium, Hexavalent	DETSC 2203	0.007	mg/l	< 0.007	< 0.007				< 0.007
Copper, Dissolved	DETSC 2306	0.4	ug/l	2.3	0.5	2.0	15	0.8	0.6
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.28	0.10	< 0.09	0.22	< 0.09	0.09
Mercury, Dissolved	DETSC 2306	0.01	ug/l	0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	6.7	4.5	1.1	11	1.6	< 0.5
Selenium, Dissolved	DETSC 2306	0.25	ug/l	11	0.88	1.0	2.7	0.44	0.69
Zinc, Dissolved	DETSC 2306	1.3	ug/l	50	25	20	16	5.1	7.8
Inorganics									
pH	DETSC 2008		pH	7.7	6.5				6.9
Cyanide, Total	DETSC 2130	0.04	mg/l	< 0.04	< 0.04				< 0.04
Dissolved Organic Carbon	DETSC 2085	2	mg/l	14	10				< 2.0
Total Hardness as CaCO3	DETSC 2303	0.1	mg/l	367	273	135	781	220	114
Sulphate as SO4	DETSC 2055	0.1	mg/l	91	140				25
Sulphur as S, Total	DETSC 2320*	10	mg/l	95	120				13
Petroleum Hydrocarbons									
Aliphatic C5-C6: HS_1D_AL	DETSC 3322	0.1	ug/l	< 0.1	< 0.1				< 0.1
Aliphatic C6-C8: HS_1D_AL	DETSC 3322	0.1	ug/l	< 0.1	< 0.1				< 0.1
Aliphatic C8-C10: HS_1D_AL	DETSC 3322	0.1	ug/l	< 0.1	< 0.1				< 0.1
Aliphatic C10-C12: EH_CU_1D_AL	DETSC 3072*	1	ug/l	1.6	< 1.0				< 1.0
Aliphatic C10-C44: EH_CU_1D_AL	DETSC 3072*	1	ug/l	260	< 1.0				< 1.0
Aliphatic C12-C16: EH_CU_1D_AL	DETSC 3072*	1	ug/l	5.4	< 1.0				< 1.0
Aliphatic C16-C21: EH_CU_1D_AL	DETSC 3072*	1	ug/l	24	< 1.0				< 1.0
Aliphatic C21-C35: EH_CU_1D_AL	DETSC 3072*	1	ug/l	130	< 1.0				< 1.0
Aliphatic C35-C44: EH_CU_1D_AL	DETSC 3072*	1	ug/l	95	< 1.0				< 1.0
Aromatic C5-C7: HS_1D_AR	DETSC 3322	0.1	ug/l	< 0.1	< 0.1				< 0.1
Aromatic C7-C8: HS_1D_AR	DETSC 3322	0.1	ug/l	< 0.1	< 0.1				< 0.1
Aromatic C8-C10: HS_1D_AR	DETSC 3322	0.1	ug/l	< 0.1	< 0.1				< 0.1
Aromatic C10-C12: EH_CU_1D_AR	DETSC 3072*	1	ug/l	2.2	< 1.0				< 1.0
Aromatic C12-C16: EH_CU_1D_AR	DETSC 3072*	1	ug/l	5.1	< 1.0				< 1.0
Aromatic C16-C21: EH_CU_1D_AR	DETSC 3072*	1	ug/l	23	< 1.0				< 1.0
Aromatic C21-C35: EH_CU_1D_AR	DETSC 3072*	1	ug/l	140	< 1.0				< 1.0
Aromatic C35-C44: EH_CU_1D_AR	DETSC 3072*	1	ug/l	84	< 1.0				< 1.0
Aromatic C10-C44: EH_CU_1D_AR	DETSC 3072*	1	ug/l	270	< 1.0				< 1.0
Ali/Aro C10-C44: EH_CU_1D_Total	DETSC 3072*	1	ug/l	530	< 1.0				< 1.0
Benzene	DETSC 3322	1	ug/l	< 1.0	< 1.0				< 1.0
Toluene	DETSC 3322	1	ug/l	< 1.0	< 1.0				< 1.0
Ethylbenzene	DETSC 3322	1	ug/l	< 1.0	< 1.0				< 1.0
Xylene	DETSC 3322	1	ug/l	< 1.0	< 1.0				< 1.0

Key: * -not accredited. n/s -not supplied.

DETS

Summary of Chemical Analysis
Water Samples

Our Ref 23-20666
Client Ref 7782
Contract Title SLADEN MILL, HALIFAX ROAD, LITTLEBORUGH

			Lab No	2225784	2225785	2225786	2225787	2225788	2225789
			.Sample ID	M2	M6	M3	M4	M8	M1
			Depth	1.80	2.62	1.45	2.11	1.57	0.40
			Other ID	551-553	560-561	556	559	547	548-550
			Sample Type	WATER	WATER	WATER	WATER	WATER	WATER
			Sampling Date	22/08/2023	22/08/2023	22/08/2023	22/08/2023	22/08/2023	22/08/2023
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
MTBE	DETSC 3322	1	ug/l	< 1.0	< 1.0				< 1.0
PAHs									
Naphthalene	DETSC 3304	0.05	ug/l	< 0.05	< 0.05				< 0.05
Acenaphthylene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01				< 0.01
Acenaphthene	DETSC 3304	0.01	ug/l	0.02	0.01				< 0.01
Fluorene	DETSC 3304	0.01	ug/l	0.01	0.01				< 0.01
Phenanthrene	DETSC 3304	0.01	ug/l	0.06	0.06				< 0.01
Anthracene	DETSC 3304	0.01	ug/l	0.01	0.01				< 0.01
Fluoranthene	DETSC 3304	0.01	ug/l	0.08	0.08				< 0.01
Pyrene	DETSC 3304	0.01	ug/l	0.06	0.06				< 0.01
Benzo(a)anthracene	DETSC 3304*	0.01	ug/l	0.02	0.02				< 0.01
Chrysene	DETSC 3304	0.01	ug/l	0.04	0.04				< 0.01
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	0.04	0.04				< 0.01
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	0.01	0.01				< 0.01
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	0.03	0.03				< 0.01
Indeno(1,2,3-c,d)pyrene	DETSC 3304	0.01	ug/l	0.02	0.02				< 0.01
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01				< 0.01
Benzo(g,h,i)perylene	DETSC 3304	0.01	ug/l	0.02	0.02				< 0.01
PAH Total	DETSC 3304	0.2	ug/l	0.41	0.40				< 0.20
Phenols									
Phenol - Monohydric	DETSC 2130	0.1	mg/l	< 0.1	< 0.1				< 0.1

Key: * -not accredited. n/s -not supplied.

DETS

Information in Support of the Analytical Results

Our Ref 23-20666
Client Ref 7782
Contract SLADEN MILL, HALIFAX ROAD, LITTLEBOROUGH

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2225784	M2 1.80 WATER	22/08/23	GB 1L, GV, PB 1L	Aliphatics/Aromatics (4 days), Chromium, Hexavalent (4 days), Hardness (7 days), Kone (4 days), pH/Cond/TDS (1 days), PAH MS (4 days)	
2225785	M6 2.62 WATER	22/08/23	GB 1L, GV	Aliphatics/Aromatics (4 days), Chromium, Hexavalent (4 days), Hardness (7 days), Kone (4 days), pH/Cond/TDS (1 days), PAH MS (4 days)	
2225786	M3 1.45 WATER	22/08/23	GV	Hardness (7 days)	
2225787	M4 2.11 WATER	22/08/23	GV	Hardness (7 days)	
2225788	M8 1.57 WATER	22/08/23	GV	Hardness (7 days)	
2225789	M1 0.40 WATER	22/08/23	GB 1L, GV, PB 1L	Aliphatics/Aromatics (4 days), Chromium, Hexavalent (4 days), Hardness (7 days), Kone (4 days), pH/Cond/TDS (1 days), PAH MS (4 days)	

Key: G-Glass P-Plastic B-Bottle V-Vial

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

DETS

Information in Support of the Analytical Results

List of HWOL Acronyms and Operators

Acronym	Description
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
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total

Det	Acronym
Aliphatic C5-C6	HS_1D_AL
Aliphatic C6-C8	HS_1D_AL
Aliphatic C8-C10	HS_1D_AL
Aliphatic C10-C12	EH_CU_1D_AL
Aliphatic C10-C44	EH_CU_1D_AL
Aliphatic C12-C16	EH_CU_1D_AL
Aliphatic C16-C21	EH_CU_1D_AL
Aliphatic C21-C35	EH_CU_1D_AL
Aliphatic C35-C44	EH_CU_1D_AL
Aromatic C5-C7	HS_1D_AR
Aromatic C7-C8	HS_1D_AR
Aromatic C8-C10	HS_1D_AR
Aromatic C10-C12	EH_CU_1D_AR
Aromatic C12-C16	EH_CU_1D_AR
Aromatic C16-C21	EH_CU_1D_AR
Aromatic C21-C35	EH_CU_1D_AR
Aromatic C35-C44	EH_CU_1D_AR
Aromatic C10-C44	EH_CU_1D_AR
Ali/Aro C10-C44	EH_CU_1D_Total

End of Report

Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US
Tel: (01244) 528777
email: hawardencustomerservices@alsglobal.com
Website: www.alsenvironmental.co.uk

Sub Surface Laboratories Ltd
3 Peel Street
Preston
Lancashire
PR2 2QS

Attention: David Ravenscroft-Jones

CERTIFICATE OF ANALYSIS

Date of report Generation:	12 September 2023
Customer:	Sub Surface Laboratories Ltd
Sample Delivery Group (SDG):	230907-56
Your Reference:	7782
Location:	SLADEN MILL, LITTLEBOROUGH
Report No:	703529
Order Number:	

We received 7 samples on Thursday September 07, 2023 and 7 of these samples were scheduled for analysis which was completed on Tuesday September 12, 2023. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Laboratories (UK) Limited Hawarden.

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.
Incorrect sampling dates and/or sample information will affect the validity of results.
The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:



Sonia McWhan
Operations Manager

ALS Laboratories (UK) Limited. Registered Office: Torrington Avenue, Coventry CV4 9GU. Registered in England and Wales No. 02391955.
Version: 3.6 Version Issued: 12/09/2023

Validated

CERTIFICATE OF ANALYSIS

SDG: 230907-56 **Report Number:** 703529 **Superseded Report:**
Client Ref.: 7782 **Location:** SLADEN MILL, LITTLEBOROUGH

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
28593551	FIELD BLANK			05/09/2023
28593552	M1		0.30	05/09/2023
28593553	M2		1.50	05/09/2023
28593554	M3		2.00	05/09/2023
28593555	M4			05/09/2023
28593556	M6			05/09/2023
28593557	M8			05/09/2023

Only received samples which have had analysis scheduled will be shown on the following pages.

10:56:28 12/09/2023

Validated

CERTIFICATE OF ANALYSIS

SDG: 230907-56 Report Number: 703529 Superseded Report:
Client Ref.: 7782 Location: SLADEN MILL, LITTLEBOROUGH

Results Legend
X Test
N No Determination Possible

Sample Types -
S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Lab Sample No(s)			28593551	28593552	28593553	28593554	28593555	28593556	28593557
Customer Sample Reference			FIELD BLANK	M1	M2	M3	M4	M6	M8
AGS Reference									
Depth (m)				0.30	1.50	2.00			
Container			Digitube fo PFAS analysis.	Digitube fo PFAS analysis.	Digitube fo PFAS analysis.	Digitube fo PFAS analysis.	Digitube fo PFAS analysis.	Digitube fo PFAS analysis.	Digitube fo PFAS analysis.
Sample Type			UNL	GW	GW	GW	GW	GW	GW
PFAS Liquids	All	NDPs: 0 Tests: 7							
			X	X	X	X	X	X	X

Validated

CERTIFICATE OF ANALYSIS

SDG: 230907-56 **Report Number:** 703529 **Superseded Report:**
Client Ref.: 7782 **Location:** SLADEN MILL, LITTLEBOROUGH

Results Legend
ISO17025 accredited.
M mCERTS accredited.
aq Aqueous / settled sample.
diss.filt Dissolved / filtered sample.
tot.unfilt Total / unfiltered sample.
* Subcontracted - refer to subcontractor report for accreditation status.
** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F) Trigger breach confirmed
1-4+§@ Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	FIELD BLANK	M1	M2	M3	M4	M6
			Depth (m)	.	0.30	1.50	2.00	.	.
			Sample Type	Unspecified Liquid (UNL)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
			Date Sampled	05/09/2023	05/09/2023	05/09/2023	05/09/2023	05/09/2023	05/09/2023
			Sample Time	.	.	.	.	.	.
			Date Received	07/09/2023	07/09/2023	07/09/2023	07/09/2023	07/09/2023	07/09/2023
			SDG Ref	230907-56	230907-56	230907-56	230907-56	230907-56	230907-56
			Lab Sample No.(s)	28593551	28593552	28593553	28593554	28593555	28593556
			AGS Reference						
PFOA (335-67-1)	<0.65 ng/l	TM337		<0.65	115 #	119 #	212 #	161 #	160 #
Linear PFOS (1763-23-1)	<0.65 ng/l	TM337		<0.65	1.76 #	6.7 #	5.88 #	11.6 #	5.53 #
Branched PFOS	<0.65 ng/l	TM337		<0.65	2.08 #	6.36 #	4.29 #	12.9 #	5.03 #
Total PFOS	<0.65 ng/l	TM337		<0.65	3.84 #	13.1 #	10.2 #	24.5 #	10.6 #

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Validated

CERTIFICATE OF ANALYSIS

SDG: 230907-56 **Report Number:** 703529 **Superseded Report:**
Client Ref.: 7782 **Location:** SLADEN MILL, LITTLEBOROUGH

Results Legend
- # ISO17025 accredited.
- M mCERTS accredited.
- aq Aqueous / settled sample.
- diss.filt Dissolved / filtered sample.
- tot.unfilt Total / unfiltered sample.
- * Subcontracted - refer to subcontractor report for accreditation status.
- ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
- (F) Trigger breach confirmed
- 1-4+§@ Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.					
			M8					
			Depth (m)					
			Sample Type	Ground Water (GW)				
			Date Sampled	05/09/2023				
			Sample Time	-				
			Date Received	07/09/2023				
			SDG Ref	230907-56				
			Lab Sample No.(s)	28593557				
			AGS Reference					
PFOA (335-67-1)	<0.65 ng/l	TM337	49 #					
Linear PFOS (1763-23-1)	<0.65 ng/l	TM337	6.5 #					
Branched PFOS	<0.65 ng/l	TM337	3.38 #					
Total PFOS	<0.65 ng/l	TM337	9.87 #					

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Validated

CERTIFICATE OF ANALYSIS

SDG: 230907-56 **Report Number:** 703529 **Superseded Report:**
Client Ref.: 7782 **Location:** SLADEN MILL, LITTLEBOROUGH

Table of Results - Appendix

Method No	Description
TM337	Analysis of PFAS

NA = not applicable.
Chemical testing (unless subcontracted) performed at ALS Laboratories (UK) Limited Hawarden (Method codes TM).

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Validated

CERTIFICATE OF ANALYSIS

SDG: 230907-56 Report Number: 703529 Superseded Report:
Client Ref.: 7782 Location: SLADEN MILL, LITTLEBOROUGH

Test Completion Dates

Lab Sample No(s)	28593551	28593552	28593553	28593554	28593555	28593556	28593557
Customer Sample Ref.	FIELD BLANK	M1	M2	M3	M4	M6	M8
AGS Ref.							
Depth		0.30	1.50	2.00			
Type	Unspecified	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
PFAS Liquids	12-Sep-2023	12-Sep-2023	12-Sep-2023	12-Sep-2023	12-Sep-2023	12-Sep-2023	12-Sep-2023

10:56:28 12/09/2023

CERTIFICATE OF ANALYSIS

SDG: 230907-56 **Report Number:** 703529 **Superseded Report:**
Client Ref: 7782 **Location:** SLADEN MILL, LITTLEBOROUGH

Appendix

General

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH4 by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 15 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. For dried and crushed preparations of soils volatile loss may occur e.g volatile mercury

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17 Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

18. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

19. **Sample Deviations**

If a sample is classed as deviated then the associated results may be compromised.

1	**Container with Headspace provided for volatiles analysis**
2	**Incorrect container received**
3	**Deviation from method**
4	**Matrix interference**
♦	**Sample holding time exceeded in laboratory**
@	**Sample holding time exceeded due to late arrival of instructions or samples**
§	**Sampled on date not provided**

20. **Asbestos**

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2021), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials and soils are obtained from supplied bulk materials andd soils which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2021).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining.

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

4.15. Certification – Borehole & Soil Sampling Investigation 06.10.2023-13.10.2023

DETS

Certificate of Analysis

Certificate Number 23-24776 *Issued:* 27-Oct-23

Client Sub Surface Laboratories Ltd
3 Peel Street
Preston
Lancashire
PR2 2QS

Our Reference 23-24776
Client Reference 7782A
Order No (not supplied)
Contract Title SLADEN MILL
Description 12 Soil samples.
Date Received 19-Oct-23
Date Started 19-Oct-23
Date Completed 27-Oct-23
Test Procedures Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Kirk Bridgewood
General Manager

ilac-MRA UKAS TESTING 2139

Derwentside Environmental Testing Services Limited
Unit 2, Park Road Industrial Estate South, Consett, Co Durham, DH8 5PY
Tel: 01207 582333 • email: info@dets.co.uk • www.dets.co.uk Page 1 of 10

DETS

Summary of Chemical Analysis
Soil Samples

Our Ref 23-24776
Client Ref 7782A
Contract Title SLADEN MILL

				Lab No	2249915	2249916	2249917	2249918	2249919	2249920
				.Sample ID	M9	M9	M10	M10	M11	M12
				Depth	1.20-2.00	2.00	1.20	1.80	0.30-1.30	1.20
				Other ID	282	283	279	279	285	294
				Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Sampling Date	06/10/2023	06/10/2023	06/10/2023	06/10/2023	06/10/2023	06/10/2023
				Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**							
Asbestos Quantification	DETSC 1102	0.001	%		0.018		0.002			
Preparation										
Stones >10mm	DETSC 1003*	1	% m/m		19	27	16	32	26	2.0
Moisture Content	DETSC 1004	0.1	%		26	20	18	9.3	9.6	23
Metals										
Arsenic	DETSC 2301#	0.2	mg/kg		94	33	44	4.4	4.9	4.0
Boron, Water Soluble (2.5:1)	DETSC 2311#	0.2	mg/kg		0.9	0.6	0.7	0.3	< 0.2	0.7
Cadmium	DETSC 2301#	0.1	mg/kg		0.3	0.4	0.5	< 0.1	0.2	< 0.1
Chromium	DETSC 2301#	0.15	mg/kg		25	16	21	8.1	9.9	26
Chromium, Hexavalent	DETSC 2204*	1	mg/kg		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg		150	210	98	9.1	52	36
Lead	DETSC 2301#	0.3	mg/kg		1100	150	190	18	45	20
Mercury	DETSC 2325#	0.05	mg/kg		0.11	0.13	0.11	< 0.05	< 0.05	< 0.05
Molybdenum	DETSC 2301#	0.4	mg/kg		13	5.6	5.9	2.1	1.2	< 0.4
Nickel	DETSC 2301#	1	mg/kg		79	39	46	12	15	32
Selenium	DETSC 2301#	0.5	mg/kg		2.4	0.9	0.8	0.6	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg		77	130	170	41	69	70
Inorganics										
pH	DETSC 2008#		pH		7.7	8.0	7.9	8.1	8.6	7.0
Cyanide, Total	DETSC 2130#	0.1	mg/kg		0.2	< 0.1	0.3	< 0.1	< 0.1	< 0.1
Organic matter	DETSC 2002#	0.1	%		6.0	3.2	3.4	0.2	1.1	0.8
Sulphide	DETSC 2024*	10	mg/kg		75	68	68	28	< 10	20
Sulphur (free)	DETSC 3049#	0.75	mg/kg		< 0.75	< 0.75	< 0.75	< 0.75	< 0.75	< 0.75
Sulphate as SO4, Total	DETSC 2321#	0.01	%		0.13	0.09	0.12	0.03	0.03	0.06
Petroleum Hydrocarbons										
Aliphatic C5-C6: HS_1D_AL	DETSC 3321*	0.01	mg/kg		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8: HS_1D_AL	DETSC 3321*	0.01	mg/kg		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10: HS_1D_AL	DETSC 3321*	0.01	mg/kg		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg		< 1.5	3.6	< 1.5	< 1.5	1.5	< 1.5
Aliphatic C12-C16: EH_CU_1D_AL	DETSC 3072#	1.2	mg/kg		< 1.2	16	< 1.2	< 1.2	3.4	< 1.2
Aliphatic C16-C21: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg		< 1.5	43	< 1.5	< 1.5	9.8	< 1.5
Aliphatic C21-C35: EH_CU_1D_AL	DETSC 3072#	3.4	mg/kg		< 3.4	240	< 3.4	< 3.4	79	< 3.4
Aliphatic C35-C44: EH_CU_1D_AL	DETSC 3072*	3.4	mg/kg		< 3.4	17	< 3.4	< 3.4	36	< 3.4
Aliphatic C10-C44: EH_CU_1D_AL	DETSC 3072*	10	mg/kg		< 10	320	< 10	< 10	130	< 10
Aromatic C5-C7: HS_1D_AR	DETSC 3321*	0.01	mg/kg		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8: HS_1D_AR	DETSC 3321*	0.01	mg/kg		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C8-C10: HS_1D_AR	DETSC 3321*	0.01	mg/kg		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C10-C12: EH_CU_1D_AR	DETSC 3072#	0.9	mg/kg		1.5	2.3	< 0.9	< 0.9	10	< 0.9
Aromatic C12-C16: EH_CU_1D_AR	DETSC 3072#	0.5	mg/kg		5.0	8.9	< 0.5	< 0.5	7.0	< 0.5
Aromatic C16-C21: EH_CU_1D_AR	DETSC 3072#	0.6	mg/kg		7.2	33	< 0.6	< 0.6	8.3	< 0.6
Aromatic C21-C35: EH_CU_1D_AR	DETSC 3072#	1.4	mg/kg		41	130	< 1.4	< 1.4	130	< 1.4
Aromatic C35-C44: EH_CU_1D_AR	DETSC 3072*	1.4	mg/kg		7.5	31	< 1.4	< 1.4	68	< 1.4
Aromatic C10-C44: EH_CU_1D_AR	DETSC 3072*	10	mg/kg		62	200	< 10	< 10	220	< 10

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

DETS

Summary of Chemical Analysis
Soil Samples

Our Ref 23-24776
Client Ref 7782A
Contract Title SLADEN MILL

			Lab No	2249915	2249916	2249917	2249918	2249919	2249920
			.Sample ID	M9	M9	M10	M10	M11	M12
			Depth	1.20-2.00	2.00	1.20	1.80	0.30-1.30	1.20
			Other ID	282	283	279	279	285	294
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	06/10/2023	06/10/2023	06/10/2023	06/10/2023	06/10/2023	06/10/2023
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Ali/Aro C10-C44: EH_CU_1D_Total	DETSC 3072*	10	mg/kg	62	530	< 10	< 10	350	< 10
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
m+p Xylene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
o Xylene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
MTBE	DETSC 3321	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PAHs									
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	0.9	0.5	< 0.1	< 0.1
Anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	0.2	0.1	< 0.1	< 0.1
Fluoranthene	DETSC 3301	0.1	mg/kg	0.2	0.1	1.8	0.9	< 0.1	< 0.1
Pyrene	DETSC 3301	0.1	mg/kg	0.1	0.1	1.6	0.8	< 0.1	< 0.1
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	0.8	0.4	< 0.1	< 0.1
Chrysene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	0.8	0.4	< 0.1	< 0.1
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	0.7	0.3	< 0.1	< 0.1
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	0.4	0.2	< 0.1	< 0.1
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	1.1	0.7	< 0.1	< 0.1
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	0.8	0.7	< 0.1	< 0.1
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	0.1	0.2	< 0.1	< 0.1
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	0.5	0.3	< 0.1	< 0.1
PAH 16 Total	DETSC 3301	1.6	mg/kg	< 1.6	< 1.6	9.9	5.5	< 1.6	< 1.6
Phenols									
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

DETS

Summary of Chemical Analysis
Soil Samples

Our Ref 23-24776
Client Ref 7782A
Contract Title SLADEN MILL

			Lab No	2249921	2249922	2249923	2249924	2249925	2249926
			.Sample ID	M12	M12	M14	M14	M14	M14
			Depth	2.20	3.70	1.35	1.80	2.40	3.70
			Other ID	295	296	289	289	290	291
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	06/10/2023	06/10/2023	06/10/2023	06/10/2023	06/10/2023	06/10/2023
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Asbestos Quantification	DETSC 1102	0.001	%			0.002	0.58	< 0.001	
Preparation									
Stones >10mm	DETSC 1003*	1	% m/m	1.0	32	22	24	11	1.0
Moisture Content	DETSC 1004	0.1	%	18	13	24	13	16	20
Metals									
Arsenic	DETSC 2301#	0.2	mg/kg	5.2	3.4	12	6.7	8.3	16
Boron, Water Soluble (2.5:1)	DETSC 2311#	0.2	mg/kg	0.4	0.2	0.9	0.5	0.5	1.2
Cadmium	DETSC 2301#	0.1	mg/kg	< 0.1	< 0.1	0.7	0.1	0.3	0.4
Chromium	DETSC 2301#	0.15	mg/kg	12	11	18	650	70	37
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	24	12	110	150	87	35
Lead	DETSC 2301#	0.3	mg/kg	28	7.9	190	68	60	30
Mercury	DETSC 2325#	0.05	mg/kg	0.05	< 0.05	0.78	0.08	0.13	< 0.05
Molybdenum	DETSC 2301#	0.4	mg/kg	1.1	< 0.4	2.3	17	6.4	3.3
Nickel	DETSC 2301#	1	mg/kg	12	25	21	400	48	26
Selenium	DETSC 2301#	0.5	mg/kg	0.6	0.6	0.8	0.8	0.6	1.0
Zinc	DETSC 2301#	1	mg/kg	35	33	160	180	91	140
Inorganics									
pH	DETSC 2008#		pH	6.1	6.6	8.1	8.0	8.7	6.7
Cyanide, Total	DETSC 2130#	0.1	mg/kg	0.2	< 0.1	0.5	0.2	0.1	0.5
Organic matter	DETSC 2002#	0.1	%	3.2	0.4	4.0	2.1	1.6	6.2
Sulphide	DETSC 2024*	10	mg/kg	44	16	28	20	24	200
Sulphur (free)	DETSC 3049#	0.75	mg/kg	10	< 0.75	< 0.75	< 0.75	< 0.75	3.4
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.06	0.06	0.09	0.13	0.09	0.31
Petroleum Hydrocarbons									
Aliphatic C5-C6: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16: EH_CU_1D_AL	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Aliphatic C16-C21: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	4.3	< 1.5	< 1.5
Aliphatic C21-C35: EH_CU_1D_AL	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4	< 3.4	48	< 3.4	< 3.4
Aliphatic C35-C44: EH_CU_1D_AL	DETSC 3072*	3.4	mg/kg	< 3.4	< 3.4	< 3.4	22	< 3.4	< 3.4
Aliphatic C10-C44: EH_CU_1D_AL	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	74	< 10	< 10
Aromatic C5-C7: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C8-C10: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C10-C12: EH_CU_1D_AR	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16: EH_CU_1D_AR	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Aromatic C16-C21: EH_CU_1D_AR	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Aromatic C21-C35: EH_CU_1D_AR	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4	< 1.4	74	< 1.4	< 1.4
Aromatic C35-C44: EH_CU_1D_AR	DETSC 3072*	1.4	mg/kg	< 1.4	< 1.4	< 1.4	42	< 1.4	< 1.4
Aromatic C10-C44: EH_CU_1D_AR	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	120	< 10	< 10

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 23-24776
Client Ref 7782A
Contract Title SLADEN MILL

			Lab No	2249921	2249922	2249923	2249924	2249925	2249926
			.Sample ID	M12	M12	M14	M14	M14	M14
			Depth	2.20	3.70	1.35	1.80	2.40	3.70
			Other ID	295	296	289	289	290	291
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	06/10/2023	06/10/2023	06/10/2023	06/10/2023	06/10/2023	06/10/2023
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Ali/Aro C10-C44: EH_CU_1D_Total	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	190	< 10	< 10
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
m+p Xylene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
o Xylene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
MTBE	DETSC 3321	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PAHs									
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	0.7	1.3	< 0.1	< 0.1
Anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	0.2	< 0.1	< 0.1	< 0.1
Fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	1.0	1.2	< 0.1	< 0.1
Pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	0.9	1.1	< 0.1	< 0.1
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	0.4	0.2	< 0.1	< 0.1
Chrysene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	0.5	0.7	< 0.1	< 0.1
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	0.3	0.4	< 0.1	< 0.1
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	0.2	0.3	< 0.1	< 0.1
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	0.6	0.5	< 0.1	< 0.1
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	0.7	0.6	< 0.1	< 0.1
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	0.1	< 0.1	< 0.1	< 0.1
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	0.4	0.3	< 0.1	< 0.1
PAH 16 Total	DETSC 3301	1.6	mg/kg	< 1.6	< 1.6	5.9	6.6	< 1.6	< 1.6
Phenols									
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	0.8

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

DETS

Summary of Asbestos Analysis
Soil Samples

Our Ref 23-24776
Client Ref 7782A
Contract Title SLADEN MILL

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
2249915	M9 282 1.20-2.00	SOIL	Chrysotile	Chrysotile present in microscopic cement debris & bundles	Keith Wilson
2249916	M9 283 2.00	SOIL	NAD	none	Keith Wilson
2249917	M10 279 1.20	SOIL	Amosite	Bundles of Amosite fibres	Keith Wilson
2249918	M10 279 1.80	SOIL	NAD	none	Keith Wilson
2249919	M11 285 0.30-1.30	SOIL	NAD	none	Keith Wilson
2249920	M12 294 1.20	SOIL	NAD	none	Keith Wilson
2249921	M12 295 2.20	SOIL	NAD	none	Keith Wilson
2249922	M12 296 3.70	SOIL	NAD	none	Keith Wilson
2249923	M14 289 1.35	SOIL	Chrysotile	Bundles of Chrysotile fibres	Keith Wilson
2249924	M14 289 1.80	SOIL	Chrysotile	Chrysotile present in visible & microscopic cement debris	Keith Wilson
2249925	M14 290 2.40	SOIL	Chrysotile	Bundles of Chrysotile fibres	Keith Wilson
2249926	M14 291 3.70	SOIL	NAD	none	Keith Wilson

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * -not included in laboratory scope of accreditation.

DETS

Summary of Asbestos Quantification Analysis
Soil Samples

Our Ref 23-24776
Client Ref 7782A
Contract Title SLADEN MILL

		Lab No	2249915	2249917	2249923	2249924
		.Sample ID	M9	M10	M14	M14
		Depth	1.20-2.00	1.20	1.35	1.80
		Other ID	282	279	289	289
		Sample Type				
		Sampling Date	06/10/2023	06/10/2023	06/10/2023	06/10/2023
		Sampling Time				
Test	**Method**	**Units**				
Total Mass% Asbestos (a+b+c)	DETSC 1102	Mass %	**0.018**	**0.002**	**0.002**	**0.580**
Gravimetric Quantification (a)	DETSC 1102	Mass %	0.015	na	na	0.580
Detailed Gravimetric Quantification (b)	DETSC 1102	Mass %	0.004	0.002	0.002	na
Quantification by PCOM (c)	DETSC 1102	Mass %	na	na	na	na
Potentially Respirable Fibres (d)	DETSC 1102	Fibres/g	na	na	na	na
Breakdown of Gravimetric Analysis (a)						
Mass of Sample		g	617.53	803.24	684.89	551.92
ACMs present*		type	Cement			Cement
Mass of ACM in sample		g	0.62			21.33
% ACM by mass		%	0.10			3.86
% asbestos in ACM		%	15			15
% asbestos in sample		%	0.015			0.580
Breakdown of Detailed Gravimetric Analysis (b)						
% Amphibole bundles in sample		Mass %	na	0.002	na	na
% Chrysotile bundles in sample		Mass %	0.004	na	0.002	na
Breakdown of PCOM Analysis (c)						
% Amphibole fibres in sample		Mass %	na	na	na	na
% Chrysotile fibres in sample		Mass %	na	na	na	na
Breakdown of Potentially Respirable Fibre Analysis (d)						
Amphibole fibres		Fibres/g	na	na	na	na
Chrysotile fibres		Fibres/g	na	na	na	na

* Denotes test or material description outside of UKAS accreditation.
% asbestos in Asbestos Containing Materials (ACMs) is determined by by reference to HSG 264.
Recommended sample size for quantification is approximately 1kg
denotes deviating sample

DETS

Summary of Asbestos Quantification Analysis
Soil Samples

Our Ref 23-24776
Client Ref 7782A
Contract Title SLADEN MILL

Lab No	2249925
.Sample ID	M14
Depth	2.40
Other ID	290
Sample Type	
Sampling Date	06/10/2023
Sampling Time	

Test	Method	Units	
Total Mass% Asbestos (a+b+c)	DETSC 1102	Mass %	**< 0.001**
Gravimetric Quantification (a)	DETSC 1102	Mass %	na
Detailed Gravimetric Quantification (b)	DETSC 1102	Mass %	<0.001
Quantification by PCOM (c)	DETSC 1102	Mass %	na
Potentially Respirable Fibres (d)	DETSC 1102	Fibres/g	na
Breakdown of Gravimetric Analysis (a)			
Mass of Sample		g	467.24
ACMs present*		type	
Mass of ACM in sample		g	
% ACM by mass		%	
% asbestos in ACM		%	
% asbestos in sample		%	
Breakdown of Detailed Gravimetric Analysis (b)			
% Amphibole bundles in sample		Mass %	na
% Chrysotile bundles in sample		Mass %	<0.001
Breakdown of PCOM Analysis (c)			
% Amphibole fibres in sample		Mass %	na
% Chrysotile fibres in sample		Mass %	na
Breakdown of Potentially Respirable Fibre Analysis (d)			
Amphibole fibres		Fibres/g	na
Chrysotile fibres		Fibres/g	na

* Denotes test or material description outside of UKAS accreditation.
% asbestos in Asbestos Containing Materials (ACMs) is determined by by reference to HSG 264.
Recommended sample size for quantification is approximately 1kg
denotes deviating sample

DETS

Information in Support of the Analytical Results

Our Ref 23-24776
Client Ref 7782A
Contract SLADEN MILL

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2249915	M9 1.20-2.00 SOIL	06/10/23	GJ 250ml, GJ 60ml, PT 1L	Sulphur (free) (7 days), pH + Conductivity (7 days)	
2249916	M9 2.00 SOIL	06/10/23	GJ 250ml, GJ 60ml, PT 1L	Sulphur (free) (7 days), pH + Conductivity (7 days)	
2249917	M10 1.20 SOIL	06/10/23	GJ 250ml, GJ 60ml, PT 1L	Sulphur (free) (7 days), pH + Conductivity (7 days)	
2249918	M10 1.80 SOIL	06/10/23	GJ 250ml, GJ 60ml, PT 1L	Sulphur (free) (7 days), pH + Conductivity (7 days)	
2249919	M11 0.30-1.30 SOIL	06/10/23	GJ 250ml, GJ 60ml, PT 1L	Sulphur (free) (7 days), pH + Conductivity (7 days)	
2249920	M12 1.20 SOIL	06/10/23	GJ 250ml, GJ 60ml, PT 1L	Sulphur (free) (7 days), pH + Conductivity (7 days)	
2249921	M12 2.20 SOIL	06/10/23	GJ 250ml, GJ 60ml, PT 1L	Sulphur (free) (7 days), pH + Conductivity (7 days)	
2249922	M12 3.70 SOIL	06/10/23	GJ 250ml, GJ 60ml, PT 1L	Sulphur (free) (7 days), pH + Conductivity (7 days)	
2249923	M14 1.35 SOIL	06/10/23	GJ 250ml, GJ 60ml, PT 1L	Sulphur (free) (7 days), pH + Conductivity (7 days)	
2249924	M14 1.80 SOIL	06/10/23	GJ 250ml, GJ 60ml, PT 1L	Sulphur (free) (7 days), pH + Conductivity (7 days)	
2249925	M14 2.40 SOIL	06/10/23	GJ 250ml, GJ 60ml, PT 1L	Sulphur (free) (7 days), pH + Conductivity (7 days)	
2249926	M14 3.70 SOIL	06/10/23	GJ 250ml, GJ 60ml, PT 1L	Sulphur (free) (7 days), pH + Conductivity (7 days)	

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.
Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.
The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-
Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

DETS

Information in Support of the Analytical Results

List of HWOL Acronyms and Operators

Acronym	Description
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
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total

Det	Acronym
Aliphatic C5-C6	HS_1D_AL
Aliphatic C6-C8	HS_1D_AL
Aliphatic C8-C10	HS_1D_AL
Aliphatic C10-C12	EH_CU_1D_AL
Aliphatic C12-C16	EH_CU_1D_AL
Aliphatic C16-C21	EH_CU_1D_AL
Aliphatic C21-C35	EH_CU_1D_AL
Aliphatic C35-C44	EH_CU_1D_AL
Aliphatic C10-C44	EH_CU_1D_AL
Aromatic C5-C7	HS_1D_AR
Aromatic C7-C8	HS_1D_AR
Aromatic C8-C10	HS_1D_AR
Aromatic C10-C12	EH_CU_1D_AR
Aromatic C12-C16	EH_CU_1D_AR
Aromatic C16-C21	EH_CU_1D_AR
Aromatic C21-C35	EH_CU_1D_AR
Aromatic C35-C44	EH_CU_1D_AR
Aromatic C10-C44	EH_CU_1D_AR
Ali/Aro C10-C44	EH_CU_1D_Total

End of Report

DETS
Certificate of Analysis

Certificate Number 23-25441-0 *Issued:* 07-Dec-23

Client Sub Surface Laboratories Ltd
3 Peel Street
Preston
Lancashire
PR2 2QS

Our Reference 23-25441-0
Client Reference 7782A
Order No (not supplied)
Contract Title Sladen Mill, Halifax Road, Littleborough
Description 4 Soil samples.
Date Received 27-Oct-23
Date Started 27-Oct-23
Date Completed 07-Dec-23
Test Procedures Identified by prefix DETSn (details on request).
Notes **This report supersedes 23-25441, amendments made**
Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Kirk Bridgewood
General Manager

ilac-MRA UKAS TESTING 2139

Derwentside Environmental Testing Services Limited
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Tel: 01207 582333 • email: info@dets.co.uk • www.dets.co.uk

DETS

Summary of Chemical Analysis
Soil Samples

Our Ref 23-25441-0
Client Ref 7782A
Contract Title Sladen Mill, Halifax Road, Littleborough

			Lab No	2254209	2254210	2254211	2254212
			.Sample ID	M13	M13	M13	M13
			Depth	1.00	1.61	2.47	3.50
			Other ID	854	854	853	852
			Sample Type	C	C	C	C
			Sampling Date	13/10/2023	13/10/2023	13/10/2023	13/10/2023
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Asbestos Quantification	DETSC 1102	0.001	%		0.007	0.001	
Preparation							
Moisture Content	DETSC 1004	0.1	%	14	17	17	8.3
Metals							
Arsenic	DETSC 2301#	0.2	mg/kg	9.1	9.2	10	3.0
Boron, Water Soluble (2.5:1)	DETSC 2311#	0.2	mg/kg	0.8	0.4	0.3	< 0.2
Cadmium	DETSC 2301#	0.1	mg/kg	0.4	0.6	0.4	0.1
Chromium	DETSC 2301#	0.15	mg/kg	18	20	18	10
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	38	500	43	12
Lead	DETSC 2301#	0.3	mg/kg	100	110	120	11
Mercury	DETSC 2325#	0.05	mg/kg	0.11	0.14	0.12	< 0.05
Molybdenum	DETSC 2301#	0.4	mg/kg	1.8	2.9	1.8	< 0.4
Nickel	DETSC 2301#	1	mg/kg	25	25	25	16
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	0.7
Zinc	DETSC 2301#	1	mg/kg	200	150	170	51
Inorganics							
pH	DETSC 2008#		pH	7.7	7.8	7.8	7.9
Cyanide, Total	DETSC 2130#	0.1	mg/kg	0.1	0.1	0.1	< 0.1
Organic matter	DETSC 2002#	0.1	%	1.4	2.6	2.1	0.2
Sulphide	DETSC 2024*	10	mg/kg	44	12	12	< 10
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.06	0.05	0.06	0.02
Petroleum Hydrocarbons							
Aliphatic C5-C6: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16: EH_CU_1D_AL	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	< 1.2
Aliphatic C16-C21: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C21-C35: EH_CU_1D_AL	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4	< 3.4	< 3.4
Aliphatic C35-C44: EH_CU_1D_AL	DETSC 3072*	3.4	mg/kg	< 3.4	< 3.4	< 3.4	< 3.4
Aliphatic C10-C44: EH_CU_1D_AL	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10
Aromatic C5-C7: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C8-C10: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C10-C12: EH_CU_1D_AR	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16: EH_CU_1D_AR	DETSC 3072#	0.5	mg/kg	< 0.5	6.2	< 0.5	< 0.5
Aromatic C16-C21: EH_CU_1D_AR	DETSC 3072#	0.6	mg/kg	< 0.6	29	< 0.6	< 0.6
Aromatic C21-C35: EH_CU_1D_AR	DETSC 3072#	1.4	mg/kg	< 1.4	43	< 1.4	< 1.4
Aromatic C35-C44: EH_CU_1D_AR	DETSC 3072*	1.4	mg/kg	< 1.4	< 1.4	< 1.4	< 1.4
Aromatic C10-C44: EH_CU_1D_AR	DETSC 3072*	10	mg/kg	< 10	79	< 10	< 10
Ali/Aro C10-C44: EH_CU_1D_Total	DETSC 3072*	10	mg/kg	< 10	79	< 10	< 10

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

DETS

Summary of Chemical Analysis
Soil Samples

Our Ref 23-25441-0
Client Ref 7782A
Contract Title Sladen Mill, Halifax Road, Littleborough

			Lab No	2254209	2254210	2254211	2254212
			.Sample ID	M13	M13	M13	M13
			Depth	1.00	1.61	2.47	3.50
			Other ID	854	854	853	852
			Sample Type	C	C	C	C
			Sampling Date	13/10/2023	13/10/2023	13/10/2023	13/10/2023
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
m+p Xylene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
o Xylene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
MTBE	DETSC 3321	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
PAHs							
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1	8.3	0.6	< 0.1
Acenaphthylene	DETSC 3301	0.1	mg/kg	< 0.1	3.4	0.8	< 0.1
Acenaphthene	DETSC 3301	0.1	mg/kg	0.2	18	3.8	0.2
Fluorene	DETSC 3301	0.1	mg/kg	0.2	23	3.6	0.2
Phenanthrene	DETSC 3301	0.1	mg/kg	1.0	120	19	1.0
Anthracene	DETSC 3301	0.1	mg/kg	0.3	30	4.7	0.3
Fluoranthene	DETSC 3301	0.1	mg/kg	2.1	140	20	1.6
Pyrene	DETSC 3301	0.1	mg/kg	2.2	130	18	1.7
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	1.0	63	8.3	0.8
Chrysene	DETSC 3301	0.1	mg/kg	1.1	67	8.7	0.8
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	0.6	42	6.8	0.5
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	0.4	25	4.0	0.3
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	1.1	53	7.4	0.8
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	1.2	33	5.0	0.9
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	5.7	0.7	0.1
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	0.7	29	3.8	0.5
PAH 16 Total	DETSC 3301	1.6	mg/kg	12	790	110	9.6
Phenols							
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

DETS

Summary of Asbestos Analysis
Soil Samples

Our Ref 23-25441-0
Client Ref 7782A
Contract Title Sladen Mill, Halifax Road, Littleborough

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
2254209	M13 854 1.00	SOIL	NAD	none	Vicky Convery
2254210	M13 854 1.61	SOIL	Amosite Chrysotile	Amosite and Chrysotile present as fibre bundles	Vicky Convery
2254211	M13 853 2.47	SOIL	Amosite	Amosite present as fibre bundles	Vicky Convery
2254212	M13 852 3.50	SOIL	NAD	none	Vicky Convery

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * -not included in laboratory scope of accreditation.

DETS

Summary of Asbestos Quantification Analysis

Soil Samples

Our Ref 23-25441-0
Client Ref 7782A
Contract Title Sladen Mill, Halifax Road, Littleborough

		Lab No	2254210	2254211
		.Sample ID	M13	M13
		Depth	1.61	2.47
		Other ID	854	853
		Sample Type	C	C
		Sampling Date	13/10/2023	13/10/2023
		Sampling Time		
Test	**Method**	**Units**		
Total Mass% Asbestos (a+b+c)	DETSC 1102	Mass %	**0.007**	**0.001**
Gravimetric Quantification (a)	DETSC 1102	Mass %	na	na
Detailed Gravimetric Quantification (b)	DETSC 1102	Mass %	0.007	0.001
Quantification by PCOM (c)	DETSC 1102	Mass %	na	na
Potentially Respirable Fibres (d)	DETSC 1102	Fibres/g	na	na
Breakdown of Gravimetric Analysis (a)				
Mass of Sample		g	557.33	470.66
ACMs present*		type		
Mass of ACM in sample		g		
% ACM by mass		%		
% asbestos in ACM		%		
% asbestos in sample		%		
Breakdown of Detailed Gravimetric Analysis (b)				
% Amphibole bundles in sample		Mass %	0.005	0.001
% Chrysotile bundles in sample		Mass %	0.002	na
Breakdown of PCOM Analysis (c)				
% Amphibole fibres in sample		Mass %	na	na
% Chrysotile fibres in sample		Mass %	na	na
Breakdown of Potentially Respirable Fibre Analysis (d)				
Amphibole fibres		Fibres/g	na	na
Chrysotile fibres		Fibres/g	na	na

* Denotes test or material description outside of UKAS accreditation.
% asbestos in Asbestos Containing Materials (ACMs) is determined by by reference to HSG 264.
Recommended sample size for quantification is approximately 1kg
denotes deviating sample

DETS

Information in Support of the Analytical Results

Our Ref 23-25441-0
Client Ref 7782A
Contract Sladen Mill, Halifax Road, Littleborough

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2254209	M13 1.00 SOIL	13/10/23	GJ 250ml, GJ 60ml, PT 1L	pH + Conductivity (7 days)	
2254210	M13 1.61 SOIL	13/10/23	GJ 250ml, GJ 60ml, PT 1L	pH + Conductivity (7 days)	
2254211	M13 2.47 SOIL	13/10/23	GJ 250ml, GJ 60ml, PT 1L	pH + Conductivity (7 days)	
2254212	M13 3.50 SOIL	13/10/23	GJ 250ml, GJ 60ml, PT 1L	pH + Conductivity (7 days)	

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

DETS

Information in Support of the Analytical Results

List of HWOL Acronyms and Operators

Acronym	Description
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
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total

Det	Acronym
Aliphatic C5-C6	HS_1D_AL
Aliphatic C6-C8	HS_1D_AL
Aliphatic C8-C10	HS_1D_AL
Aliphatic C10-C12	EH_CU_1D_AL
Aliphatic C12-C16	EH_CU_1D_AL
Aliphatic C16-C21	EH_CU_1D_AL
Aliphatic C21-C35	EH_CU_1D_AL
Aliphatic C35-C44	EH_CU_1D_AL
Aliphatic C10-C44	EH_CU_1D_AL
Aromatic C5-C7	HS_1D_AR
Aromatic C7-C8	HS_1D_AR
Aromatic C8-C10	HS_1D_AR
Aromatic C10-C12	EH_CU_1D_AR
Aromatic C12-C16	EH_CU_1D_AR
Aromatic C16-C21	EH_CU_1D_AR
Aromatic C21-C35	EH_CU_1D_AR
Aromatic C35-C44	EH_CU_1D_AR
Aromatic C10-C44	EH_CU_1D_AR
Ali/Aro C10-C44	EH_CU_1D_Total

End of Report

4.16. Certification - Groundwater Sampling Investigation 19.10.2023 – 20.10.2023

DETS

Certificate of Analysis

Certificate Number	23-24926	*Issued:*	02-Nov-23

Client Sub Surface Laboratories Ltd
3 Peel Street
Preston
Lancashire
PR2 2QS

Our Reference	23-24926
Client Reference	7782A
Order No	(not supplied)
Contract Title	SLADEN MILL, HALIFAX ROAD, LITTLEBOROUGH
Description	3 Water samples.
Date Received	20-Oct-23
Date Started	20-Oct-23
Date Completed	02-Nov-23
Test Procedures	Identified by prefix DETSn (details on request).
Notes	Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Kirk Bridgewood
General Manager

ilac-MRA UKAS TESTING 2139

Derwentside Environmental Testing Services Limited
Unit 2, Park Road Industrial Estate South, Consett, Co Durham, DH8 5PY
Tel: 01207 582333 • email: info@dets.co.uk • www.dets.co.uk

DETS

Summary of Chemical Analysis
Water Samples

Our Ref 23-24926
Client Ref 7782A
Contract Title SLADEN MILL, HALIFAX ROAD, LITTLEBOROUGH

			Lab No	2250808	2250809	2250810
			.Sample ID	M9	M10	M14
			Depth	1.71	0.65	2.82
			Other ID			
			Sample Type	WATER	WATER	WATER
			Sampling Date	19/10/2023	19/10/2023	19/10/2023
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Metals						
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	6.4	1.5	1.5
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	0.09	0.03	0.05
Chromium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25	0.37	1.7
Chromium, Hexavalent	DETSC 2203	0.007	mg/l		< 0.007	
Copper, Dissolved	DETSC 2306	0.4	ug/l	5.6	1.7	12
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.59	0.15	< 0.09
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01	0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	9.1	1.7	39
Selenium, Dissolved	DETSC 2306	0.25	ug/l	1.9	0.59	18
Zinc, Dissolved	DETSC 2306	1.3	ug/l	33	6.2	1.6
Inorganics						
pH	DETSC 2008		pH		7.0	
Cyanide, Total	DETSC 2130	0.04	mg/l		< 0.04	
Dissolved Organic Carbon	DETSC 2085	2	mg/l		2.4	
Total Hardness as CaCO3	DETSC 2303	0.1	mg/l		315	
Sulphate as SO4	DETSC 2055	0.1	mg/l		56	
Sulphur as S, Total	DETSC 2320*	10	mg/l		23	
Petroleum Hydrocarbons						
Aliphatic C5-C6: HS_1D_AL	DETSC 3322	0.1	ug/l		< 0.1	
Aliphatic C6-C8: HS_1D_AL	DETSC 3322	0.1	ug/l		< 0.1	
Aliphatic C8-C10: HS_1D_AL	DETSC 3322	0.1	ug/l		< 0.1	
Aliphatic C10-C12: EH_CU_1D_AL	DETSC 3072*	1	ug/l		< 1.0	
Aliphatic C10-C44: EH_CU_1D_AL	DETSC 3072*	1	ug/l		< 1.0	
Aliphatic C12-C16: EH_CU_1D_AL	DETSC 3072*	1	ug/l		< 1.0	
Aliphatic C16-C21: EH_CU_1D_AL	DETSC 3072*	1	ug/l		< 1.0	
Aliphatic C21-C35: EH_CU_1D_AL	DETSC 3072*	1	ug/l		< 1.0	
Aliphatic C35-C44: EH_CU_1D_AL	DETSC 3072*	1	ug/l		< 1.0	
Aromatic C5-C7: HS_1D_AR	DETSC 3322	0.1	ug/l		< 0.1	
Aromatic C7-C8: HS_1D_AR	DETSC 3322	0.1	ug/l		< 0.1	
Aromatic C8-C10: HS_1D_AR	DETSC 3322	0.1	ug/l		< 0.1	
Aromatic C10-C12: EH_CU_1D_AR	DETSC 3072*	1	ug/l		< 1.0	
Aromatic C12-C16: EH_CU_1D_AR	DETSC 3072*	1	ug/l		< 1.0	
Aromatic C16-C21: EH_CU_1D_AR	DETSC 3072*	1	ug/l		< 1.0	
Aromatic C21-C35: EH_CU_1D_AR	DETSC 3072*	1	ug/l		< 1.0	
Aromatic C35-C44: EH_CU_1D_AR	DETSC 3072*	1	ug/l		< 1.0	
Aromatic C10-C44: EH_CU_1D_AR	DETSC 3072*	1	ug/l		< 1.0	
Ali/Aro C10-C44: EH_CU_1D_Total	DETSC 3072*	1	ug/l		< 1.0	
Benzene	DETSC 3322	1	ug/l		< 1.0	
Toluene	DETSC 3322	1	ug/l		< 1.0	
Ethylbenzene	DETSC 3322	1	ug/l		< 1.0	
Xylene	DETSC 3322	1	ug/l		< 1.0	

Key: * -not accredited. n/s -not supplied.

DETS

Summary of Chemical Analysis
Water Samples

Our Ref 23-24926
Client Ref 7782A
Contract Title SLADEN MILL, HALIFAX ROAD, LITTLEBOROUGH

			Lab No	2250808	2250809	2250810
			.Sample ID	M9	M10	M14
			Depth	1.71	0.65	2.82
			Other ID			
			Sample Type	WATER	WATER	WATER
			Sampling Date	19/10/2023	19/10/2023	19/10/2023
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
MTBE	DETSC 3322	1	ug/l		< 1.0	
PAHs						
Naphthalene	DETSC 3304	0.05	ug/l		< 0.05	
Acenaphthylene	DETSC 3304	0.01	ug/l		< 0.01	
Acenaphthene	DETSC 3304	0.01	ug/l		< 0.01	
Fluorene	DETSC 3304	0.01	ug/l		< 0.01	
Phenanthrene	DETSC 3304	0.01	ug/l		< 0.01	
Anthracene	DETSC 3304	0.01	ug/l		< 0.01	
Fluoranthene	DETSC 3304	0.01	ug/l		< 0.01	
Pyrene	DETSC 3304	0.01	ug/l		< 0.01	
Benzo(a)anthracene	DETSC 3304*	0.01	ug/l		< 0.01	
Chrysene	DETSC 3304	0.01	ug/l		< 0.01	
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l		< 0.01	
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l		< 0.01	
Benzo(a)pyrene	DETSC 3304	0.01	ug/l		< 0.01	
Indeno(1,2,3-c,d)pyrene	DETSC 3304	0.01	ug/l		< 0.01	
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l		< 0.01	
Benzo(g,h,i)perylene	DETSC 3304	0.01	ug/l		< 0.01	
PAH Total	DETSC 3304	0.2	ug/l		< 0.20	
Phenols						
Phenol - Monohydric	DETSC 2130	0.1	mg/l		< 0.1	

Key: * -not accredited. n/s -not supplied.

DETS

Information in Support of the Analytical Results

Our Ref 23-24926
Client Ref 7782A
Contract SLADEN MILL, HALIFAX ROAD, LITTLEBOROUGH

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2250808	M9 1.71 WATER	19/10/23	GV		
2250809	M10 0.65 WATER	19/10/23	GB 1L x2, GV		
2250810	M14 2.82 WATER	19/10/23	GV		

Key: G-Glass V-Vial B-Bottle

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-
Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

DETS

Information in Support of the Analytical Results

List of HWOL Acronyms and Operators

Acronym	Description
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
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total

Det	Acronym
Aliphatic C5-C6	HS_1D_AL
Aliphatic C6-C8	HS_1D_AL
Aliphatic C8-C10	HS_1D_AL
Aliphatic C10-C12	EH_CU_1D_AL
Aliphatic C10-C44	EH_CU_1D_AL
Aliphatic C12-C16	EH_CU_1D_AL
Aliphatic C16-C21	EH_CU_1D_AL
Aliphatic C21-C35	EH_CU_1D_AL
Aliphatic C35-C44	EH_CU_1D_AL
Aromatic C5-C7	HS_1D_AR
Aromatic C7-C8	HS_1D_AR
Aromatic C8-C10	HS_1D_AR
Aromatic C10-C12	EH_CU_1D_AR
Aromatic C12-C16	EH_CU_1D_AR
Aromatic C16-C21	EH_CU_1D_AR
Aromatic C21-C35	EH_CU_1D_AR
Aromatic C35-C44	EH_CU_1D_AR
Aromatic C10-C44	EH_CU_1D_AR
Ali/Aro C10-C44	EH_CU_1D_Total

End of Report

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PR2 2QS

Attention: Anna Marsden

CERTIFICATE OF ANALYSIS

Date of report Generation:	02 November 2023
Customer:	Sub Surface Laboratories Ltd
Sample Delivery Group (SDG):	231020-53
Your Reference:	7782A
Location:	Sladen Mill, Littleborough
Report No:	709601
Order Number:	

We received 4 samples on Friday October 20, 2023 and 4 of these samples were scheduled for analysis which was completed on Thursday November 02, 2023. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Laboratories (UK) Limited Hawarden.

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.
Incorrect sampling dates and/or sample information will affect the validity of results.
The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:



Sonia McWhan
Operations Manager

ALS Laboratories (UK) Limited. Registered Office: Torrington Avenue, Coventry CV4 9GU. Registered in England and Wales No. 02391955.
Version: 3.6 Version Issued: 02/11/2023

Validated

CERTIFICATE OF ANALYSIS

SDG: 231020-53 **Report Number:** 709601 **Superseded Report:**
Client Ref.: 7782A **Location:** Sladen Mill, Littleborough

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
28815207	FIELD BLANK			18/10/2023
28815204	WSH9		1.71	18/10/2023
28815205	WSH10		0.65	18/10/2023
28815206	WSH14		2.82	18/10/2023

Only received samples which have had analysis scheduled will be shown on the following pages.

08:53:13 02/11/2023

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CERTIFICATE OF ANALYSIS

SDG: 231020-53 **Report Number:** 709601 **Superseded Report:**
Client Ref.: 7782A **Location:** Sladen Mill, Littleborough

Results Legend
X Test
N No Determination Possible

Sample Types -
S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water
Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Lab Sample No(s)			2881 5207	2881 5204	2881 5205	2881 5206
Customer Sample Reference			FIELD BLANK	WSH9	WSH10	WSH14
AGS Reference						
Depth (m)				1.71	0.65	2.82
Container			Digitube fo PFAS analysis.	Digitube fo PFAS analysis.	Digitube fo PFAS analysis.	Digitube fo PFAS analysis.
Sample Type			UNL	GW	GW	GW
PFAS Liquids	All	NDPs: 0 Tests: 4	X	X	X	X

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CERTIFICATE OF ANALYSIS

SDG: 231020-53 **Report Number:** 709601 **Superseded Report:**
Client Ref.: 7782A **Location:** Sladen Mill, Littleborough

Results Legend
ISO17025 accredited.
M mCERTS accredited.
aq Aqueous / settled sample.
diss.filt Dissolved / filtered sample.
tot.unfilt Total / unfiltered sample.
* Subcontracted - refer to subcontractor report for accreditation status.
** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F) Trigger breach confirmed
1-4+5@ Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	FIELD BLANK	WSH9	WSH10	WSH14		
			Depth (m)	-	1.71	0.65	2.82		
			Sample Type	Unspecified Liquid (UNL)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)		
			Date Sampled	18/10/2023	18/10/2023	18/10/2023	18/10/2023		
			Sample Time	-	-	-	-		
			Date Received	20/10/2023	20/10/2023	20/10/2023	20/10/2023		
			SDG Ref	231020-53	231020-53	231020-53	231020-53		
			Lab Sample No.(s)	28815207	28815204	28815205	28815206		
			AGS Reference						
PFOA (335-67-1)	<0.65 ng/l	TM337		<0.65	165 #	112 #	297 #		
Linear PFOS (1763-23-1)	<0.65 ng/l	TM337		<0.65	7.47 #	5.17 #	21.1 #		
Branched PFOS	<0.65 ng/l	TM337		<0.65	7.84 #	4.1 #	19.3 #		
Total PFOS	<0.65 ng/l	TM337		<0.65	15.3 #	9.28 #	40.5 #		

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CERTIFICATE OF ANALYSIS

SDG: 231020-53 **Report Number:** 709601 **Superseded Report:**
Client Ref.: 7782A **Location:** Sladen Mill, Littleborough

Table of Results - Appendix

Method No	Description
TM337	Analysis of PFAS

NA = not applicable.
Chemical testing (unless subcontracted) performed at ALS Laboratories (UK) Limited Hawarden (Method codes TM).

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CERTIFICATE OF ANALYSIS

SDG: 231020-53 Report Number: 709601 Superseded Report:
Client Ref.: 7782A Location: Sladen Mill, Littleborough

Test Completion Dates

Lab Sample No(s)	28815207	28815204	28815205	28815206
Customer Sample Ref.	FIELD BLANK	WSH9	WSH10	WSH14
AGS Ref.				
Depth		1.71	0.65	2.82
Type	Unspecified	Ground Water	Ground Water	Ground Water
PFAS Liquids	01-Nov-2023	02-Nov-2023	02-Nov-2023	02-Nov-2023

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CERTIFICATE OF ANALYSIS

SDG: 231020-53 **Report Number:** 709601 **Superseded Report:**
Client Ref: 7782A **Location:** Sladen Mill, Littleborough

Appendix

General

1. Results are expressed on a dry weight basis (dried at 35ºC) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH4 by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 15 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of 15 days after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. For dried and crushed preparations of soils volatile loss may occur e.g volatile mercury

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17 Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

18. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

19. **Sample Deviations**

If a sample is classed as deviated then the associated results may be compromised.

1	**Container with Headspace provided for volatiles analysis**
2	**Incorrect container received**
3	**Deviation from method**
4	**Matrix interference**
♦	**Sample holding time exceeded in laboratory**
@	**Sample holding time exceeded due to late arrival of instructions or samples**
§	**Sampled on date not provided**

20. **Asbestos**

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2021), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials and soils are obtained from supplied bulk materials andd soils which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2021).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining.

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

4.17. Certification - Ground & Surface Water Sampling Investigation 07.11.2023-09.11.2023

DETS

Certificate of Analysis

Certificate Number	23-26479	*Issued:*	21-Nov-23
Client	Sub Surface Laboratories Ltd 3 Peel Street Preston Lancashire PR2 2QS		
Our Reference	23-26479		
Client Reference	7782A		
Order No	(not supplied)		
Contract Title	SLADEN MILL, HALIFAX ROAD, LITTLEBORUGH		
Description	12 Water samples.		
Date Received	10-Nov-23		
Date Started	10-Nov-23		
Date Completed	21-Nov-23		
Test Procedures	Identified by prefix DETSn (details on request).		
Notes	Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.		

Approved By

Kirk Bridgewood
General Manager

ilac-MRA UKAS TESTING 2139

Derwentside Environmental Testing Services Limited
Unit 2, Park Road Industrial Estate South, Consett, Co Durham, DH8 5PY
Tel: 01207 582333 • email: info@dets.co.uk • www.dets.co.uk

DETS

Summary of Chemical Analysis
Water Samples

Our Ref 23-26479
Client Ref 7782A
Contract Title SLADEN MILL, HALIFAX ROAD, LITTLEBORUGH

			Lab No	2260449	2260450	2260451	2260452	2260453	2260454
			.Sample ID	M1	M2	M3	M4	M6	M9
			Depth	0.05	1.46	1.80	1.90	2.32	0.34
			Other ID						
			Sample Type	WATER	WATER	WATER	WATER	WATER	WATER
			Sampling Date	07/11/2023	07/11/2023	07/11/2023	07/11/2023	07/11/2023	07/11/2023
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Metals									
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	0.26	2.5	0.87	0.85	0.80	2.6
Boron, Dissolved	DETSC 2306*	12	ug/l						
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	0.03	< 0.03	0.07	0.04	0.06
Chromium, Dissolved	DETSC 2306	0.25	ug/l	0.41	< 0.25	0.62	0.54	0.40	0.29
Chromium, Hexavalent	DETSC 2203	0.007	mg/l	< 0.007	< 0.007	< 0.007	< 0.007	< 0.007	< 0.007
Copper, Dissolved	DETSC 2306	0.4	ug/l	0.6	2.8	2.1	2.6	2.1	3.9
Lead, Dissolved	DETSC 2306	0.09	ug/l	< 0.09	< 0.09	0.22	2.0	0.48	< 0.09
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	0.7	2.6	1.1	2.1	0.8	5.5
Selenium, Dissolved	DETSC 2306	0.25	ug/l	0.74	0.80	0.69	0.39	0.27	6.7
Zinc, Dissolved	DETSC 2306	1.3	ug/l	85	76	84	28	82	82
Inorganics									
pH	DETSC 2008		pH	7.5	7.4	7.5	7.6	6.9	7.0
Cyanide, Total	DETSC 2130	0.04	mg/l	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04
Dissolved Organic Carbon	DETSC 2085	2	mg/l	< 2.0	5.4	3.6	11	4.0	6.3
Total Hardness as CaCO3	DETSC 2303	0.1	mg/l	62.6	253	115	14.8	88.7	390
Sulphate as SO4	DETSC 2055	0.1	mg/l	39	120	20	6.9	11	200
Sulphur as S, Total	DETSC 2320*	10	mg/l	15	49	< 10	< 10	< 10	34
Petroleum Hydrocarbons									
Aliphatic C5-C6: HS_1D_AL	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8: HS_1D_AL	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10: HS_1D_AL	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C10-C12: EH_CU_1D_AL	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C10-C44: EH_CU_1D_AL	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	27	< 1.0	< 1.0
Aliphatic C12-C16: EH_CU_1D_AL	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C16-C21: EH_CU_1D_AL	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	8.7	< 1.0	< 1.0
Aliphatic C21-C35: EH_CU_1D_AL	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	18	< 1.0	< 1.0
Aliphatic C35-C44: EH_CU_1D_AL	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C7: HS_1D_AR	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8: HS_1D_AR	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C8-C10: HS_1D_AR	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12: EH_CU_1D_AR	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C12-C16: EH_CU_1D_AR	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C16-C21: EH_CU_1D_AR	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	9.9	4.9	< 1.0
Aromatic C21-C35: EH_CU_1D_AR	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	6.3	< 1.0	< 1.0
Aromatic C35-C44: EH_CU_1D_AR	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C10-C44: EH_CU_1D_AR	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	16	5.8	< 1.0
Ali/Aro C10-C44: EH_CU_1D_Total	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	43	5.8	< 1.0
Benzene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Key: * -not accredited. n/s -not supplied.

DETS

Summary of Chemical Analysis
Water Samples

Our Ref 23-26479
Client Ref 7782A
Contract Title SLADEN MILL, HALIFAX ROAD, LITTLEBORUGH

			Lab No	2260449	2260450	2260451	2260452	2260453	2260454
			.Sample ID	M1	M2	M3	M4	M6	M9
			Depth	0.05	1.46	1.80	1.90	2.32	0.34
			Other ID						
			Sample Type	WATER	WATER	WATER	WATER	WATER	WATER
			Sampling Date	07/11/2023	07/11/2023	07/11/2023	07/11/2023	07/11/2023	07/11/2023
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Xylene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
PAHs									
Naphthalene	DETSC 3304	0.05	ug/l	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Phenanthrene	DETSC 3304	0.01	ug/l	< 0.01	0.01	< 0.01	0.01	< 0.01	< 0.01
Anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	0.07	< 0.01	0.03	0.03	< 0.01
Pyrene	DETSC 3304	0.01	ug/l	< 0.01	0.06	< 0.01	0.04	0.03	< 0.01
Benzo(a)anthracene	DETSC 3304*	0.01	ug/l	< 0.01	0.01	< 0.01	0.01	< 0.01	< 0.01
Chrysene	DETSC 3304	0.01	ug/l	< 0.01	0.02	< 0.01	0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	0.02	< 0.01	0.01	0.01	< 0.01
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	< 0.01	0.02	< 0.01	< 0.01	0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	0.01	< 0.01
PAH Total	DETSC 3304	0.2	ug/l	< 0.20	0.20	< 0.20	< 0.20	< 0.20	< 0.20
Phenols									
Phenol - Monohydric	DETSC 2130	0.1	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

Key: * -not accredited. n/s -not supplied.

DETS

Summary of Chemical Analysis
Water Samples

Our Ref 23-26479
Client Ref 7782A
Contract Title SLADEN MILL, HALIFAX ROAD, LITTLEBOROUGH

				Lab No	2260455	2260456	2260457	2260458	2260459	2260460
				.Sample ID	M10	M14	WS4	WS5	WS6	WS7
				Depth	0.59	2.30				
				Other ID						
				Sample Type	WATER	WATER	WATER	WATER	WATER	WATER
				Sampling Date	07/11/2023	07/11/2023	07/11/2023	07/11/2023	07/11/2023	07/11/2023
				Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**							
Metals										
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	0.77	2.7	0.89	0.82	1.1	1.1
Boron, Dissolved	DETSC 2306*	12	ug/l		120				
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03	0.08	0.07	0.06	0.06
Chromium, Dissolved	DETSC 2306	0.25	ug/l	0.97	12	1.1	0.44	0.54	0.51
Chromium, Hexavalent	DETSC 2203	0.007	mg/l	< 0.007		< 0.007	< 0.007	< 0.007	< 0.007
Copper, Dissolved	DETSC 2306	0.4	ug/l	1.2	4.4	3.3	3.2	3.0	2.7
Lead, Dissolved	DETSC 2306	0.09	ug/l	< 0.09	0.18	1.9	1.8	3.1	3.0
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	0.02	< 0.01	< 0.01	< 0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	0.8	3.5	2.3	1.9	2.1	1.8
Selenium, Dissolved	DETSC 2306	0.25	ug/l	0.63	19	0.31	0.36	0.30	0.28
Zinc, Dissolved	DETSC 2306	1.3	ug/l	76	1.9	26	23	100	93
Inorganics										
pH	DETSC 2008		pH	6.9		7.1	7.5	7.1	6.5
Cyanide, Total	DETSC 2130	0.04	mg/l	< 0.04		< 0.04	< 0.04	< 0.04	< 0.04
Dissolved Organic Carbon	DETSC 2085	2	mg/l	3.2		11	11	15	15
Total Hardness as CaCO3	DETSC 2303	0.1	mg/l	118		14.9	15.9	11.7	11.3
Sulphate as SO4	DETSC 2055	0.1	mg/l	37		7.1	7.3	5.5	5.3
Sulphur as S, Total	DETSC 2320*	10	mg/l	16		< 10	< 10	< 10	< 10
Petroleum Hydrocarbons										
Aliphatic C5-C6: HS_1D_AL	DETSC 3322	0.1	ug/l	< 0.1		< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8: HS_1D_AL	DETSC 3322	0.1	ug/l	< 0.1		< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10: HS_1D_AL	DETSC 3322	0.1	ug/l	< 0.1		< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C10-C12: EH_CU_1D_AL	DETSC 3072*	1	ug/l	< 1.0		< 1.0	< 1.0	3.7	< 1.0
Aliphatic C10-C44: EH_CU_1D_AL	DETSC 3072*	1	ug/l	< 1.0		< 1.0	12	16	< 1.0
Aliphatic C12-C16: EH_CU_1D_AL	DETSC 3072*	1	ug/l	< 1.0		< 1.0	1.8	< 1.0	< 1.0
Aliphatic C16-C21: EH_CU_1D_AL	DETSC 3072*	1	ug/l	< 1.0		< 1.0	8.9	9.6	< 1.0
Aliphatic C21-C35: EH_CU_1D_AL	DETSC 3072*	1	ug/l	< 1.0		< 1.0	1.6	1.9	< 1.0
Aliphatic C35-C44: EH_CU_1D_AL	DETSC 3072*	1	ug/l	< 1.0		< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C7: HS_1D_AR	DETSC 3322	0.1	ug/l	< 0.1		< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8: HS_1D_AR	DETSC 3322	0.1	ug/l	< 0.1		< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C8-C10: HS_1D_AR	DETSC 3322	0.1	ug/l	< 0.1		< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12: EH_CU_1D_AR	DETSC 3072*	1	ug/l	< 1.0		< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C12-C16: EH_CU_1D_AR	DETSC 3072*	1	ug/l	< 1.0		< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C16-C21: EH_CU_1D_AR	DETSC 3072*	1	ug/l	< 1.0		< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C21-C35: EH_CU_1D_AR	DETSC 3072*	1	ug/l	< 1.0		< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C35-C44: EH_CU_1D_AR	DETSC 3072*	1	ug/l	< 1.0		< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C10-C44: EH_CU_1D_AR	DETSC 3072*	1	ug/l	< 1.0		< 1.0	< 1.0	< 1.0	< 1.0
Ali/Aro C10-C44: EH_CU_1D_Total	DETSC 3072*	1	ug/l	< 1.0		< 1.0	12	16	< 1.0
Benzene	DETSC 3322	1	ug/l	< 1.0		< 1.0	< 1.0	< 1.0	< 1.0
Toluene	DETSC 3322	1	ug/l	< 1.0		< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	DETSC 3322	1	ug/l	< 1.0		< 1.0	< 1.0	< 1.0	< 1.0

Key: * -not accredited. n/s -not supplied.

DETS

Summary of Chemical Analysis
Water Samples

Our Ref 23-26479
Client Ref 7782A
Contract Title SLADEN MILL, HALIFAX ROAD, LITTLEBORUGH

			Lab No	2260455	2260456	2260457	2260458	2260459	2260460
			.Sample ID	M10	M14	WS4	WS5	WS6	WS7
			Depth	0.59	2.30				
			Other ID						
			Sample Type	WATER	WATER	WATER	WATER	WATER	WATER
			Sampling Date	07/11/2023	07/11/2023	07/11/2023	07/11/2023	07/11/2023	07/11/2023
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Xylene	DETSC 3322	1	ug/l	< 1.0		< 1.0	< 1.0	< 1.0	< 1.0
MTBE	DETSC 3322	1	ug/l	< 1.0		< 1.0	< 1.0	< 1.0	< 1.0
PAHs									
Naphthalene	DETSC 3304	0.05	ug/l	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	DETSC 3304	0.01	ug/l	< 0.01		< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	DETSC 3304	0.01	ug/l	< 0.01		< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	DETSC 3304	0.01	ug/l	< 0.01		< 0.01	< 0.01	< 0.01	< 0.01
Phenanthrene	DETSC 3304	0.01	ug/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	DETSC 3304	0.01	ug/l	< 0.01		< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	DETSC 3304	0.01	ug/l	0.04		< 0.01	< 0.01	< 0.01	< 0.01
Pyrene	DETSC 3304	0.01	ug/l	0.03		< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	DETSC 3304*	0.01	ug/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	DETSC 3304	0.01	ug/l	0.02		< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	0.02		< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01		< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	DETSC 3304	0.01	ug/l	< 0.01		< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	< 0.01		< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETSC 3304	0.01	ug/l	< 0.01		< 0.01	< 0.01	< 0.01	< 0.01
PAH Total	DETSC 3304	0.2	ug/l	< 0.20		< 0.20	< 0.20	< 0.20	< 0.20
Phenols									
Phenol - Monohydric	DETSC 2130	0.1	mg/l	< 0.1		< 0.1	< 0.1	< 0.1	< 0.1

Key: * -not accredited. n/s -not supplied.

DETS

Information in Support of the Analytical Results

Our Ref 23-26479
Client Ref 7782A
Contract SLADEN MILL, HALIFAX ROAD, LITTLEBOROUGH

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2260449	M1 0.05 WATER	07/11/23	GB 1L, GV, PB 1L	pH/Cond (1 days)	
2260450	M2 1.46 WATER	07/11/23	GB 1L, GV, PB 1L	pH/Cond (1 days)	
2260451	M3 1.80 WATER	07/11/23	GB 1L, GV, PB 1L	pH/Cond (1 days)	
2260452	M4 1.90 WATER	07/11/23	GB 1L, GV, PB 1L	pH/Cond (1 days)	
2260453	M6 2.32 WATER	07/11/23	GB 1L, GV, PB 1L	pH/Cond (1 days)	
2260454	M9 0.34 WATER	07/11/23	GB 1L, GV, PB 1L	pH/Cond (1 days)	
2260455	M10 0.59 WATER	07/11/23	GB 1L, GV, PB 1L	pH/Cond (1 days)	
2260456	M14 2.30 WATER	07/11/23	GV		
2260457	WS4 WATER	07/11/23	GB 1L, GV	pH/Cond (1 days)	
2260458	WS5 WATER	07/11/23	GB 1L, GV, PB 1L	pH/Cond (1 days)	
2260459	WS6 WATER	07/11/23	GB 1L, GV, PB 1L	pH/Cond (1 days)	
2260460	WS7 WATER	07/11/23	GB 1L, GV, PB 1L	pH/Cond (1 days)	

Key: G-Glass P-Plastic B-Bottle V-Vial

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

DETS

Information in Support of the Analytical Results

List of HWOL Acronyms and Operators

Acronym	Description
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
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total

Det	Acronym
Aliphatic C5-C6	HS_1D_AL
Aliphatic C6-C8	HS_1D_AL
Aliphatic C8-C10	HS_1D_AL
Aliphatic C10-C12	EH_CU_1D_AL
Aliphatic C10-C44	EH_CU_1D_AL
Aliphatic C12-C16	EH_CU_1D_AL
Aliphatic C16-C21	EH_CU_1D_AL
Aliphatic C21-C35	EH_CU_1D_AL
Aliphatic C35-C44	EH_CU_1D_AL
Aromatic C5-C7	HS_1D_AR
Aromatic C7-C8	HS_1D_AR
Aromatic C8-C10	HS_1D_AR
Aromatic C10-C12	EH_CU_1D_AR
Aromatic C12-C16	EH_CU_1D_AR
Aromatic C16-C21	EH_CU_1D_AR
Aromatic C21-C35	EH_CU_1D_AR
Aromatic C35-C44	EH_CU_1D_AR
Aromatic C10-C44	EH_CU_1D_AR
Ali/Aro C10-C44	EH_CU_1D_Total

End of Report

Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US
Tel: (01244) 528777
email: hawardencustomerservices@alsglobal.com
Website: www.alsenvironmental.co.uk

Sub Surface Laboratories Ltd
3 Peel Street
Preston
Lancashire
PR2 2QS

Attention: Anna Marsden

CERTIFICATE OF ANALYSIS

Date of report Generation:	24 November 2023
Customer:	Sub Surface Laboratories Ltd
Sample Delivery Group (SDG):	231109-61
Your Reference:	7782A
Location:	Sladen Mill, Littleborough
Report No:	712112
Order Number:	

We received 13 samples on Thursday November 09, 2023 and 13 of these samples were scheduled for analysis which was completed on Friday November 24, 2023. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Laboratories (UK) Limited Hawarden.

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.
Incorrect sampling dates and/or sample information will affect the validity of results.
The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:



Sonia McWhan
Operations Manager

ALS Laboratories (UK) Limited. Registered Office: Torrington Avenue, Coventry CV4 9GU. Registered in England and Wales No. 02391955.
Version: 3.6 Version Issued: 24/11/2023

Validated

CERTIFICATE OF ANALYSIS

SDG: 231109-61 Report Number: 712112 Superseded Report:
Client Ref.: 7782A Location: Sladen Mill, Littleborough

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
28914262	FIELD BLANK			07/11/2023
28914245	M1		0.05	07/11/2023
28914246	M2		1.46	07/11/2023
28914248	M3		1.80	07/11/2023
28914250	M4		1.90	07/11/2023
28914251	M6		2.32	07/11/2023
28914253	M9		0.34	07/11/2023
28914255	M10		0.59	07/11/2023
28914257	M14		2.30	07/11/2023
28914258	WS4			07/11/2023
28914259	WS5			07/11/2023
28914260	WS6			07/11/2023
28914261	WS7			07/11/2023

Only received samples which have had analysis scheduled will be shown on the following pages.

08:55:36 24/11/2023

Validated

CERTIFICATE OF ANALYSIS

SDG: 231109-61 **Report Number:** 712112 **Superseded Report:**
Client Ref.: 7782A **Location:** Sladen Mill, Littleborough

Results Legend
X Test
N No Determination Possible

Sample Types -
S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water
Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Lab Sample No(s)	2891262	2891245	2891246	2891248	2891250	2891251	2891253	2891255	2891257	2891258	2891259	2891260	2891261
Customer Sample Reference	FIELD BLANK	M1	M2	M3	M4	M6	M9	M10	M14	WS4	WS5	WS6	WS7
AGS Reference													
Depth (m)		0.05	1.46	1.80	1.90	2.32	0.34	0.59	2.30				
Container	Digitube fo PFAS analysis.	Digitube fo PFAS analysis.	Digitube fo PFAS analysis.	Digitube fo PFAS analysis.	Digitube fo PFAS analysis.	Digitube fo PFAS analysis.	Digitube fo PFAS analysis.	Digitube fo PFAS analysis.	Digitube fo PFAS analysis.	Digitube fo PFAS analysis.	Digitube fo PFAS analysis.	Digitube fo PFAS analysis.	Digitube fo PFAS analysis.
Sample Type	UNL	GW	GW	GW	GW	GW	GW	GW	GW	SW	SW	SW	SW
PFAS Liquids / All / NDPs: 0 Tests: 13	X	X	X	X	X	X	X	X	X	X	X	X	X

Validated

CERTIFICATE OF ANALYSIS

SDG: 231109-61 **Report Number:** 712112 **Superseded Report:**
Client Ref.: 7782A **Location:** Sladen Mill, Littleborough

Results Legend
ISO17025 accredited.
M mCERTS accredited.
aq Aqueous / settled sample.
diss.filt Dissolved / filtered sample.
tot.unfilt Total / unfiltered sample.
* Subcontracted - refer to subcontractor report for accreditation status.
** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F) Trigger breach confirmed
1-4+§@ Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	FIELD BLANK	M1	M2	M3	M4	M6
			Depth (m)	.	0.05	1.46	1.80	1.90	2.32
			Sample Type	Water	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
			Date Sampled	07/11/2023	07/11/2023	07/11/2023	07/11/2023	07/11/2023	07/11/2023
			Sample Time	.	.	.	.	.	.
			Date Received	09/11/2023	09/11/2023	09/11/2023	09/11/2023	09/11/2023	09/11/2023
			SDG Ref	231109-61	231109-61	231109-61	231109-61	231109-61	231109-61
			Lab Sample No.(s)	28914262	28914245	28914246	28914248	28914250	28914251
			AGS Reference						
PFOA (335-67-1)	<0.65 ng/l	TM337		<0.65	97.1 #	125 #	89.8 #	610 #	24.3 #
Linear PFOS (1763-23-1)	<0.65 ng/l	TM337		<0.65	<3.25 #	9.9 #	<3.25 #	18.5 #	<3.25 #
Branched PFOS	<0.65 ng/l	TM337		<0.65	3.35 #	7.6 #	<3.25 #	19.3 #	<3.25 #
Total PFOS	<0.65 ng/l	TM337		<0.65	3.35 #	17.5 #	<3.25 #	37.9 #	<3.25 #

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Validated

CERTIFICATE OF ANALYSIS

SDG: 231109-61 **Report Number:** 712112 **Superseded Report:**
Client Ref.: 7782A **Location:** Sladen Mill, Littleborough

Results Legend
- # ISO17025 accredited.
- M mCERTS accredited.
- aq Aqueous / settled sample.
- diss.filt Dissolved / filtered sample.
- tot.unfilt Total / unfiltered sample.
- * Subcontracted - refer to subcontractor report for accreditation status.
- ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
- (F) Trigger breach confirmed
- 1-4+§@ Sample deviation (see appendix)

Customer Sample Ref.	M9	M10	M14	WS4	WS5	WS6
Depth (m)	0.34	0.59	2.30	-	-	-
Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)
Date Sampled	07/11/2023	07/11/2023	07/11/2023	07/11/2023	07/11/2023	07/11/2023
Sample Time	-	-	-	-	-	-
Date Received	09/11/2023	09/11/2023	09/11/2023	09/11/2023	09/11/2023	09/11/2023
SDG Ref	231109-61	231109-61	231109-61	231109-61	231109-61	231109-61
Lab Sample No.(s)	28914253	28914255	28914257	28914258	28914259	28914260
AGS Reference						

Component	LOD/Units	Method					
PFOA (335-67-1)	<0.65 ng/l	TM337	108 #	145 #	74.3 #	24.8 #	25.4 #	30.6 #
Linear PFOS (1763-23-1)	<0.65 ng/l	TM337	3.08 #	<3.25 #	7.3 #	<1.3 #	<1.3 #	<1.3 #
Branched PFOS	<0.65 ng/l	TM337	4.18 #	<3.25 #	7.99 #	<1.3 #	<1.3 #	<1.3 #
Total PFOS	<0.65 ng/l	TM337	7.26 #	<3.25 #	15.3 #	<1.3 #	<1.3 #	<1.3 #

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CERTIFICATE OF ANALYSIS

SDG: 231109-61 **Report Number:** 712112 **Superseded Report:**
Client Ref.: 7782A **Location:** Sladen Mill, Littleborough

Results Legend	Customer Sample Ref.	WS7					
# ISO17025 accredited.	Depth (m)	.					
M mCERTS accredited.	Sample Type	Surface Water (SW)					
aq Aqueous / settled sample.	Date Sampled	07/11/2023					
diss.filt Dissolved / filtered sample.	Sample Time	.					
tot.unfilt Total / unfiltered sample.	Date Received	09/11/2023					
* Subcontracted - refer to subcontractor report for accreditation status.	SDG Ref	231109-61					
** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery	Lab Sample No.(s)	28914261					
(F) Trigger breach confirmed	AGS Reference						
1-4+§@ Sample deviation (see appendix)							

Component	LOD/Units	Method						
PFOA (335-67-1)	<0.65 ng/l	TM337	29.1 #					
Linear PFOS (1763-23-1)	<0.65 ng/l	TM337	<1.3 #					
Branched PFOS	<0.65 ng/l	TM337	<1.3 #					
Total PFOS	<0.65 ng/l	TM337	<1.3 #					

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CERTIFICATE OF ANALYSIS

SDG: 231109-61 **Report Number:** 712112 **Superseded Report:**
Client Ref.: 7782A **Location:** Sladen Mill, Littleborough

Table of Results - Appendix

Method No	Description
TM337	Analysis of PFAS

NA = not applicable.
Chemical testing (unless subcontracted) performed at ALS Laboratories (UK) Limited Hawarden (Method codes TM).

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Validated

CERTIFICATE OF ANALYSIS

SDG: 231109-61 Report Number: 712112 Superseded Report:
Client Ref.: 7782A Location: Sladen Mill, Littleborough

Test Completion Dates

Lab Sample No(s)	28914262	28914245	28914246	28914248	28914250	28914251	28914253	28914255	28914257	28914258
Customer Sample Ref.	FIELD BLANK	M1	M2	M3	M4	M6	M9	M10	M14	WS4
AGS Ref.										
Depth		0.05	1.46	1.80	1.90	2.32	0.34	0.59	2.30	
Type	Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Surface Water
PFAS Liquids	21-Nov-2023	21-Nov-2023	21-Nov-2023	21-Nov-2023	24-Nov-2023	21-Nov-2023	21-Nov-2023	21-Nov-2023	21-Nov-2023	21-Nov-2023

Lab Sample No(s)	28914259	28914260	28914261
Customer Sample Ref.	WS5	WS6	WS7
AGS Ref.			
Depth			
Type	Surface Water	Surface Water	Surface Water
PFAS Liquids	21-Nov-2023	21-Nov-2023	21-Nov-2023

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CERTIFICATE OF ANALYSIS

SDG: 231109-61 **Report Number:** 712112 **Superseded Report:**
Client Ref: 7782A **Location:** Sladen Mill, Littleborough

Appendix

General

1. Results are expressed on a dry weight basis (dried at 35ºC) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH4 by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 15 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of 15 days after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. For dried and crushed preparations of soils volatile loss may occur e.g volatile mercury

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17 Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

18. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

19. **Sample Deviations**

If a sample is classed as deviated then the associated results may be compromised.

1	**Container with Headspace provided for volatiles analysis**
2	**Incorrect container received**
3	**Deviation from method**
4	**Matrix interference**
♦	**Sample holding time exceeded in laboratory**
@	**Sample holding time exceeded due to late arrival of instructions or samples**
§	**Sampled on date not provided**

20. **Asbestos**

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2021), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials and soils are obtained from supplied bulk materials andd soils which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2021).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining.

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

5. APPENDIX B: SITE INVESTIGATION PHOTOS.



Trial Hole 1.



Trial Hole 2.



Trial Hole 3.



Trial Hole 4.



Trial Hole 5.



Trial Hole 6.



Trial Hole 7.



Trial Hole 8.



Trial Hole 9.



Trial Hole 10.



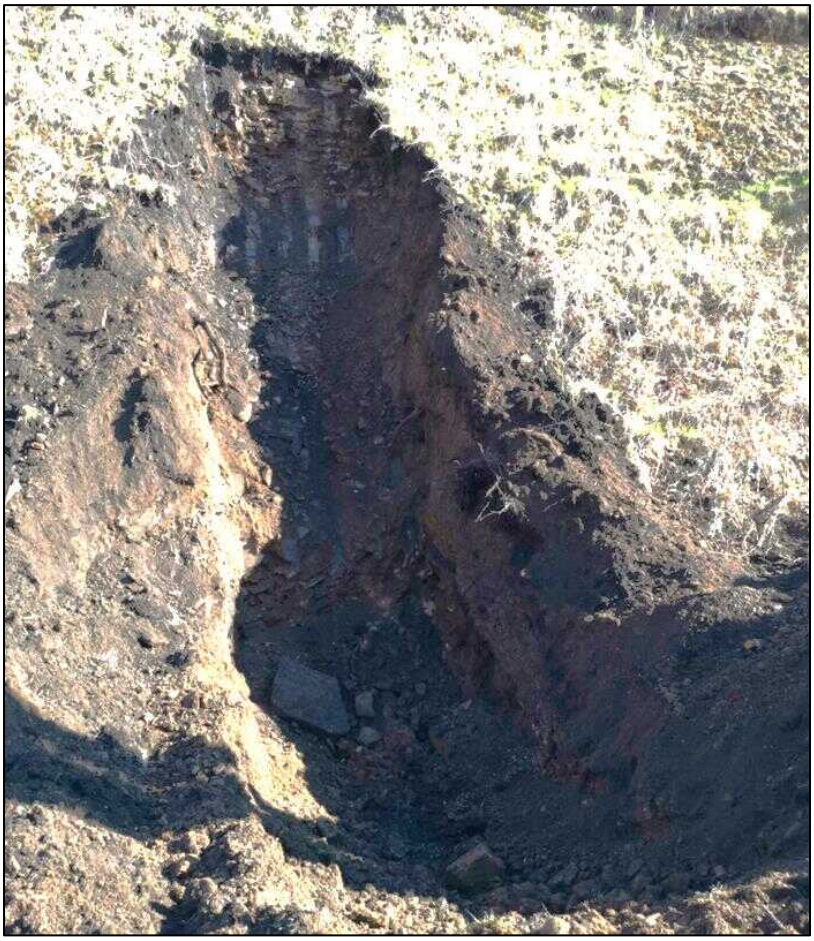
Trial Hole 11



Trial Hole 12



Trial Hole 13



Trial Hole 15



Trial Hole 16



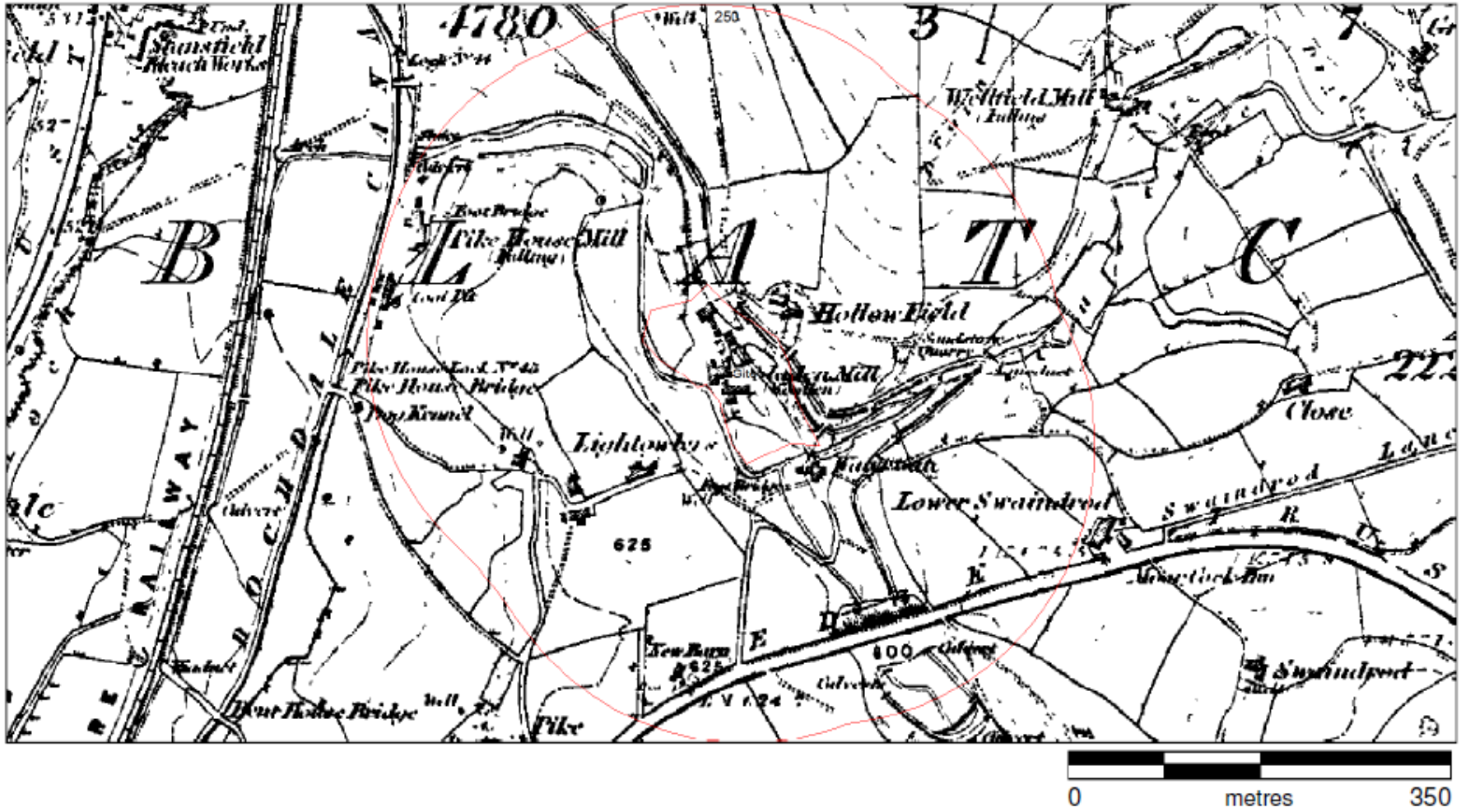
Trial Hole 17



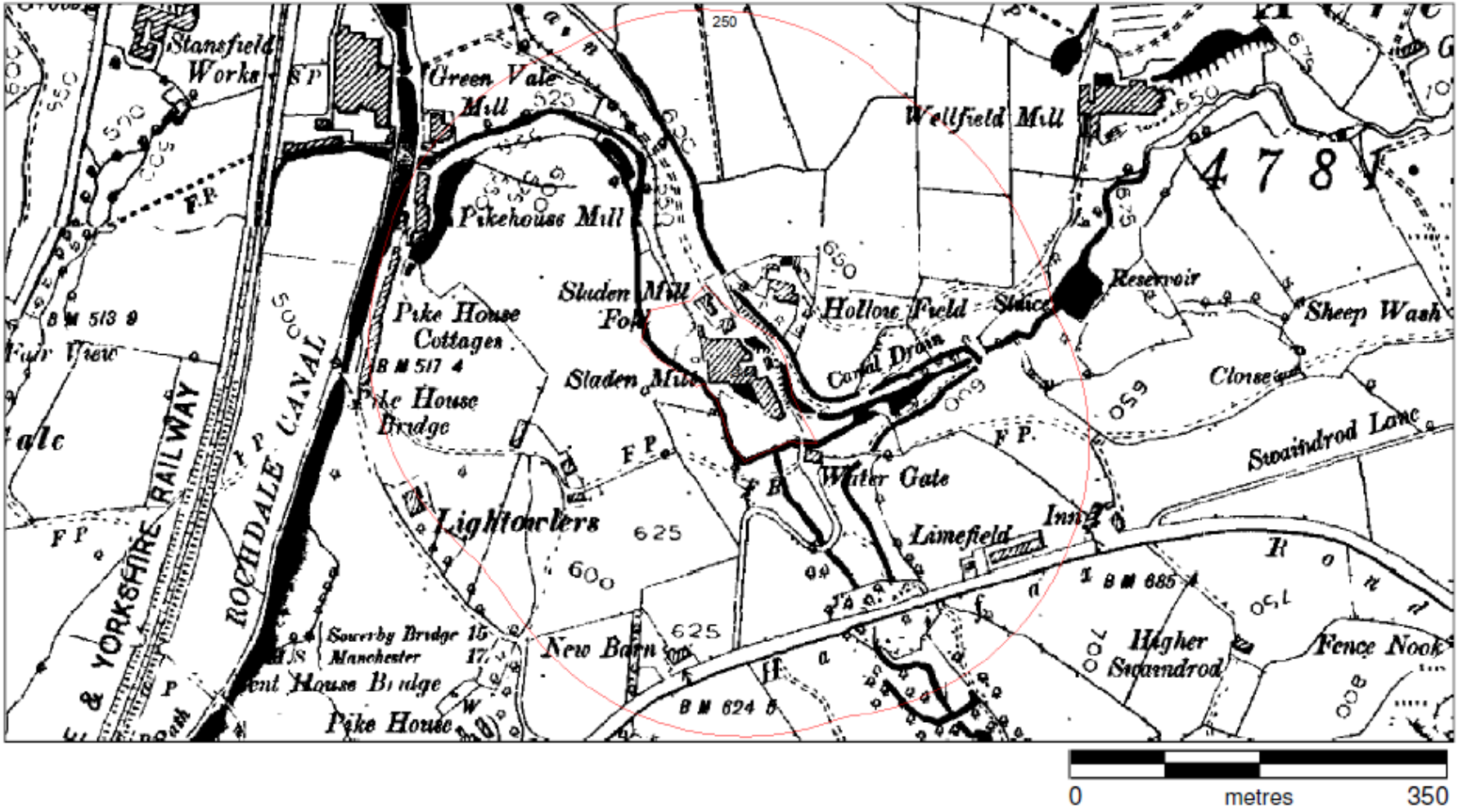
Trial Hole 18

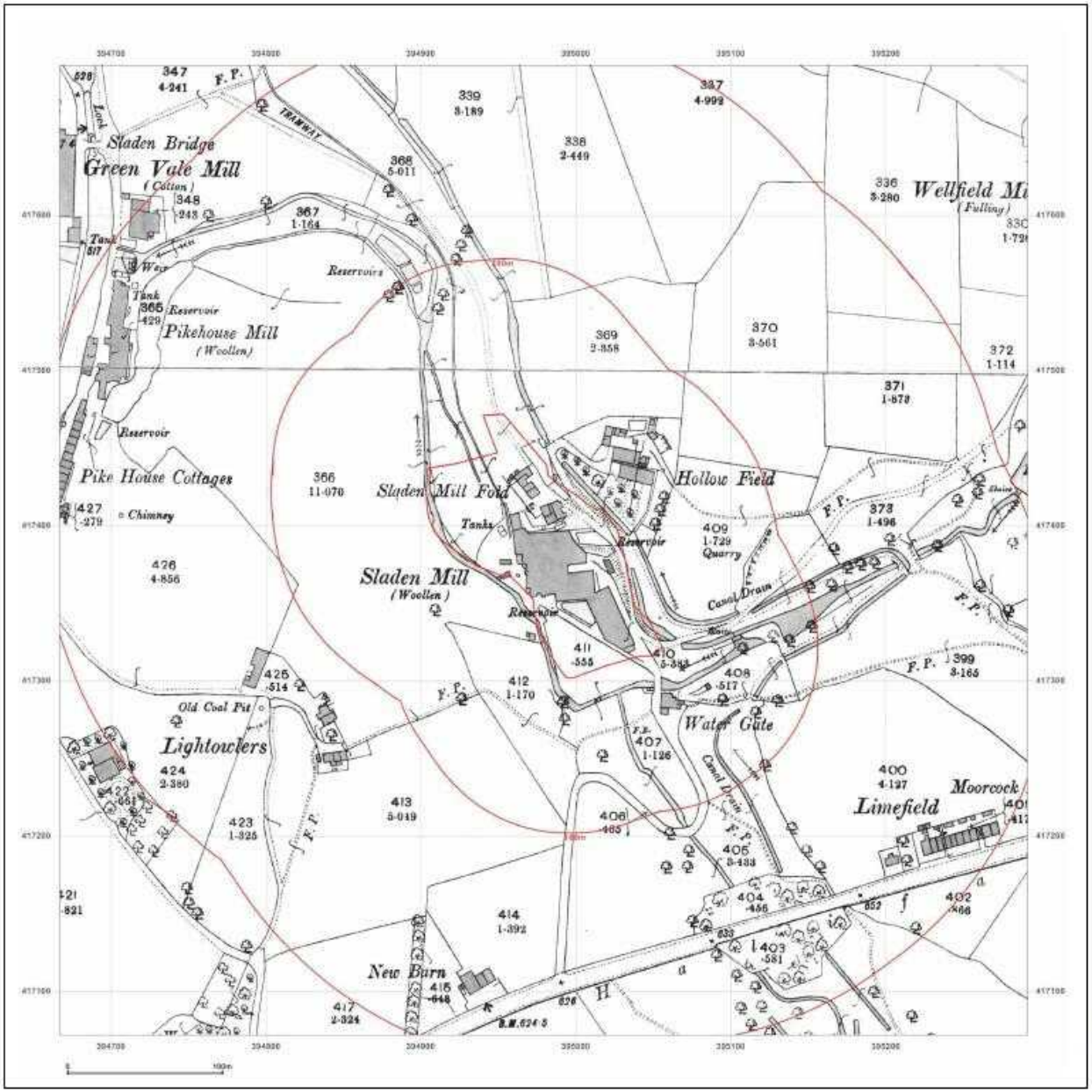
6. APPENDIX C: HISTORIC MAPS & SUPPORTING DOCUMENTATION.

5. Layer Name: 1848 map



6. Layer Name: 1854 map





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Site Details:
Sladen Mill

Client Ref: EMS_290434_393098
Report Ref: EMS-290434_393098
Grid Ref: 394979, 417384

Map Name: County Series
Map date: 1891
Scale: 1:2,500
Printed at: 1:2,500

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Surveyed 1891
Revised 1891
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1891
Revised 1891
Edition N/A
Copyright N/A
Levelled N/A

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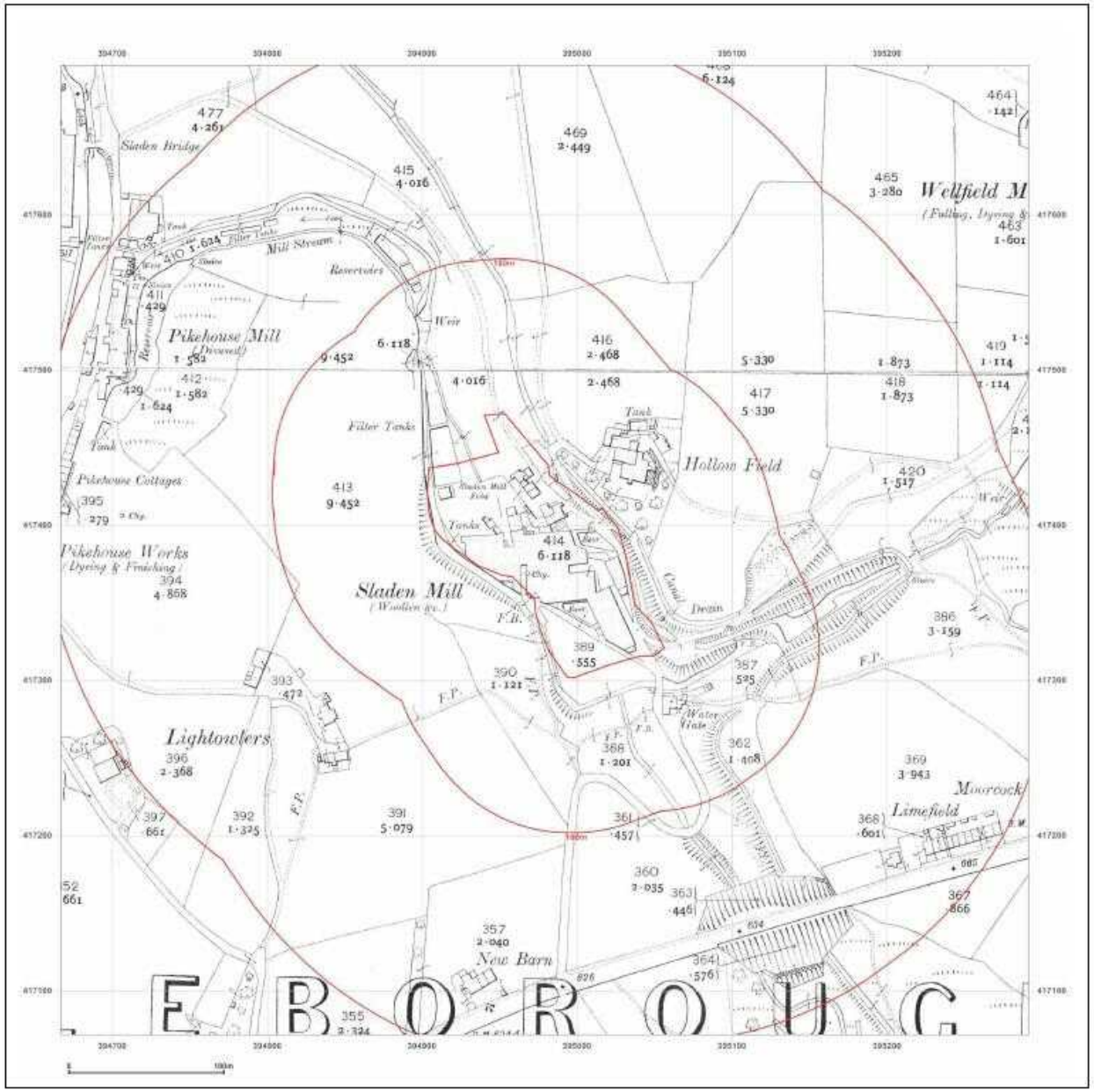
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Production date: 26 February 2015

To view map legend click here Legend


SLADEN MILL
LADEN MILL. FIRE. 1905



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Site Details:
Sladen Mill

Client Ref: EMS_290434_393098
Report Ref: EMS-290434_393098
Grid Ref: 394979, 417384

Map Name: County Series
Map date: 1910
Scale: 1:2,500
Printed at: 1:2,500

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Surveyed 1910
Revised 1910
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1910
Revised 1910
Edition N/A
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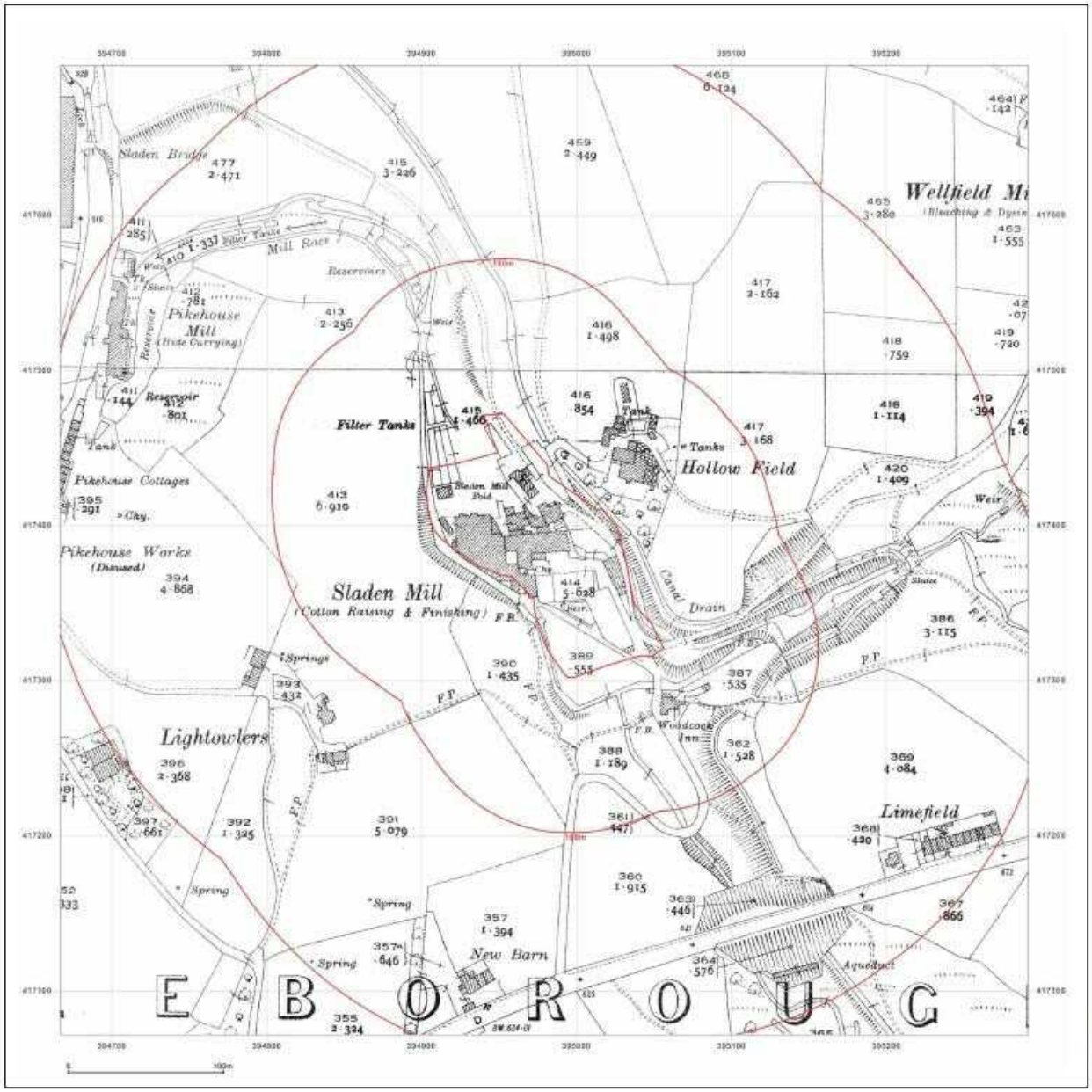
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Site Details:
Sladen Mill

Client Ref: EMS_290434_393098
Report Ref: EMS-290434_393098
Grid Ref: 394979, 417384

Map Name: County Series
Map date: 1928-1930
Scale: 1:2,500
Printed at: 1:2,500

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Surveyed 1930
Revised 1930
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1928
Revised 1928
Edition N/A
Copyright N/A
Levelled N/A

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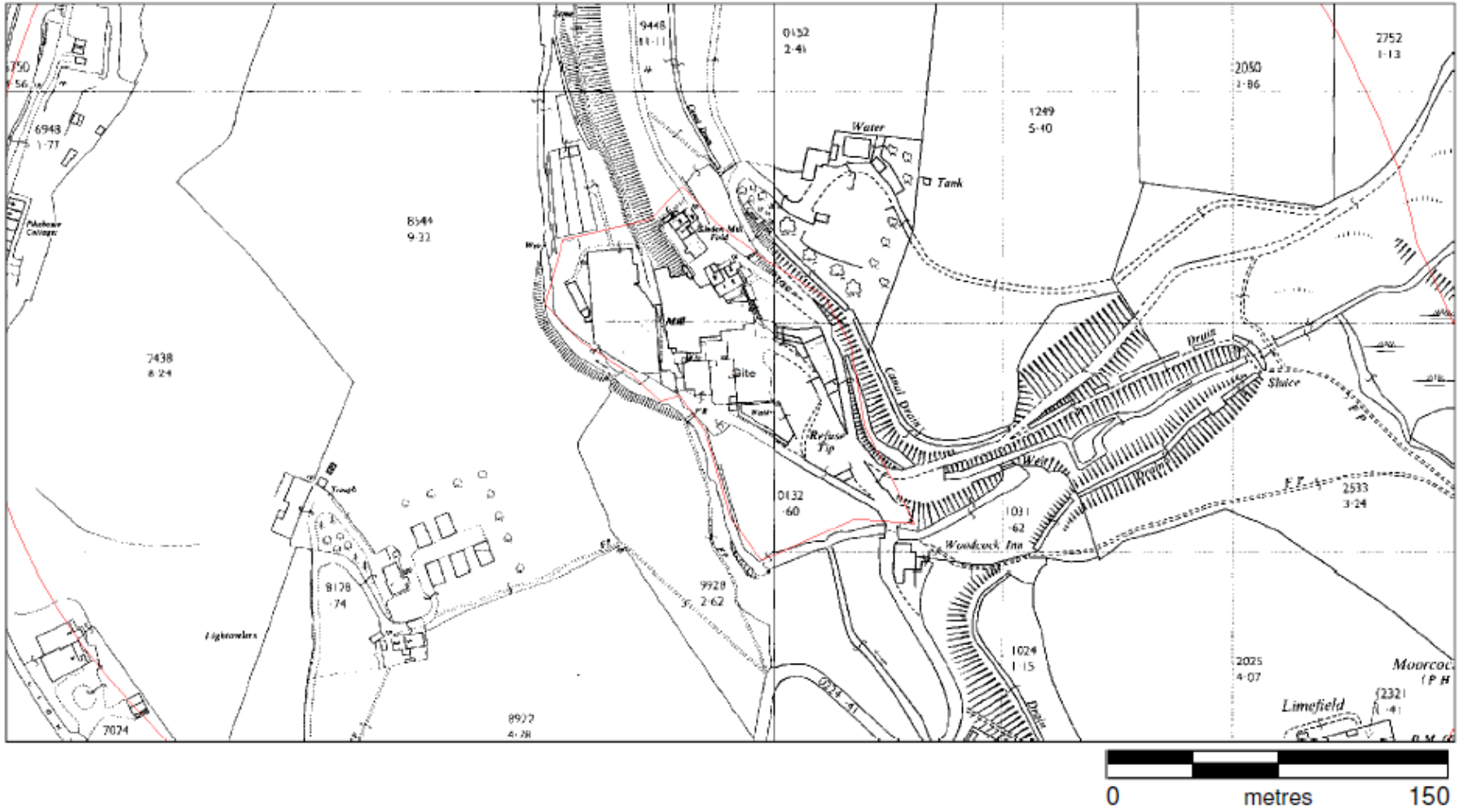
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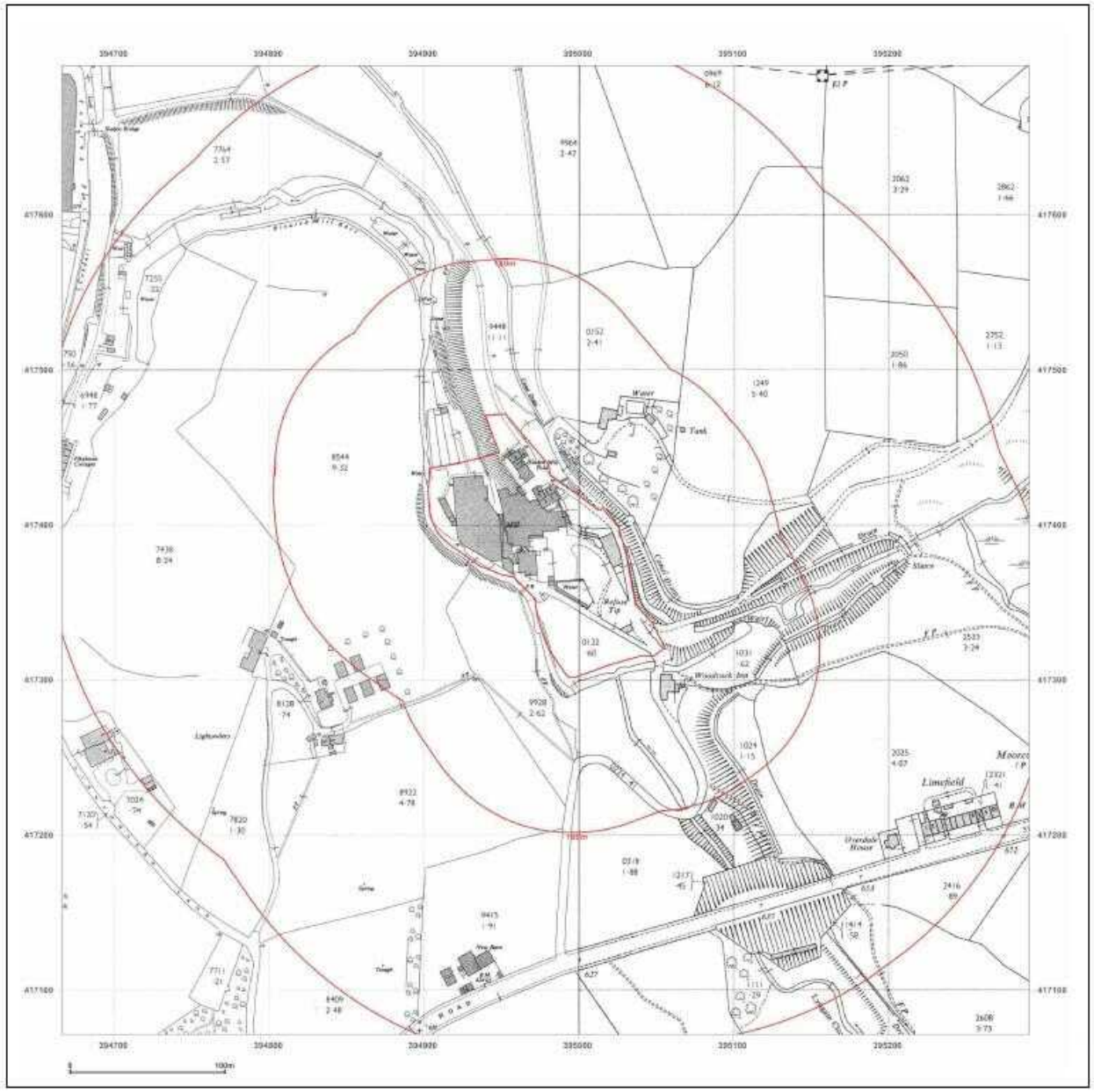
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Production date: 26 February 2015

To view map legend click here Legend

18. Layer Name: 1950's map





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Site Details:
Sladen Mill

Client Ref: EMS_290434_393098
Report Ref: EMS-290434_393098
Grid Ref: 394979, 417384

Map Name: National Grid
Map date: 1961
Scale: 1:2,500
Printed at: 1:2,500

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Surveyed 1961
Revised 1961
Edition 1963
Copyright 1963
Levelled 1962

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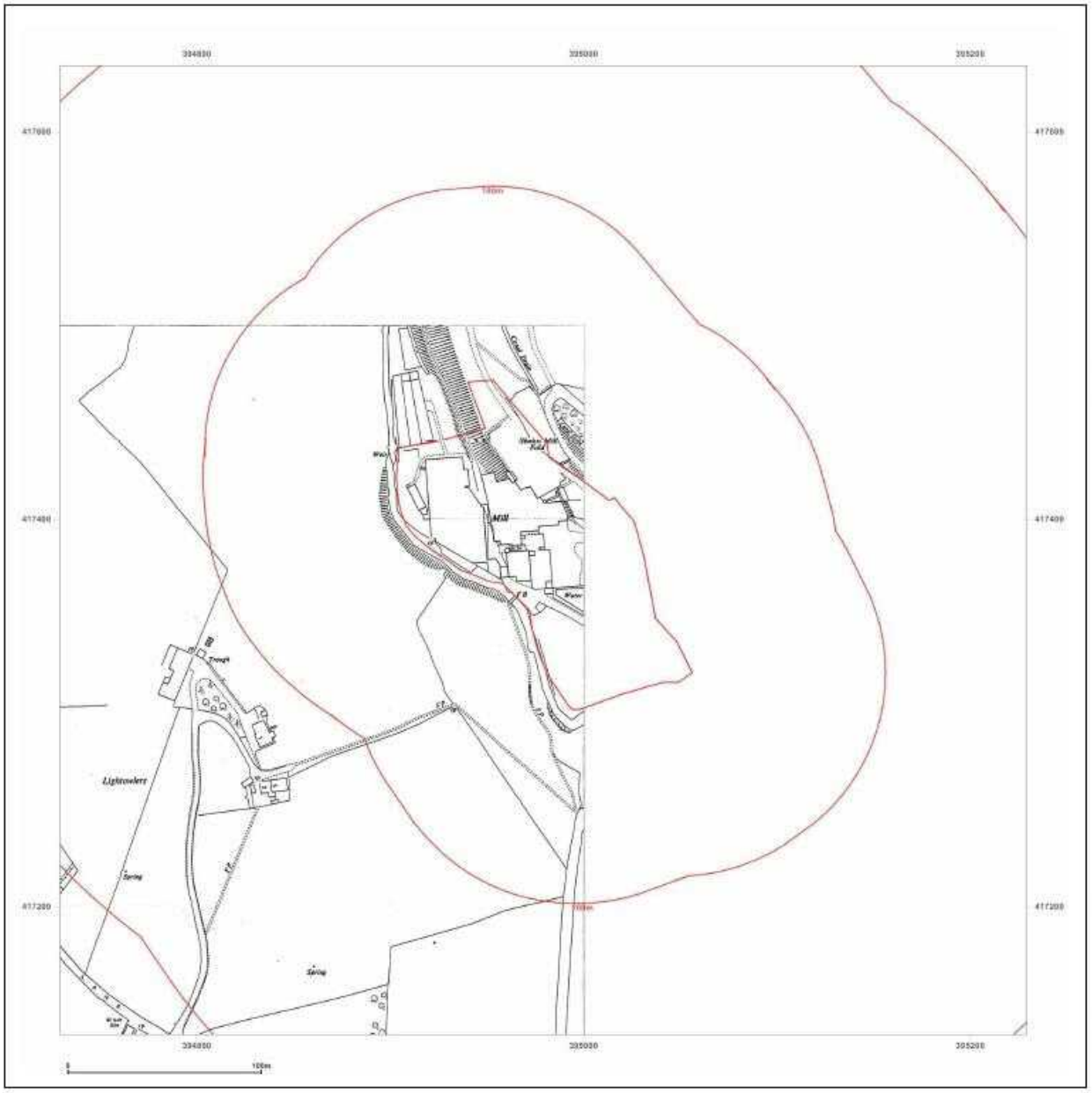
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Production date: 26 February 2015

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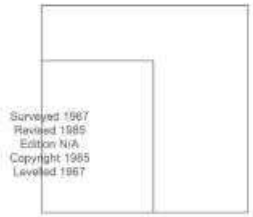
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Site Details:
Sladen Mill

Client Ref: EMS_290434_393098
Report Ref: EMS-290434_393098
Grid Ref: 394979, 417384

Map Name: National Grid
Map date: 1985
Scale: 1:1,250
Printed at: 1:2,000

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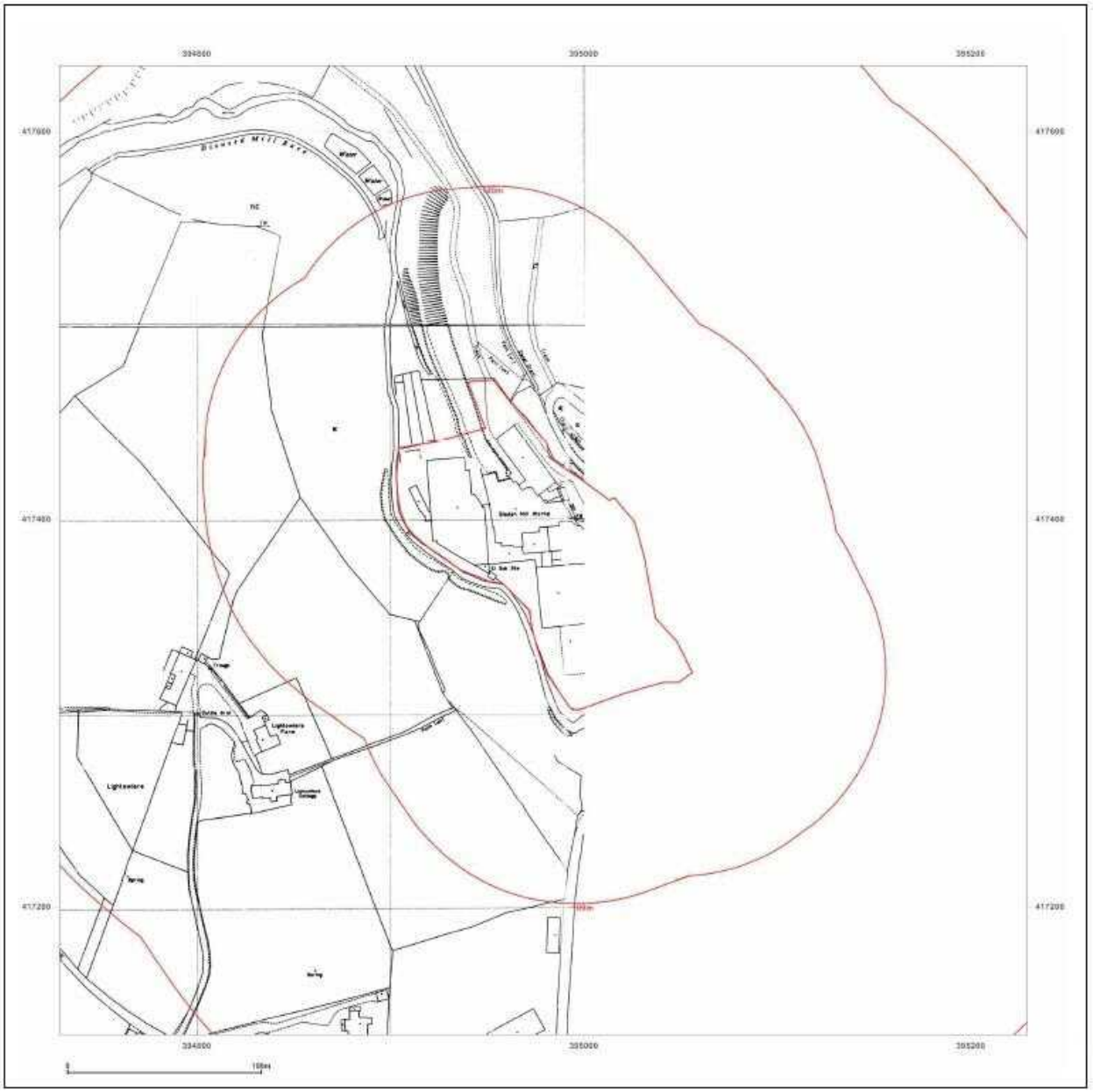
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Production date: 26 February 2015

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Site Details:
Sladen Mill

Client Ref: EMS_290434_393098
Report Ref: EMS-290434_393098
Grid Ref: 394979, 417384

Map Name: National Grid
Map date: 1989-1992
Scale: 1:1,250
Printed at: 1:2,000

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Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

Surveyed N/A
Revised N/A
Edition N/A
Copyright 1992
Levelled N/A

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Production date: 26 February 2015

To view map legend click here *Legend*

6.1. February 2014, Building Notice, ref: 14/00179/DEM, 'Prior notification of proposed demolition of mill' & supporting documentation.

ROCHDALE BOROUGH COUNCIL

Town and Country Planning Act 1990 as amended by Section 13 Planning and Compensation Act 1991
The Town and Country Planning (General Permitted Development) Order 1995 (as amended)

PRIOR APPROVAL REQUIRED

Name and address for correspondence:	Applicant name:
C Smith And Sons (Rochdale Ltd) Mr Michael Smith Sladen Fold Farm Todmorden Road Littleborough OL15 0LP	C Smith And Sons (Rochdale Ltd)

Part 1 - Particulars of Application

Date of Application: 17 February 2014 Application No: 14/00179/DEM

Proposal:	**Prior notification of proposed demolition of mill**
Location:	**Sladen Mill, Halifax Road, Littleborough, OL15 0LB,**

Part II - Particulars of decision

The Rochdale Metropolitan Borough Council hereby give notice in pursuance of the provisions of the Town and Country Planning Act 1990 that prior approval **IS REQUIRED** for the development referred to in Part 1 hereof.

Date of Decision 5 March 2014

MR Rooth

.....

Signed on behalf of the Council

ROCHDALE BOROUGH COUNCIL

Town and Country Planning Act 1990 as amended by Section 13 Planning and Compensation Act 1991
The Town and Country Planning (General Permitted Development) Order 1995 (as amended)

DETERMINATION ON PROPOSAL TO DEMOLISH

Name and address for correspondence:	Applicant name:
C Smith And Sons (Rochdale Ltd) Sladen Fold Farm Todmorden Road Littleborough OL15 0LP	C Smith And Sons (Rochdale Ltd)

Part 1 - Particulars of Application

Date of Application: 17 February 2014 Application No: 14/00179/DEM

Proposal: **Prior notification of proposed demolition of mill**
Location: **Sladen Mill, Halifax Road, Littleborough, OL15 0LB,**

Part II - Particulars of decision

The Rochdale Metropolitan Borough Council hereby give notice in pursuance of the provisions of the Town and Country Planning Act 1990 that permission has been **Granted** for the carrying out of the works relating to the demolition and subsequent restoration of the site referred to in Part 1 hereof in accordance with the application and plans submitted.

Reason for Decision:

Date of Decision 5 March 2014

MR

.....
Signed on behalf of the Council

IMPORTANT
PLEASE ENSURE THAT YOU HAVE READ AND FULLY UNDERSTOOD THE CONTENTS OF THIS DECISION NOTICE.

YOUR ATTENTION IS DRAWN TO THE ATTACHED NOTES.

Rochdale MBC
Economy & Environment
Building Control Services
Number One Riverside
Smith Street
Rochdale
OL16 1XU

Tel: 01706 924327
Email: building.control@rochdale.gov.uk

ROCHDALE METROPOLITAN BOROUGH COUNCIL

LABC

SECTION 80 – BUILDING ACT, 1984 NOTICE OF INTENDED DEMOLITION

I, the person whose signature, name and address appear below, HEREBY GIVE NOTICE of proposed works of demolition as follows:

Premises: SLADEN MILL, HALIFAX RD, LITTLEBOROUGH OL15 0LH

Description: PART DEMOLITION OF SITE.

Owner: ALDERBURGH

Owner's Address: SLADEN MILL, HALIFAX RD, LITTLEBOROUGH, OL15 0LB

Does any part of the building contain asbestos containing materials? (YES) / NO

TYPE 3 ASBESTOS SURVEY DONE.

*Please note that if the proposed building to be demolished **does** contain asbestos containing materials (ACMs), then the contractor must comply with the Control of Asbestos Regulations 2012 and an Asbestos Demolition Survey Report, completed in accordance with HSG 264, should be submitted to the HSE.*

If an application has been submitted for Building Regulations or Planning or is pending please give details.

Description:

Application Number:

Is it a Listed Building? YES / (NO) Is it in a Conservation Area? YES / (NO)

I CONFIRM THAT a Copy of This Notice Has Been Given to the Following, as Required by Law:

1. **Electricity Supplier:** SERVICES ISOLATED BY OUR CLIENT
2. **Gas Supplier:**
3. **Occupiers of the properties adjacent to the building to be demolished:**

Name: **Name:**
Address: **Address:**

Name: **Name:**
Address: **Address:**

I

understand that I will receive in return a notice specifying certain steps that must be undertaken during the course of the demolition and that copies of that notice will have also been given to the HSE, adjacent occupiers and Gas and Electricity Connection Companies.

I also understand that I may not commence demolition work until I have received notice of the Council's requirement(s) under Section 81 or a period of not less than six weeks has expired from the date I give this Notice.

Start Date: ASAP (ONCE APPROVED) (If known, but in accordance with the above paragraph)

Contract Duration (Approx) 4 WEEKS

Name and address of person or company undertaking the demolition: P SMITH & SONS (ROCHDALE) LTD
SLADEN FOLD FARM
SUMMIT, LITTLEBOROUGH
OL15 0LP

Name and address of Agent (if any): N/A

Signature: Paul G Douglas **Date:** 4-1-2014

Name (print) PAUL DOUGLAS

Address SLADEN FOLD FARM
SUMMIT, LITTLEBOROUGH
OL15 0LP 01706 378558

Please return to the address below with the fee of £155.00 made payable to Rochdale MBC

Return to: Rochdale MBC, Economy & Environment, Building Control Services, Number One Riverside, Smith Street, Rochdale, OL16 1XU.

Revised June 13 dco

Registered Office
Sladen Fold Farm, Summit, Littleborough, Lancashire, OL15 0LP
Tel : 01706 378558 / 07831 462892 - Fax : 01706 378616
Email : csmithandsons@aol.com

C SMITH & SONS (ROCHDALE) Ltd

Proposed Health and Safety Pack covering

Demolition Works

at

Sladen Mill, Halifax Road, Littleborough, Lancs, OL15 0LB



on behalf of

ALDERBURGH

Registered Office
Sladen Fold Farm, Summit, Littleborough, Lancashire, OL15 OLP
Tel : 01706 378558 / 07831 462692 - Fax : 01706 378616 – Email : csmithandsons@aol.com

C SMITH & SONS (ROCHDALE) Ltd

Outline Method Statement

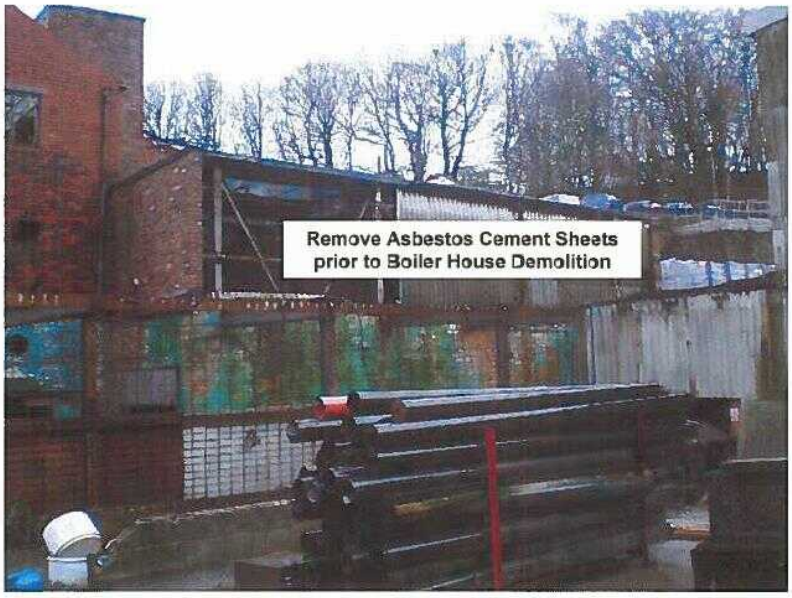
Reference Number :	**MS/SM/001**	**Site Location:**	**Sladen Mill, Halifax Road, Littleborough, Lancs, OL15 0LB**
Author(s):	**Tony Hardman (07808 292636)**		
Activity Under Consideration :	**Demolition of Identified Dilapidated Structures**		

Step	Description	Activities Required	Remarks
	Introduction and Site Safety	C Smith & Sons (Rochdale Ltd), hereinafter referred to as CSS, have been appointed by our Client (Alderburgh Limited) as the contractor responsible for demolition of a range of buildings and structures at the above site. We understand that since a fire (approx 20 years ago) the various structures have been lying unused and have gradually fallen into a state of dilapidation and disrepair. The structures are now to be demolished, removing the risk of potential collapse and allowing the created space to be used for site based storage/parking etc. This method statement sets out the proposed safe system of work which will be employed by ourselves during the initial clean up and subsequent demolition (down to slab level) of the identified structures. A Refurbishment and Demolition Asbestos Survey (ref S.J.01174, dated 21 December, 2013) has been prepared. The report identifies various asbestos containing materials which shall be removed by our trained and competent operatives prior to commencement of the demolition activities. The method statement assumes that any equipment required by the Client has been previously removed from all areas identified for demolition.	Our Demolition Manager for this project shall be Michael Smith (07831 462692) with day-to-day Supervision by Carl Jones (07970 900109). Carl shall take charge of the works and be responsible for the day-to-day management and co-ordination of all related Health and Safety matters within the workplace. He shall liaise with the Client Mr Peter Davidson, Tel 07976 720650, to determine any current or forthcoming site activities which may affect the safe completion of our work. Any minor and reasonable changes to the sequence or methodology of work shall be agreed on site and this method statement shall be hand amended to reflect the change. Where such changes are deemed to be significant a new method statement shall be produced.

Registered Office
Sladen Fold Farm, Summit, Littleborough, Lancashire, OL15 OLP
Tel : 01706 378558 / 07831 462692 - Fax : 01706 378616 – Email : csmithandsons@aol.com

C SMITH & SONS (ROCHDALE) Ltd

Site Photo's



Asbestos Cement Sheets to be removed prior to Boiler House Demolition

Dunelm Environmental Consultancy (UK)

ASBESTOS SURVEY REPORT

SURVEY REFERENCE NO:	S.J.01174
CLIENT:	C Smith & Son
SITE ADDRESS:	Sladen Mill Littleborough
CONTACT:	Michael Smith
SURVEY TYPE:	Refurbishment/Demolition Survey
SURVEY DATE:	21st December 2013
SURVEY LEADER:	Martin Dennett
SURVEYOR(S):	Martin Dennett
REPORT ISSUE DATE:	21st December 2013
REPORT PREPARED BY:	M Dennett
REPORT REVIEWED BY:	M Dennett

THE LEAD SURVEYOR M. Dennett is the holder of a P402 Certificate: Buildings Surveys and Bulk Sampling for Asbestos (including Risk Assessment and Risk Management Strategies) Certificate in Asbestos Inspection procedures and Asbestos Inspector Assessment. & P406 Supervisory Management Certificate

Report No S.J.01174

SECTION 1: EXECUTIVE SUMMARY
For further details please see section 7
Requires a competent contractor with trained staff under non Licensed Notifiable removal regulations to remove as follows:

Floor	Sample No.	Material Type	Asbestos Type	Comments	Photo
Boiler Room	Visual	Fuse Box Flash Pads	Chrysotile	Remove prior to Demolition	
Boiler room	Visual	Asbestos Cement wall panels	Chrysotile	Remove prior to Demolition	
Store	Visual	Asbestos Cement wall panels	Chrysotile	Remove prior to Demolition	
Stenyer room	Visual	Asbestos Cement Roof	Chrysotile	Remove prior to Demolition	No Photo

6.2. 2017 Building Notice, ref: DEM/17/0122, 'Demolition of Site Buildings' & supporting documentation.

ROCHDALE BOROUGH COUNCIL

ECONOMY SERVICE

John Searle
Director of Economy

BUILDING CONTROL SERVICE
Dave Oakes BSc (Hons) MSc C.Build.E MCABE FRACS
Building Control Manager
Number One Riverside
Smith Street
Rochdale
OL16 1XU

Colin Smith & Sons
Sladen Fold Farm
Summit
Littleborough
OL15 0LP

Fax: 01706 924628
Our ref: DEM/17/0122
Enquiries to: ADMIN
Direct Line: 01706 924327
Date: 8 November 2017

Dear Sirs

THE BUILDING ACT 1984 SECTION 81 + 82 : REFERENCE:DEM/17/0122
NOTICE OF INTENDED DEMOLITION

Location: Alderburgh Ltd, Sladen Mill, Halifax Road, Littleborough, OL15 0LB,
Proposal: DEMOLITION OF EXISTING BUILDINGS

BUILDING ACT 1984: SECTION 81
NOTICE TO PERSONS UNDERTAKING DEMOLITION WORKS

To: Colin Smith & Sons, Sladen Fold Farm, Summit, Littleborough, OL15 0LP

Further to the receipt of the Section 80 Notice, dated 16th October 2017, which specifies certain works of demolition intended to be carried out in respect of the building(s) at the following address:

Sladen Mill, Halifax Road, Littleborough, OL15 0LB

Rochdale Borough Council (referred to as 'the Council' hereafter) pursuant to Sections 81 & 82 of the Building Act 1984, requires you to complete the work of demolition in accordance with the attached Schedule, no later than 8 weeks from the date of commencement.

NOTE 1: You have a right of appeal to a Magistrates' Court against this Notice and your attention is drawn to the notes attached hereto which set out the relevant statutory provisions regarding appeals against, and the enforcement of, this Notice. Any appeal must be made within 21 days from the date when this Notice is served upon you.

NOTE 2: The Contractor should contact Building Control on Telephone No 01706 924325 between the hours of 9.00am and 4.30pm to arrange any site meetings deemed necessary before any works of demolition.

NOTE 3: Your attention is drawn to the provisions contained in Sections 92, 83, 99, 102 and 103 of the Building Act 1984. Any appeal in pursuance of these provisions should be made to a Magistrates' Court and must be brought within 21 days of the service of this notice.

Signed: Mr David Oakes
Date: 8 November 2017
cc HSE, Electricity North West, National Grid, United Utilities, Adjacent Owners.

LABC

Rochdale MBC
Economy & Environment
Building Control Services
Number One Riverside
Smith Street
Rochdale
OL16 1XU

Tel: 01706 924327
Email: building.control@rochdale.gov.uk

ROCHDALE BOROUGH COUNCIL

LABC

SECTION 80 – BUILDING ACT, 1984 NOTICE OF INTENDED DEMOLITION

I, the person whose signature, name and address appear below, HEREBY GIVE NOTICE of proposed works of demolition as follows:

Premises: SLADEN MILL, BLACKSTONE EDGE ROAD, LITTLEBOROU

Description: STONE, BRICK & SLATE & PORTAL FRAMED BUILDIN

Owner: ALDERBURGH LTD / PAL SIPP PR DAVIDSON & R DAVIDSO

Owner's Address:

Does any part of the building contain asbestos containing materials? YES / NO — SEE SURVEY

*Please note that if the proposed building to be demolished **does** contain asbestos containing materials (ACMs), then the contractor must comply with the Control of Asbestos Regulations 2012 and an Asbestos Demolition Survey Report, completed in accordance with HSG 264, should be submitted to the HSE.*

If an application has been submitted for Building Regulations or Planning or is pending please give details.

Description: RESIDENTIAL DEVELOPMENT

Application Number: 15/01235/OUT.

Is it a Listed Building? YES / NO — Is it in a Conservation Area? YES / NO

I CONFIRM THAT a Copy of This Notice Has Been Given to the Following, as Required by Law:

1. **Electricity Supplier:** BY CLIENT
2. **Gas Supplier:** BY CLIENT
3. **Occupiers of the properties adjacent to the building to be demolished:**

Name:
Address:

Name:
Address:

Name: N/A
Address:

Name: N/A
Address:

I understand that I will receive in return a notice specifying certain steps that must be undertaken during the course of the demolition and that copies of that notice will have also been given to the HSE, adjacent occupiers and Gas and Electricity Connection Companies.

I also understand that I may not commence demolition work until I have received notice of the Council's requirement(s) under Section 81 or a period of not less than six weeks has expired from the date I give this Notice.

Start Date: NOV 2017 (If known, but in accordance with the above paragraph)

Contract Duration (Approx) 6-8 WEEKS

Name and address of person or company undertaking the demolition: COLIN SMITH & SONS
SLADEN FOLD FARM
SUMMIT
LITTLEBOROUGH OL15 0LP

Name and address of Agent (if any):

Signature: [signature] **Date:** 16 OCTOBER 2017

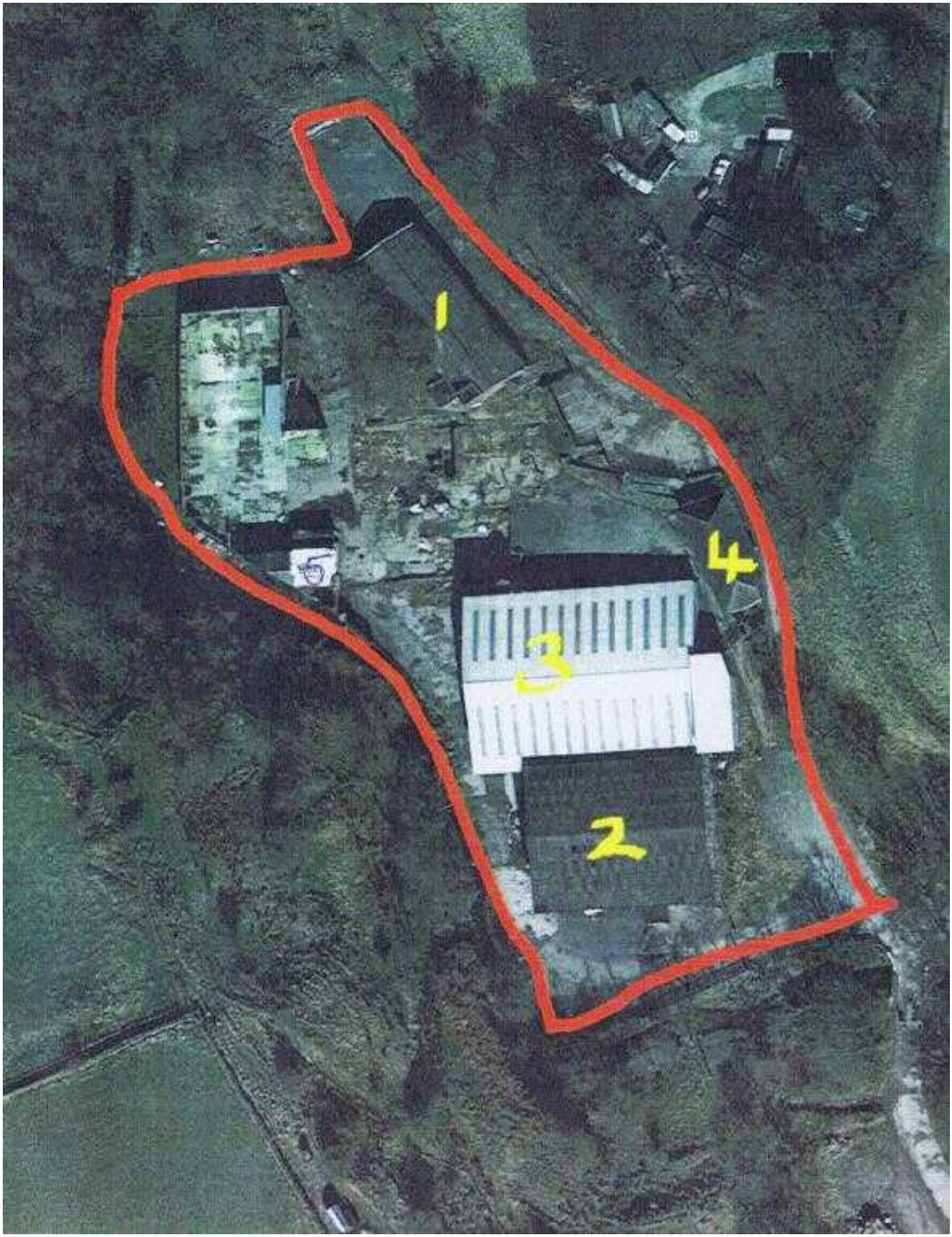
Name (print) MICHAEL SMITH

Address SLADEN FOLD FARM
LITTLEBOROUGH
OL15 0LP

Please return to the address below with the fee of £164.00 made payable to Rochdale MBC

Return to: Rochdale MBC, Economy & Environment, Building Control Services, Number One Riverside, Smith Street, Rochdale, OL16 1XU.

Revised March 2014 AT


1
2
3
4
5

COLIN SMITH & SONS
Sladen Fold Farm, Lightowlers Lane, Littleborough, Lancashire, OL15 OLP
Tel : 01706 378558 / 07831 462692 - Fax : 01706 378616 – Email : info@csmithandsons.co.uk

Outline Method Statement

Reference Number :	**MS/SM/002**	**Site Location:**	**Sladen Mill, Blackstone Edge Road, Littleborough, OL15 0LB**
Author(s):	**Tony Hardman (07808 292636)**		
Activity Under Consideration :	**Demolition of Site Buildings**		

Step	Description	Activities Required	Remarks
	Introduction and Site Safety	Colin Smith & Sons, hereinafter referred to as CSS, have been appointed by our Client (PAL Trustees Ltd, PR Davidson & B Davidson) as the contractor responsible for the demolition of a number of buildings at the above site (see attached Site Plan). This method statement sets out the proposed safe system of work which will be employed by ourselves during the initial soft stripping and subsequent demolition (down to slab level) of the identified structures. A Refurbishment and Demolition Asbestos Survey (ref S.J.01410, issued 12 December, 2017) has been prepared. The report identifies various asbestos containing materials (Chrysotile cement sheets in Buildings 1, 2 and 3) which shall be removed by our trained and competent operatives prior to commencement of the remote demolition activities. The method statement assumes that any equipment required by the Client has been previously removed from the buildings identified for demolition.	Our Demolition Manager for this project shall be Michael Smith (07831 462692) with day-to-day Supervision by Carl Jones (07970 900109). Carl shall take charge of the works and be responsible for the day-to-day management and co-ordination of all related Health and Safety matters within the workplace. He shall liaise with the Client Mr Peter Davidson, Tel 07976 720650, to determine any current or forthcoming site activities which may affect the safe completion of our work. Any minor and reasonable changes to the sequence or methodology of work shall be agreed on site and this method statement shall be hand amended to reflect the change. Where such changes are deemed to be significant a new method statement shall be produced.

COLIN SMITH & SONS
Sladen Fold Farm, Lightowlers Lane, Littleborough, Lancashire, OL15 OLP
Tel : 01706 378558 / 07831 462692 - Fax : 01706 378616 – Email : info@csmithandsons.co.uk

Reference Number : MS/SM/002

Step	Description	Activities Required	Remarks
6.0	***Removal of Asbestos Containing Materials*** *(Cement Sheets)*	With all areas now cleared of any debris identify the asbestos containing materials (and any others which may have appeared following completion of the clean up activities) and establish the access requirements to assist in their removal.	
7.0		Check ground conditions and position the MEWP adjacent to the cement sheets.	
8.0		Rig up gas cutting equipment, bolt croppers etc, climb into the MEWP basket, attach safety harness to installed anchor point and raise the basket to sit adjacent to the first sheet identified for removal.	Cement sheets are installed to the roof and sides of Buildings 1 and 2.
9.0		Using a combination of gas cutting equipment and/or bolt croppers carefully remove the sheet fixing bolts and lower the sheet into the MEWP basket.	
10.0		Remove the remaining cement sheets in that location then lower the basket, remove and wrap/bag the cement sheets and place aside ready for disposal.	Complete a final inspection/clean down of the floor/area.
11.0		Repeat above steps until all remaining cement sheets (and rainwater goods) have been removed then undress from PPE, bag this as asbestos waste and dispose of all asbestos waste via the approved disposal route.	As above. Place consignment notes in the site file.
12.0		With all asbestos containing materials removed, reposition the MEWP clear of the point of work and manoeuvre the demolition plant into position adjacent to the agreed start point.	

COLIN SMITH & SONS
Sladen Fold Farm, Lightowlers Lane, Littleborough, Lancashire, OL15 OLP
Tel : 01706 378558 / 07831 462692 - Fax : 01706 378616 – Email : info@csmithandsons.co.uk

Reference Number : MS/SM/002

Step	Description	Activities Required	Remarks
13.0	***Demolition Works*** *(Buildings 1, 2 and 3)*	Extend the fencing as appropriate and set up dust suppression equipment (where weather/site conditions dictate).	All fencing is to be positioned to create a suitable Demolition Exclusion Zone. Position a Banksman adjacent to the point of work (a safe distance away from the operating machine).
14.0		Using the excavator with fitted shear cut out and remove the steel portal frame of Building 1.	Banksman is to ensure that no persons enter the area during demolition. If access is required all work must stop until the area has been vacated and it is safe to resume.
15.0		With the building demolished use gas cutting equipment to complete further size reduction of the portal frame steel structure (if required) and load to scrap bulker.	Use the gas cutting equipment to remove any tripping hazards (remaining steel columns flush to the floor slab).
16.0		Repeat above steps to demolish Buildings 2 and 3 down to slab level.	
17.0	*Building 4*	Where salvageable arrange removal of any roofing slates by specialist roofing contractor	Separate RAMS will refer.
18.0		Use a combination of excavator and Demolition Operatives working from a MEWP (when demolishing the elevation adjacent to the minor road) to reduce the building down to slab/wall level.	Banksman to be positioned along Blackstone Edge Road during demolition of the adjacent elevation.
19.0		Segregate all recovered materials into 'like' types.	
20.0		Load the reccvered stone, scrap and timber into the appropriate waste skips and remove from site.	

COLIN SMITH & SONS
Sladen Fold Farm, Lightowlers Lane, Littleborough, Lancashire, OL15 OLP
Tel : 01706 378558 / 07831 462692 - Fax : 01706 378616 – Email : info@csmithandsons.co.uk

HAZARD No.	EXISTING CONTROLS	EXISTING INFORMATION Can refer to existing documents	EXISTING TRAINING	BEST PRACTICE	EXISTING CONTROLS OK / Not OK
8 cont	Teamwork to be employed for heavier sections of debris. Dusty areas to be wetted down prior to sweeping up and removal of debris in that area with suitable RPE worn. Skips to be regularly removed leaving a clean and safe site. Open top skips to be covered prior to removal. Consignment notes to be obtained for each removed load.	As above	As above	As above	Okay
9	The site Refurbishment and Demolition Survey Report shows the presence of asbestos containing materials (ACM's) in the form of cement sheets. Particulate respirators (FFP3), disposable coveralls and gloves to be worn when removing and handling the sheets and any other non notifiable materials which may be discovered during the course of the work. Routine environmental clean-ups will be completed as the work progresses. Where additional ACM's detected (or suspected) all work shall cease in that particular area and the area fenced off until independent inspection/analysis has been completed.	Site Safety Rules (posted at the point of entry) Asbestos Awareness Course Refurbishment and Demolition Asbestos Survey ref S.J. 01410.	Asbestos awareness training Persons working under direct supervision of Competent Person.	Control of Asbestos Regulations 2012 COSHH 2002	Okay

The Hazardous Waste Regulations 2005: Consignment Note

Environment Agency

CONSIGNEE'S CO

PART A Notification details

1 Consignment note code: SLADEW10006V

2 The waste described below is to be removed from (name, address, postcode, telephone, e-mail, facsimile): SLADEN MILL
HALIFAX ROAD
LITTLEBOROUGH
LANCASHIRE
OL15 0LB

3 The waste will be taken to (name, address and postcode): BRADLEY PARK WASTE MGT
LOWER QUARRY ROAD
HUDDERSFIELD HD2 1FN

4 The waste producer was (if different from 2) (name, address, postcode, telephone, e-mail, facsimile):

PART B Description of the waste

If continuation sheet used, tick here ☐

1 The process giving rise to the waste(s) was: DEMOLITION

2 SIC (2007) for the process giving rise to the waste: 43.11 1

3 WASTE DETAILS (where more than one waste type is collected all of the information given below must be completed for each EWC identified)

Description of waste	List of wastes (EWC code)(6 digits)	Quantity (kg)	The chemical/biological components in the waste and their concentrations are: Component	Concentration (% or mg/kg)	Physical form (gas, liquid, solid, powder, sludge or mixed)	Hazard code(s)	Container type, number and size
ASBESTOS CEMENT SHEET MIX	170605		CHRYSOTILE	0.1%	SOLID	H7	LOOSE

The information given below is to be completed for each EWC identified

EWC code	UN identification number(s)	Proper shipping name(s)	UN class(es)	Packing group(s)	Special handling requirements
170605	2590	DEMOLITION	9	III/T.	PPE TO BE WORN

PART C Carrier's certificate

If more than one carrier is used, please attach schedule for subsequent carriers. If schedule of carriers is attached tick here. ☐

I certify that I today collected the consignment and that the details in A2, A3 and B3 are correct and I have been advised of any specific handling requirements.

Where this note comprises part of a multiple collection the round number and collection number are:

1

1 Carrier name: COLIN SMITH & SONS

On behalf of (name, address, postcode, telephone, e-mail, facsimile): SLADEN FOLD FARM, SUMMIT LITTLEBOROUGH LANCS OL15 0LP 01706 378558

2 Carrier registration no./reason for exemption: CBDU 123851

3 Vehicle registration no. (or mode of transport, if not road): MX17 DZZ

Signature

Date 28.10.2019 Time 1400

PART D Consignor's certificate

I certify that the information in A, B and C has been completed and is correct, that the carrier is registered or exempt and was advised of the appropriate precautionary measures. All of the waste is packaged and labelled correctly and the carrier has been advised of any special handling requirements.

I confirm that I have fulfilled my duty to apply the waste hierarchy as required by Regulation 12 of the Waste (England and Wales) Regulations 2011.

1 Consignor name: TAL TRUSTEES

On behalf of (name, address, postcode, telephone, e-mail, facsimile): C/O JAMES HAY PENSIONS DUNNS HOUSE ST PAULS ROAD SALISBURY SP2 7BF

Signature JEREMY BURKE

Date 28.10.2019 Time 1400

PART E Consignee's certificate (where more than one waste type is collected all of the information given below must be completed for each EWC)

Individual EWC code(s) received	Quantity of each EWC code received (kg)	EWC code accepted/rejected	Waste management operation (R or D code)
170605	11220	✓	D5

1 I received this waste at the address given in A3 on: Date 28.10.19 Time 1400

2 Vehicle registration no. (or mode of transport if not road):

3 Where waste is rejected please provide details: MX17 DZZ

Name:

On behalf of (name, address, postcode, telephone, e-mail, facsimile):

HD2 1FN

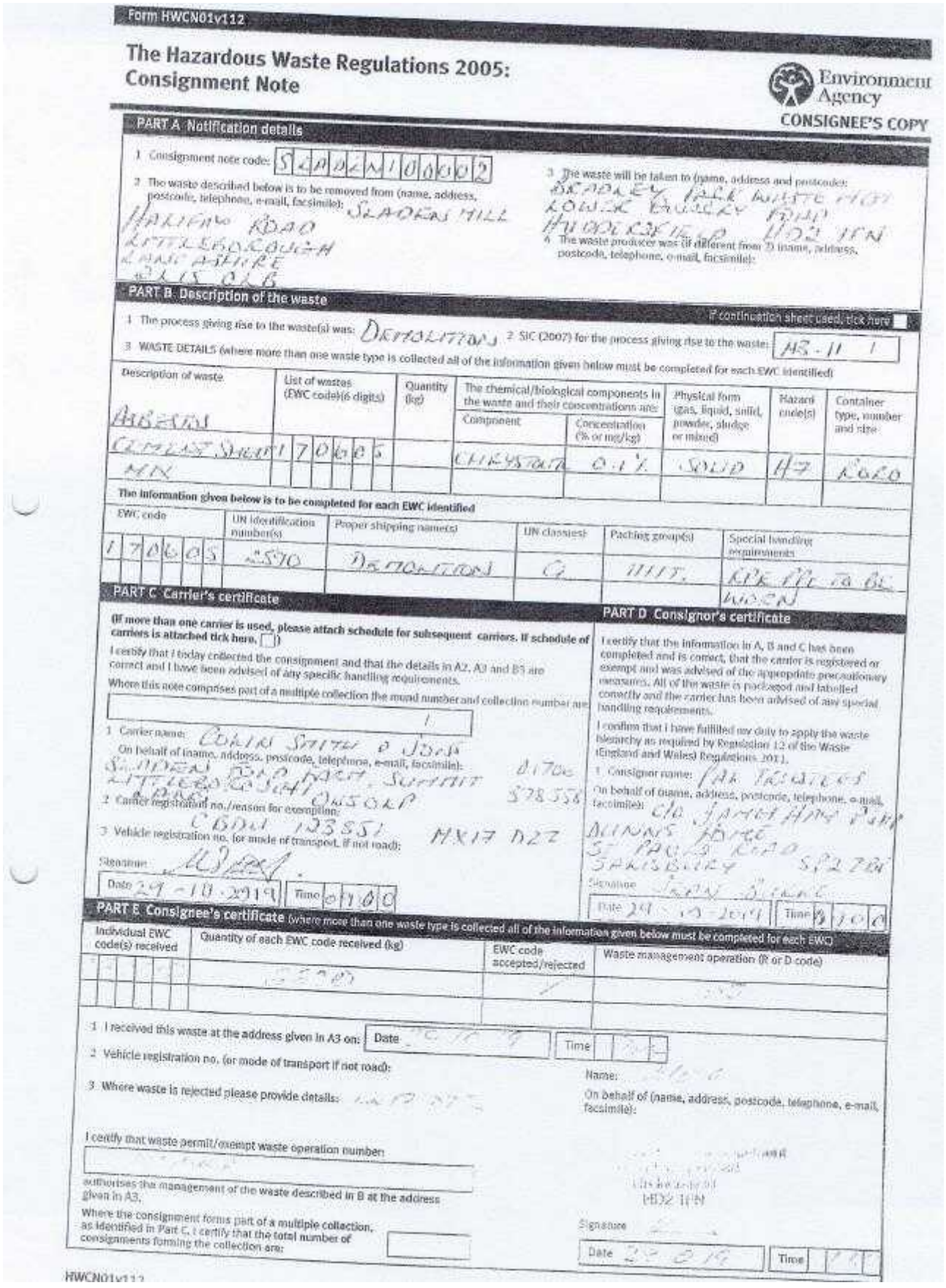
I certify that waste permit/exempt waste operation number: EP3454HA authorises the management of the waste described in B at the address given in A3.

Where the consignment forms part of a multiple collection, as identified in Part C, I certify that the total number of consignments forming the collection are:

Signature

Date 28.10.19 Time 1400

HWCN01v112



Form HWCN01v112

The Hazardous Waste Regulations 2005: Consignment Note

Environment Agency

CONSIGNEE'S COPY

PART A Notification details

1 Consignment note code: S4MDCM10002

2 The waste described below is to be removed from (name, address, postcode, telephone, e-mail, facsimile): SLADENS MILL, HALIFAX ROAD, LITTLEBOROUGH, LANCASHIRE, OL15 0LB

3 The waste will be taken to (name, address and postcode): BRADLEY LANE WASTE MGT, LOWER BRADLEY FARM, HUDDERSFIELD, HD2 1FN

4 The waste producer was (if different from 2) (name, address, postcode, telephone, e-mail, facsimile):

PART B Description of the waste

If continuation sheet used, tick here ☐

1 The process giving rise to the waste(s) was: DEMOLITIONS 2 SIC (2007) for the process giving rise to the waste: 43.11.1

3 WASTE DETAILS (where more than one waste type is collected all of the information given below must be completed for each EWC identified)

Description of waste	List of wastes (EWC code)(6 digits)	Quantity (kg)	The chemical/biological components in the waste and their concentrations are: Component	Concentration (% or mg/kg)	Physical form (gas, liquid, solid, powder, sludge or mixed)	Hazard code(s)	Container type, number and size
ASBESTOS							
CEMENT SHEET MIX	170605		CHRYSOTILE	0.1%	SOLID	H7	SKIP

The information given below is to be completed for each EWC identified

EWC code	UN identification number(s)	Proper shipping name(s)	UN class(es)	Packing group(s)	Special handling requirements
170605	2590	DEMOLITIONS	9	III	SPECIFIC TO BE HANDLED

PART C Carrier's certificate

(If more than one carrier is used, please attach schedule for subsequent carriers. If schedule of carriers is attached tick here, ☐)

I certify that I today collected the consignment and that the details in A2, A3 and B5 are correct and I have been advised of any specific handling requirements.

Where this note comprises part of a multiple collection the round number and collection number are: 1

1 Carrier name: COLIN SMITH & SONS

On behalf of (name, address, postcode, telephone, e-mail, facsimile): SLADEN FARM, SUMMIT, LITTLEBOROUGH, OL15 0LP, 01706 378558

2 Carrier registration no./reason for exemption: CBDU 123551

3 Vehicle registration no. (or mode of transport if not road): MX17 NZZ

Signature:

Date 29-10-2019 Time 0700

PART D Consignor's certificate

I certify that the information in A, B and C has been completed and is correct, that the carrier is registered or exempt and was advised of the appropriate precautionary measures. All of the waste is packaged and labelled correctly and the carrier has been advised of any special handling requirements.

I confirm that I have fulfilled my duty to apply the waste hierarchy as required by Regulation 12 of the Waste (England and Wales) Regulations 2011.

1 Consignor name: JAK HOMES

On behalf of (name, address, postcode, telephone, e-mail, facsimile): C/O JAMES HAY PLC, MINERS HOUSE, 5 PAUL'S ROAD, SALISBURY, SP2 7BH

Signature:

Date 29-10-2019 Time 1000

PART E Consignee's certificate (where more than one waste type is collected all of the information given below must be completed for each EWC)

Individual EWC code(s) received	Quantity of each EWC code received (kg)	EWC code accepted/rejected	Waste management operation (R or D code)
	13720	✓	R13

1 I received this waste at the address given in A3 on: Date 30/10/19 Time 13:45

2 Vehicle registration no. (or mode of transport if not road):

3 Where waste is rejected please provide details:

Name:

On behalf of (name, address, postcode, telephone, e-mail, facsimile):

I certify that waste permit/exempt waste operation number:

authorises the management of the waste described in B at the address given in A3.

Where the consignment forms part of a multiple collection, as identified in Part C, I certify that the total number of consignments forming the collection are:

Signature:

Date 30/10/19 Time 13:45

HWCN01v112

Form HWCN01v112

The Hazardous Waste Regulations 2005: Consignment Note

Environment Agency

CONSIGNEE'S COPY

PART A Notification details

1 Consignment note code: SLADEN1 0003

2 The waste described below is to be removed from (name, address, postcode, telephone, e-mail, facsimile): SLADEN MILL
HALIFAX ROAD
LITTLEBOROUGH
LANCASHIRE
OL15 OLB

3 The waste will be taken to (name, address and postcode): BRADLEY PARK WASTE MGT
LOWER QUARRY ROAD
HUDDERSFIELD HD2 1FN

4 The waste producer was (if different from 2) (name, address, postcode, telephone, e-mail, facsimile):

PART B Description of the waste

If continuation sheet used, tick here ☐

1 The process giving rise to the waste(s) was: DEMOLITION 2 SIC (2007) for the process giving rise to the waste: 43.11.1

3 WASTE DETAILS (where more than one waste type is collected all of the information given below must be completed for each EWC identified)

Description of waste	List of wastes (EWC code)(6 digits)	Quantity (kg)	The chemical/biological components in the waste and their concentrations are: Component	Concentration (% or mg/kg)	Physical form (gas, liquid, solid, powder, sludge or mixed)	Hazard code(s)	Container type, number and size
ASBESTOS CEMENT SHEET MIX	170605		CHRYSOTILE	0-1%	SOLID	H7	RORO

The information given below is to be completed for each EWC identified

EWC code	UN identification number(s):	Proper shipping name(s)	UN class(es)	Packing group(s)	Special handling requirements
170605	2590	DEMOLITION	9	III/T.	RPE PPE TO BE WORN

PART C Carrier's certificate

(If more than one carrier is used, please attach schedule for subsequent carriers. If schedule of carriers is attached tick here. ☐)

I certify that I today collected the consignment and that the details in A2, A3 and B3 are correct and I have been advised of any specific handling requirements.

Where this note comprises part of a multiple collection the round number and collection number are: 1

1 Carrier name: COLIN SMITH & SONS 07706 378558

On behalf of (name, address, postcode, telephone, e-mail, facsimile): SLADEN FOLD FARM SUMMIT, LITTLEBOROUGH OL15

2 Carrier registration no. / reason for exemption: CBDU 123851 17X17 D22

3 Vehicle registration no. (or mode of transport, if not road):

Signature

Date 29.10.2019 Time 11:10

PART D Consignor's certificate

I certify that the information in A, B and C has been completed and is correct, that the carrier is registered or exempt and was advised of the appropriate precautionary measures. All of the waste is packaged and labelled correctly and the carrier has been advised of any special handling requirements.

I confirm that I have fulfilled my duty to apply the waste hierarchy as required by Regulation 12 of the Waste (England and Wales) Regulations 2011.

1 Consignor name: P&L TRUSTEES

On behalf of (name, address, postcode, telephone, e-mail, facsimile): C/O JAMES HAY P'SHIP DUNNS HOUSE ST JAMES ROAD SP2 7BF SALISBURY

Signature SEAN BURKE

Date 29-10-2019 Time 11:10

PART E Consignee's certificate (where more than one waste type is collected all of the information given below must be completed for each EWC)

Individual EWC code(s) received	Quantity of each EWC code received (kg)	EWC code accepted/rejected	Waste management operation (R or D code)
170605	10000	✓	D5

1 I received this waste at the address given in A3 on: Date 29.10.19 Time 11:20

2 Vehicle registration no. (or mode of transport if not road):

3 Where waste is rejected please provide details: 17X17 D22 Z

Name: REMOVAL

On behalf of (name, address, postcode, telephone, e-mail, facsimile):

I certify that waste permit/exempt waste operation number: EP3434HA

authorises the management of the waste described in B at the address given in A3.

Where the consignment forms part of a multiple collection, as identified in Part C, I certify that the total number of consignments forming the collection are:

Signature

Date 29.10.19 Time 11:20



Demolition crush which has now been removed from Site.



Demolition materials separated for removal.

T J BOOTH ASSOCIATES

CONSULTING CIVIL & GEOTECHNICAL ENGINEERS

20A Eastgate St
Rochdale
Lancashire
OL16 1DH

Mr Majid Mir, Planning Department,
Number One Riverside,
Smith St,
Rochdale,
Lancs,
OL16 1XU.

Thursday, 23 May 2024

Reference: *let-tjba-RMBC-sladen* mill-hydro-geol report-230524.docx

Subject: **Site of Former Sladen Mill,**
Halifax Rd, Littleborough, OL15 0LB.
15/01235/OUT.
Submission of details to comply with Condition 5.

Dear *Majid*:

Further to your correspondence with our client Mere Group Ltd regarding the above and the correspondence dated 28th Mar 24 from The Environment Agency (ref SO/2024/123863).

Please find attached with this letter a Supplementary Geo-Environmental Report into the Hydrogeology and potential Contaminant Transport for the Site.

The report was prepared specifically to address the comments raised by the EA with respect to the current Enviro Phase 2+3 Report-rev5.

We have prepared the report to address the specific request for a hydro-geological model using the EA Remedial Targets Methodology, so a numerical model (*remedial targets worksheet v3.2*) was developed to assess the fate of persistent groundwater contaminants and remediation requirements to their source. To this end we have concentrated on the identified contaminants of

Tel: 01706 868288
Fax: 01706 868288
e-mail: office@tjba.co.uk

Proprietor.
Timothy John Booth
BSc (Hons) C.Eng. C.Env. MICE
t/a T J Booth Associates

concern to groundwater receptors and the primary and most persistent of these are per/polyfluoroalkyl substances (PFAS).

We have selected the PFAS for modelling and reporting as the worst-case contaminant due to their mobility and persistence in the groundwater environment. The remaining CoC's were Selenium, Sulphate and Benzo(a)pyrene.

The outcome of the modelling shows a fourfold reduction in PFAS contamination to levels below UK drinking water standards and a substantial timescale of magnitude 10^3 years to reach the nearest receptor. The report has recommended an improved cover system to the Site areas to reduce rainwater percolation into the subsoils beneath (*this has not been modelled*). The remaining COC's are less persistent / less mobile and the recommended remediation is considered to address the risk from them.

Attached is the Supplementary Geo-Environmental Report-rev 0 and Remedial Target Worksheets for the two identified potential receptors.

Please forward this letter and attachments to the EA and subject to their acceptance we will amend and update the Enviro Phase 2+3 Report and resubmit for approval.

Sincerely yours,



Tim Booth, BSc (Hons), C. Eng. C. Env. MICE.
T J Booth Associates.

T J BOOTH ASSOCIATES

CONSULTING CIVIL & GEOTECHNICAL ENGINEERS

Supplementary Geo-Environmental Report.

Hydrogeology and potential Contaminant Transport.

Proposed Residential Development.
Former Sladen Mill,
Halifax Rd,
Littleborough.
Rochdale.

Author:	Tim Booth, BSc(hons), C.Eng, C. Env, MICE.
Client:	Mere Group
Reference:	rep-tjba-mere grp-sladen mill-hydrogeology-150424.docx

Revision	Date	Reason
0	May 2024	Original modelling report using PFAS.

T J Booth Associates.

20A Eastgate St,

Rochdale,

Lancs,

OL16 1DH.

Tel: 01706 868288.

Email: office@tjba.co.uk

Supplementary Geo-Environmental Report.
Hydrogeology and potential Contaminant Transport.
Former Sladen Mill, Halifax Rd, Littleborough.

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1 Introduction.

T J Booth Associates have prepared a Geo-Environmental Phase 2-3 Report for the above Site, currently on revision 5, issued to the Environment Agency via the Rochdale MBC Planning Dept on the 23rd Feb 24.

A response letter was received from the EA via RMBC 28th Mar 24 which raised questions regarding:

Underlying stratigraphy:

> We disagree with this position as the ground investigation logs confirm the absence of a lower permeability layer that is protective of the underlying sandstone bedrock deposits suggesting that there is indeed a likely pathway between the source and receptors. A good number of the reported logs show a likely direct linkage between the upper made ground deposits and the underlying natural deposits and therefore the underlying aquifer.

Hydrogeology:.

> Based on the principles of LCRM, 2023 we strongly disagree with this evaluation as the presence of contaminants of concern in relevant receptors (i.e. the groundwater body identified beneath the site in the attached borehole and trial pit logs) is in itself at least a moderate to high risk as this is, in itself, a source, pathway and relevant receptor.

This report is to address the EA response; to clarify the Conclusions and Recommendations of the Phase 2-3 Report.

2 Regional Background.

2.1 Landform and process

OS 1:25 k Map.



The Site is outlined in red on the map above.

The regional landform is a plateau deeply dissected by river valleys, often with distinct 'steps' where rivers have cut down below the level of earlier broader valleys, and showing signs of over-deepening by glacial meltwater. Most of these valleys are narrow with some glacial till and moraine.

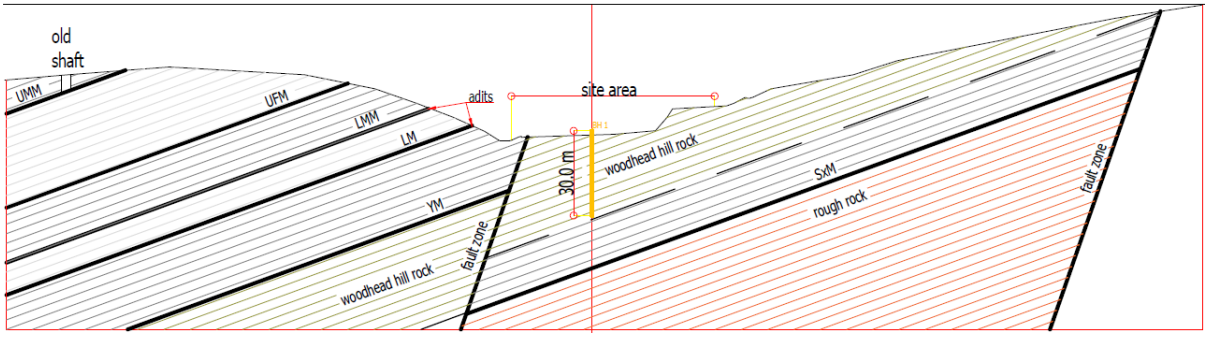
The rocks dip to the west, resulting in a series of escarpments, steep to the east and sloping away to the west, forming some prominent rocky edges.

Source: Countryside Character Area Description, Southern Pennines Natural Area Profile

2.2 Bedrock geology

The solid geology is dominated by Carboniferous rocks. The Millstone Grit group of Namurian age (Rough Rock series on the section) comprising gritstones, sandstones and coarse-grained sandstones formed by ancient river deltas. Between Todmorden and Bacup, Westphalian-age (lower) Coal Measures, a sequence of thin coals, shales and sandstones, (Woodhead Hill Rock series on the section) overlies the Millstone Grit.

The geology of the area is complex as these sedimentary rocks are of widely varying thickness and are cut by many faults.



Regional Section

Coal and ironstone have all been worked from the rocks in the past, as well as stone for building and shales for brick making. Currently the only commercial extraction is of stone for road construction and building.

A breakdown of the solid geology as a proportion of the total land area is:

- *52 per cent sandstones (including gritstones)*
- *46 per cent mudstones and siltstones*

Source: Countryside Character Area Description, Southern Pennines Natural Area Profile

2.3 Hydrogeology.

Coal measure rocks generally contain a series of high-permeability rocks (e.g., sandstone) of various thickness separated by low-permeability rocks (e.g., mudstones, shales), also of various thickness. These high-permeability rocks are generally termed aquifers, depending upon their capacity to yield useful volumes of water; the low-permeability rocks are generally termed aquitards, which limit or inhibit water and gas flow vertically across. The permeability of aquifer rocks ranges from about 1 to 100 md (millidarcy), and the permeability of aquitard rocks can be as low as 0.0001 md.

In general, depth from the ground surface to the groundwater table varies widely. Depending on the local topography, a groundwater system may contain local, perched groundwater (commonly fed by rainfall) and a sequence of deep regional groundwater (which is generally continuous over the entire basin). Depending on the thickness and permeability of aquitards separating individual groundwater systems, they may be connected hydraulically to varying degrees, described as loosely, moderately or well connected.

Groundwater flow in the Pennine Coal Measures is via fractures, with some intergranular flow within sandstone units. Aquifer properties are typically heterogeneous and anisotropic, and have been heavily modified by a legacy of coal mining. Increased fracturing following subsidence and new connections between once hydraulically isolated units via roadways and mines, has changed the natural behaviour of the Coal Measures (Banks, 1997; Jones et al., 2000). Regional flow is primarily from west to east, but also controlled by the folding and jointing/faulting across the region, alongside the historic mine workings, resulting in a complex 3D and potentially "karstic" like flow regime (Banks, 1997).

Permeabilities for the Pennine Coal Measures are variable and typically greatest in the Upper Coal Measures (up to 3 orders of magnitude greater average permeability than the Lower and Middle Coal Measures). Permeability is greatest in the sandstone horizons, but the mudstones and siltstones can have low values, and function as leaky aquitards (Banks, 1997; Jones et al., 2000). Hydraulic conductivity ranges from 3.8 $x10^{-5}$ m/d to 9.4 $x10^{-4}$ m/d for the Pennine Lower Coal Measures, 4 $x10^{-4}$ m/d to 4 $x10^{-2}$ m/d for the Pennine Middle Coal Measures, and 6.4 $x10^{-6}$ m/d to 1.7 $x10^{1}$ m/d for the Pennine Upper Coal Measures. Permeability is affected both by depth and structural features; with increasing overburden pressure permeability decreases. Jointing and faulting have juxtaposed much of the sandstone units against lower-permeability strata, which result in discontinuous horizons. Some units may even be hydraulically isolated from any incoming recharge (Jones et al., 2000).

Porosity across the Pennine Coal Measures ranges from an average of 11% to 17%, with greater storage typically associated with the sandstone units. Transmissivities range from 0.4 m2 /d to 416 m2 /d, with a median of 16 m2 /d, as recorded in the BGS Aquifer Properties database (Jones et al., 2000). The Coal Measures have a distinct response curve during pumping tests, where drawdown "creeps" slowly downwards after initially high yields. This is attributed to the prominence of fracture flow and either the interaction with boundary conditions, or an excessive pumping rate (Jones et al., 2000). Historically, the Coal Measures were dewatered in order for mining to proceed at progressively greater depths. Following the closure of the coal-mining industry, water levels have rebounded across the region, and have been the subject of further study (Burke et al., 2005; Dumpleton et al., 2001; Gandy and Younger, 2007; Gee et al., 2020; Younger and Adams, 1997).

Baseline groundwater chemistry: the Pennine Coal Measures of the East Midlands and South Yorkshire, BGS 2021.

From the EA data; the regional aquifer ground water vulnerability is medium (east) and high (west), with poor polygon resolution noted. Its designation is **Secondary A** aquifer and the Superficial deposits are classed as **Unproductive**.

There aren't any potable water abstraction wells recorded in the area. United Utilities abstract surface water via reservoirs in the surrounding higher catchments.

3 Site Specific Properties.

The regional section above and detail section below indicate the stratigraphy of the underlying **bedrock** and the anthropogenic **made ground** local to the former buildings on the Site.

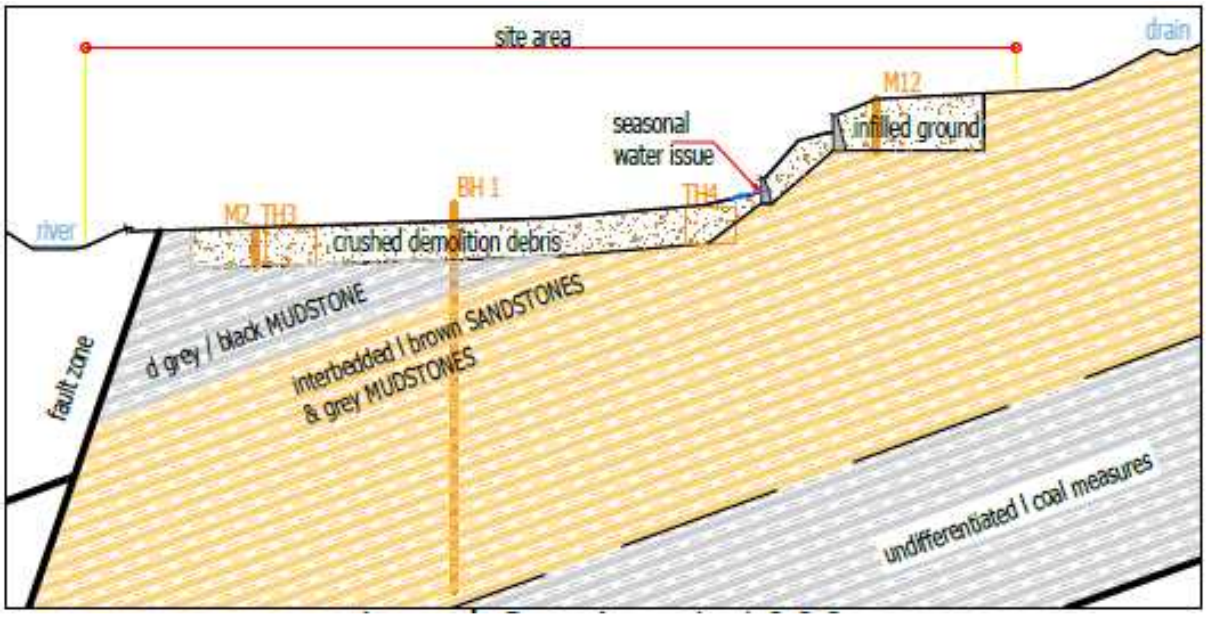
The Made Ground comprises crushed construction / demolition debris, described as slightly silty, very sandy GRAVEL with cobbles and occasional boulders, moderately graded in a med dense state. It varies in thickness over the Site from negligible up to 4.0 m deep in locations of former basements / pits. In some locations partial sub-structures still remain. During periods of steady rainfall water accumulates on the surface and runs off towards the adjacent watercourse. In drier periods the groundwater seats upon the underlying bedrock as a perched local water table and is occasionally absent altogether. Water springs were noted during the winter months at the junction of the MADE GROUND and embankment / wall structures.

The primary bedrock stratum below the Site is the Woodhead Hill Rock which comprises steeply dipping (c 20 degs) interbedded sedimentary sandstones and mudstones. The strata of this series are exposed in the steep slope bisecting the Site where the beds can be observed. In this exposure the Sandstones are thinly bedded weakly cemented pale brown with very weak grey laminated Mudstones. The former form approx. 25% of the strata depth.

A fault zone intersects the Site located generally along the stream alignment trending NW-SE with the W block downthrow cutting off the underlying Namurian grits on the W side.

The watercourse along the SW side of the Site is located directly onto the coal measures rock and in some parts the level of the former basements is deeper than the stream bed.

Local Site Stratigraphy Cross Section.



The interface between the Made Ground and bedrock is very variable with pockets of deeper deposits which would effectively function as sumps to water percolating downwards or arriving laterally (seasonal springs noted) from the higher areas into the Made Ground.

Site Investigation Plan.

On the plan (see Appendix) the location of the site investigation trial and boreholes have been indicated. Also indicated is the boundary between continuous mudstone strata to the SW and the interbedded sandstone strata. The boundary is also indicated on the Local Section above.

The site investigation exploratory holes encountered groundwater of negligible depth at the interface with the base of the Made Ground and bedrock. The monitoring boreholes were sunk to a shallow depth into the underlying bedrock to allow sampling to take place. The immediate water table below

the Site is a rainwater fed perched feature and only present seasonally depending upon rainfall amounts in the region.

The deeper borehole (BH1) transited through the MG into MUDSTONE and then interbedded yellow & grey SANDSTONES. Water was struck in the top of the MUDSTONE (perched), but the remainder of the hole was dry to a depth of 30.0m.

3.1 Contaminants of Concern.

The source contaminant (µg/l) with receptor EQS and Drinking Water limits is tabulated below from the groundwater test results.

Client / Site:		Mere Group - Sladen Mill, Littleborough.									
Sample Type:		Groundwater Samples									
Sampling Date:		20.07.2023, 22.08.2023, 07.09.2023, 19.10.2023, 20.10.2023, 07.11.2023 & 09.11.2023									
CONTAMINANT		No	Max (µg/l)	Mean (µg/l)	t 95 (µg/l)	EQS FRESHWATER AA		EQS FRESHWATER MAX		UK DWI WATER SUPPLY REGULATIONS 2016	
						(µg/l)	Pass/Fail	(µg/l)	Pass/Fail	(µg/l)	Pass/Fail
METALS											
	Chromium VI	17	10.0	6.3	10.0	3.4	FURTHER ACTION	0	NO REGS	50	PASS
	Copper	20	15.0	3.6	12.2	1	FURTHER ACTION	0	NO REGS	2000	PASS
	Nickel	20	39.0	5.4	12.4	4	FURTHER ACTION	34	PASS	20	PASS
	Selenium	20	19.0	3.5	18.1	0	NO REGS	0	NO REGS	10	FURTHER ACTION
	Zinc	20	85.0	38.9	84.1	10.9	FURTHER ACTION	0	NO REGS	0	NO REGS
INORGANIC											
	Cyanide (Total)	14	40.0	32.5	40.0	1	FURTHER	5	FURTHER	50	PASS
	Sulphate	14	473000	124779	434650	400000	PASS	0	NO REGS	250000	FURTHER ACTION
ORGANIC											
PAH	benzo[a]pyrene	14	0.09	0.01929	0.051	0.00017	FURTHER ACTION	0.27	PASS	0.01	FURTHER ACTION
PAH	fluoranthene	14	0.16	0.04	0.11	0.0063	FURTHER ACTION	0.12	PASS	0	NO REGS
SVOC	phenol	14	100.0	87.1	100.0	7.7	FURTHER	46	FURTHER	0	NO REGS
POPS											
	perfluorooctane sulfonate (PFOS) total	17	0.0405	0.01343	0.0384	0.00065	FURTHER ACTION	36	PASS	0.1	PASS
	Per/polyfluoroalkyl substances (PFAS) total	17	0.6479	0.1701	0.3996	0.00065	FURTHER ACTION	36	PASS	0.1	FURTHER ACTION

It's to be noted that the Annual Average EQS for freshwater bodies is the dominant measure giving rise to seven contaminants of concern, if the UK drinking water levels were used it would reduce to four contaminants; Selenium, Sulphate, PAH benzo(a)pyrene and Per/polyfluoroalkyl substances (PFAS).

4 Numerical Source / Pathway / Receptor Model.

The final paragraphs of the EA response letter suggests that a Numerical Model of the Pathway from Source to potential Receptor be undertaken, specifically using the Remedial Targets Methodology Worksheet. It goes further to suggest that Site Specific parameters are adopted in the model in the absence of real-world alternatives.

> When we previously recommended that further assessment was undertaken, we anticipated that the principles of LCRM, 2023 would be applied and that a suitable (numeric) detailed quantitative risk assessment would be undertaken especially as some of the contaminants of concern are considered hazardous and assessment of their risk to relevant receptors undertaken. We feel that this is additionally supported by the Groundwater (Daughter) directive 2006/118/EC.
>
> This version does not undertake that work therefore we are unable to agree that no remediation is required.
>
> In undertaking this work we advise that you consider and follow the Remedial Targets Methodology guidance document (Remedial Targets Methodology: Hydrogeological Risk Assessment for Land Contamination (RTM P20) ref. LIT 6627, EA, 2006) which can be found at this website address Land contamination: remedial targets methodology (RTM) - GOV.UK (www.gov.uk).
>
> Further, we recommend that where possible site specific input parameters are used to populate your chosen model so that the risk assessment reflects ground conditions as closely as possible and only used academic or generic values in the absence of real-world alternatives.

4.1 Remedial Targets Worksheet (RTW v3.2).

The EA RTW v 3.2 requires substantial input data in order to determine contaminant risk at a remote groundwater receptor. It allows a number of potential contaminants to be modelled, subject to knowing their behavioural properties during groundwater transport.

It presumes knowledge of a wide range of soil properties, such as porosity (air & water filled), Henry's coefficient, infiltration properties, saturated aquifer thickness, hydraulic gradient, mixing zone thickness, soil water partition coefficients…etc.

Further, the Worksheet clearly states that the geo-hydraulic properties of the soils should be ideally derived from direct testing of the strata (boreholes, soil lab samples, hydraulic permeability tests such as pumped packer / falling head tests). Only failing this adopting the use of global parameters based upon published literature.

However the stratigraphy and nature of the bedrock is such that direct testing as per the first option above would only provide local properties and could not account for the effect of faulting, folding, variability in seam thicknesses and overburden pressures. Thus it is not practicable to try and model the geo-hydraulic behaviour from direct insitu / lab testing unless extensive enough to characterise the regional stratigraphy. Similarly the made ground has variable properties depending upon the source, crushing & sorting process and compaction.

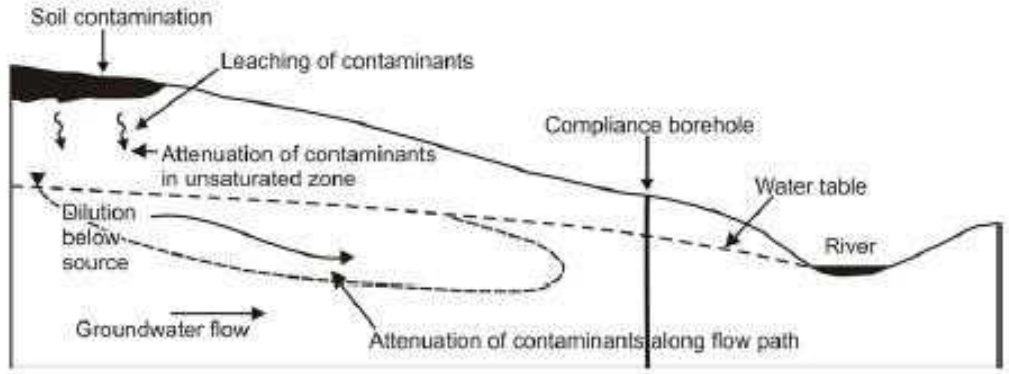
The Model is simplistic, it cannot deal with anisotropy and or faulted soils, so at best only indicative output can be expected for the Sladen Mill Site and its environs.

Considering the above it is only logical to undertake the modelling based upon published parameters and basic assumptions regarding the local / regional groundwater regime, using mean input values to identify receptor outcomes.

Should the modelling indicate **high contaminative risks** to receptors further soil characterisation may be advised.

4.2 The Model.

The input requirements to the model are based upon a simple flow regime, source, partial saturated zone, regional water table connected to receptor water body.



Potential receptors were identified on the OS 1:25k map and are;

Watercourse adjacent to the Site.

River Roch, 650 m W at 150 m aOD (*direct pathway*).

Pond fed by a leat from the Lydgate Brook 300 m NW at 160 m aOD is likely to be above the regional water table so is discounted.

Rochdale canal located 600 m W is not considered a receptor due to its raised level above the valley and use of clay linings to seal the cuttings / embankments.

Boreholes undertaken by the EA in the Roch valley approx. 0.65 km west (*Littleborough & Rochdale FRMS phase1-gale storage reservoir-jun19*) have identified the local water table (150 m aOD) and stratigraphy (BH/GSR/15). A review of all the boreholes for the above showed the local Roch Valley water table to be at or close to the river level.

Pathways to the receptor are into the vadose zone in the underlying soil / rock towards the local/ regional water table and hence onwards to the receptor water course.

For the local **watercourse** receptor the pathway is in the vadose zone within the Made Ground into the perched water table which is modelled as 50 mm deep (conservative) located upon the mudstone Bedrock and hence down gradient to the watercourse.

Regarding the river **Roch** receptor the depth to the regional water table directly beneath the Site is unknown, but from the results of BH1 is in excess of 30 m placing it at not greater than 140.00 m aOD. This implies that the water table at the Site doesn't interact directly with the river Roch where it is closest to the Site (unless artesian conditions exist). So in order to facilitate the Model there were two options; presume a higher regional water table level beneath the Site (conservative), or select a receptor at a level less than 140 m aOD (approx. 1.5 km SW in Littleborough). For the purposes of the Model the former option was used, the depth to the Site water table has been assumed to be 19 m bGL (i.e. 151 maOD). This will provide a minimal hydraulic gradient to the receptor. The depth of the partially saturated zone will be taken as 20 m and the underlying aquifer depth at 70 m.

The Model outputs three levels of assessment, but only the groundwater level three is used:

Level 3, (Soil & Ground water attenuation in the aquifer).

A steady state analysis is selected with vertical & lateral dispersion.

The **parameters** used in the Model are tabulated in the Appendix:

4.3 Modelling Input.

For the purpose of modelling because the distribution of local 'hotspots' and their precise extent aren't known accurately, the mean contaminant concentration has been applied over the full area of the Site.

The **Dominico Steady State** option is selected for remedial target calculation.

4.3.1 PFAS (total).

Source groundwater concentration	(total PFAS mean)	$1.70x10^{-4}$ mg/l	**170** ng/l.
	(total PFAS t95)	$0.399x10^{-4}$ mg/l	**400** ng/l.
	(PFOA mean)	$1.57x10^{-4}$ mg/l	**157** ng/l.
	(PFOS mean)	$1.34x10^{-5}$ mg/l	**13** ng/l.
Source soil concentration (mean)	n/a	----------mg/kg.	
Target concentration (total PFAS)	*see para below*	$2.4x10^{-4}$ mg/l	**240** ng/l.

Remarks on the EQS *(ref: Environmental Fate of PFAS, Rep 8/16, Concawe 2016)*

*The AA-EQS for PFOS in surface water 0.00065 µg/l (**0.65** ng/l) is considerably lower than the UK drinking water standards* 0.1 µg/l *(**100** ng/l).*

*The low level of the AA-EQS is driven by the starting point for the calculation being the consumption of fish. Wilson (2015) demonstrated that with alternative (also defendable) values for: TDI (0.3 vs. 0.15 µg/kg day), contribution of fish to dietary uptake (73% vs. 10%), average fish consumption rate (0.028 kg/day vs. 0.115 kg/day), bioconcentration and biomagnification factors (1.124 vs 2.800 and 2 vs 5), the AA-EQS could have been derived 370 times higher at 0.24 µg/l (**240** ng/l).*

The **PFOA's** have the lower sorption properties, thus most mobile in ground water and these properties will be used in the Model.

The following **physiochemical** properties are used in the Model (*Concawe 2016; Table in Appendix*).

PFOA.

Henrys Coefficient ($Pa.m^3/mol$)			0.04 - 0.09	**0.065**.
Octanol water partition coeff (log Kow)	5.30	Kow =		**0.403**.
Organic carbon partition coeff (log Koc)	1.31 – 2.35	Koc =	0.117 – 0.371	**0.244**.
Soil-water partition coeff (Kd@pH 7.0)			0.0 – 3.4	**1.80**.
Dissociation constant (pKa)			-0.16 – 3.8	**3.2.**

PFOS.

Henrys Coefficient ($Pa.m^3/mol$)			<2e-6 – 3e-4	**0.0002**.
Octanol water partition coeff (log Kow)	6.43	Kow =		**0.808**.
Organic carbon partition coeff (log Koc)	2.5 – 3.1	Koc =	0.398 – 0.491	**0.445**.
Soil-water partition coeff (Kd@pH 7.0)			0.1 – 97	**1.80**.
Dissociation constant (pKa)			-0.6 – -2.6	**-1.6.**

4.4 Modelling Output.

4.4.1 PFAS.

River Roch receptor.

PFOA's	**Level 3 (groundwater).**		
Remedial target	179 ng/l	>157 ng/l	**PASS**.
Concentration at Compliance Point	88 ng/l	<100 ng/l	**PASS**.

Stream receptor.

PFOA's	**Level 3 (groundwater).**		
Remedial target	264 ng/l	>157 ng/l	**PASS**.
Concentration at Compliance Point	64 ng/l	<100 ng/l	**PASS**.

4.4.2 Summary.

The model output achieved the remedial target concentrations at the source and compliance point concentrations.

Contaminant transport times were in the order of 10^3 years.

5 Discussion & Recommendations.

5.1 Discussion.

The Site development for residential dwellings and the risks to site operatives and future residents is addressed in the Phase 2+3 Geo-Environmental Report rev 5 (Feb 24). It identified the need to provide a clean cover system to the garden & landscape areas over the made ground on the site and provision of ground gas protection to the buildings.

In the above report the fate of potentially mobile contaminants within the made ground and their risk to groundwater receptors was not addressed directly. In particular PFAS were identified by the EA to be of particular concern and further surface and groundwater sampling regimes were undertaken to characterise the extent of this contaminant.

The modelling in this report has been undertaken to investigate the specific contamination from PFAS within the groundwater regime beneath the Site (170 ng/l mean) and the effects on potential receptors linked (pathway) to the groundwater; i.e. local rivers & streams.

PFAS are moderately mobile in a groundwater environment, by their very nature they are hydrophobic repelling water molecules and PFOA's in particular are the most persistent. In the Model the properties for PFOA's are used providing conservative results.

The target level for PFAS within the water environment differ, whether for potable purposes or for aquatic species, the former is set at 100 ng/l (UK DW Standard) and the latter 0.65 ng/l (EQS AA). However it is reasoned elsewhere (*Wilson 2015)* that a more practicable level would be 240 ng/l for aquatic environments. For the purposes of this report and modelling a remedial compliance level for Drinking Water at the receptor of 100 ng/l was be used.

The variability of the subsoils, geology and the limitations of the Remedial Targets Worksheet will mean that the results of the modelling will be indicative only and should be used only to gain a level of confidence in the fate of potential contaminants within the groundwater regime.

Also the PFAS contaminant was noted to be present with the watercourse upstream of the Site at 30 ng/l reducing downstream to <25 ng/l, so appears to be already widely present even in this primarily rural catchment.

The proposed cover system to be employed will further reduce the pathway potential by reducing the surface permeability into the underlying made ground, however the Model cannot deal with this level of detail (i.e. introduction of soil layers). If the final recommended cover system was to be utilised in the model it would have to be modelled using a modified overall permeability value for the vadose layer.

The result of the modelling suggests even with some conservative assumptions (using parameters for PFOA's, mean contaminant concentrations and soil properties) that a Site-specific remediation is not necessary in order to protect the groundwater receptors.

The simple hydro-geological calculations sections indicate magnitudes of 10^3 years for contaminants to reach the receptors.

However, in the light of the above conservatisms / assumptions, it would be prudent to introduce an additional level of protection to the Site by providing two zones of low permeability; firstly a 50 mm compacted MOT1 'no dig' layer overlain by 200 mm of clayey subsoil as part of the overall 600 mm of clean inert cover soil. This would give an increased level of confidence in the security of off-site receptors.

5.2 Recommendations.

In order to have reasonable confidence to manage and mitigate the effects of ground water contamination within the Site subsoils it is recommended that the finished Site is protected with a low permeability cover system. This shall comprise provision of a two-layer barrier; 50 mm of well compacted MOT1 crushed limestone overlain by 200 mm of clayey subsoil carefully placed and

compacted. Onto this can be a sandy subsoil and topsoil finish upto the 600 mm overall thickness of cover soil.

To paved areas a minimum of 200 mm of well compacted MOT1 shall be adopted as a foundation.

On steep slopes and landscaped areas 200 mm of clayey subsoil shall be utilised as part of the 450 overall cover soil requirements.

The requirement for SUDS shall not permit the use of soakaways into the underlying made ground, only the use of sealed storage tanks / ponds / basins is to be permitted.

Signed…… 

T J Booth BSc (Hons), C. Eng. C. Env. MICE.

T J Booth Associates.

6 Appendix.

6.1 Site Investigation Plan.



6.2 Model Parameters.

Physical Parameters.

Site level	168.00 m aOD.
Site rockhead level	166.00 m aOD.
Site local (perched) water table	166.05 m aOD.
Site regional water table	140.00 m aOD.
Roch Valley level	152.00 m aOD.
Roch Valley upper water table level	150.00 m aOD.
Roch Valley rockhead level	130.00 m aOD.
Distance to local watercourse (average of Site width)	35.00 m.
Distance to Roch Valley (direct)	0.65 km
Site length (*approx. perp to gw flow dirn*)	200.00 m.
Site width (*approx. parallel to gw flow dirn*)	70.00 m.
Site total area	14000 sqm.

Site impermeable area (houses, roads pathways)		6000 sqm.
Site permeable area (gardens, landscaped areas)		8000 sqm.
Geo-Hydraulic Parameters.		
Lower Coal Measures, *(refer to section 2.3).*		
Permeability (hydraulic conductivity)	lower	3.8x10-5 m/day.
	Upper	9.4x10-4 m/day.
	Mean	5.0x10-4 m/day.
bulk density	25 kN/cu m	2.5 g/cu cm.
Porosity		14 % (*computed in worksheet*).
Made Ground.		
Permeability (hydraulic conductivity)	Mean	0.010 m/day (*Appendix 1.16x10^{-7} m/s*).
bulk density		20 kN/cu m 2.0 g/cu cm.
Porosity		39 % (*computed in worksheet*).
Soil pH		7.7.
TOC (SOM/1.72)		3.6% / 1.72 = 2.1%
Effective Rainfall	0.5 m/y	1.37 mm/d (*chart in Appendix*).

6.2.1 Soil Properties.

Table C.1 Typical mass densities of basic soil types

Type of Soil	*Mass density ρ (Mg/m³)**			
	Poorly graded soil		*Well-graded soil*	
	Range	*Typical value*	*Range*	*Typical value*
Loose sand	1.70–1.90	1.75	1.75–2.00	1.85
Dense sand	1.90–2.10	2.07	2.00–2.20	2.10
Soft clay	1.60–1.90	1.75	1.60–1.90	1.75
Stiff clay	1.90–2.25	2.00	1.90–2.25	2.07
Silty soils	1.60–2.00	1.75	1.60–2.00	1.75
Gravelly soils	1.90–2.25	2.07	2.00–2.30	2.15

*Values are representative of moist sand, gravel, saturated silt, and clay.

Porosity

Gravel	30-40%	
Sand	20-35 %	
Silt	35-50 %	
Clay	33-60 %	
Sand and gravel, mixed	20-35 %	
Glacial till	10-20 %	
Sandstone	5-30%	
Limestone	5-30%	
Shale	10-30 %	
Fractured igneous rock	10-40%	
Granite	0.5-1.5 %	---- (Unfractured) ----
Diabase	0.1-0.5 %	
Gabbro	0.1-0.2 %	
Basalt	0.1-1.0 %	
Gneiss	0.5-1.5 %	
Marble	0.5-2 %	
Slate	0.1-0.5 %	
Quartzite	0.1-0.5 %	

Permeability

Well-sorted gravel	10^{-2} to 1 cm/sec
Well-sorted sands, glacial outwash	10^{-3} to 10^{-1} cm/sec
Silty sands, fine sands	10^{-5} to 10^{-3} cm/sec
Silt, sandy silts, clayey sands, till	10^{-6} to 10^{-4} cm/sec
Clay	10^{-9} to 10^{-6} cm/sec

6.3 Littleborough FRMS Phase 1; BH/GSR/15.

bam ritchies

BOREHOLE LOG

Borehole No: BH/GSR/15
Sheet 1 of 4

Project Name:	Littleborough & Rochdale FRMS Phase 1	Survey Grid System:	OSGB	Hole Type:	CP+RC
		Co-ordinates:	394567.40 mE	Checked By:	HA
Project No:	314C		417419.85 mN	Approved By:	PMCG
Client:	Environment Agency	Ground Level:	152.33 mOD	Scale:	1:50
Engineer:	Jacobs			Log Status:	FINAL
Date Started:	08/11/2018	Orientation:	-- deg.	Print Date:	18/06/2019
Date Completed:	12/12/2018	Inclination:	90 deg.	Final Depth:	32.50m

Stratum Description	Legend	Depth (Thickness) (m)	Level (m)	Sampling, Coring and In Situ Testing: Depth (m)	Type	Dia (mm)	Rec %	Blows (mins)	Test	Test Result	Units	TCR SCR RQD %	5 min d ave if max (mm)	Water	Well/ Backfill
Grass and peaty TOPSOIL.		(0.30)													
Very soft to soft dark brown mottled dark grey slightly gravelly slightly sandy silty CLAY. Sand is fine to coarse. Gravel is subrounded to subangular fine to coarse of sandstone, mudstone and various other lithologies.		0.30 (1.10)	152.03	0.25 0.50 0.70 0.50 - 1.00 1.00	ES ES D B ES										
Medium dense dark greyish brown very sandy silty subrounded to subangular fine to coarse GRAVEL of sandstone, siltstone and various other lithologies with occasional subrounded cobbles of sandstone. Sand is fine to coarse.		1.40 (2.60)	150.93	1.20 - 1.65 1.65 - 1.70 2.00 - 2.45 2.00 - 2.45 2.70 3.00 - 3.45 3.00 - 3.45 3.70	UT D B B 	100	75	56	 C C 	 N=15 N=24 					
Soft dark brownish grey slightly gravelly sandy silty CLAY. Sand is fine to coarse. Gravel is subrounded to subangular fine to coarse of sandstone, siltstone and various other lithologies.		4.00 (1.20)	148.33	4.00 - 4.45 4.00 - 4.45 4.70	B D				 C 	 N=11 					
Medium dense dark greyish brown and dark grey sandy slightly clayey subangular and angular fine to coarse GRAVEL of various lithologies. Sand is fine to coarse.		5.20 (4.30)	147.13	5.00 - 5.45 5.00 - 5.45 5.00 - 5.45 5.70 6.00 - 6.45 6.00 - 6.45 6.70 7.00 - 7.45 7.00 - 7.45 7.70 8.00 - 8.45 8.00 - 8.45 8.70 9.00 - 9.45 9.00 - 9.45	B D D B D B D B D B 				 S C C C C 	 N=16 N=15 N=16 N=16 N=19 					
Firm dark grey slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is subrounded to subangular fine to coarse of various lithologies.		9.50 (0.40) 9.90	142.83 142.43	9.70	D										

Stratum depths measured along borehole axis.

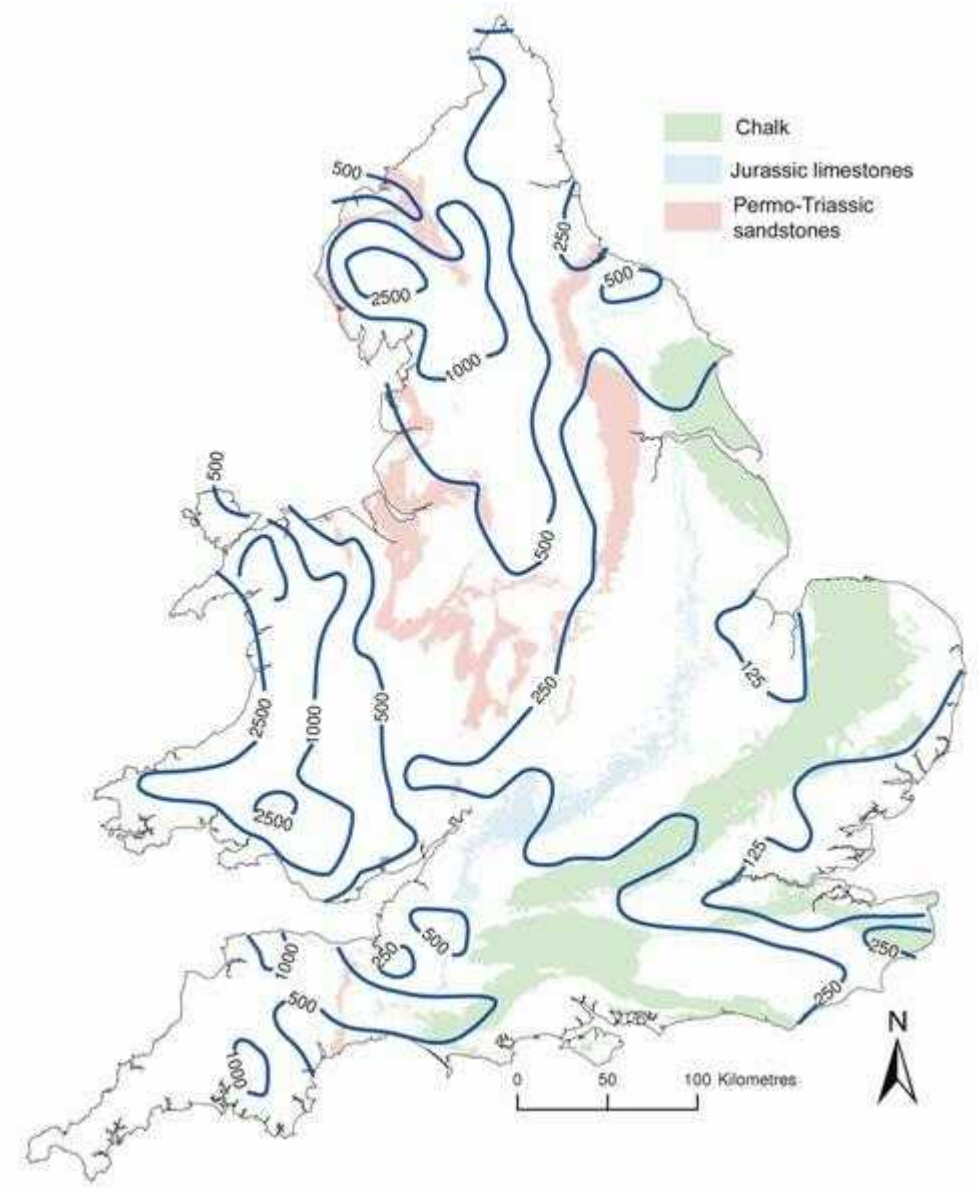
Groundwater levels may be subject to seasonal, tidal and other fluctuations and should not be taken as constant.

Explanation of symbols and abbreviations given in 'Key to Exploratory Holes'

Further details given on appended 'Borehole Information Sheet'.

Office: BAM Ritchies, Glasgow Road, Kilsyth, Glasgow G65 9BL BAM R Borehole Log 17/10/2017

6.4 Effective Rainfall (UK).



6.5 PFAS; physiochemical properties table (CONCAWE 2016).

Name	Acronym	CAS Registry Number	Molecular Formula	Molecular Weight [g/mol]	Density[a] (20 - 25 °C) [g/ml]	Water Solubility[b] (20 - 25 °C) [g/L]	Melting Point[a] [°C]	Boiling Point[a] [°C]	Vapor Pressure[b] [Pa]	Henry-Coefficient [Pa·m³·mol⁻¹]	log Kow[b] [-]	log K_{OC} [L/kg]	Kd (pH 7)	Dissociation Constant (pKa)
Perfluoroalkyl Carboxylates / Perfluoroalkyl Carboxylic Acids	**PFCAs**													
Perfluorobutanoic Acid	PFBA	375-22-4	$F(CF_2)_3COOH$	214.04	1.65	Miscible	-17.5	121	1307	--	2.82	1.88	--	-0.2 to 0.7
Perfluoropentanoic Acid	PFPeA	2706-90-3	$F(CF_2)_4COOH$	264.05	1.70	112.6	--	124.4	1057	--	3.43	1.37	--	-0.06
Perfluorohexanoic Acid	PFHxA	307-24-4	$F(CF_2)_5COOH$	314.05	1.72	21.7	14	143	457	--	4.06	1.91	--	-0.13
Perfluoroheptanoic Acid	PFHpA	375-85-9	$F(CF_2)_6COOH$	364.06	1.79	4.2	30	175	158	--	4.67	2.19	0.4 - 1.1	-0.15
Perfluorooctanoic Acid	PFOA	335-67-1	$F(CF_2)_7COOH$	414.07	1.80	3.4 - 9.5	37 - 60	188 - 192	4 - 1300	0.04 - 0.09	5.30	1.31 - 2.35	0 - 3.4	-0.16 to 3.8
Perfluorononanoic Acid	PFNA	375-95-1	$F(CF_2)_8COOH$	464.08	1.75	9.50	59 - 66	218	1.3	--	5.92	2.39	2.6 - 5.9	-0.17
Perfluorodecanoic Acid	PFDA	335-76-2	$F(CF_2)_9COOH$	514.09	1.78	9.50	77 - 88	218	0.2	--	6.50	2.78	2.0 - 31	-0.17
Perfluoroundecanoic Acid	PFUnA	2058-94-8	$F(CF_2)_{10}COOH$	564.09	1.76	0.004	83 - 101	160 - 230	0.1	--	7.15	3.30	12 - 103	-0.17
Perfluorododecanoic Acid	PFDoA	307-55-1	$F(CF_2)_{11}COOH$	614.10	1.77	0.0007	107 - 109	245	0.01	--	7.77	--	24 - 269	-0.17 to 0.8
Perfluorotridecanoic Acid	PFTrdA	72629-94-8	$F(CF_2)_{12}COOH$	664.11	1.77	0.0002	--		0.3	--	8.25	--	--	--
Perfluorotetradecanoic Acid	PFTeDA	376-06-7	$F(CF_2)_{13}COOH$	714.12	1.78	0.00003	--	276	0.1	--	8.90	--	--	--
Perfluoropentadecanoic Acid	PFPeDA	141074-63-7	$F(CF_2)_{14}COOH$	764.12	--	--	--	--	--	--	--	--	--	--
Pentadecafluorooctanoic Acid Ammonium Salt (Ammonium Pentadecafluorooctanoate)	APFO	3825-26-1	C8 H4 NF15 NO2	445.11	--	14.2	157 - 185	--	0.01	--	--	--	--	2.5
Perfluoroalkyl Sulfonates / Perfluoroalkyl Sulfonic Acids	**PFSAs**													
Perfluorobutane Sulfonate	PFBS	375-73-5	$F(CF_2)_4SO_3H$	300.10	1.81	46.2 - 56.6	76 - 84	211	631	--	3.90	1.00	--	-6.0 to -5.0
Perfluorohexane Sulfonate	PFHxS	432-50-8	$F(CF_2)_6SO_3H$	400.11	--	2.3	--	--	58.9	--	5.17	1.78	0.6 - 3.2	-6.0 to -5.0
Perfluoroheptane Sulfonate	PFHpS	357-92-8	$F(CF_2)_7SO_3H$	450.12	--	--	--	--	--	--	--	--	--	--
Perfluorooctane Sulfonate	PFOS	1763-23-1	$F(CF_2)_8SO_3H$	500.13	--	0.52 - 0.57	54	> 400	6.7	<2e-8 to 3e-4	6.43	2.5 - 3.1	0.1 - 97	-6.0 to -2.6
Perfluorodecane Sulfonate	PFDS	333-77-3	$F(CF_2)_{10}SO_3H$	600.14	--	0.002			0.71	--	7.66	3.53	--	--
Perfluoroalkyl Phosphonic Acids	**PFPAs**													
Perfluorobutyl Phosphonic Acid	PFBPA	52299-24-8	$F(CF_2)_4P(O)(OH)_2$	350.02	--	14259.1	--	--	0.18	--	2.19	--	--	--
Perfluorohexyl Phosphonic Acid	PFHxPA	40143-76-8	$F(CF_2)_6P(O)(OH)_2$	400.03	--	515.3	--	--	0.04	--	3.48	--	--	--
Perfluorooctyl Phosphonic Acid	PFOPA	40143-78-0	$F(CF_2)_8P(O)(OH)_2$	500.05	--	24.5	--	--	0.01	--	4.73	--	--	--
Perfluorodecyl Phosphonic Acid	PFDPA	52299-28-0	$F(CF_2)_{10}P(O)(OH)_2$	600.06	--	0.5	--	--	0.0002	--	5.98	--	--	--
Perfluorooctane Sulfonamide and Derivatives														
Perfluorooctane Sulfonamide	PFOSA	754-91-6	$F(CF_2)_8SO_2NH_2$	498.14	--	-	154 - 155	--	--	--	-	2.5 - 2.62	35 - 58	--
Perfluorooctane Sulfonamidoethanol	FOSE	10116-92-4	$F(CF_2)_8SO_2NH(CH_2)_2OH$	543.19	--	0.0009	--	--	0.00	--	5.78	--	--	--
N-Methyl-Perfluorooctane Sulfonamide	N-MeFOSA	31506-32-8	$F(CF_2)_8SO_2NHCH_3$	513.17	--	0.0002	--	--	0.30	--	6.07	3.14	--	--
N-Ethyl-Perfluorooctane Sulfonamide	N-EtFOSA	4151-50-2	$F(CF_2)_8SO_2NHCH_2CH_3$	527.20	--	0.0001	--	--	0.12	--	6.71	3.23	--	--
N-Methyl-Perfluorooctane Sulfonamidoethanol	N-MeFOSE	24448-09-7	$F(CF_2)_8SO_2N(CH_3)(CH_2)_2OH$	557.22	--	0.0003	--	--	0.0004	--	6.00	--	--	--
N-Ethyl-Perfluorooctane Sulfonamidoethanol	N-EtFOSE	1691-99-2	$F(CF_2)_8SO_2N(CH_2CH_3)(CH_2)_2OH$	571.25	--	0.0001	55 - 60	--	0.002	--	6.52	--	--	--

Hydrogeological risk assessment for land contamination

Remedial Targets Worksheet , Release 3.2

First released: 2006. Version 3.2: January 2013

This worksheet has been produced in combination with the document 'Remedial Targets Methodology: Hydrogeological risk assessment for land contamination (Environment Agency 2006).

Users of this worksheet should always refer to the User Manual to the Remedial Targets Methodology and to relevant guidance on UK legislation and policy, in order to understand how this procedure should be applied in an appropriate context.

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IMPORTANT: To enable MS Excel worksheet, click Tools, Add -Ins, Analysis Tool Pak and Analysis Tool Pak-VBA (to calculate error functions).

Details to be completed for each assessment				
Site Name:	sladen mill: receptor-river roch			
Site Address:	halifax rd, littleborough			
Completed by:	tjb			
Date:	12th apr 24		Version:	3.2
Contaminant	PFOA (total)			
Target Concentration (C_T)	1.00E-04	mg/l	Origin of C_T:	EQS freshwater based upon drinking water standards

This worksheet can be used to determine remedial targets for soils (Worksheets Level 1 Soil, Level 2 and Level 3 Soil) or to determine remedial targets for groundwater (Level 3 Groundwater). For Level 3, parameter values must be entered separately dependent on whether the assessment is for soil or groundwater. For soil, remedial targets are calculated as either mg/kg (for comparision with soil measurements) or mg/l (for comparison with leaching tests or pore water concentrations).
Site details entered on this page are automatically copied to Level 1, 2 and 3 Worksheets.
Worksheet options are identified by brown background and employ a pull-down menus. Data entry are identified as blue background.
Data origin / justification should be noted in cells coloured yellow and fully documented in subsequent reports.
Data carried forward from an earlier worksheet are identified by a light green background
It is recommended that a copy of the original worksheet is saved (all data fields in the original copy are blank).

The spreadsheet also includes a porosity calculation worksheet, a soil impact calculation worksheet and a worksheet that performs some simple hydrogeological calculations.

R&D Publication 20 Remedial Targets Worksheet, Release 3.2

Level 3 - Groundwater

See Note

Input Parameters (using pull down menu)

	Variable	Value	Unit	Source
Contaminant		PFOA (total)		from Level 1
Target Concentration	C_T	1.00E-04	mg/l	from Level 1

Select analytical solution (click on brown cell below, then on pull-down menu)

Domenico - Steady state — Equations in HRA publication

Approach for simulating vertical dispersion: Simulate vertical dispersion in 2 directions

Select nature of decay rate (click on brown cell below, then on pull-down menu)

Approach for simulating degradation of pollutants: Apply degradation rate to dissolved pollutants only

				Source of parameter value
Initial contaminant concentration in groundwater at plume core	C_0	1.57E-04	mg/l	*mean groundwater PFOA*
Half life for degradation of contaminant in water	$t_{1/2}$	9.00E+99	days	*no degradation*
Calculated decay rate	λ	7.70E-101	$days^{-1}$	
Width of plume in aquifer at source (perpendicular to flow)	Sz	2.00E+02	m	*site width*
Plume thickness at source	Sy	7.00E+01	m	*site depth*
Saturated aquifer thickness	da	7.10E+01	m	*assume 71 m (site width)*
Bulk density of aquifer materials	ρ	2.50E+00	g/cm^3	*porosity calc*
Effective porosity of aquifer	n	1.40E-01	fraction	*porosity calc*
Hydraulic gradient	i	1.50E-03	fraction	*1 m in 650m*
Hydraulic conductivity of aquifer	K	5.00E-04	m/d	*mean lower coal measures*
Distance to compliance point	x	6.50E+02	m	*river roch adjacent Site*
Distance (lateral) to compliance point perpendicular to flow direction	z		m	
Distance (depth) to compliance point perpendicular to flow direction	y		m	
Time since pollutant entered groundwater	t	1.00E+100	days	*time variant options only*
Parameters values determined from options				
Partition coefficient	Kd	2.44E-01	l/kg	*see options*
Longitudinal dispersivity	ax	6.50E+01	m	*see options*
Transverse dispersivity	az	6.50E+00	m	*see options*
Vertical dispersivity	ay	6.50E-01	m	*see options*

Calculated Parameters

	Variable	
Groundwater flow velocity	v	5.36E-06 m/d
Retardation factor	Rf	5.36E+00 fraction
Decay rate used	λ	1.44E-101 d^{-1}
Rate of contaminant flow due to retardation	u	1.00E-06 m/d
Contaminant concentration at distance x, assuming two-way vertical dispersion	C_{ED}	8.76E-05 mg/l
Attenuation factor (two way vertical dispersion, CO/CED)	**AF**	**1.79E+00**

Remedial Targets

Remedial Target		**1.79E-04**	**mg/l**	For comparison with measured groundwater concentration.
Domenico - Steady state				
Distance to compliance point		**650**	**m**	
Concentration of contaminant at compliance point	**C_{ED}/C_0**	**8.76E-05**	**mg/l**	Domenico - Steady state

Care should be used when calculating remedial targets using the time variant options as this may result in an overestimate of the remedial target.
The recommended value for time when calculating the remedial target is 9.9E+99.

Select Method for deriving Partition Co-efficient (using pull down menu)

Calculate for ionic organic chemicals (acids)

Entry if specify partition coefficient (option)			
Soil water partition coefficient	Kd		l/kg
Entry for non-polar organic chemicals (option)			
Fraction of organic carbon in aquifer	foc		fraction
Organic carbon partition coefficient	Koc		l/kg
Entry for ionic organic chemicals (option)			
Sorption coefficient for related species	$K_{oc,n}$	0.00E+00	l/kg
Sorption coefficient for ionised species	$K_{oc,i}$	2.44E-01	l/kg
pH value	pH	7.70E+00	
acid dissociation constant	pKa	3.20E+00	
Fraction of organic carbon in aquifer	foc	2.10E-02	fraction
Soil water partition coefficient	Kd	2.44E-01	l/kg

Define dispersivity (click brown cell and use pull down list)

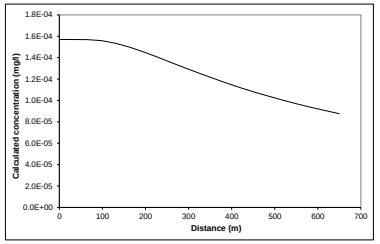
Dispersivities 10%, 1%, 0.1% of pathway length

		Enter value	Calc value	Xu & Eckstein	
Longitudinal dispersivity	**ax**	0.00E+00	6.50E+01	1.01E+01	m
Transverse dispersivity	**az**	0.00E+00	6.50E+00	1.01E+00	m
Vertical dispersivity	**ay**	0.00E+00	6.50E-01	1.01E-01	

Note values of dispersivity must be > 0

For calculated value, assumes ax = 0.1 *x, az = 0.01 * x, ay = 0.001 * x

Xu & Eckstein (1995) report ax = $0.83(\log_{10}x)^{2.414}$; az = ax/10, ay = ax/100 are assumed



Note graph assumes plume disperses vertically in one direction only. An alternative solution assuming the centre of the plume is located at the mid-depth of the aquifer is presented in the calculation sheets.

Note

This sheet calculates the Level 3 remedial target for groundwater, based on the distance to the receptor or compliance located down hydraulic gradient of the source Three solution methods are included, the preferred option is Ogata Banks.

By setting a long travel time it will give the steady state solution, which should be used to calculate remedial targets.

The measured groundwater concentration should be compared with the Level 3 remedial target to determine the need for further action.
Note if contaminant is not subject to first order degradation, then set half life as 9.0E+99.

This worksheet should be used if pollutant transport and degradation is best described by a first order reaction. If degradation is best desribed by an electron limited degradation such as oxidation by O2, NO3, SO4 etc than an alternative solution should be used

Site being assessed:	sladen mill: receptor-river roch
Completed by:	tjb
Date:	12th apr 24
Version:	3.2

Calculated concentrations for distance-concentration graph

Domenico - Steady state
From calculation sheet

Distance	Concentration
	mg/l
0	1.6E-04
32.5	1.57E-04
65.0	1.57E-04
97.5	1.56E-04
130.0	1.54E-04
162.5	1.50E-04
195.0	1.45E-04
227.5	1.41E-04
260.0	1.35E-04
292.5	1.30E-04
325.0	1.25E-04
357.5	1.21E-04
390.0	1.16E-04
422.5	1.12E-04
455.0	1.08E-04
487.5	1.04E-04
520.0	1.00E-04
552.5	9.67E-05
585.0	9.35E-05
617.5	9.05E-05
650.0	8.76E-05

Porosity Calculator

These results are not carried through to any of the other worksheets

DRY BULK DENSITY DATA

Variable	Value	Unit	justification
Natural Moisture Content	8.35	% wt	
Particle Density	2.65	tonnes/m^3	(Change this number only if you have specific information)
Dry Bulk Density	2.17	tonnes/m^3	
Calculated Parameters			
Voids Ratio	0.22	fraction	
Initial Saturation	100.00	*%*	
Total porosity	**0.181**	**fraction**	
Air Filled Porosity	**0.000**	**fraction**	
Water Filled Porosity	**0.181**	**fraction**	

WET BULK DENSITY DATA

Variable	Value	Unit	
Moisture Content	3.77	% wt	
Particle Density	2.65	tonnes/m^3	(Change this number only if you have specific information)
Actual (wet) Bulk Density (i.e. at natural MC)	2.50	tonnes/m^3	
Calculated Parameters			
Voids Ratio	0.10	fraction	
dry bulk density	2.41	tonnes/m^3	
Initial Saturation	100.00	*%*	
Total porosity	**0.091**	**fraction**	
Air Filled Porosity	**0.000**	**fraction**	
Water Filled Porosity	**0.091**	**fraction**	

Analytical solutions provided by David Hall, Golder Associates (UK) Ltd

Simple hydrogeological calculations

(These are not specific to, or required in, the Remedial Targets Methodology)

Parameter	symbol		unit	justification
Hydraulic conductivity	K	5.00E-04	m/d	Banks & Jones, BGS 2021
Hydraulic gradient	i	1.50E-03	unitless	1 m head in 650 m
Effective porosity of aquifer	n	1.40E-01	fraction	porosity calculator
Thickness of saturated aquifer	b	7.10E+01	m	site depth
Width of aquifer perpendicular to flow	w	2.00E+02	m	site length
Distance to receptor	x	6.50E+02	m	0.65 km to roch valley
Bulk density of aquifer materials	ρ	2.50E+00	g/cm^3	
Soil-water partition co-efficient	Kd	1.80E+00	l/kg	PFAs non sorb
Retardation factor of pollutant	R	3.31E+01		

Groundwater flow velocity	v(GW)	6.20E-11	m/s	5.36E-06	m/day	1.96E-03	m/year
Time for groundwater to reach receptor	t(GW)	1.05E+13	seconds	1.21E+08	days	3.32E+05	years
Rate of groundwater flow through aquifer	Q	1.23E-07	m^3/s	1.07E-02	m^3/day	3.89E+00	m^3/year

Contaminant flow velocity	v(contam)	1.87E-12	m/s	1.62E-07	m/day	5.90E-05	m/year
Time for contaminant to reach receptor	t(contam)	3.47E+14	seconds	4.02E+09	days	1.10E+07	years

Hydrogeological risk assessment for land contamination

Remedial Targets Worksheet , Release 3.2

First released: 2006. Version 3.2: January 2013

This worksheet has been produced in combination with the document 'Remedial Targets Methodology: Hydrogeological risk assessment for land contamination (Environment Agency 2006).

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IMPORTANT: To enable MS Excel worksheet, click Tools, Add -Ins, Analysis Tool Pak and Analysis Tool Pak-VBA (to calculate error functions).

Details to be completed for each assessment				
Site Name:	sladen mill: receptor-stream			
Site Address:	halifax rd, littleborough			
Completed by:	tjb			
Date:	24th apr 24		Version:	3.2
Contaminant	PFOA's			
Target Concentration (C_T)	1.00E-04	mg/l	Origin of C_T:	UK drinking water

This worksheet can be used to determine remedial targets for soils (Worksheets Level 1 Soil, Level 2 and Level 3 Soil) or to determine remedial targets for groundwater (Level 3 Groundwater). For Level 3, parameter values must be entered separately dependent on whether the assessment is for soil or groundwater. For soil, remedial targets are calculated as either mg/kg (for comparision with soil measurements) or mg/l (for comparison with leaching tests or pore water concentrations).
Site details entered on this page are automatically copied to Level 1, 2 and 3 Worksheets.
Worksheet options are identified by brown background and employ a pull-down menus. Data entry are identified as blue background.
Data origin / justification should be noted in cells coloured yellow and fully documented in subsequent reports.
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The spreadsheet also includes a porosity calculation worksheet, a soil impact calculation worksheet and a worksheet that performs some simple hydrogeological calculations.

R&D Publication 20 Remedial Targets Worksheet, Release 3.2

Level 3 - Groundwater

See Note

Input Parameters (using pull down menu)

	Variable	Value	Unit	Source
Contaminant		PFOA's		from Level 1
Target Concentration	C_T	1.00E-04	mg/l	from Level 1

Select analytical solution (click on brown cell below, then on pull-down menu)

Domenico - Steady state — Equations in HRA publication

Approach for simulating vertical dispersion: Simulate vertical dispersion in 2 directions

Select nature of decay rate (click on brown cell below, then on pull-down menu)

Approach for simulating degradation of pollutants: Apply degradation rate to dissolved pollutants only

				Source of parameter value
Initial contaminant concentration in groundwater at plume core	C_0	1.70E-04	mg/l	*mean groundwater*
Half life for degradation of contaminant in water	$t_{1/2}$	9.00E+99	days	*no degradation*
Calculated decay rate	λ	7.70E-101	$days^{-1}$	
Width of plume in aquifer at source (perpendicular to flow)	Sz	2.00E+02	m	*site width*
Plume thickness at source	Sy	4.90E-02	m	*49 mm*
Saturated aquifer thickness	da	5.00E-02	m	*assume 50 mm*
Bulk density of aquifer materials	ρ	2.00E+00	g/cm^3	*porosity calc*
Effective porosity of aquifer	n	3.96E-01	fraction	*porosity calc*
Hydraulic gradient	i	1.40E-03	fraction	*50mm in 35 m*
Hydraulic conductivity of aquifer	K	1.00E-02	m/d	*mean MG*
Distance to compliance point	x	3.50E+01	m	*watercourse d/s of site*
Distance (lateral) to compliance point perpendicular to flow direction	z		m	
Distance (depth) to compliance point perpendicular to flow direction	y		m	
Time since pollutant entered groundwater	t	1.00E+100	days	*time variant options only*
Parameters values determined from options				
Partition coefficient	Kd	1.80E+00	l/kg	*see options*
Longitudinal dispersivity	ax	3.50E+00	m	*see options*
Transverse dispersivity	az	3.50E-01	m	*see options*
Vertical dispersivity	ay	3.50E-05	m	*see options*

Calculated Parameters

	Variable	
Groundwater flow velocity	v	3.54E-05 m/d
Retardation factor	Rf	1.01E+01 fraction
Decay rate used	λ	7.63E-102 d^{-1}
Rate of contaminant flow due to retardation	u	3.50E-06 m/d
Contaminant concentration at distance x, assuming two-way vertical dispersion	C_{ED}	6.45E-05 mg/l
Attenuation factor (two way vertical dispersion, CO/CED)	**AF**	**2.64E+00**

Remedial Targets

Remedial Target		**2.64E-04**	**mg/l**	For comparison with measured groundwater concentration.
Domenico - Steady state				
Distance to compliance point		**35**	**m**	
Concentration of contaminant at compliance point	**C_{ED}/C_0**	**6.45E-05**	**mg/l**	Domenico - Steady state

Care should be used when calculating remedial targets using the time variant options as this may result in an overestimate of the remedial target.
The recommended value for time when calculating the remedial target is 9.9E+99.

Select Method for deriving Partition Co-efficient (using pull down menu)

User specified value for partition coefficient

Entry if specify partition coefficient (option)			
Soil water partition coefficient	Kd	1.80E+00	l/kg
Entry for non-polar organic chemicals (option)			
Fraction of organic carbon in aquifer	foc		fraction
Organic carbon partition coefficient	Koc		l/kg
Entry for ionic organic chemicals (option)			
Sorption coefficient for related species	$K_{oc,n}$		l/kg
Sorption coefficient for ionised species	$K_{oc,i}$		l/kg
pH value	pH		
acid dissociation constant	pKa		
Fraction of organic carbon in aquifer	foc		fraction
Soil water partition coefficient	Kd	1.80E+00	l/kg

Define dispersivity (click brown cell and use pull down list)

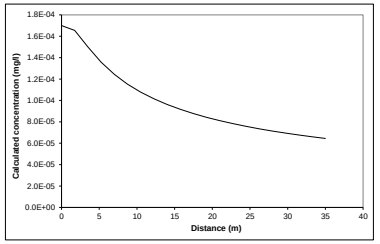
User defined values for dispersivity

		Enter value	Calc value	Xu & Eckstein	
Longitudinal dispersivity	**ax**	3.50E+00	3.50E+00	2.37E+00	m
Transverse dispersivity	**az**	3.50E-01	3.50E-01	2.37E-01	m
Vertical dispersivity	**ay**	3.50E-05	3.50E-02	2.37E-02	

Note values of dispersivity must be > 0

For calculated value, assumes ax = 0.1 *x, az = 0.01 * x, ay = 0.001 * x

Xu & Eckstein (1995) report ax = $0.83(\log_{10}x)^{2.414}$; az = ax/10, ay = ax/100 are assumed



Note graph assumes plume disperses vertically in one direction only. An alternative solution assuming the centre of the plume is located at the mid-depth of the aquifer is presented in the calculation sheets.

Note

This sheet calculates the Level 3 remedial target for groundwater, based on the distance to the receptor or compliance located down hydraulic gradient of the source Three solution methods are included, the preferred option is Ogata Banks.

By setting a long travel time it will give the steady state solution, which should be used to calculate remedial targets.

The measured groundwater concentration should be compared with the Level 3 remedial target to determine the need for further action.
Note if contaminant is not subject to first order degradation, then set half life as 9.0E+99.

This worksheet should be used if pollutant transport and degradation is best described by a first order reaction. If degradation is best desribed by an electron limited degradation such as oxidation by O2, NO3, SO4 etc than an alternative solution should be used

Calculated concentrations for distance-concentration graph

Domenico - Steady state
From calculation sheet

Distance	Concentration
	mg/l
0	1.7E-04
1.8	1.65E-04
3.5	1.50E-04
5.3	1.36E-04
7.0	1.24E-04
8.8	1.15E-04
10.5	1.08E-04
12.3	1.02E-04
14.0	9.62E-05
15.8	9.17E-05
17.5	8.77E-05
19.3	8.42E-05
21.0	8.11E-05
22.8	7.83E-05
24.5	7.58E-05
26.3	7.35E-05
28.0	7.14E-05
29.8	6.95E-05
31.5	6.77E-05
33.3	6.60E-05
35.0	6.45E-05

Site being assessed:	sladen mill: receptor-stream
Completed by:	tjb
Date:	24th apr 24
Version:	3.2

Porosity Calculator

These results are not carried through to any of the other worksheets

DRY BULK DENSITY DATA

Variable	Value	Unit	justification
Natural Moisture Content	24.76	% wt	
Particle Density	2.65	tonnes/m^3	(Change this number only if you have specific information)
Dry Bulk Density	1.60	tonnes/m^3	
Calculated Parameters			
Voids Ratio	0.66	fraction	
Initial Saturation	100.00	*%*	
Total porosity	**0.396**	**fraction**	
Air Filled Porosity	**0.000**	**fraction**	
Water Filled Porosity	**0.396**	**fraction**	

WET BULK DENSITY DATA

Variable	Value	Unit	
Moisture Content	24.53	% wt	
Particle Density	2.65	tonnes/m^3	(Change this number only if you have specific information)
Actual (wet) Bulk Density (i.e. at natural MC)	2.00	tonnes/m^3	
Calculated Parameters			
Voids Ratio	0.65	fraction	
dry bulk density	1.61	tonnes/m^3	
Initial Saturation	100.00	*%*	
Total porosity	**0.394**	**fraction**	
Air Filled Porosity	**0.000**	**fraction**	
Water Filled Porosity	**0.394**	**fraction**	

Analytical solutions provided by David Hall, Golder Associates (UK) Ltd

Simple hydrogeological calculations

(These are not specific to, or required in, the Remedial Targets Methodology)

Parameter	symbol		unit	justification
Hydraulic conductivity	K	1.00E-02	m/d	silty S&G
Hydraulic gradient	i	1.40E-03	unitless	50mm in 35 m
Effective porosity of aquifer	n	3.96E-01	fraction	porosity calc
Thickness of saturated aquifer	b	5.00E-02	m	50 mm on bedrock
Width of aquifer perpendicular to flow	w	2.00E+02	m	site length
Distance to receptor	x	3.50E+01	m	35m half site depth
Bulk density of aquifer materials	ρ	2.00E+00	g/cm^3	published data
Soil-water partition co-efficient	Kd	1.80E+00	l/kg	level 3 GW
Retardation factor of pollutant	R	10.09090909		

Groundwater flow velocity	v(GW)	4.09E-10	m/s	3.54E-05	m/day	1.29E-02	m/year
Time for groundwater to reach receptor	t(GW)	8.55E+10	seconds	9.90E+05	days	2.71E+03	years
Rate of groundwater flow through aquifer	Q	1.62E-09	m^3/s	1.40E-04	m^3/day	5.11E-02	m^3/year

Contaminant flow velocity	v(contam)	4.05E-11	m/s	3.50E-06	m/day	1.28E-03	m/year
Time for contaminant to reach receptor	t(contam)	8.63E+11	seconds	9.99E+06	days	2.74E+04	years

Controlled Waters Risk Assessment

Sladen Mill, Littleborough

SOIL AND STRUCTURES

Controlled Waters Risk Assessment

Sladen Mill, Littleborough

SOIL AND STRUCTURES

Report Status

Project Number	20403
Report Number	001

Revision	V01 – Issue for information
	V02 – Revised following Client comments
	V03 – Revised following peer review
	V04 – Revised with findings of additional fieldwork
	V05 – Revised following receipt of finalised environmental testing certificates
	V06 – Revised with findings of additional fieldwork
	V07 – Revised following consultation with the Environment Agency and peer review

Date Issued	29 July 2024 (V01)
	05 August 2024 (V02)
	23 August 2024 (V03)
	18 November 2024 (V04)
	26 November 2024 (V05)
	25 February 2024 (V06)
	08 August 2025 (V07)

Report Author

Russell Bowman (Director) *BSc (Hons) MSc CEng CWEM MCIWEM*

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Appendices Drawings > Exploratory Hole Logs (TP201 to TP206; photographs from TP301 to TP319) > Laboratory Analysis Testing Certificates > Regulatory Consultations (Environment Agency) > Other Correspondence > Heritage Note

Annexes Background Information (presented separately)

Peer review: *this Controlled Waters Risk Assessment has been developed with input from Land Quality Management's Paul Nathanial, lead author of the CIRIA guidance on PFAS and BS18504:2017 Sustainable Remediation.*

Units*: Throughout this Report chemical concentrations or target concentrations are reported in: parts per million (ppm) milligrams per kilogram (mg/kg) for solids; and, parts per billion (ppb) micrograms per litre (ug/l) for liquids.*

Appointment

Soil and Structures Ltd were instructed by Mere Development Group (*the Client*) in June 2024 to prepare a Controlled Waters Risk Assessment (*the Report*) to support the re-development of a parcel of land formerly occupied by Sladen Mill, Littleborough (*the Site*).

Development proposals include for construction of 25 no. dwellings and associated hardstanding, including access roads, and soft landscaping areas under reserved matters planning application ref. 21/00950/REM pursuant to outline permission ref. 15/0125/OUT.

Reliance on the advice presented herein rests solely with the Client.

Scope and Context

The Controlled Waters Risk Assessment (*this Report*) follows on from and builds on, previous ground-related reporting prepared by others for the Site and the proposed development. The Report has also been prepared following extended pre-application consultations with the Environment Agency the full minutes/details of which are not referenced herein but rather the basis of the agreement that was sought carried through the conclusions.

This Report presents a revised assessment of risk presented to 'Controlled Waters' (*as defined by the Water Resources Act 1991*) that asks - is the risk to identified Controlled Waters from identified sources of potentially polluting material pollution acceptably low and, if not, how can the risk be reduced to acceptably low levels?

In support of this main objective, the Report also;

> Addresses data gaps, clarifies key elements of the Site's characterisation and presents updated ground and groundwater models for the Site – the 'baseline' condition; and,

> Supports follow-on decision-making for the proposed development of the Site, advice on which is set out within Soil and Structure's Remediation Strategy (report ref. 20403-R-002-V04) – the 'endline' condition.

The legal context of the advice presented within this Report relates to an assessment of:

i) The suitability of the Site for its proposed end use that is rooted within national planning policy guidance (the National Planning Policy Framework) that is governed by planning law (various acts). The assessment of 'suitability' relates specifically to the potential hazard of pollution.

Advice in relation to the hazards of potentially harmful material ('contamination') or ground gases is excluded from this assessment but is carried across within the follow-on Remediation Strategy document.

This Report does not include advice in relation to other ground-related hazards, e.g. compressible material or slope stability, but notes that any remedial work need to be reconciled against the broader objectives and influences of all other groundwork activities.

Background to this Report

This Report is preceded by various existing ground-related reports prepared by others the findings of which are discussed within this Report. All available background data, including these reports, are annexed to this Report (included as a separate document available on request).

References

The Report has been written with reference to various sources of information. These are either appended or included as footnotes at the base of each respective page.

A glossary of abbreviations is provided within Section 10 of this Report.

1.0 The Site and Proposed Development

1.1 The Site

Location and size: The Site (the planning boundary) comprises a parcel of land approximately 1.30 ha in area located 175 m north of Halifax Road, Littleborough, Lancashire (Figure 1).

Access: The main body of the Site is accessed on foot and by vehicle via a fenced entrance in the south-eastern corner and the upper level of the Site openly accessible on foot and by vehicle midway down the eastern boundary.

Topography: is characterised by two distinct areas with general westerly and north-westerly fall in levels (within the Castle Brook valley): i) the 'main body' of the Site that lies between 165 and 174 mAOD; and, ii) the 'upper level' that is present midway along the eastern boundary of the Site that lies between 176.5 and 177 mAOD.

Utilities: Below ground utilities are expected to be present beneath the Site with evidence of overhead lines on Site.

Existing structures: At the point of issue various structures were noted on Site including: a masonry structure and electrical sub-station on the western edge of the Site; sandstone retaining walls in varied conditions along the eastern edge of the Site and locally to the bridge in the southern portion of the Site; and, localised areas of residual concrete hardstanding.

1.2 The Proposed Development

Development proposals: Development proposals (Figure 2) include for construction of 25 no. dwellings and associated hardstanding, including access roads, and soft landscaping areas.

ⓘ ***Development works and risk:*** *An appreciation of the construction processes is essential for development-related risk assessments given the groundworks stand to meaningfully alter the level of risk, e.g. unstable slopes being removed by earthworks, or unsuitable material being exposed as part of the works.*

To enable this development, the following groundworks are likely to be required, N.B. listing is outline only.

> Preparation: at the point of inspection Site clearance and preparation appears to have been partially completed with remaining works including: demolition of the remaining structures (detailed above) and excavation and off-Site disposal of soils impacted with non-native invasive plant species; and, removal of remaining hardstanding surfaces.

> Earthworks (cut and fill): Are expected to be required to suit development levels with the existing Made Ground deposits not anticipated to be suitable for re-use as a general fill in its current condition.

  Crucially in relation to this Report, filling operations (land raising) is planned across the lower portion of the Site returning temporarily exposed groundwater flows (from the spring-line) back beneath the ground surface that themselves will be captured as part of a groundwater management system planned as part of the works.

> Utility Excavations: Excavation of any drainage and other utility alignments.

> Foundations: Subject to the selected foundation solution, construction of sub-structures (foundations).

> Surfacing: Formation soft landscaping and hardstanding surfaces.

ⓘ ***Risk profile of the proposed development for 'Controlled Waters' [1]:*** *The proposed development would see a former industrial site that has been subject to multiple uses (land associated with coal mining, a woollen mill, a cotton raising and finishing mill, and more recently the manufacture of uPVC products) converted to a residential use.*

This change of use represents a shift from a land use with low sensitivity and high pollution potential (various industrial uses) to a high sensitivity and low pollution potential (residential). On this basis alone, the requirement for risk management (remedial works) would be anticipated.

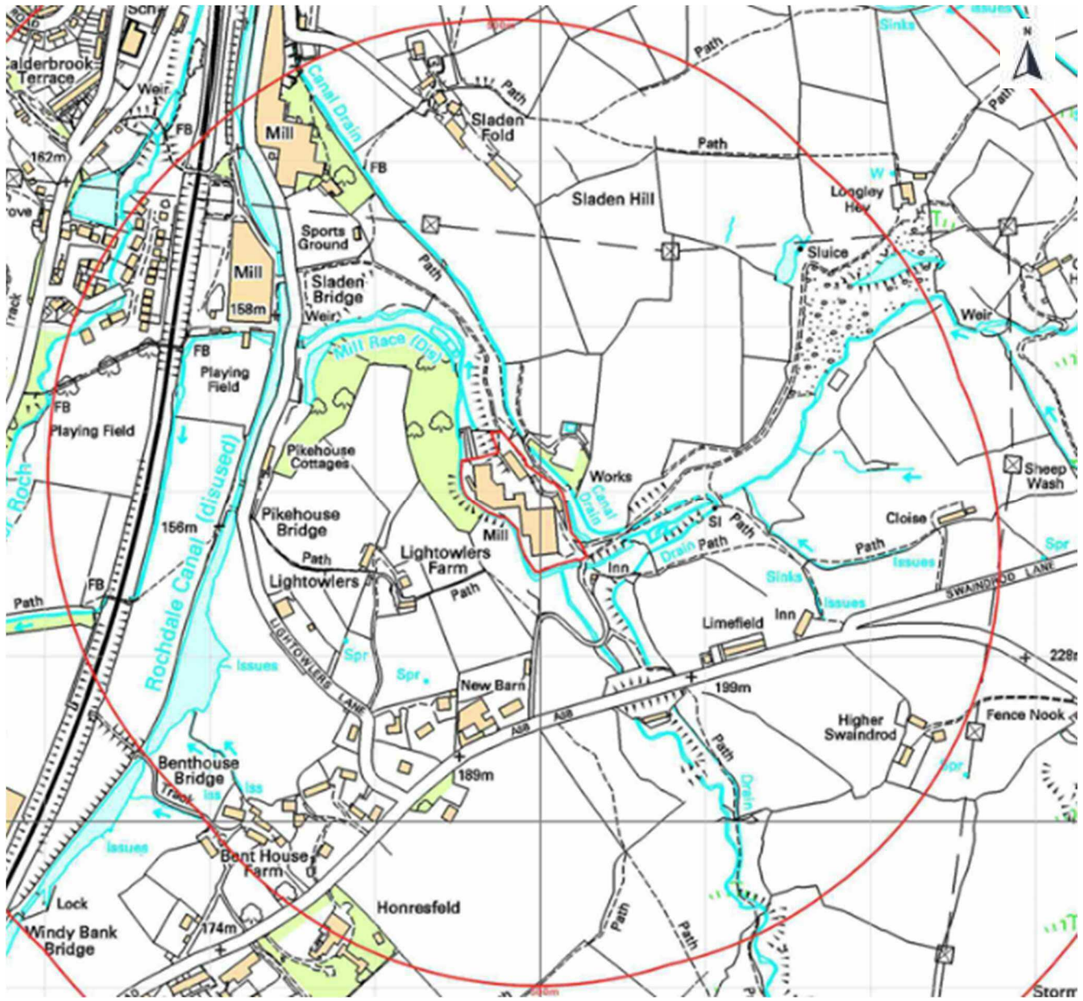


Figure 1: Location Plan

> *Site approximately centred on 394983 417383*
> *Central red line = outline planning application boundary; outer red line = 500 m buffer*

[1] *Water Resources Act 1991 (legislation.gov.uk)*



Figure 2 – Development Plan
> *Extract from appended drawing*

2.0 Background to this Report

Previous ground-related reporting: This Report follows on from multiple phases of fieldwork and various ground-related reports prepared by Brownfield Solutions Ltd and T J Booth Associates (TJBA) Ltd between April 2015 and May 2024. prepared in relation to the two planning applications (and related condition discharge applications); a reserved matters application ref. 21/00950/REM pursuant to outline permission ref. 15/0125/OUT.

An earlier ground investigation report is also understood to have been prepared as part of original transactional due-diligence however, beyond an anecdotal comment by the former owner ('the Site was found to be pretty clean overall despite its former industrial use'), this reporting has not been made available for review

Most recently, in response to Environment Agency consultation, TJBA prepared a report entitled; "*Hydrogeology and Potential Contaminant Transport*" dated May 2024 (Revision 0). In overview, this report included:

> Analytical modelling (Remedial Targets Methodology) relating to the transport of two Poly- and Per-fluoroalkyl Substances (PFAS) present within the groundwater beneath the Site to two receptors; Castle Brook (bordering the Site) and the River Roch (1.5 km west of the Site).

  Key assumptions of this model included: i) exclusion of groundwater as a 'receptor' identifying Castle Brook and the River Roch as the critical receptors; ii) defining the 'source' as the mean concentration of total PFAS (sum of PFOA and PFOS) within the centre of the Site; and, iii) use of the Drinking Water Inspectorate (DWI) threshold (0.1 µg/l) as the target concentration.

  Key findings of the analytical modelling included: i) the target concentration was not exceeded in either receptor inferring that the risk presented to the identified receptors was acceptably low. Notwithstanding this, risk management was recommended as detailed in the bullet point below.

> A recommendation that risk management (remedial works) was required to reduce the risk to Controlled Waters to acceptably low levels superseding earlier advice presented within their (TJBA) earlier reporting "*Phase 2 Site Investigation & Risk Assessment – Phase 3 Remediation Statement*" dated February 2024 (Revision 5) that no remedial works we required.

  The recommended remedial action included the provision of a 'low permeability' layer as part of the clean capping layer (recommended separately to reduce the risk to human health) to limit the rate of infiltration (rainfall) through the Made Ground deposits on Site.

A more detailed summary of these earlier reports is not included here with readers of this Report expected to either be familiar with this reporting or else have copies available for review and cross-referencing.

Sufficiency of this background information and residual uncertainty: overall, these earlier reports were considered to have generally provided sufficient factual data to: i) inform an assessment of the risk to potential receptors; and/or, ii) inform risk management decisions whilst maintaining a precautionary approach.

In a consultation response dated 14 February 2024, the Environment Agency (EA) also confirmed this position stating:

> *"We {the EA} are stratified that sufficient information has been submitted to support part (i) of condition 5."* *{Part (i) relating to the characterisation of the Site}*

Some specific points of uncertainty, or further characterisation, were identified as discussed within Section 3.0 and 4.0.

Regulatory consultations – human health: whilst not directly relating to the scope of this Report, it is noted for completeness, that within a planning decision notice (condition approval) dated 15 December 2023, Rochdale Borough Council confirmed that Condition 5 (that relates to land quality) could not be discharged subject to the Environment Agency's satisfaction that risks to Controlled Waters were either acceptably low or risk management measures, i.e. remedial works, were set out to ensure the risk would be acceptably low.

***Regulatory consultations – Controlled Waters*:** to date, nine formal consultation responses have been submitted by the Environment Agency copies of which are appended.

In addition, three in-person meetings were held as part of pre-application consultations reference to which is also made below.

The most recent of the formal consultations (07 June 2024) ultimately concluded that the relevant planning condition (Condition 5) was not able to be fully discharged (*N.B. partial discharge for 'site characterisation' was granted on 14 February 2024*) owing to:

> The conceptual site model presented not reflecting the revealed ground conditions or other environmental data that the Environment Agency have access to;

> Only two chemicals of concern being modelled as part of the Remedial Targets Methodology assessment presented as part of TJBA report *"Hydrogeology and Potential Contaminant Transport"* dated May 2024;

> Not all worksheets for the Remedial Targets Methodology being submitted;

> The incorrect selection of a target concentration noting that the Annual Average Environmental Quality Standard of 0.00065 µg/l needed to be adopted;

> The inappropriate use of averaged concentrations of PFOA and PFOS where maximum concentrations should be modelled; and,

> A general remark that; "*We {the EA} continue to feel that the site will need the benefit of remediation*".

> Specific comments drawing attention to: i) the presence of visible presence of hydrocarbons within machine excavated trial pits in select locations across the Site; and, ii) the potential presence of precursor compounds (Fluorotelemers).

Another of these recent consultations (16 September 2024) issued following the initial submission of this Report (V03) added that the relevant planning condition (Condition 5) was not able to be fully discharged owing to:

> Further investigation of the bedrock aquifer being required to determine if it should be considered 'a receptor';

> Further consideration of PFAS in soils and shallow groundwater being required;

> Insufficient sampling of PFAS in content of historic use of the Site – TOP Assay testing required;

> Use of the maximum chemical concentrations within the RTM P20 is required; and,

> Consideration of material movements across the Site with additional work (GI, RA and RS) required.

A note on the Flood Risk Activity Permit was also included but is beyond the scope of this Report.

Separately, in minutes (appended) from a meeting held on the 12 August 2024, more in-depth comments were shared that were responded to in a Briefing Note (issued separately to this Report).

The firth (V05) version of this Report consolidated findings of additional fieldwork completed in October 2024 in response to the September 2024 consultation (and respective meeting minutes).

An in-person meeting on 17 January 2025 followed the issue of V05 of this Report (minutes appended) served to further clarify the Environment Agency's requirements with respect to characterisation of the Site (the focus of the meeting with remedial options discussed in outline only).

The sixth (V06) version of the Controlled Waters Risk Assessment includes the findings of the additional fieldwork that were discussed and agreed with the Environment Agency at this latest meeting.

The most recent in-person meeting on 05 June 2025 followed the issue of V06 of this Report with the advice and presence of Paul Nathanial of LQM Ltd sought to support the discussions and establish an acceptable way forward.

This seventh (V07) version of the Controlled Waters Risk Assessment carries through the key points that were agreed upon as part of this most recent meeting that included confirmation that:

> The presence of overland flows of water across the Site have only manifest on Site because of demolition works with no overland flows of water evident prior to this work taking place. More specifically, through reductions in ground level across the eastern edge of the Site (including as part of the treatment/removal of non-native invasive species), have temporarily resulted in groundwater being exposed at the surface of the Site that, post-construction, will be below ground level. In addition, this groundwater will be captured, controlled and diverted as part of a groundwater management system further details of which are discussed within Soil and Structures Remediation Strategy, presented under separate cover.

> The use of Detailed Quantitative Risk Assessment as a tool to support the Controlled Waters Risk Assessment is not well suited to this very shallow and fast flowing groundwater catchment.

> Beyond the removal of a localised 'source' of PFAS impacted soils present on the upper level of the Site (locally to TP206), that no PFAS-related groundwater remediation will be sought by the Environment Agency.

3.0 Additional Investigation – Desk-Based Research and Testimony

3.1 Desk-Based Research

A review of the existing commentary and additional desk-based research was completed in support of this Report the findings of which included:

> ***History** - Sladen Mill v's Sladen Wood Mill:* In the 1940s when textile manufacture was rapidly moving out of the UK mill owners looked to diversify to remain financially sustainable.
>
> Within the Littleborough area, Sladen Wood Mill became a centre of excellence for research and development for new materials and finishes[2] as part of this move to diversify.

Key line of evidence: Despite sharing a similar name Sladen Wood Mill is located c. 700 m north-north-west of the Site (Figure 3) however, the presence of a canal drain between these two mills (and others within the region) does suggest a degree of connectivity. It is however noted that numerous other mills are present closer to Sladen Wood Mill that were known to have been used for the manufacture and application of plastic materials and finishes, e.g. Rock Nook Mill, that is known to have been owned and operated by a PTFE manufacturer (a PFAS compound)[1].

> ***History** - Regional Context of Sladen Mill and the Potential Use of PFAS on the Site*: The Site was formerly occupied by Sladen Mill that was historically one of many mills located within the Summit and Littleborough region (Figure 3) involved in the manufacture or treatment of textiles[3].

Key line of evidence: Sladen Mill (the Site) was later converted as a 'cotton raising and finishing' mill. Whilst the exact details of the processes involved are not known, 'raising' is a mechanical process and 'finishing' also likely to be a mechanical process in this setting given the wider context of numerous other mills within the wider area involved with the 'fulling and dyeing' of textiles (chemical dominated processes) that would have been already better set-up for the use of chemicals.

In a separate 'Heritage Note' (appended) Wardell Armstrong provided a more in-depth analysis of the Site's former uses. Of specific note is: i) the adaption of the mil in the 1960s for both the manufacture of wool products together with '*bleaching, dyeing, raising and finishing…*' over its final 20 years of operation as a mill; ii) the ownership of Wellfield Mill, further upstream of Castle Brook, by Charles Kershaw who also owned and operated Sladen Mill suggesting this was the Site where, for most of the mill's operation, fabrics were sent for chemical treatment; iii) Sladen Wood Mill (and Rook Nook Mill), that was a confirmed Site of PFAS compound use, was owned and operated by Fothergill & Harvey, local competitors to Charles Kershaw; and, iv) based on the desk-based historical review within the Heritage Note, no evidence of PFAS use can be found for Sladen Mill.

Similarly, PFAS compounds generally came into use and production from the 1940s onwards in the UK after Sladen Mill had been diversified as a 'cotton raising and finishing mill'.

In minutes from a meeting held on 12 August 2024 (appended) the Environment Agency stated: *"… This company {Alderburgh Ltd} made products … for which there is a very high confidence of using/applying finish using/containing PFAS. …"*. This statement was supported with reference to the company website[4].

Further to this comment being made in more recent consultation responses, the former owner/proprietor of the Sladen Mill complex (and owner of Alderburgh Ltd) was contacted who confirmed that: i) the main/sole process on Site was plastic (LDPE) extrusion and moulding from pellets with no liquid chemical processes; ii) sealed, liquid based waterproofing products were sourced from suppliers, stored on Site under license and sold wholesale; iii) a historic ground investigation pre-demolition 'by a Nottingham based firm' completed in support of an earlier planning application (and not available on the planning portal or company archives) found 'little to no chemicals in the ground'; and, iv) periodically ferrous (orche) water flushed down the valley via Castle Brook.

Within an in person meeting the Environment Agency shared research emerging from Australia that indicated plasticisers used in the extrusion and moulding of PE products included PFAS compounds. Whilst further interrogation of this research has not been completed, it was notionally agreed that, notwithstanding the commentary from the former owner, there was the potential for PFAS compounds to have been used on Site (as a liquid based free-product) and it remained a plausible chemical of concern.

> ***History** – Former mill race*: A former mill race (Figure 3) traverses the Site in a south to north alignment and was likely in use as a source of process water (boiler water and general water) and potentially, earlier in the Mill's use, as a source of power for a mill-wheel.

> ***Geology** – Discrepancy in the positioning of Site within the geological sequence*: The TJBA reporting positions the Site directly overlying the Woodhead Hill Rock (named sandstone unit).

This is consistent with both the 1921 geological mapping referenced in within the TJBA Coal Mining Risk Assessment (Figure 5) and the Coal Authority mapping records[5] with the latter also suggesting the presence of a geological fault through the Site (given the abrupt end of coal seam outcrops north of the Site).

However, the most up-to-date British Geological Survey (BGS) mapping at both 1:50,000 and 1:10,000 scales (Figure 4) indicate the Site lies higher up the geological sequence with the adits to the west of the Site liekly targeting the Upper Foot Coal and not the deeper Lower Foot Coal as suggested by the contemporary mapping.

On the modern mapping (Figure 4) the fault is located further east of the Site with the Site geology characterised by undifferentiated Pennine Lower Coal Measures (which are typically a mudstone dominated sequence of rocks). This positioning of the Site is most clearly evidenced by the two outcrops of the Upper Foot Coal seam either side of the Site in Figure 3, a seam that, before being eroded away, would otherwise cross the Site following the south-westerly trending bedrock dip direction and angle (16 to 20 degrees).

The Lower Mountain Coal (also known as the Half Yard Coal[6]) and the Lower Foot Coal were both of extractable thickness and mined in the local area[7].

Based on the rotary borehole record presented within the TJBA reporting and inspection of the outcropping bedrock across the eastern embankment of the Site, the Coal Authority and earlier BGS mapping is validated. Discussions with a retired BGS Geologists noted that, unless a field report has been prepared for a given site, neither the earlier nor contemporary mapping can be relied upon as an accurate record. They also noted that digitisation of modern geological mapping can, and often does, include for gross generalisations of the geology. Correlation of the Coal Authority, earlier BGS mapping and Site observations (outcropping sandstone across embankment) is compelling evidence that the contemporary mapping is less reliable in this scenario.

[2] *Major move to plastic kept firm in credit - Manchester Evening News*
[3] *1891 Cotton Mills in Littleborough - Graces Guide*
[4] Wayback Machine
[5] *Interactive Map Viewer | Coal Authority (bgs.ac.uk)*
[6] *Todmorden Moor.pdf (wyorksgeologytrust.org)*
[7] *Rochdale district, sheet 76, a brief explanation (bgs.ac.uk)*

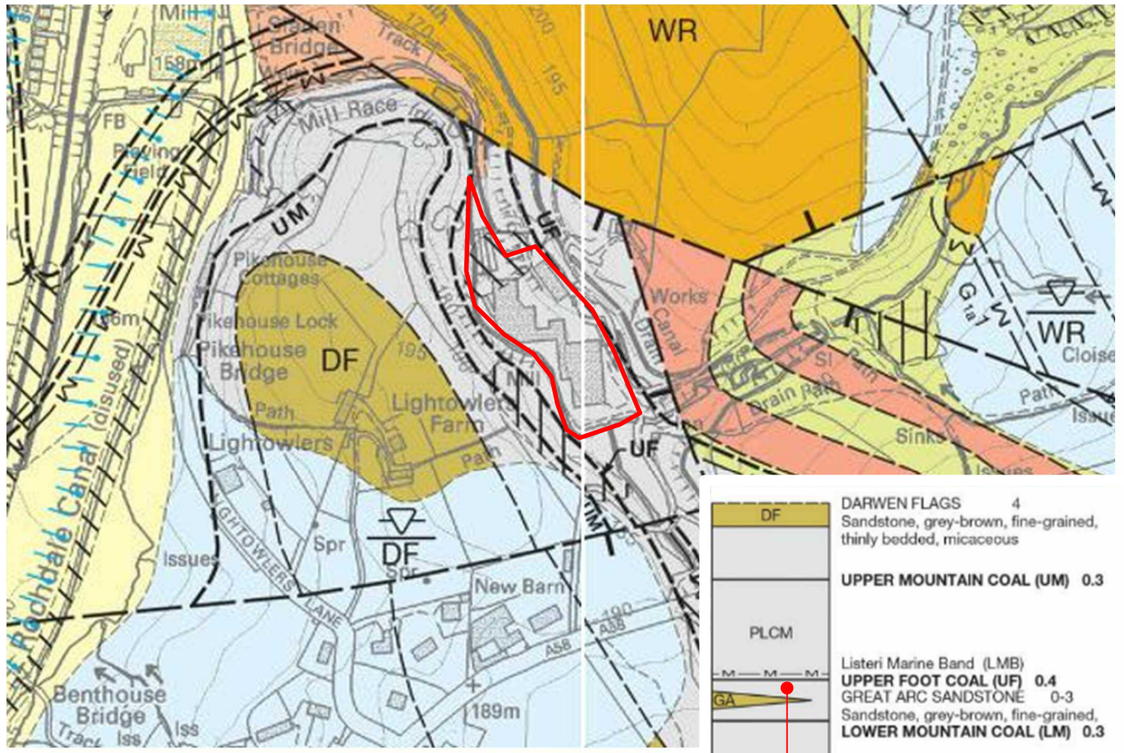


Figure 4 – Extract of current 1:10,000 solid and drift geological mapping
> Reproduced under Open Government License (v3.0)
> INSERT ➔: Vertical section illustrating c. 30 m deep borehole beneath the Site based on this mapping (red line) and c. 30 m deep borehole based on the TBJA drilling records and older geological mapping records (purple line).

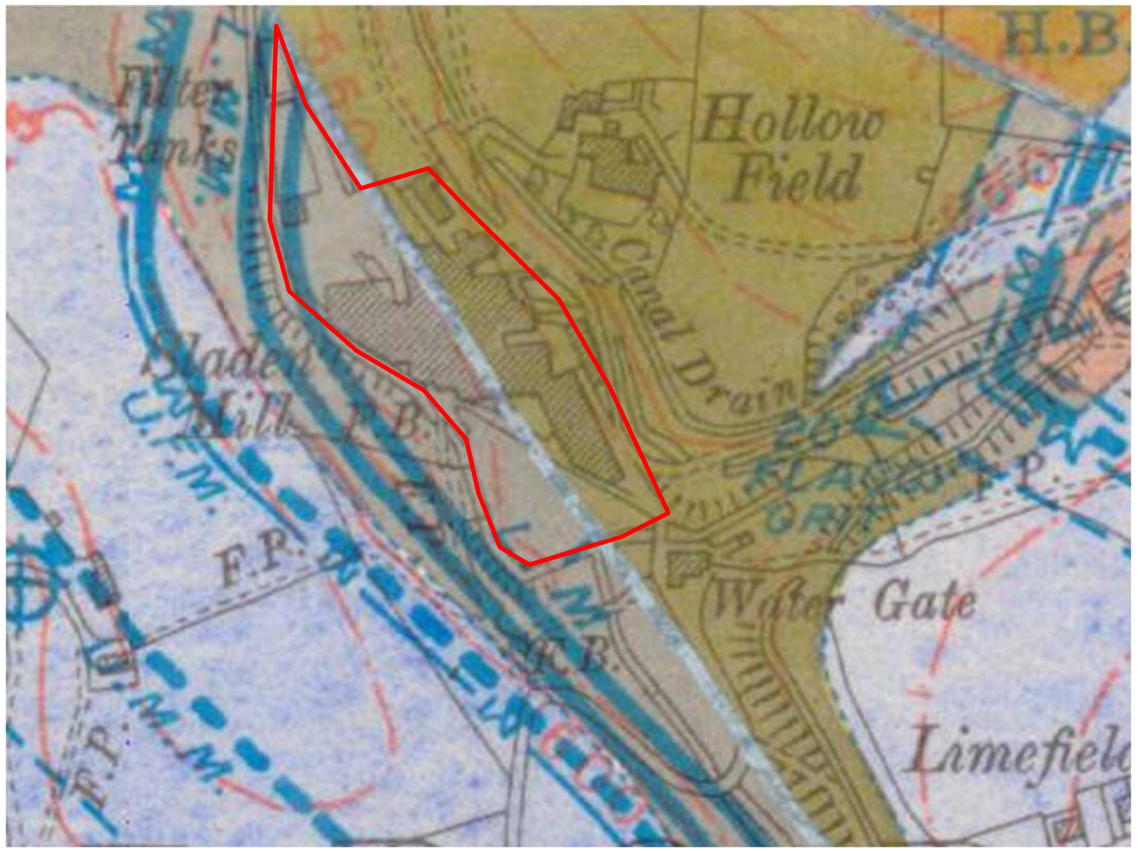


Figure 5 – 1921 1:10,560 solid geological mapping referenced within TJBA Coal Mining Risk Assessment
> Faint white line = fault alignment
> Note the difference in colour (geological units) against Figure 4
> Note the presentation of the Upper Foot coal seam (UFM – higher up the hillside) relative to the presentation within Figure 4 that suggests this was the seam the adits on the western bank of Castle Brook were targeting.

> ***Hydrogeology*** *– Spring lines*: Contemporary Ordnance Survey mapping records the presence of numerous 'spring' points at higher elevations to the Site within the same geological unit. This phenomenon is anticipated within this catchment that is dominated by highly varied topography and interbedded layers of variably permeable sedimentary rocks resulting in multi-layered aquifers (typically sandstone units).

A spring-line is evidenced at, or immediately below, the base of the embankment that runs along the eastern edge of the Site. In two discrete areas, because of the demolition works and localised reductions in ground level, e.g. removal of non-native invasive species, this has temporarily resulted in two spring points ephemerally/intermittently flowing from the base of the embankment. The intermittent nature appears to reflect seasonality (higher flows in winter/spring) and rainfall events noting that at least a 24 hr lag on rainfall events was noted.

> ***Geochemistry*** *– Regional Context of the Site*: As noted previously, PFAS compounds were historically used within the local area with no direct evidence of their use on the Site itself.

Key line of evidence: PFAS was detected within groundwater at a concentration of 0.0589 µg/l in a borehole located around 1000 m south-east-east of the Site[8] higher up within the local catchment and likely 'up-gradient' of the Site within the bedrock aquifer.

> ***Geochemistry*** *– Chemical signature of PFAS compounds*: the ratio of PFOA to PFOS can be used as a basic means to profile the chemical signature of PFAS compounds that is often an effective tool to discern whether the source is either an Aqueous Fire Fighting Foam (AFFF) or a material coating.

> AFFF has a greater ratio of PFOS to PFOA whereas material coatings have a greater ration of PFOA to PFOS.

Key line of evidence: Analysis of the ratios for the existing PFAS dataset and the additional laboratory analysis presented within this Report confirmed a consistently greater ratio of PFOA to PFOS (as illustrated on the Ground Model in Section 5.0). This confirms that the PFAS present on Site, and within the water environment locally to the Site, originates from a material coating source and not AFFF. This finding correlates with the regional context (historic centre for PFAS-related research) and the presence of various 'fulling and dying' mills within the local area, including Wellfield Mill upstream of the Site (alongside Castle Brook).

> ***Surface water quality – Roch (Source to Spodden)****:* Contemporary (2019) river quality[9] data for the local catchment - Roch (source to Spodden) - confirms a 'moderate' ecological classification.

> ***Termination depth of window sample boreholes:*** The reason the window sample boreholes typically terminated within the Made Ground deposits was not stated but assumed likely due to practical refusal on a 'hard' surface, e.g. cobble sized material or larger, or bedrock. The base depth of the window sample boreholes likely represents a point at, or close to, the bedrock surface when compared against nearby trial pits that did prove bedrock.

> ***Groundwater sampling methodology:*** Full details of the sampling methodology employed for obtaining groundwater samples was not stated but referenced to have been in line with current guidance[10].

It was subsequently confirmed via email (copy appended) that the testing guidelines issued by the laboratory were followed (correct sampling media) with the sampling methodology confirmed in outline.

Key area of uncertainty: on sampling, the boreholes likely recharged quickly due to the prevailing groundwater conditions but, given the 'shallow' flows over the bedrock surface, likely included a high proportion of sediments. Sediments will influence groundwater quality but, in this instance, due to the naturally fast recharge is expected to have contributed low levels of error within the analysis, i.e. samples likely represent groundwater quality.

> ***Sampling rationale:*** The rationale for selecting Perfluorooctanic Acid (PFOA) and Perfluoroctane Sulfonic Acid (PFOS) as markers for the broader PFAS compounds for both sampling and analytical modelling was not stated.

It is assumed that the PFOA and PFOS were selected due to their relatively higher mobility, compared to other PFAS compounds, and the fact they represent generally more toxic, regulated[11], 'dead end' daughter products from the degradation of more complex, typically less mobile, PFAS compounds. It is noted that this sampling rationale was supported by, and continued through, the additional fieldworks presented as part of this Reporting.

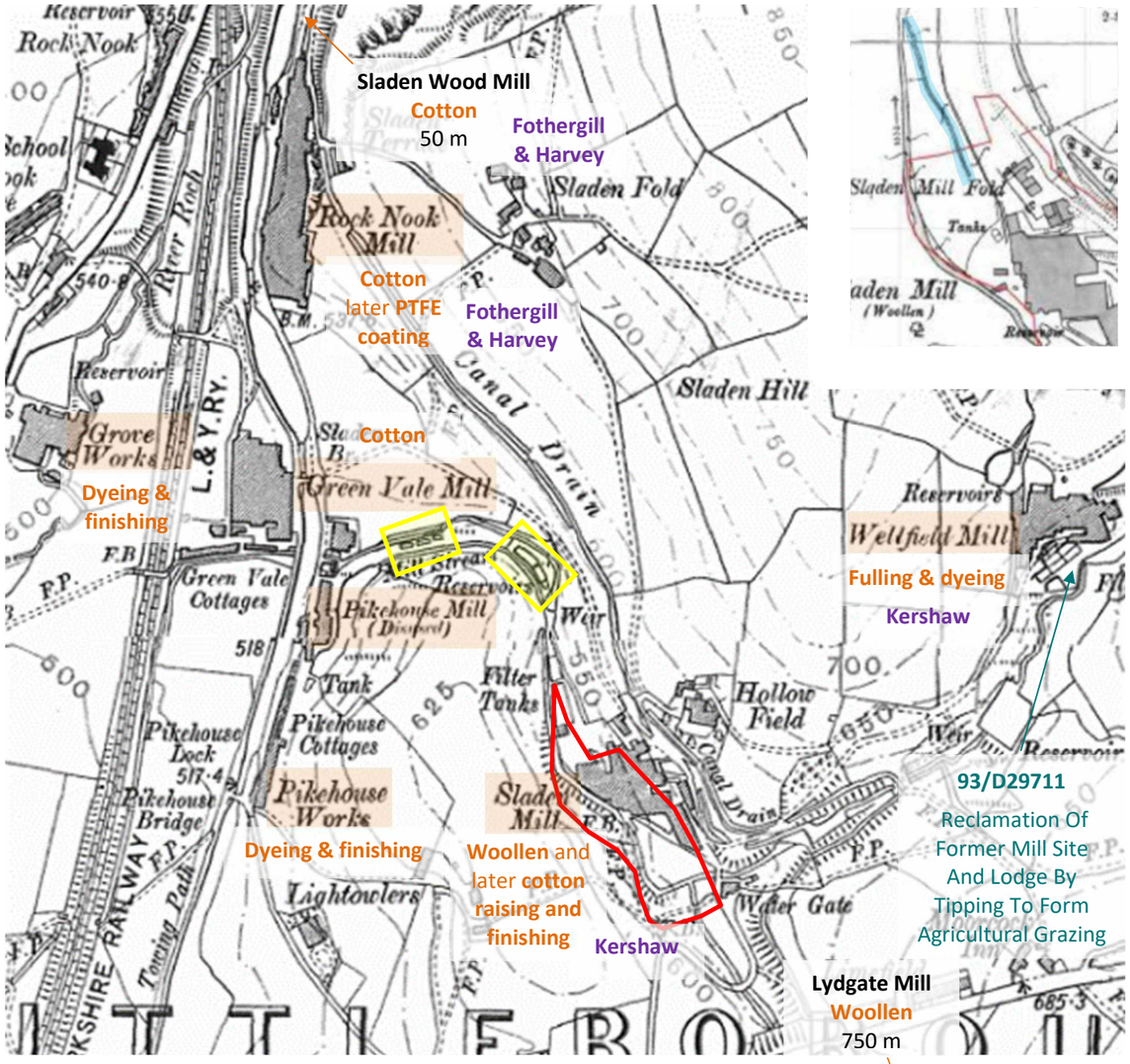


Figure 3 – Historical, industrial context of the Site
> Extract from appended mapping (1910 to 1911)
> Red line = approximate Site boundary
> Brown shaded boxes and text = most mills within the vicinity (1000 m) of the Site and their uses
> Purple text = Site ownership (where known; as presented with the appended Heritage Note)
> Yellow boxes = evidence of the watercourse having been modified to include additional downstream treatment of water remote from the upstream mills
> INSERT TOP: Extract from the 1891 Ordnance Survey mapping with the former mill race highlighted blue

[8] PFAS / constituencies and population | Flourish
[9] Ecology Map | The Rivers Trust

[10] *BS ISO 5667-11:2009 Water Quality. Sampling. Guidance On Sampling Of Groundwaters (British Standard)*
[11] The Persistent Organic Pollutants (Amendment) Regulations 2025

4.0 **Additional Investigation –** Walkover, Trial Pitting, Aquifer Testing, Monitoring, Sampling and Laboratory Analysis

The additional fieldworks were completed over four visits; 05 June 2024 (walkover and sampling), 08 July 2024 (walkover and sampling); 10 October 2024 (walkover, sampling, trial pitting), 03 February 2025 (walkover, sampling, aquifer testing and trial pitting) the rational and findings of which are summarised in the respective sections below.

As noted within Section 3.0, the scope of the additional fieldwork was developed: following a review of the existing reports prepared for the Site; to address 'data gaps'; and, with respect to the most recent round of investigation (TP301 to TP319), in direct response to requests made by the Environment Agency (meeting on 17 January 2025).

4.1 Walkover

As well as general orientation of the Site and immediate surrounding area, four separate walkovers of the Site and surrounding area were completed to investigate specific features.

> ***Former mill race:*** An extended walkover, 50 m downstream of the Site along Castle Brook was conducted to assess what evidence, if any, of the historic mill race existed (Figure 3).

Reasoning: to assess the extent to which, if any, this feature was serving as a preferential pathway for either shallow groundwater flows or surface water. On former brownfield sites with heterogenous fill deposits such as those present on the Site, relic sub-structures and particular relic culverts or drains, commonly serve as both sumps and preferential flow paths for water, and any dissolved chemicals within it, as well as any free-product, e.g. hydrocarbons.

Whilst industrial features were noted, e.g. sandstone abutment / retaining wall on the western edge of the brook and, a relic metal (likely steel) pipe projecting from the eastern (Site-side) edge of the brook, no evidence of the former mill race outlet was noted (Photograph 5 & 6).

> ***Bedrock***: Whilst already noted within the TJBA reporting, the outcropping bedrock on the embankment face within the north-eastern portion of the Site was re-inspected.

Reasoning: to further characterise the dip and interbedded nature of the sedimentary bedrock sequence beneath the Site given the structural geology of the bedrock will be having a guiding influence on both the movement of groundwater beneath the Site and within the wider catchment.

The bedrock was found to comprise a very thinly bedded fine-grained sandstone interbedded with rare thinly to thickly laminated siltstone and mudstone bands dipping at apparent angles of between 17 to 25 degrees (bed slippage likely exaggerating the upper limit) that is consistent with the recorded dip angles (Section 2.0).

Based on the nature and thickness of this sandstone dominated sequence of bedrock, this is considered likely to represent the outcrop of the Woodhead Hill Rock that further supports the geological modelling set out within the TJBA reporting.

> ***Ephemeral/intermittent springs***: Whilst already noted within the TJBA reporting, the presence of ephemeral/intermittent spring points were identified as key features of the Site's groundwater regime. The emergence of water from these points was only apparent on completion of the demolition works that included the removal and off-Site disposal of soils impacted with non-native invasive species.

Reasoning: to further characterise these water features that are considered likely to represent points at which the groundwater temporarily surface emerges 'out of the ground' (springs) that, together with the structural geology, will have a guiding influence on the groundwater regime across the Site.

Inspection of the springs occurred on three separate occasions following wet (05 June 2024), dry (08 July 2024), wet (10 October 2024) and dry (03 February 2025) spells in the local weather (48 hrs prior to visit) noting that water flow rates drop off markedly following periods of dry weather (flashy groundwater conditions).

> ***Springs outside of the Site boundary:*** An extended walkover, 100 m downstream and 100 m upstream of the Site along Castle Brook was conducted to better understand the groundwater regime within the local catchment and obtain both spring water and surface water samples upstream and downstream from the Site. The importance of this work was highlighted following an initial review of the Site setting and the detection of PFAS within the spring water on the eastern edge of the Site.





Photograph 1 ↑ & 2 → Inspection of the exposed outcrop of bedrock within the north-western portion of the Site.
> *Sandstone dominated sequence of rocks*

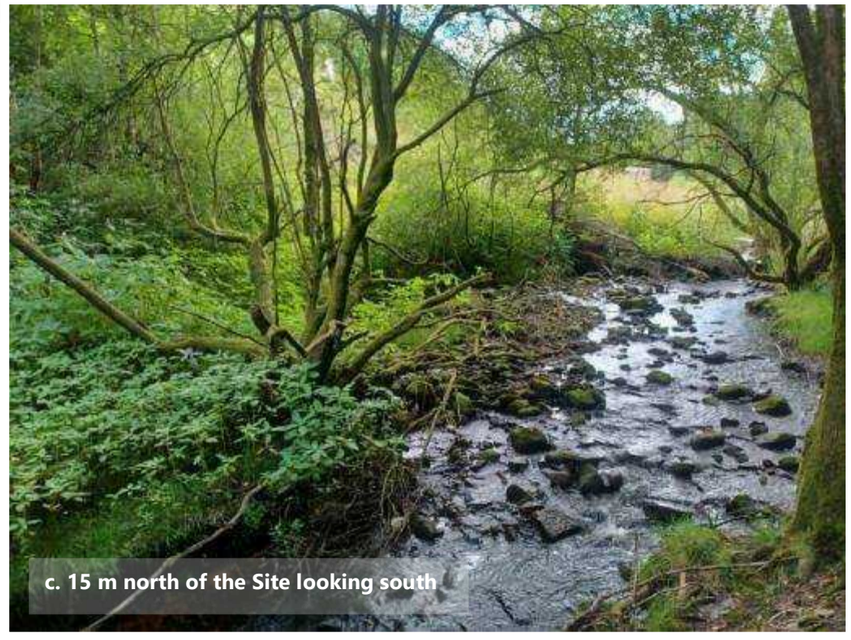




Photograph 3 ↑ & 4 → Inspection of 'Spring 1' exposed following demolition works (flowing in wet period – Photograph 3 – positive flow within informal channel; and a dry period – Photograph 4 – minor flows from engineered gap within the wall construction indicating this spring point has been present since the wall's construction c. 1890s.



Photograph 5 ↑ & 6 → Inspection of Castle Brook downstream of the Site with no evidence of a former mill race outlet noting the presence of a pipe emerging from the direction of the Site (dry pipe and no evidence of erosion at the base suggesting limited to no discharge during wetter periods of weather).



4.2 **Trial Pitting –** First Round (TP201 to TP206)

To obtain soil samples and for ground profiling around select features on the Site, machine excavated trial pits were advanced using a 36 tonne excavator with a toothed bucket.

The exploratory hole logs are appended that include detailed descriptions of the materials encountered, key observations and photographs of the excavations and their arisings. The rational for locations is set out in Section 4.6.

The trial pitting confirmed the ground conditions reported within the existing ground investigation reporting (prepared by TJBA) with the following additional, key observations.

- *Observation 1:* the presence of rounded cobbles and boulders at the interface between the Made Ground and underlying bedrock is consistent with water-washed debris (alluvial/fluvial deposits) including within TP203 (eastern portion of the lower level). This in turn is consistent with a formerly (geological time scale) wider and faster flowing (more energetic) valley formation that was able to weather and transport particles of this size. This material was deposited on the plateau that Sladen Mill was ultimately constructed on. As flows diminished in the post-glacial period, the valley has narrowed and confined to the deep-cut channels of the respective brooks.

  The presence of these cobbles and boulders was confirmed within three (TP202, TP203 and TP204) of the trial pits advanced across the lower portion of the Site and, taken together with the nature of the material logged in these locations and the materials logged within the existing trial pits, it is likely that a terrace/plateau of post-glacial, fluvially modified soil exists over the Site that would have formed a 'plateau' of material that was well suited (topographically and geologically) to being developed for Sladen Mill. Given groundwater was observed flowing through these deposits in all locations they were encountered, they are anticipated (based on their particle size distribution and effective porosity) and evidenced to have high permeability.
- *Observation 2:* suspected evidence of breccia (fault weathered material) was encountered within TP202 (more weathered bedrock deposits that appeared 'blended' but were not reworked) located on the western edge of the Site (adjacent to Castle Brook).

  This suggests the fault's alignment is well correlated with the alignment of Castle Brook and Lydgate Brook.
- *Observation 3:* where encountered, the mudstone deposits were found to be 'weak to medium strong' that suggests a similar strength profile to the sandstone deposits (thinly bedded).
- *Observation 4:* groundwater was encountered as lateral, base flows (east to west) within all exploratory holes advanced across the lower portion of the Site.

  This trend of groundwater flow was captured on videos that can be made available on request and confirms the general trend in groundwater flow patterns: emergence of groundwater at the spring line (c. 170 mAOD) that subsequently; 'cascades' (flows into) the variably but typically high permeability (granular dominated) Made Ground deposits before intercepting the comparatively low permeability and moderately dipping (towards Castle Brook) bedrock deposits, and running off this surface into Castle Brook (supporting base flow in this watercourse);
- *Observation 5:* apart from ash and clinker, no evidence of potentially harmful or polluting material, e.g. stained soils or water, was observed within the trial pits.
- *Observation 6:* the former reservoir on the upper portion of the Site is infilled with reworked natural materials.

4.3 **Trial Pitting –** Second Round (TP301 to TP319)

To obtain additional soil samples for PFAS analysis, additional machine excavated trial pits were advanced using a 36 tonne excavator with a toothed bucket.

The exploratory hole logs are summarised in the table presented within Section 4.8 based on generalised detailed descriptions of the materials encountered alongside key observations with photographs of the excavations and their arisings included as an appendix to this Report. The rational for locations is set out in Section 4.6.

The trial pitting confirmed the ground conditions reported within the existing ground investigation reporting (prepared by TJBA), and first round of additional trial pitting with the following additional, key observations.

- *Observation 1:* the presence of rounded cobbles and boulders at the interface between the Made Ground and underlying bedrock was confirmed across the lower portion of the Site.
- *Observation 2:* a generally 'shallow' bedrock surface (within 2.0 m of ground level) was revealed across the upper portion of the Site including locally to the former reservoir suggesting this historic feature was 'shallow' and likely with a localised deepening around former drainage infrastructure.
- *Observation 3:* groundwater was encountered as lateral, base flows (east to west) within all exploratory holes advanced across the lower portion of the Site. No groundwater was encountered across the upper portion.

4.4 **Aquifer Testing**

To obtain a better understanding of groundwater flow rates across the Site, aquifer testing was completed on 03 February 2025.

The aquifer testing included a tracer test (fluorescein) within borehole M3 (Photograph 10) and falling head tests (variable head tests) within boreholes; M3, M6 and M9.

The tracer test was conducted in line with current guidance[12],[13] using 10 litres of fluorescein solution (230 g in 10 litres of tap water) with an anticipated 'break-out' time of around 1 to 3 hours based on an estimated mass, hydraulic conductivity (k) of between 10^{-2} to 10^{-4} m/s.

The tracer test was considered ineffectual with dilution anticipated to be too great resulting in too great a dilution to be visibly detected – no evidence of break-out was noted within 5 hours of dye injection.

The falling head tests involved charging selected boreholes with 50 litres (borehole M3) and 25 litres (borehole M6 and M9) of tap water and observing/measuring the head response. In each location, none of the boreholes were able to maintain a head of water with the rate of drainage (permeability) too great.

The testing confirmed 'high' rates of permeability across the three areas of the Site where testing was performed with the 'ineffectual' variable head testing indicating that permeability is likely to be 'at least' 10^{-4} m/s or faster.

This rate is consistent with both the granular dominated Made Ground deposits (anticipated to have variable but generally high permeability) and the underlying 'cobble bed' (likely localised River Terrace Deposits; anticipated to have high permeability) encountered across the Site, within which groundwater is expected to be preferentially flowing.

[12] Microsoft Word - SC030155SR8 Final.doc

[13] Tracer tests and remediation schemes: environmental permit exemption - GOV.UK

4.5 Monitoring

To obtain a better understanding of groundwater trends across the Site, groundwater level monitoring within existing monitoring wells (boreholes that were locatable and accessible) was undertaken.

Monitoring was completed on two occasions: 05 June 2024; and, 08 July 2024 with the consolidated results (including earlier monitoring completed by TJBA) presented in Table 1.

Repeat monitoring of groundwater levels was not completed on 10 October 2024 given a sufficient information was deemed to have been obtained to gain a good-enough understanding of the groundwater dynamics on Site.

***Access*:** was possible to all areas of the Site where boreholes were drilled however, some borehole positions were not able to be located or had been destroyed and the emergence of pioneer vegetation over the two visits (despite having coordinates available) meant repeat monitoring of all standpipe locations was not possible.

Pollution control and cross-contamination prevention procedures: were employed during the works that included wiping down of the dip tape with a disposable wipe.

***Revealed groundwater trends*:** The additional monitoring on Site confirmed the anticipated conditions with four key observations.

- *Observation 1:* no staining or odour was noted on the dip tape within any of the exploratory holes monitored.
- *Observation 2*: groundwater levels were generally recorded in line with those recorded as part of the previous fieldwork completed by TJBA.

  Whilst river levels are only estimated based on projections from the topographical survey, there appears to be a general trend of:

  i) Seasonality with groundwater levels highs typically occurring in Autumn/Winter and groundwater lows typically occurring in Summer.

  ii) Groundwater levels being higher than the brook across the southern two thirds of the Site.

  iii) Groundwater levels that rest close to the level of the brook across the northern third of the Site. This trend suggests that the surface watercourse (Castle Brook) is likely a gaining watercourse along most of its alignment as it passes the Site with possible losses or mixing with groundwater across the northern third of the Site.
- *Observation 3*: on the second visit, following a dry period, groundwater levels were consistently lower across the Site indicating, as anticipated, that groundwater levels are likely very sensitive to rainfall events that can be described as 'flashy'; and,
- *Observation 4*: localised variance in groundwater levels, e.g. 3 m level difference between M3 and M5 that are c. 25 m apart, taken together with the findings of the machine excavated trial pits (typically advanced deeper than the monitoring boreholes with variable strikes) is indicative of variable permeability (that is anticipated) whereby locally deeper, more granular deposits are potentially acting as 'sumps' serving to temporarily store more water.

Whilst the monitoring standpipes didn't prove bedrock deposits categorically the base / refusal depths are typically consistent with the depths of fill within nearby machine excavated trial pits. It is however noted that fill depths of over 4.00 m were recorded in various areas of the Site (refer to Ground Model in Section 5.0).

Table 1 – Consolidated Groundwater Level Monitoring Results

> *Dark blue monitoring wells (M7, M12 and M13) were advanced across the upper level of the Site*

				22.08.23				18.10.2023				07.11.2023				05.06.2024				08.07.2024				Range in levels		
				Autumn				Autumn				Winter				Summer				Summer				Cell colours = seasons		
	GL	Response Zone		Water level		Base of well		Water level		Base of well		Water level		Base of well		Water level		Base of well		Water level		Base of well		Water level		
	mAOD	*Depth range*	*Geology*	*mbgl*	*mAOD*	*mbgl*	*mAOD*	*mbgl*	*mAOD*	*mbgl*	*mAOD*	*mbgl*	*mAOD*	*mbgl*	*mAOD*	*mbgl*	*mAOD*	*mbgl*	*mAOD*	*mbgl*	*mAOD*	*mbgl*	*mAOD*	Low	High	Range
M1	170.75	1.00 to 2.40	MG	0.40	170.35	2.80	167.95					0.05	170.70	2.80	167.95	0.70	170.05	1.05	169.70			1.05	169.70	0.70	0.05	0.65
M2	168.50	1.00 to 3.00	MG	1.80	166.70	3.00	165.50					1.46	167.04	3.00	167.75									1.80	1.46	0.34
M3	168.75	1.00 to 3.00	MG	1.54	167.21	3.00	165.75					1.80	166.95	3.00	165.75	2.55	166.20	3.00	165.75	2.65	166.10	3.00	165.75	2.65	1.54	1.11
M4	167.50	1.00 to 2.70	MG	2.11	165.39	2.70	164.80					1.90	165.60	2.70	166.05	2.35	165.15	2.40	165.10			2.40	165.10	2.35	1.90	0.45
M5	167.50	1.00 to 4.00	MG	2.66	164.84	4.00	163.50							4.00	163.50	2.50	165.00	3.40	164.10	2.66	164.84	3.40	164.10	2.66	2.50	0.16
M6	167.50	1.00 to 4.00	MG	2.62	164.88	4.00	163.50					2.32	165.18	4.00	163.50	2.65	164.85	3.25	164.25	2.72	164.78	3.25	164.25	2.72	2.32	0.40
M7	176.75	1.00 to 2.80	MG into Nat	Dry		2.80	173.95					Dry		2.80	164.70									Dry	Dry	
M8	168.70	1.00 to 2.00	MG	1.57	167.13	2.00	166.70					Flood		2.00	174.75									1.57	0.00	1.57
M9	172.75	1.00 to 2.40	MG					1.71	171.04	2.40	170.35	0.34	172.41	2.40	166.30	Dry		1.95	170.80	Dry		1.95	170.80	1.95	0.34	1.61
M10	170.75	1.00 to 2.00	MG into Nat					0.65	170.10	3.00	167.75	0.59	170.16	2.00	170.75					Dry		1.05	169.70	0.65	Dry	0.65
M11	168.65	0.40 to 1.40	MG into Nat					1.30	167.35	1.40	167.25	Dry		1.40	169.35	Dry		1.40	167.25	Dry		1.40	167.25	Dry	1.30	1.30
M12	178.25	1.00 to 4.00	MG into Nat					Dry		4.00	174.25	Dry		4.00	164.65									Dry	Dry	
M13	176.50	1.00 to 4.00	MG into Nat					Dry		4.00	172.50	Dry		4.00	174.25									Dry	Dry	
M14	165.00	1.00 to 4.00	MG					2.28	162.72	4.00	161.00	2.30	162.70	3.00	173.50							3.20	161.80	2.30	2.28	0.02

4.6 Surface Water Sampling

First sampling visit – 05 June 2024: To obtain a better understanding of the chemical quality of the surface water course (Castle Brook) running along the length of the Site, a key Controlled Water receptor, repeat sampling from the existing sampling positions was completed.

Second sampling visit – 08 July 2024: A return sampling visit was completed with additional sampling points selected within the local water network. Sampling of the on Site spring was also completed as discussed within Section 4.4 below.

These additional sampling points included:

i) Discrete locations > 8 m upstream from the confluence of Lydgate (or Red) Brook and Castle Brook to establish if and where there was a difference in the chemical quality across the two watercourses (*Note: TJBA reporting completed sampling upstream in Castle Brook*); and,

ii) At least 25 m downstream of the Site (Photograph 5) to establish if surface water quality further downstream followed a similar trend to that expressed by the samples obtained at the upstream, midstream and downstream sampling locations.

Sampling from the midstream sampling location was excluded given two rounds of sampling and laboratory analysis at this location revealed a predictable and repeatable trend of PFAS concentrations remaining within the upstream and downstream concentrations.

Third sampling visit – 10 October 2024: Sampling of Castle Brook was also completed on 10 October 2024 at a location around 75 m upstream of the Site (and the access bridge). The sample point was immediately downstream of a spring point on the edge of the watercourse.

Repeat sampling of other surface water monitoring locations was not completed given a good enough understanding of the surface water quality trends had already been established.

Fourth sampling visit – 03 February 2025: Repeat sampling of Castle Brook 75 m upstream of the Site was completed at the same sampling location used on the 10 September 2024.

Sampling protocol: On the first, second and fourth sampling events, surface water was collected direct from the mid-point of the channel using PFAS suitable sampling media with samples held in cool boxes chilled to below 4°C.

On the third sampling event, the surface water was collected direct from the mid-point of the channel using PET containers that, under previous analysis, had been deemed suitable for PFAS but, through changes to the analytical method and miscommunication with the testing laboratory (confirmation was sought from a separate testing laboratory within the company, that confirmed PET containers were suitable).

With respect to the use of PET containers, the laboratory was unable to confirm whether PFAS concentrations would be over or under-reported. As before, the samples held within cool boxes chilled to below 4°C.

4.7 Groundwater Sampling

Following the initial Site visit and surface water sampling on 05 June 2024, the presence of the spring points on the eastern edge of the Site were earmarked for sampling to better understand how the quality of the water emerging from these locations fed into the Site's surface water and groundwater regime.

Following the first round of spring water sampling (08 July 2024; only Spring 1 was flowing enough to sample) an additional round of spring water sampling was completed (10 October 2024) where sampling from two on-Site springs (Spring 1 and Spring 2) was completed with sampling also conducted from a third spring that discharges into Castle Brook ~75 m downstream of the Site (Spring 3).

No further sampling of the groundwater from the existing monitoring wells was completed given the sufficiency of the existing dataset (confirming the presence of PFAS in groundwater beneath the Site), together with the findings of the spring water analysis on and off Site, to inform an assessment of the fate and transport of PFAS.

Additional sampling of spring water was completed on 03 February 2025 at the third spring (Spring 3) and at the fourth spring (Spring 4) 75 m upstream of the Site. The inclusion of sampling from Spring 4 was to further investigate concentrations of PFAS within the bedrock aquifer up-gradient (hydraulic gradient) of the Site.

ⓘ ***Spring line:*** *It is important to note that, the selection 'spring' sampling locations was based on both; the viability of obtaining samples (safety, flow rate) and their location (either on Site – Spring 1 and Spring 2 – or sufficiently far from the Site to not be hydraulically connected – Spring 3 and Spring 4). However, the emergence of groundwater from the ground around this elevation (within all trial pits excavated along the embankment base) is continuous and representative of a 'spring line'. The more discrete emergence of groundwater at these 'spring' points is likely due to the presence of more permeable zones, e.g. fissures, (secondary porosity expecting to be dominating within this aquifer).*

This spring line has, in parts of the Site (locally to the 'spring points') been temporarily exposed as part of the demolition works and, once construction works are completed, will be recovered as part of land raising works as well as captured within a groundwater management system (toe-drain) that outfalls to Castle Brook under a Discharge Consent (to be agreed).

4.8 Soil Sampling

First sampling visit – 10 October 2024: Further to the soil sampling completed as part of the existing ground investigation, additional machine excavated trial pits were advanced across the Site to facilitate sampling of soils in select locations as detailed below.

The sampling was completed to better understand the fate and transport of PFAS and, more specifically with respect to this scenario, if and where the Site soils represented a source of PFAS.

Sampling protocol: In advance of the sampling commencing, a field blank was placed in the central portion of the Site, later collected and sealed on completion of the sampling. During the sampling visit the weather was generally dry with a light hail shower towards the end of the day with evidence of hail having landed in the field blank.

The use of a 36 tonne excavator permitted soil samples to be obtained directly from the bucket at the required depth intervals, limiting the potential for cross-contamination (if obtained from the spoil heap).

Samples were obtained within sampling media provided by the analytical laboratory.

Sampling locations: are explained below:

Sampling location	Feature Targeted	Rationale
TP201	Former filter beds (lower portion of the Site) – where historic wastes may have been deposited	Samples from the shallow (1.50 m depth; recently worked) and deeper (3.00 m depth; historic) **Made Ground** were obtained to confirm the presence/absence of PFAS compounds within these two materials

TP202	Borehole M4 – where the highest concentrations of PFOA were recorded within groundwater	Samples from the shallow (1.50 m depth; historic) **Made Ground** and deeper (2.00 m depth) **natural bedrock** deposits were obtained to confirm the presence/absence of PFAS compounds within these two materials. *Deeper sample test result not returned by analytical laboratory.*
TP203	Base of the eastern embankment where spring water is emerging	Samples from the shallow (0.75 m depth) **natural bedrock** deposits were obtained to confirm the presence/absence of PFAS compounds within this material
TP204	Former reservoir (lower portion of the Site) – where historic wastes may have been deposited	Samples from the shallow (1.50 m depth; historic) **Made Ground** and deeper (2.50 m depth) **natural bedrock** deposits were obtained to confirm the presence/absence of PFAS compounds within these two materials
TP205	Background concentrations on upper level – no feature targeted	Samples from the shallow (1.00 m depth; historic) **Made Ground** and deeper (2.20 m depth) **natural bedrock** deposits were obtained to confirm the presence/absence of PFAS compounds within these two materials
TP206	Former reservoir (upper portion of the Site) – where historic wastes may have been deposited and directly above 'Spring 1'	Samples from the shallow (1.00 m depth; historic) **Made Ground** and deeper (2.60 m depth) **suspected natural bedrock** deposits were obtained to confirm the presence/absence of PFAS compounds within these two materials

Second sampling visit – 03 February 2025: Following the first round of trial pitting and sampling detailed above, additional machine excavated trial pits were advanced across the Site to facilitate further sampling of soils.

The sampling was completed at the request of the Environment Agency to offer further confidence in relation to the potential presence of PFAS across the Site with low concentrations (27.5 µg/kg) of PFOA detected within TP206.

Sampling protocol: A total of 39 additional soil samples were obtained from 19 machine excavated trial pits (TP301 to TP319) at varying depth intervals in a broadly spatial, systematic pattern across the upper and lower portions of Site.

Sample depth intervals aimed to reflect a Cartesian sampling arrangement with intermediary depths across trial pit locations offering as close to a 3D spatial coverage of the soils across the Site.

Where sample depths were repeated across adjacent trial pit locations, e.g. TP301 and TP302, the layer thicknesses of the material within the ground guided sampling at the same depth intervals with a concurrent objective of characterising the chemical quality (with respect to PFAS) of the different materials encountered across the Site (noting the soils across the Site are themselves spatially variable).

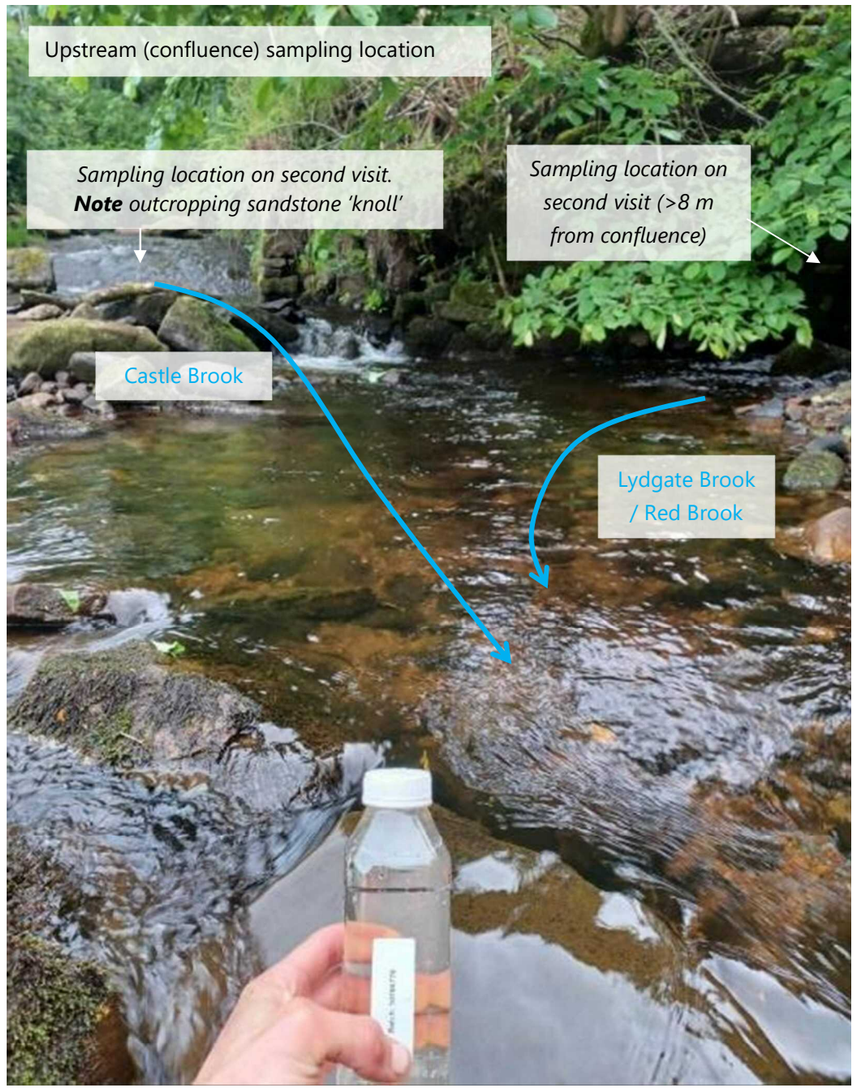
Specific targeting was included within the sampling strategy including: i) the upper level of the Site (TP301 to TP308) that lies topographically above the spring line along the eastern boundary of the Site; ii) 'delineation of TP206 (TP301 to TP303) where PFOA was detected as part of the previous round of soil sampling and analysis; iii) the former mill race (TP310); and, iv) locations in close proximity to the main, surface water flowpaths for the spring water (TP313 and TP316). No sampling below groundwater was encountered due to the confirmed presence of PFAS.

The repeat use of a 36 tonne excavator permitted a continuity in the sampling procedure from the previous round of fieldworks.

Samples were obtained within sampling media provided by the analytical laboratory and stored below 4°C until collected by the laboratory.

Sampling depths, materials sampled and locations: are detailed below and mapped on the Ground Model (page 25):

Sampling Location	Depth (m)	Material Sampled	PFAS (µg/kg)
TP301 *Upper reservoir*	0.50	Dark purplish brown ashy BRICK FILL	5.1 PFOS
	1.00	Dark greyish brown REWORKED NATURAL FILL	ND
	2.00	Silty sandy gravel RESIDUAL SOIL	ND
TP302 *Upper reservoir*	0.25	Dark grey ASH FILL	6.8 PFOA
	1.00	Multi-coloured very sandy silt REWORKED NATURAL FILL	ND
	1.50	Silty sandy gravel RESIDUAL SOIL	ND
TP303 *Upper reservoir*	0.25	Dark purplish brown ashy BRICK FILL	30.1 PFOA
	1.00	Dark grey ASH FILL	2.7 PFOA
	1.50	Silty sandy gravel RESIDUAL SOIL	ND
TP304	0.75	Dark greyish brown ashy BRICK FILL	1.4 PFOA
	1.50	Silty sandy gravel RESIDUAL SOIL	1.2 PFOA
TP305	0.50	Brown SANDSTONE and BRICK FILL	1.5 PFOA
	1.10	Silty sandy gravel RESIDUAL SOIL	ND
TP306	0.25	Dark grey ASH FILL	ND
	0.75	Silty sandy gravel RESIDUAL SOIL	ND
TP307	0.25	Dark grey ASH FILL	1.5 PFOS
	0.50	Silty sandy gravel RESIDUAL SOIL	ND
TP308	0.25	Dark greyish brown ashy BRICK FILL	2.1 PFOS
	0.50	Silty sandy gravel RESIDUAL SOIL	1.4 PFOA
TP309	0.50	Brown SANDSTONE and BRICK FILL	ND
	1.50	Brown SANDSTONE and BRICK FILL	ND
TP310 *Mill race*	0.25	Light yellowish brown SANDSTONE FILL	ND
	1.00	Light yellowish brown SANDSTONE FILL	ND
	2.00	Dark greyish brown ashy BRICK FILL	ND
TP311	-	No sample obtained; shallow groundwater encountered	-
TP312	0.50	Light yellowish brown SANDSTONE FILL	ND
	1.00	Dark greyish brown ashy BRICK FILL + ceramics	2.2 PFOA
	1.20	Dark greyish brown ashy BRICK FILL + metal fragments	ND
TP313 *Spring water pathway*	0.25	Dark greyish brown ashy BRICK FILL	4.6 PFOA
	0.75	Dark greyish brown ashy BRICK FILL	1.4 PFOA
TP314	0.50	Light yellowish brown REWORKED SANDSTONE	ND
TP315	0.50	Light yellowish brown REWORKED SANDSTONE	ND
TP316 *Spring water pathway*	0.50	Dark grey ASH FILL	2.7 PFOA
	1.00	Dark greyish brown ashy BRICK FILL	ND
TP317	0.25	Dark greyish brown ashy BRICK FILL	ND
TP318	0.30	Orangish brown cobbles REWORKED RIVER TERRACE	1.8 PFOS
	0.60	Light brown gravelly cobbles RIVER TERRACE DEPOSITS	ND
	0.90	Light brown gravelly cobbles RIVER TERRACE DEPOSITS	1.6 PFOS; 1.2 PFOA
TP319	0.50	Brown silt FILL	9.7 PFOA
	1.00	Brown silt FILL	ND



Photograph 7 ← Confluence sampling location with discrete sampling within each watercourse also completed.





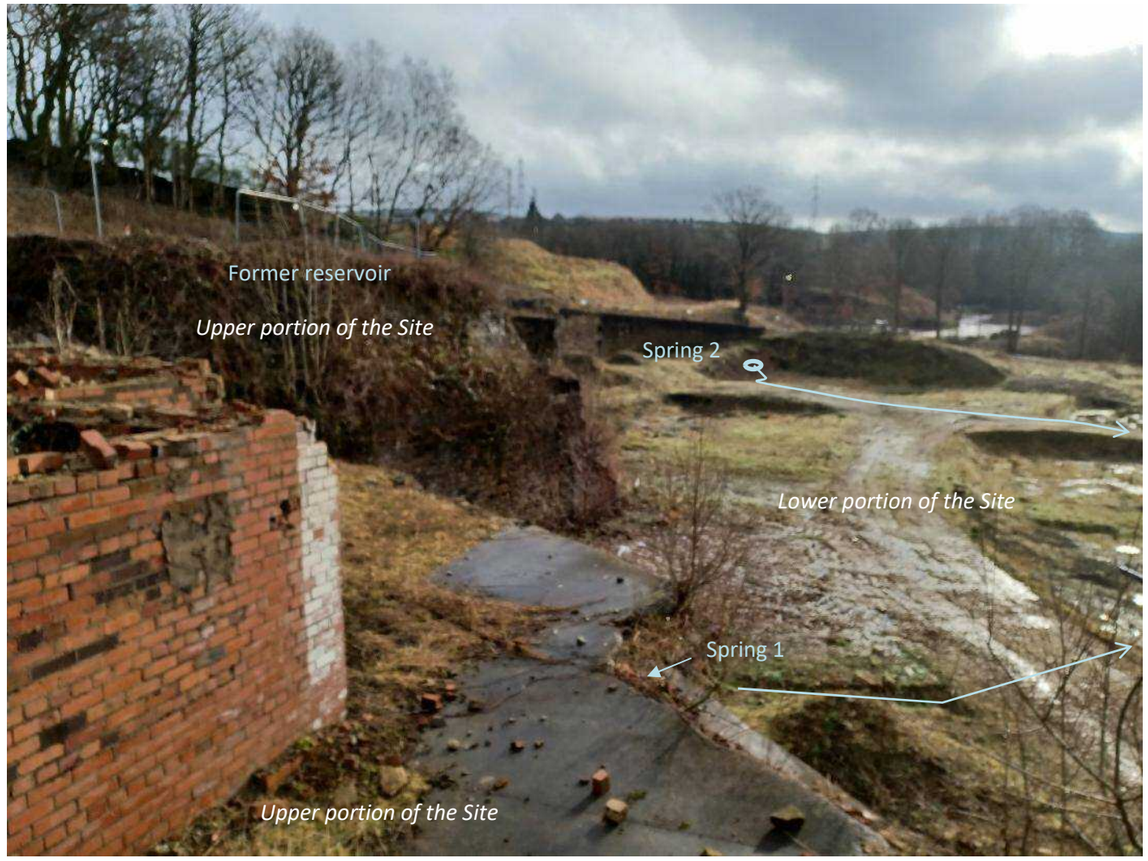
Photograph 8 ↑ Field blanks for TOP Assay samples – hail drops evident on the post-sampling pot.



Photograph 9 → Spring 3 sampling location – water is flowing at a fast rate and low volume off the roof of this small opening (natural) in the stream sidewall. Castle Brook is flowing 1 m behind the photographer.



Photograph 10 Fluorescein dye tracer testing within M3 (03 February 2025)



Photograph 11 General arrangement of the Site with relative position of springs and reservoir illustrated



Photograph 12 General arrangement of the upper portion of the Site illustrating outcropping sandstone

4.9 Laboratory Analysis – First and Second Rounds of Additional Analysis – 05 June 2024 & 08 July 2024

Environmental samples (surface water and 'spring water') were obtained from the locations detailed within Section 4.4, Section 4.5, Figure 8 and the Ground Model – Plan in Section 5.0.

Sample collection by a UKAS accredited laboratory was scheduled for the following morning (within 12 hrs) to limit the potential for sampling error, e.g. degradation of sample through microbial activity.

The samples were scheduled for the same suite of analysis adopted by TJBA within their existing monitoring programmes to support an assessment of temporal variation in the chemical concentrations.

First round of surface water sampling: The analysis suites selected for testing on the first round of monitoring included:

Sulphate as SO_4	USEPA16 PAH	PFOS and PFOA

Whilst the rationale for the selection of these compounds was not stated within earlier ground-related reporting, it is inferred that the selection was because:

i) These compounds were markers of inorganic (sulphate), organic (PAHs) and emerging (PFAS) pollutants.

ii) These compounds were recorded elevated against the respective threshold concentrations as part of the groundwater monitoring completed on the Site, i.e. there appears to be a 'source' of the respective compounds within the groundwater beneath the Site that stands to present an unacceptable risk to surface water (the receptor) for which monitoring of chemical quality is warranted.

Second round of surface water sampling and spring water (groundwater) sampling: The analysis suites selected for testing on the second round of sampling included:

PFOS and PFOA

Whilst not the only chemical of concern, PFOS and PFOA were selected for repeat sampling given:

i) The comparatively elevated concentrations of these compounds recorded within groundwater beneath the Site (PFOA; 0.61 µg/l) relative to the Environment Agency's stated target concentrations (Annual Average Environmental Quality Standard; 0.00065 µg/l).

ii) The emerged trend of sulphate and PAH fate and transport with the comparatively high concentrations recorded within the groundwater beneath the Site (maximum concentrations of 473,000 µg/l and 0.09 µg/l for sulphate and benzo(a)pyrene {as a marker of PAHs} respectively) not appearing to be carried across into the surface water (maximum concentrations of 7,300 µg/l and <0.01 µg/l for sulphate and benzo(a)pyrene {as a marker of PAHs} respectively).

iii) To allow temporal trends in this key chemical of concern to be better understood.

Sulphate was excluded from the testing schedule given concentrations on the first found of monitoring indicated a possible, marginal increase in concentration downstream but were in line with those concentrations recorded during earlier visits.

Similarly, PAHs were excluded from the testing schedule given non-detectable concentrations (Method Detection Limit of 0.01 µg/l) were recorded across all three sampling locations. Again, this was consistent with the findings of the earlier sampling completed by TJBA and therefore considered to offer a more representative impression of PAH concentrations within the surface water course.

Key findings from this these first and second rounds of additional laboratory analysis included:

> A repeated trend of below detection levels of PAHs across the upstream, midstream and downstream samples.

> A repeated trend of generally 'stable' concentrations of sulphate across the upstream, midstream and downstream samples.

> A repeated trend of generally 'stable' concentrations of PFAS across the upstream, midstream and downstream samples during the first sampling visit (noting that previous reporting reported a decrease in concentrations whereas this additional sampling suggests a slight increase).

> Markedly different concentrations of PFAS compounds within Castle Brook comparted to Lydgate Brook / Red Brook suggesting the former is more heavily impacted by PFAS compounds upstream of the Site.

> A repeated trend of 'background' concentrations of PFAS within surface water upstream of the Site being up to 61 times higher than the Annual Average Environmental Quality Standard (0.00065 µg/l).

> Markedly elevated concentrations of PFAS compounds within the spring water emerging on the eastern boundary of the Site (two times higher than the average concentration within the groundwater on Site).

> A repeated trend of 'stable' concentrations of PFAS across the upstream, midstream and downstream samples during the second sampling visit noting concentrations of PFAS upstream were twenty times higher and further downstream ten times higher. These 'spiked' concentrations of PFAS upstream and downstream of the Site are likely due to the Site effectively 'buffering' (dilution with rainwater recharge) the PFAS concentrations in the spring water that, upstream and downstream of the Site, is discharging directly into the watercourse.

These findings are presented within Figure 8 and represented on the Ground Model within Section 6.0.

Further commentary on these findings is included within the Risk Assessment (Section 6.0).

4.10 Laboratory Analysis – Third Round of Monitoring – 10 October 2024

Environmental samples (soil, surface water and 'spring water') were obtained from the locations detailed within Section 4.4, Section 4.6, Figure 8 and the Ground Model – Plan in Section 5.0.

Sample collection by a UKAS accredited laboratory was scheduled for the following morning (within 12 hrs) to limit the potential for sampling error, e.g. degradation of sample through microbial activity.

The samples were scheduled for PFAS specific analysis with the testing for monohydric phenols scheduled following sampling and collection as a 'quick check' on phenol contents. It is noted that the sampling media (PET bottles) was not suited to phenol analysis and therefore the results (all below detection) may not be representative.

The soil sampling: The compounds selected for testing of all soil samples obtained as part of this round of trial pitting fieldworks (TP201 to TP206) included:

Total Oxidisable Precursor (TOP) Assay

This suite of analysis was selected to both screen the soils sampled (Made Ground and natural bedrock) for the presence or absence of PFAS (pre-oxidation) and, where present, to support forensic analysis of the source, or sources, of PFAS, e.g. does spring water PFAS originate from the same precursor as any PFAS encountered within the soil.

Third round of surface water sampling: The analysis suites selected for testing on the third round of monitoring (Castle Brook 75 m upstream of the Site) included:

PFAS DWI 47

This suite of analysis was selected to better understand the wider composition of PFAS compounds within Castle Brook, building on the analysis of PFOA and PFOS completed on the previous rounds of monitoring.

The spring water (groundwater) sampling: The compounds selected for testing of the soils on Site included:

Spring 1 (on-Site) >>>	Total Oxidisable Precursor (TOP) Assay
Spring 2 (on-Site) and Spring 3 (off-Site) >>>	PFAS Drinking Water Inspectorate (DWI) 47

The TOP Assay analysis was selected on Spring 1 given the confirmed presence of PFOA and PFOS within the water and to support forensic analysis of the source or sources of PFAS. To date, the data from this analysis has not been supplied however, based on the other lines of evidence, is not considered critical to the overall understanding of the fate and transport of PFAS.

The extended DWI 47 suite of analysis was selected to better understand the wider composition of PFAS compounds within the spring waters, building on the dataset obtained as part of previous rounds of monitoring.

Key findings from this this third round of additional laboratory analysis included:

> A single detection of PFAS within the soils (Made Ground and natural bedrock deposits; 11 samples in total) in sampling locations where PFAS, if present, was more likely to be encountered. This single detection related to the shallow Made Ground deposits within TP206 (0.50 m sample depth) on the upper level of the Site (the location of the former reservoir) where PFOA was recorded at 27.5 µg/kg.

> Highest PFOA concentrations confirmed within 'Spring 2' located on the eastern edge of the Site confirming a second location (after Spring 1) where PFAS impacted groundwater is draining onto, and into, the Site.

> Markedly higher concentrations of PFOA upstream of the Site within Castle Brook (0.097 µg/l compared to a previous 'high' of 0.044 µg/l) suggesting a factor 2 dilution of PFOA concentrations down Castle Brook. This finding needs to be viewed in the context of otherwise 'stable' concentrations of PFOA within Castle Brook as it flows alongside the Site and the subsequent increase in PFOA concentrations further downstream of the Site.

  Based on the overall trend in groundwater flow patterns in this catchment, this finding is suggestive of the soils present across the Site acting as a 'buffer' to otherwise higher concentrations of PFOA directly discharging into Castle Brook where the watercourse is bordered by rock outcrops and spring flows. It is likely that groundwater emerging from the spring-line on the Site's eastern embankment is draining into the Made Ground and natural soils across the Site and being diluted by effective rainfall falling across this area (retardation likely minimal).

  The correlation between the spring water flow paths (Ground Model – Plan; Section 5.0) and the higher concentrations of PFOA within the groundwater (borehole M4) further supports this analysis.

> Elevated concentrations of PFOA within Spring 3 (0.24 µg/l) that is sufficiently far from the Site to not be hydraulically connected further confirming the presence of elevated concentrations of 'ambient' PFAS within the bedrock aquifer higher up the hydraulic gradient. This finding offers an additional line of evidence that the primary, identifiable 'source' of PFAS lies off-Site and, based on the groundwater regime, at higher topographical elevations to the Site.

  For completeness, it is noted that, in having become impacted by the PFAS containing spring water the groundwater beneath the Site has itself become impacted and therefore, in strict terms, becomes a 'source' of PFAS.

  It is however, considered more useful to consider the groundwater beneath the Site as a continuation of the spring water flows (from Spring 1 and Spring 2 but more significantly, from a continuous spring-line along the full eastern boundary of the Site) that are both: i) draining overland across the Site where flow rates are greatest (Spring 1 and Spring 2) within silt-laden channels; and, ii) draining to ground on the eastern boundary of the Site (where the water table emerges at the ground surface) percolating through the variably but generally high permeability Made Ground and natural soil deposits, and the flowing over the bedrock surface before discharging into Castle Brook. These principles are conceptually illustrated in Figure 8.

  These flows were known about at the point in time when Sladen Mill was constructed with 'weep holes' constructed into the retaining wall that runs along part of the eastern edge of the Site. In having been temporarily exposed as part of the demolition works but no evidence of drainage infrastructure reported, it is likely that these flows were previously 'buried' beneath the Site directly into Castle Brook; pathways that, if present, have subsequently been destroyed through the action of demolishing Sladen Mill. Equally, this water may have been allowed to simply 'soakaway' and drain to ground when Sladen Mill was constructed.

These findings are presented within Figure 8 and represented on the Ground Model within Section 5.0.

Further commentary on these findings is included within the Risk Assessment (Section 6.0).

4.11 **Laboratory Analysis –** Fourth Round of Monitoring – 03 February 2025

Environmental samples (soil, surface water and 'spring water') were obtained from the locations detailed within Section 4.4, Section 4.6 (including table of results), Figure 8 and the Ground Model – Plan in Section 5.0.

Sample collection by a UKAS accredited laboratory was scheduled for the following morning (within 12 hrs) to limit the potential for sampling error, e.g. degradation of sample through microbial activity.

The samples were scheduled for PFAS specific analysis based on the Environment Agency's specific request for further confidence in relation to the potential presence of PFAS in soils across the Site.

The soil sampling: The compounds selected for testing of all soil samples obtained as part of this round of trial pitting (TP301 to TP319) included:

Total Oxidisable Precursor (TOP) Assay	PFAS Standard Suite 17

This suite of analysis was selected to both screen the soils sampled (Made Ground, natural soils and natural bedrock) for the presence or absence of PFAS with TOP Assay analysis scheduled on randomly selected but spatially distributed samples from the Made Ground.

Fourth round of surface water sampling: The analysis suite selected for testing of Castle Brook 75 m upstream of the Site included:

PFAS Standard Suite 17

This suite of analysis was selected to obtain additional confidence in the upstream concentrations of PFAS and as a comparison against the spring water quality (discharging into the water course at this point).

The spring water (groundwater) sampling: The compounds selected for testing of the soils on Site included:

Spring 3 (75 m downstream) >>>	PFAS Standard Suite 17
Spring 4 (75 m upstream) >>>	PFAS Standard Suite 17

Key findings from this this fourth round of additional laboratory analysis included:

> The detection of PFAS within 17 of the 39 soil samples scheduled for analysis noting that, any samples obtained from the lower portion of the Site stand to have been compromised by PFAS impacted groundwater / spring water flows (7 out of the total 17 positive detections of PFAS) that periodically 'flood' large areas of the Site.

> Across these 17 positive detections, only PFOA (12) and PFOS (5) were detected (of the 17 PFAS compounds tested for) emphasising that main chemical of concern is PFOA.

> Across the total 50 soil samples tested for PFAS, PFAS has been detected within 18 samples (36 %) or, 11 samples (22 %) when removing the data relating to the lower portion of the Site that, as noted above, stand to have been compromised by PFAS impacted spring water infiltrating through the Site's soils.

> With respect to the Site soils being impacted by PFAS impacted spring water, TP313 and TP316 were positioned close to main surface water flow paths for the spring water. As anticipated, PFOA was detected in both these locations suggesting that periodically higher flow rates from the two main spring points on Site are likely leading to localised flooding of these area with PFAS impacted spring water that in turn is resulting in residual concentrations remaining in the soils locally to these hole positions.

> Across the total 18 positive detections of PFAS the following statistics are reported (all values in µg/kg):

	PFOA	PFOS
Average	1.89	0.24
Max	30.10	5.10
Min	0.00	0.00
Stdev	5.85	0.85
StErr	0.83	0.12
UCL 95	3.55	0.24
LCL 95	1.89	0.24

> When excluding the comparatively higher concentrations of PFAS recorded within TP206 and TP303 (treating this area as a localised 'hotspot'), the following statistics are reported (all values in µg/kg):

	PFOA	PFOS
Average	0.77	0.25
Max	9.70	5.10
Min	0.00	1.00
Stdev	1.87	0.87
StErr	0.27	0.13
UCL 95	1.31	0.25
LCL 95	0.77	0.25

> Across all PFAS soil data, the concentrations are 'low' and, whilst strictly representing a 'source' of potential pollution, based on these overall low concentrations and overall trend of reducing concentrations with depth (Figure 6) and the low concentrations (overall mass of PFAS) relative to the groundwater concentrations.

> Considering TP206 and TP303 in isolation, where the highest concentrations of PFOA in soils was recorded on Site, these detections were recorded across shallow depths only with no PFAS detected within the deeper samples in these locations. Furthermore, at the concentrations recorded they are, of themselves, 'low' (overall mass of PFAS) and are not considered credible sources of the elevated concentrations of PFAS within either the spring water or groundwater beneath the Site.

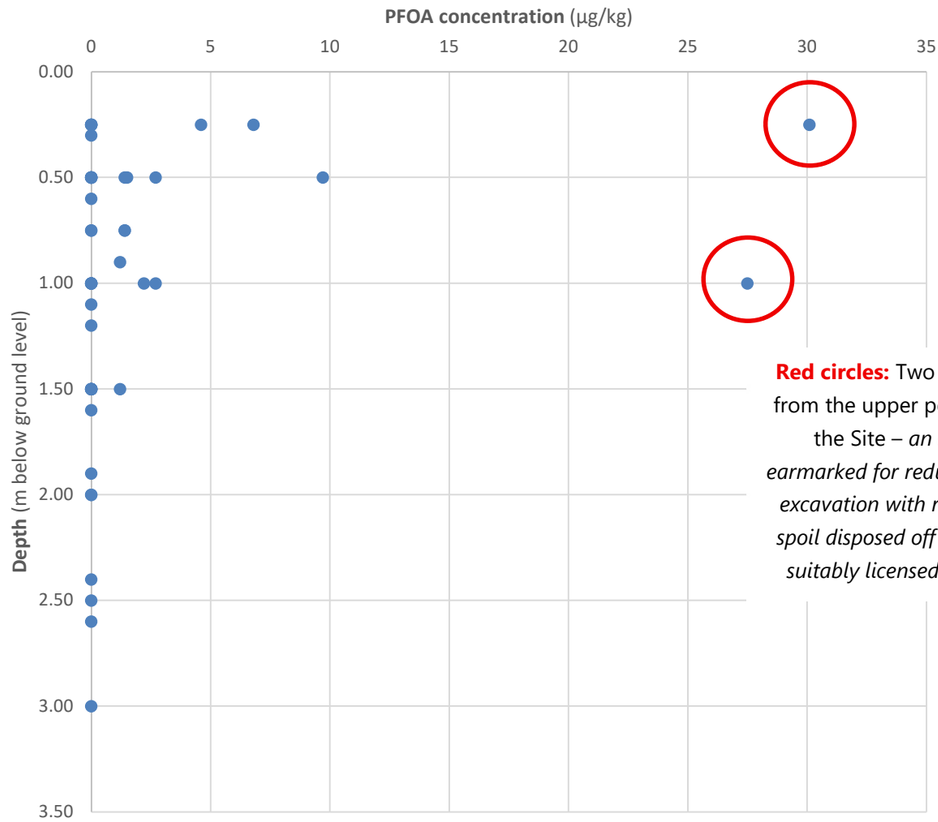
> Elevated concentrations of PFAS (mainly PFOA but also including other compounds) upstream of the Site within Castle Brook as previously recorded in October 2024

> Elevated concentrations of PFOA within Spring 3 (0.24 µg/l) and Spring 4 (0.10 µg/l) that is sufficiently far from the Site to not be hydraulically connected further confirming the presence of elevated concentrations of PFAS up-gradient of the Site within the bedrock aquifer. The confirmed presence of PFAS within Spring 4 offers an additional line of evidence that the primary, identifiable 'source' of PFAS lies off-Site and, based on the local catchment dynamics and groundwater regime, at higher topographical elevations to the Site.

> Overall, these findings are anticipated, with the presence of PFAS within the soils across the Site consistent with the high levels within the wider water catchment (lower level of the Site) and, across the upper level of the Site, potentially linked to a small volume of historically deposited PFAS containing material (locally to TP206 and TP303), e.g. hydraulic oil containing PFAS.

These findings are represented on the Ground Models within Section 5.0.

Further commentary on these findings is included within the Risk Assessment (Section 6.0).



Red circles: Two samples from the upper portion of the Site – *an area earmarked for reduced level excavation with resultant spoil disposed off Site to a suitably licensed facility*

Figure 6: Aggregated PFOA dataset (N = 50; soil data) illustrating general trend of reducing concentrations with depth

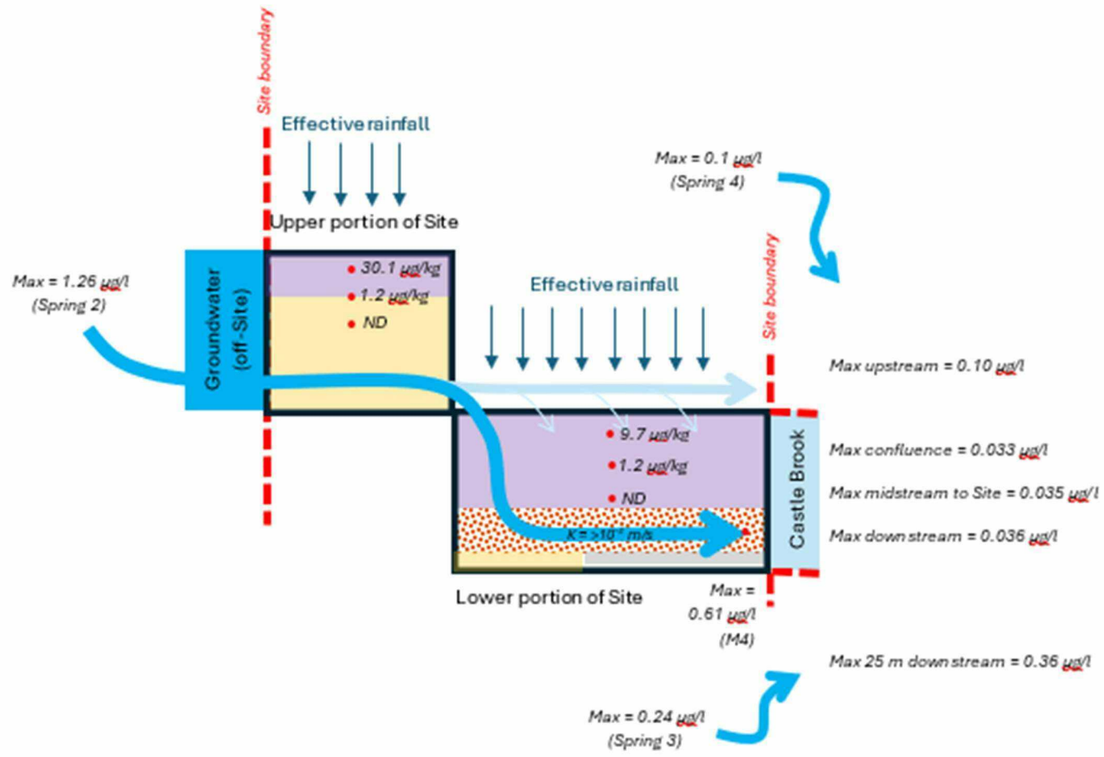


Figure 7: Compartmental model illustrating the mass flux of water through the Site where line thicknesses represent relative fluxes through the system

Sampling events (colour coordinated with graph) >		20 July 2023				05 June 2024				08 July 2024				10 October 2024			
		PFOA	**PFOS**	*Total*	*Ratio*	**PFOA**	**PFOS**	*Total*	*Ratio*	**PFOA**	**PFOS**	*Total*	*Ratio*	**PFOA**	**PFOS**	*Total*	*Ratio*
Upstream (125m; Castle Brook)	-	-	-	-	-	-	-	-	-	-	-	-	-	0.097	0.004	0.1010	4.12
Upstream (Castle Brook)	*WS7*	0.0291	0.0013	0.0304	4.47	-	-	-	-	0.044	0.00072	0.0447	1.64	-	-	-	-
Upstream (Lydgate Brook / Red Brook)	-	-	-	-	-	-	-	-	-	0.0144	0.00081	0.0152	5.63	-	-	-	-
Upstream (Confluence)	*WS6*	0.0306	0.0013	0.0319	4.25	0.0327	0.00081	**0.0335**	2.48	-	-	-	-	-	-	-	-
Midstream	*WS5*	0.0254	0.0013	0.0267	5.12	0.0346	0.00081	**0.0354**	2.34	-	-	-	-	-	-	-	-
Downstream	*WS4*	0.0248	0.0013	0.0261	5.24	0.0359	0.00089	**0.0368**	2.48	0.0323	0.00075	0.0331	2.32	-	-	-	-
Downstream (25 m)	-	-	-	-	-	-	-	-	-	0.364	0.00089	**0.3649**	0.24	-	-	-	-
Spring 1 (on-Site)	-	-	-	-	-	-	-	-	-	0.318	0.00177	**0.3198**	0.56	TBC	TBC		
Spring 2 (on-site)	-	-	-	-	-	-	-	-	-	-	-	-	-	1.255	0.001	**1.2560**	0.08
Spring 3 (75 m downstream)	-	-	-	-	-	-	-	-	-	-	-	-	-	0.236	0.002	**0.2380**	0.85

Surface water data ordered in flow direction

Groundwater data spring water

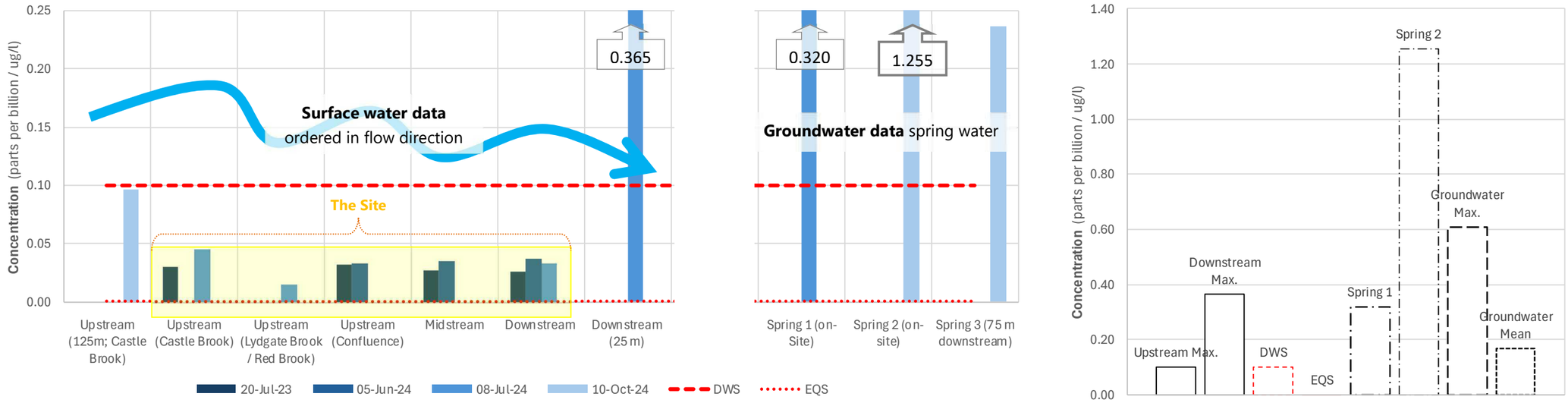
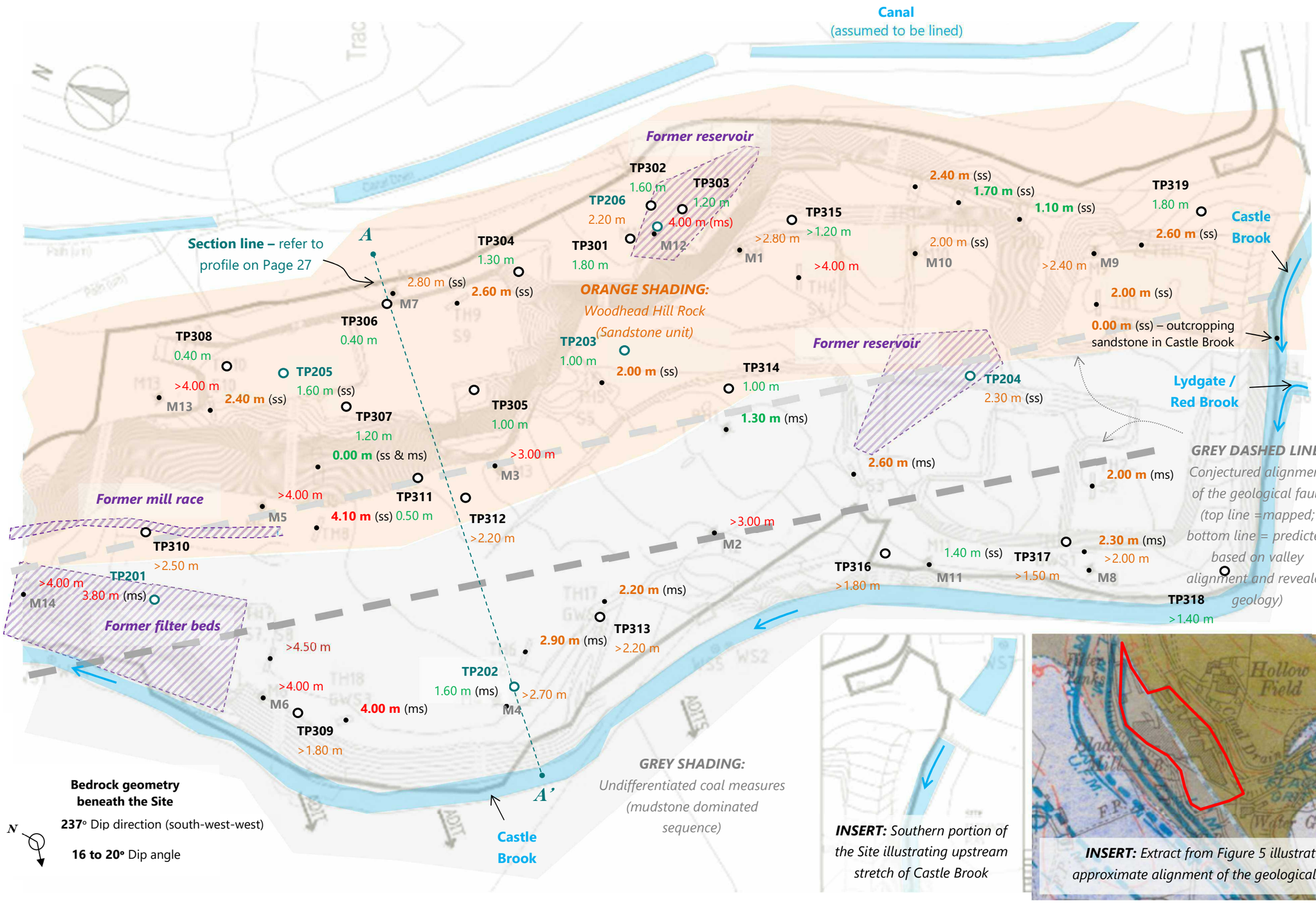


Figure 8 – Tabulated and graphical presentations of PFAS surface water monitoring data (and maximum and mean groundwater concentrations for comparison)

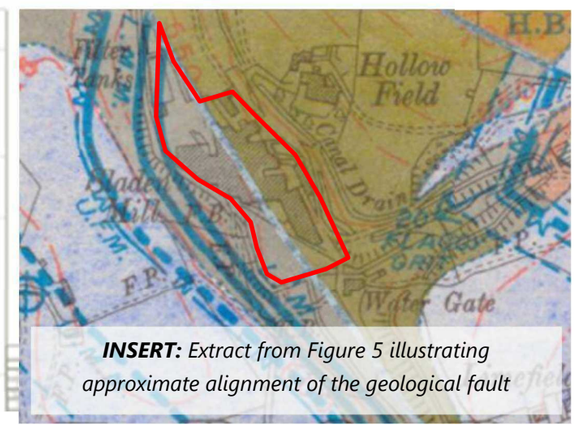
> Table: key 'maximum' concentrations highlighted light yellow

> Left hand graph illustrating spatial and temporal trends in surface water quality data compared against different 'standards'; right hand graph comparing maximum concentrations at key locations including in groundwater (GW)

5.0 **Ground Model** – Baseline (Current Condition) – Plan – Geological Setting (depth to bedrock deposits)



***INSERT:** Southern portion of the Site illustrating upstream stretch of Castle Brook*



***INSERT:** Extract from Figure 5 illustrating approximate alignment of the geological fault*

Key

Depths to bedrock and bedrock types (mudstone, ms & sandstone, ss) mapped across exploratory hole positions and colour coded based on depth ranges of:

0 to 1.99 m = 'shallow'

1.99 to 2.99 m = 'moderate'

> 2.99 = 'deep'

Bold text = bedrock confirmed

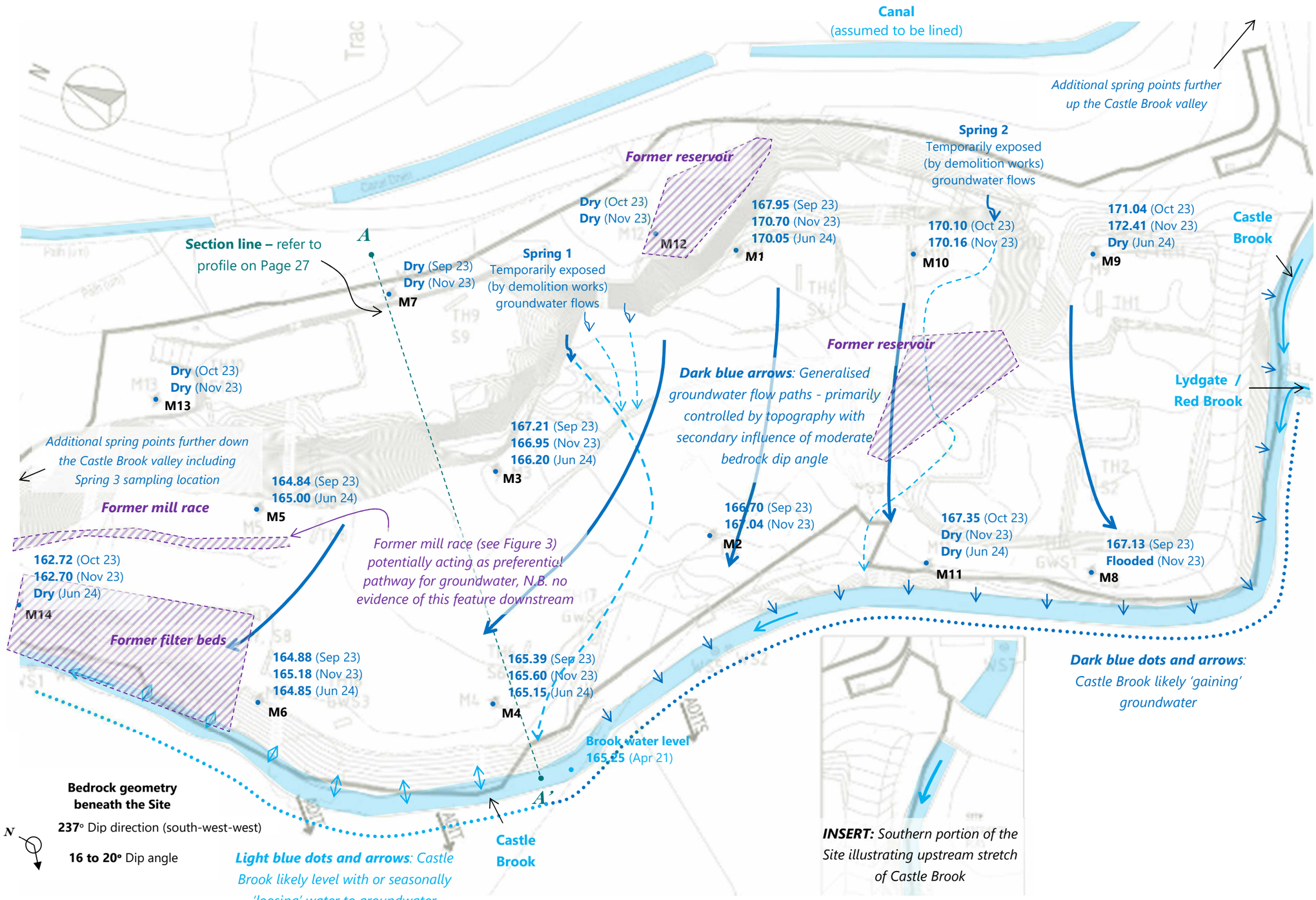
Purple = key sub-structures

- Machine excavated trial pit (October 2024)
- Machine excavated trial pit (February 2025)

Notes

1. The accuracy of the historic exploratory hole positions cannot be confirmed and should be taken as approximate (no coordinates supplied).
2. Drawing is indicative only – do not scale.

5.0 **Ground Model** – Baseline (Current Condition) – Plan – Hydrogeological and Hydrological Setting



Key

Groundwater related features illustrated in dark blue.

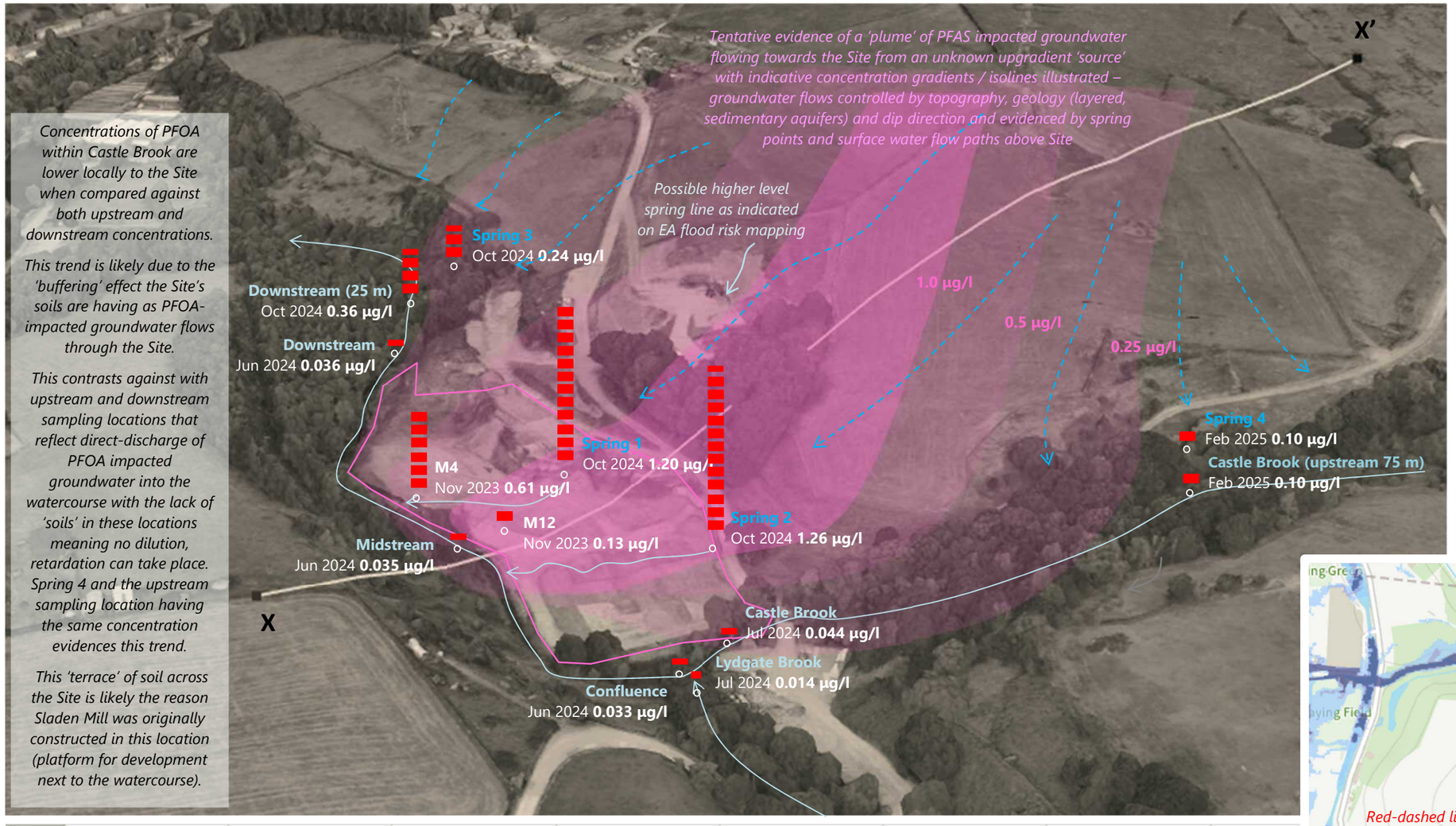
Surface water related features illustrated in light blue.

Seepage / spring points with bolder lines representing the more dominant / persistent flows (based on visual comparison across two most recent Site visits) and light blue dashed lines representing main flow paths across the Site.

Notes

1. The accuracy of the historic exploratory hole positions cannot be confirmed and should be taken as approximate (no coordinates supplied).
2. Drawing is indicative only – do not scale from drawing.

5.0 **Ground Model** – Baseline (Current Condition) – Isometric View – Spatial Distribution of maximum PFOA Concentrations Groundwater and Surface Water on Site and locally to the Site

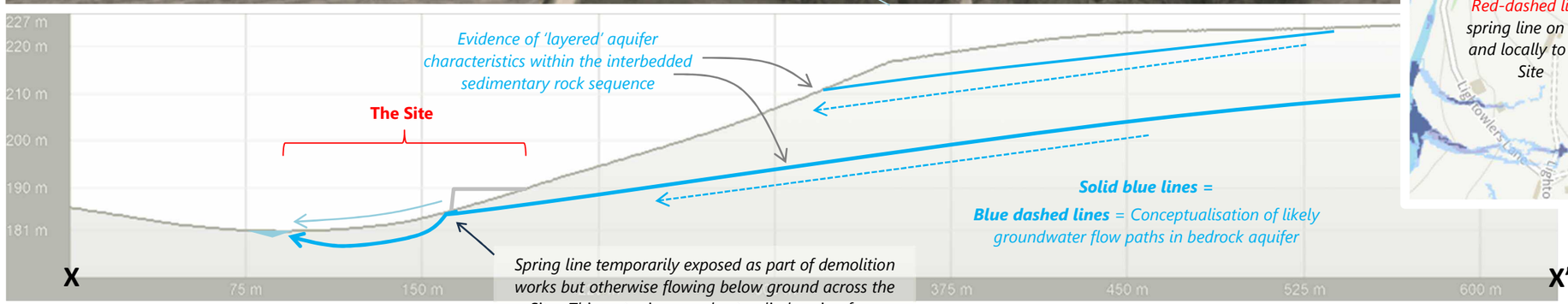


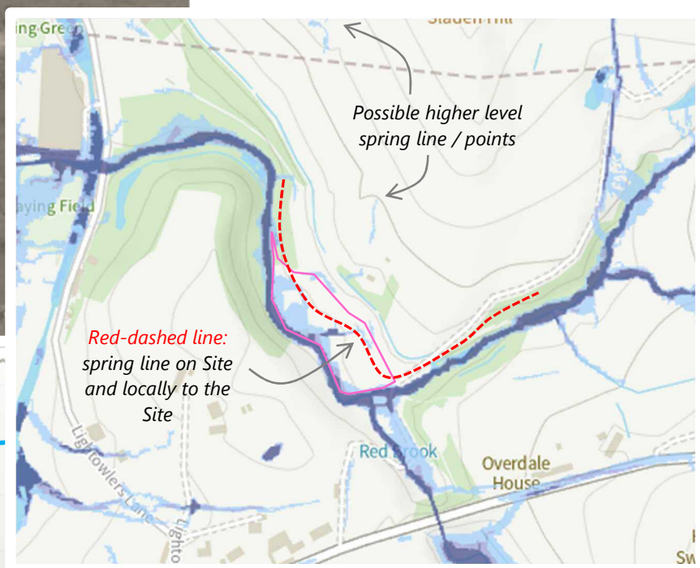
Key

Blue dashed lines = *Conceptualisation of likely groundwater flow paths in bedrock aquifer*

Light blue lines = *Surface water flow paths*

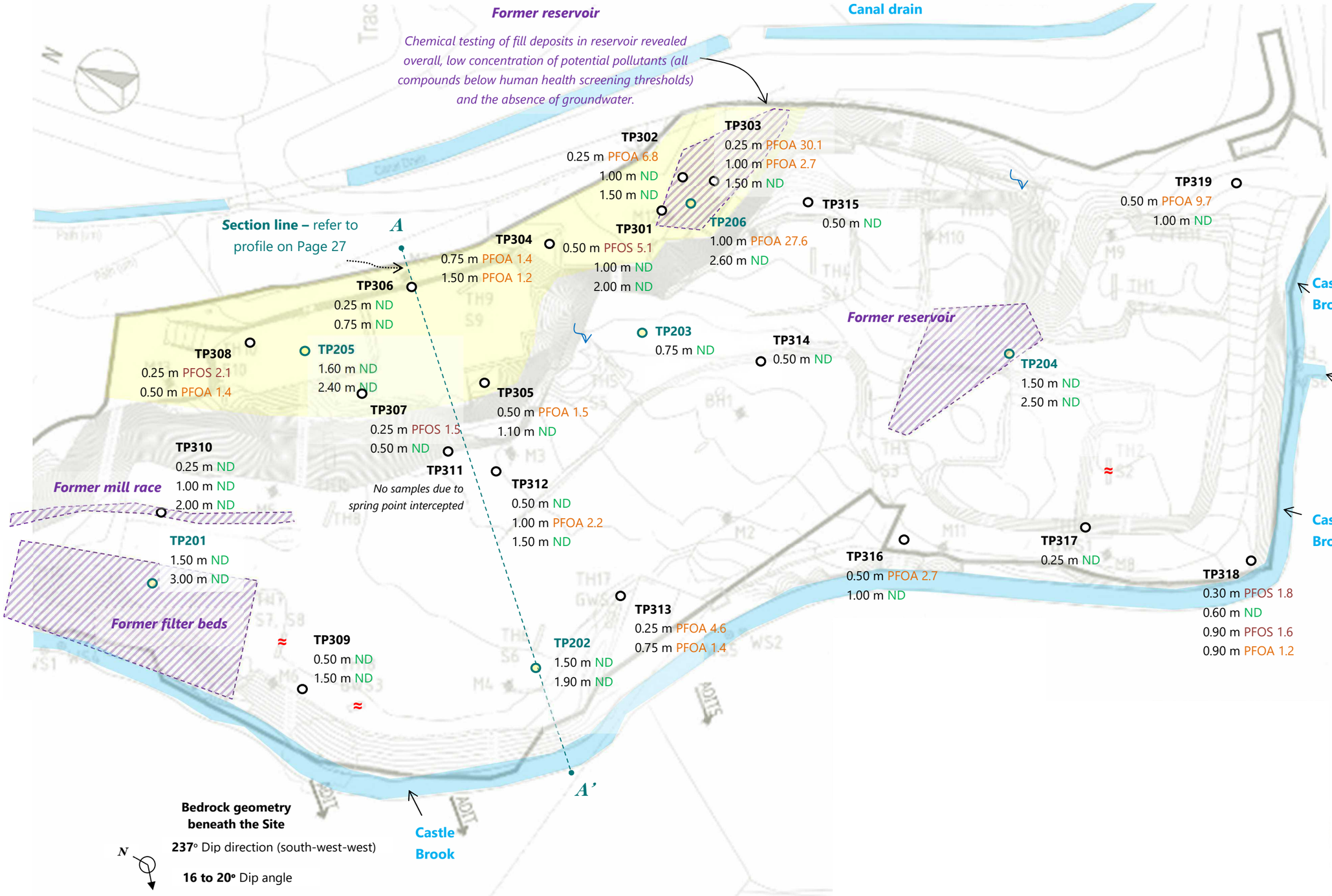
Red blocks = conceptual illustration of relative concentrations of PFOA with one 'full' block = 0.1 µg/l





Extract from Environment Agency flood mapping (surface water)

5.0 **Ground Model** – Baseline (Current Condition) – Plan – Spatial Distribution of PFOA & PFOS Concentrations in Soil on Site (refer to table in Section 4.8 also)



Key

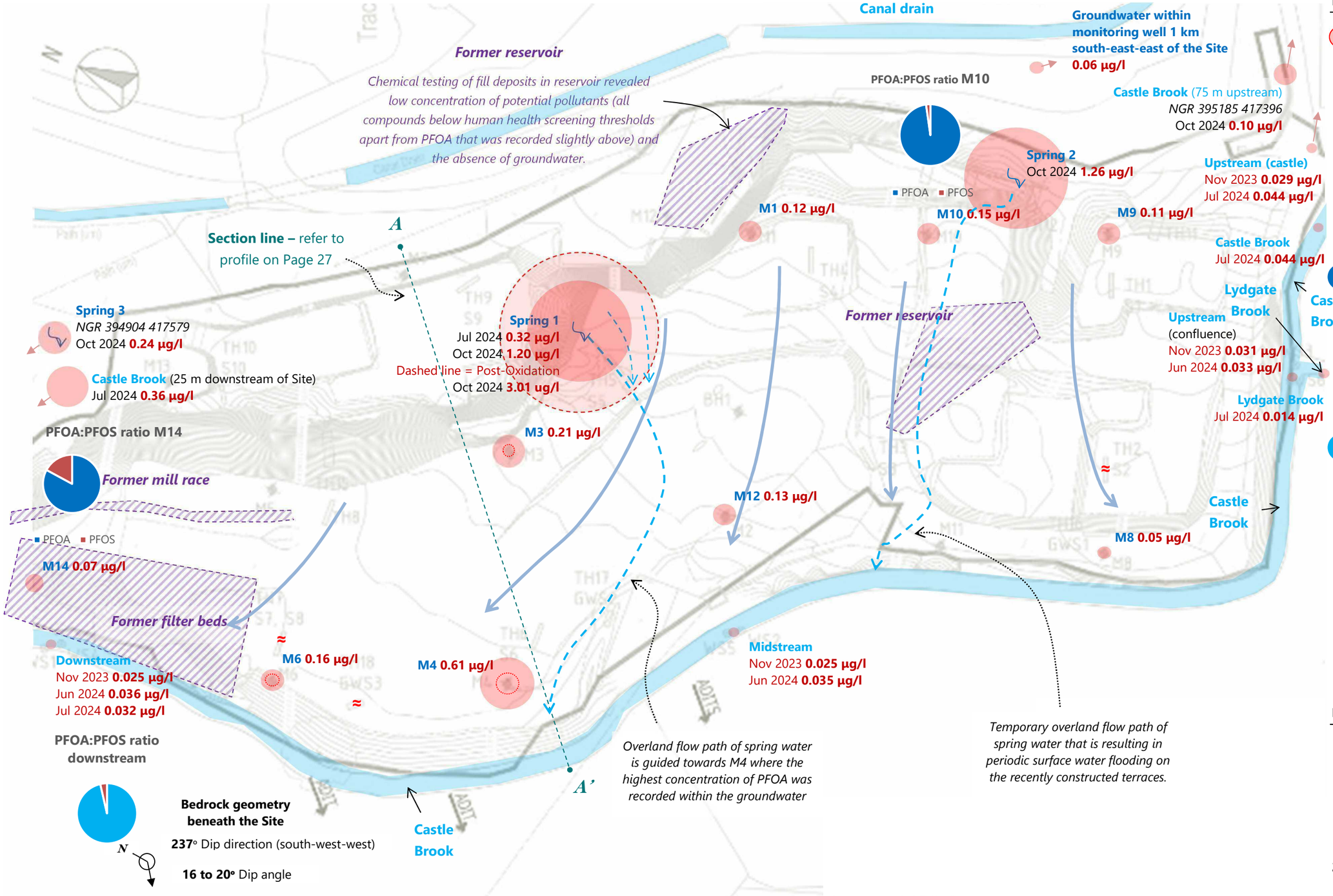
- Soil sampling location and depth (200 series holes)
- Soil sampling location and depth (300 series holes)

Category 4 Screening Level (interim) for PFOA = 7.6 µg/kg

Notes

1. The accuracy of the historic exploratory hole positions cannot be confirmed and should be taken as approximate (no coordinates supplied).
2. Drawing is indicative only – do not scale from drawing.

5.0 **Ground Model** – Baseline (Current Condition) – Plan – Spatial Distribution of PFOA Concentrations in Groundwater and Surface Water on Site and locally to the Site



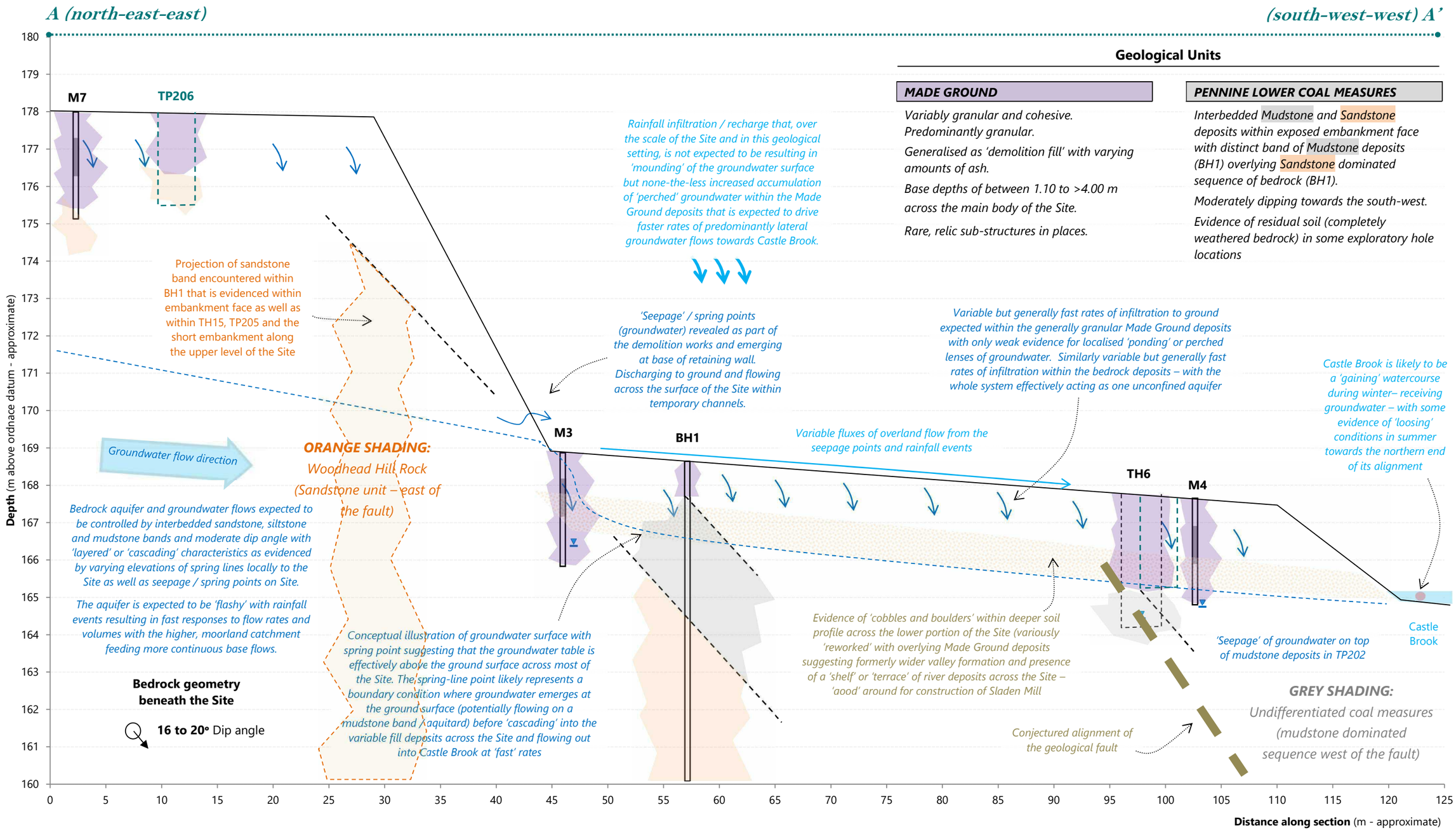
Key

- Concentration 'bubbles' scaled compared to 0.1 µg/l (Drinking Water Inspectorate standard) for relative comparison and distribution of PFOA in groundwater and surface water.
- Maximum concentration reported and represented as shaded circle with minimum concentration illustrated by dashed line.
- Average ratios of PFOA to PFOS (across all groundwater data) were 9.56% indicating the original source of PFAS is unlikely to be AFFF.
- Highest (M14) and lowest (M10) ratios illustrated on the plan.
- Average ratios of PFOA to PFOS (across all surface water data) were 3.77 % indicating the surface water source of PFAS is unlikely to be AFFF with 'slightly lower' ratios to those found groundwater.
- ≈ Evidence of NAPL as visual or olfactory marker (trial pits only)

Notes

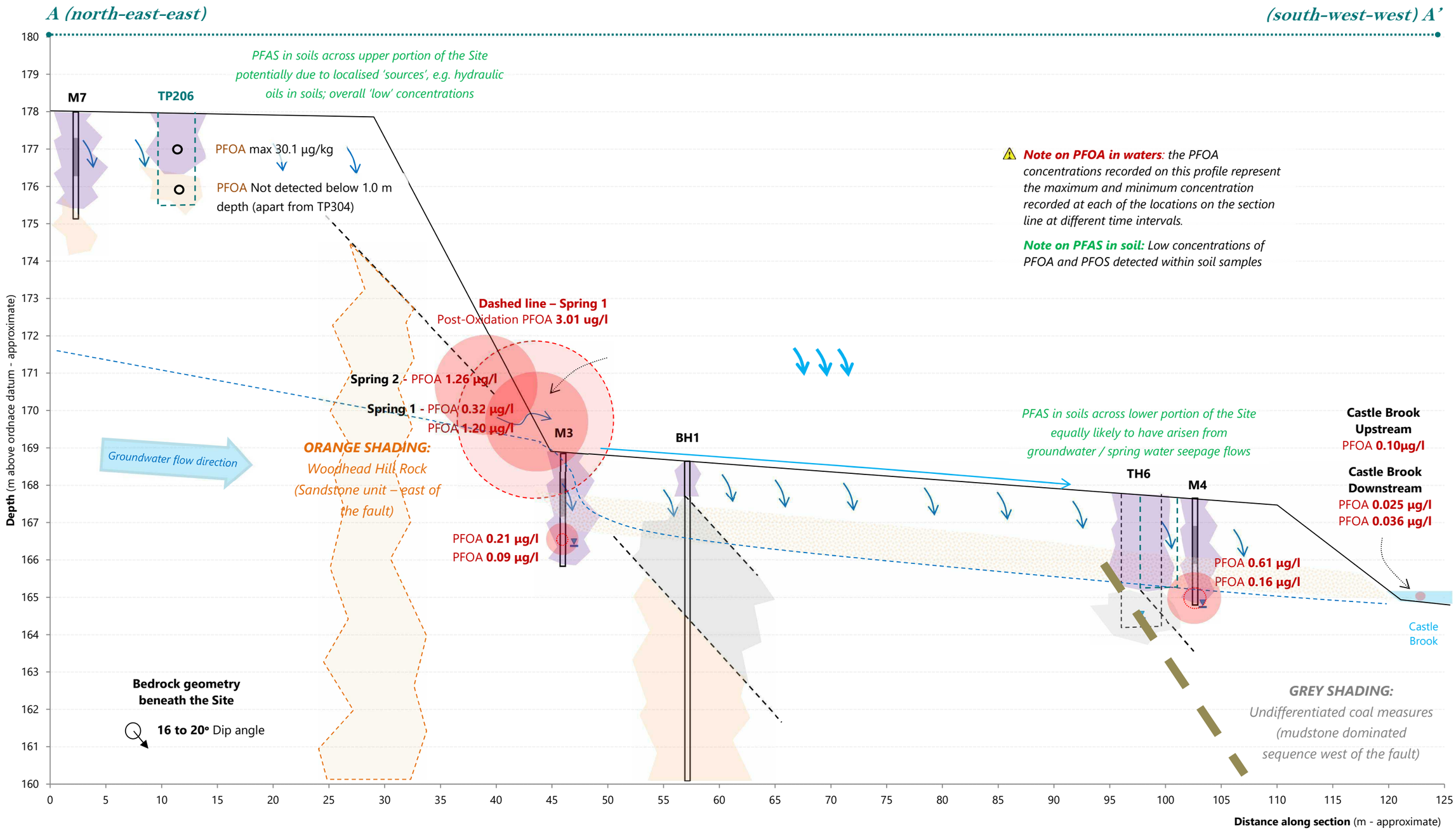
1. The accuracy of the historic exploratory hole positions cannot be confirmed and should be taken as approximate (no coordinates supplied).
2. Drawing is indicative only – do not scale from drawing.

5.0 **Ground Model** – Baseline (Current Condition) – Profile (*aligned with dip direction of bedrock*) – Focus on Geology and Hydrogeology



Illustrative / conceptual only – do not scale from drawing – note compressed horizontal axis that exaggerates dip angle

5.0 **Ground Model** – Baseline (Current Condition) – Profile (*aligned with dip direction of bedrock*) – Focus on PFAS Distribution



Illustrative / conceptual only – do not scale from drawing – note compressed horizontal axis that exaggerates dip angle

6.0 Controlled Waters Risk Assessment

ⓘ ***The Risk Management Process***

Screening for hazards is first stage of risk management; establishing whether a hazard exists (that could present a risk). The scope of this Report focuses on one specific 'historical' hazard – potentially polluting material.

Once the hazard is identified, i.e. material has been encountered that presents a potential risk of pollution, the second stage of risk management starts; establishing if the risk presented is acceptably low or not and, if not, what action is required to either further assess the risk or reduce this risk to acceptably low levels.

This decision-making process based on the stages set out in current guidance[14].

Lines of evidence are used across both stages to inform the assessment. These lines of evidence relate to both the Site itself, the inherent hazards in the ground, and the proposed development, i.e. how other groundworks affects risk.

Site investigation and characterisation is based on judgements being made relating to discrete data points (trial pits and boreholes commonly) across much larger site areas. It therefore follows that unexpected encounters can arise even where all available information (or evidence) indicates a hazard is not present.

6.1 General comments

The commentary presented within this section should be read in conjunction with the background information and reporting relating to the Site that includes the raw data, i.e. the original chemical testing certificates.

6.2 Definition of potential 'Sources'

Chemical testing of the Made Ground (and to a lesser extent underlying natural soils) deposits across the Site revealed:

> A 'chemical fingerprint' that is broadly consistent with that anticipated on a former Victorian-era mill (combustion by-products; PAHs, sulphate and ash-derived toxic metals and non-metals, e.g. lead and arsenic) that was more recently redeveloped as a modern manufacturing centre of uPVC products for the construction sector (weathered oil-range hydrocarbons detected in select locations noting an absence of fuel-related BTEX compounds).

> The presence of low concentrations of PFAS compounds (in soils) across the upper and lower positions of the Site noting a localised area of higher concentrations (TP206 and TP303).

> A generally 'less degraded than anticipated' chemical profile with concentrations of inorganic and organic species 'low' in comparison to those typically encountered on former mill sites based on the Author's experience and the trends in chemical testing data.

  For example, the presence of disperse asbestos within the Made Ground soils guides risk to human health with the chemical quality of this material otherwise generally below screening thresholds for the proposed residential end use. Elaborating on this further; the maximum and mean (arithmetic) concentration of arsenic in the Made Ground soils across the Site was 94 mg/kg and 23 mg/kg respectively; similarly, the maximum and mean (arithmetic) concentration of benzo(a)pyrene was 53 mg/kg and 3 mg/kg respectively

  Localised areas of suspected 'free-product' were identified as either visual (staining) or olfactory (odours) evidence of hydrocarbons. Chemical testing of soils and groundwater in these locations (that included a simple 'grab' sample of groundwater in TH18) confirmed the presence of weathered oil; possible hydraulic oil (heavy range aliphatic and aromatic hydrocarbons >C16).

Chemical testing of the groundwater across Site revealed:

> The presence of various chemical compounds at 'elevated' concentrations to the extent that the groundwater across the Site could be described as 'degraded'.

> No discernible pattern to the chemical quality of the groundwater (noting the presence of the previously discussed 'free-product' within localised areas) that, based on the heterogeneous nature of the Made Ground deposits, is considered to represent single source, i.e. there are no areas where the chemical fingerprint of the soils suggests a different material is present.

> A 'chemical fingerprint' of these compounds that broadly consistent with that anticipated on a former Victorian-era mill (combustion by-products; PAHs, sulphate and ash-derived toxic metals and non-metals, e.g. lead and arsenic; and tars; phenols). Notwithstanding this, there is only a weak, qualitative correlation between the 'soil source' and the 'groundwater source' with only sulphate elevated across both media.

  Simple examples of this difference in chemical compositions include: i) a maximum concentration of phenol within the soils of 0.7 mg/kg compared against a max and mean (arithmetic) concentrations within groundwater of 100 µg/l and 87.1 µg/l respectively; and, ii) a maximum concentration of hexavalent chromium within the soils of <0.50 mg/kg compared against a max and mean (arithmetic) concentration within groundwater of 10 µg/l and 6.3 µg/l respectively.

> The presence of PFAS compounds within the groundwater that ratio analysis (PFOA to PFOS) confirms not to be associated with Aqueous Film Forming Foam (AFFF) used in fire suppressants but more likely waterproofing compounds.

  The only identifiable use of PFAS compounds on Site is considered to be additives to hydraulic oils that would have been used as part of the Site's more recent use as a uPVC product manufacturer. However, it is noted that the Environment Agency highlighted emerging research from Australia that indicates plasticisers, that can be used during PE extrusion, have been found to contain PFAS.

  Related to the point above, there is no evidence to indicate that uPVC was synthesized on the Site (from the more toxic and potentially polluting vinyl chloride) but rather Alderbergh Ltd involved with the manufacture (shaping and extrusion) of LDPE products from pellets as detailed more fully within Section 3.1.

[14] *Environment Agency's Land Contamination Risk Management (2020).*

Chemical testing of the spring water revealed:

> Concentrations of PFAS within the spring water emerging on the eastern edge of the Site (max. PFOA = 1.26 µg/l in Spring 2) that are around thirty times higher than the concentrations within Castle Brook as it passes the Site.

It is noted that surface water samples upstream and downstream of the Site were found to have higher concentrations of PFOA compared to Castle Brook as it passes the Site, further commentary on which is detailed within Section 6.4.

This of itself, confirms the primary source of PFAS is not on Site owing to: i) the 'flashy' nature of the groundwater regime locally; ii) the shallow presentation of bedrock west of these spring points; and, iii) elevated concentrations of PFOA within Spring 3 (downstream of the Site) and Spring 4 (upstream of the Site) both of which are remote and hydraulically unconnected to the Site (no plausible pathway).

With respect to the presence of PFAS within the shallow soils of TP206 and TP303, at the concentrations recorded, this is not considered to be an abiding source of PFAS within the soils that is contributing to the elevated concentrations of PFAS within the spring water or groundwater beneath the Site. This is due to both the reducing concentrations of PFAS with depth in these locations indicating limited, or negligible, downward migration of the PFAS (also noting the presence of hardstanding cover in these locations) and the overall low concentrations of PFAS (max. 30.1 µg/kg POFA) indicating the overall 'mass' of PFAS within the shallow soils across this portion of the Site is low and unlikely contributing to PFAS concentrations within the spring water or groundwater beneath the Site.

Summary: Based on these chemical profiles (across all soils and waters tested) and supporting lines of evidence it is concluded that:

> Owing to the weak correlation between the soil and groundwater quality datasets and the presence of elevated concentrations of PFAS within the spring water and low concentrations in the soils on Site, it is likely that;

i) The soil source on Site (all chemical compounds) represents a markedly diminished source of potentially polluting material that has been 'washed through' (leached) through by both continuous groundwater flow (from the springs) and, to a lesser extent, the successive cycles of rainfall since the Site has been left disused; and/or,

ii) With specific reference to PFAS, the groundwater quality is reflective of 'ambient' levels locally with the groundwater encountered beneath the Site being continuously recharged by the springs present along the eastern border of the Site. This water flows through the Site at high rates and volumes and ultimately discharges into Castle Brook.

> Taken together, whilst the Site's groundwater is identified as a 'source' of potentially polluting material, it is diminished and being discharged into by fast flowing and high volumes of spring water (groundwater) that, for PFAS compounds, represents a more significant source of potentially polluting material, and one that not located on-Site.

With respect to the latter point, the soils and groundwater across the Site are therefore also identified as 'receptors' that are being adversely impacted by PFAS containing groundwater.

Whilst only marginally elevated relative to soil and groundwater concentrations across the Site, the potential presence of 'free product' hydrocarbons locally to TH2, TH7 and TH18 are also identified as specific sources of potentially polluting material.

6.3 Definition of potential 'Pathways'

The surface water regime across the Site is characterised by:

i) The locally steep topography resulting in generally 'flashy' conditions dominating, i.e. heavy rainfall leading to high fluxes (rates and volumes) of surface water flows and run-off.

ii) The presence of a variably but generally highly permeable surface cover that, at the point of issue, is resulting in a tendency for rainfall landing on the Site to infiltrate to ground – recharging groundwater;

iii) The presence of temporarily exposed 'spring' points along the eastern boundary of the Site that both discharge to ground and, under periods of heavy rainfall, result in overland flows across informal channels towards Castle Brook on the western edge of the Site.

The groundwater regime across the Site is characterised by:

i) Similar characteristics to the surface water regime with the moderate and westerly dipping bedrock further contributing to 'flashy' conditions and fast rates of groundwater flow dominating within the catchment. This is evidenced by the marked change in flow rates from the 'springs' on the eastern boundary of the Site before and after rainfall events and the presence of east to west groundwater flows on the surface of the bedrock deposits within the trial pits.

ii) Recharge of the groundwater on Site being both spring and rainfall fed. Spring-based recharge is likely dominating due to the continuous nature of these flows (with varied rates and volumes) and rainfall recharge contributing to dilution of chemicals within the groundwater beneath the Site.

iii) Groundwater levels that are suggestive of a 'gaining' watercourse (Castle Brook) across the southern two thirds of the Site (feeding base flow of Castle Brook) and a 'neutral' or possible loosing watercourse across the northern third of the Site (water 'lost' from Castle Brook into groundwater).

iv) Through this 'flashy' characteristic, a tendency for lateral migration to dominate, driven by the fast groundwater flow conditions within the bedrock aquifer locally to the Site.

v) The presence of heterogenous Made Ground deposits into which rainfall and spring water will percolate and collect leading to both the temporary storage of water within the ground and discrete flow paths that, where present, were found to fast rates of flow that are more likely reflective of surface water rates, i.e. flow rates (permeability) potentially around 0.1 m/s but measured at rates greater than 10^{-4} m/s.

This rate of flow was evidenced within; i) both rounds of trial pitting completed across the Site with 'fast' rates of east to west lateral flow evidenced on the bedrock surface; and, ii) through falling head testing completed within boreholes M3, M6 and M9.

vi) The presence of a massive sandstone unit (likely the Woodhead Hill Rock) and possible fault zone either of which represent more preferential pathways for the vertical migration of water and any associated chemical compounds. It is noted that the moderately dipping bedrock and spring fed recharge of the Site are likely resulting in a far greater rate of lateral groundwater movement relative to vertical groundwater movement with the fault tentatively mapped along the centre of the Site (along the alignment of Castle Brook and Lydgate Brook).

6.4 Definition of potential 'Receptors'

The Controlled Water receptors identified include:

> Castle Brook (surface watercourse) immediately west of the Site – *a watercourse for which the environmental quality is unknown but lying within a currently rural dominated catchment noting the historical presence of various mills upstream of the Site (including along Lydgate Brook).*

> The bedrock aquifer beneath the Site – characterised by; high vulnerability (sandstone dominated bedrock) with Secondary A classification, and a lack of Source Protection Zones or other recorded potable abstractions within 1 km of the Site.

  It is noted high concentrations of PFAS compounds have been confirmed within spring water on and off Site and therefore, whilst strictly it remains a potential receptor, it is more appropriately considered as a 'source' in this scenario.

> Soils across the Site – *as discussed previously within Section 6.2.*

For completeness, Castle Brook is a tributary of the River Roch that represents an indirect surface water receptor and similarly, human health is noted as potential receptor that, whilst beyond the scope of this Report, is carried through within Soil and Structure's Remediation Strategy ref. 20403-R-002-V04.

6.5 Assessment of risk to Controlled Waters

Nationally, the Site is located within an area of the UK where the chemical treatment of fabrics using PTFE and other PFAS-based compounds first developed.

Sladen Wood Mill (separate to Sladen Mill) within the lower lying Littleborough/Summit area was a centre of research and development for PTFE and PFAS related finishes to fabrics.

Regionally, the Littleborough area included a high concentration of mills and other facilities involved with the dying and finishing of fabrics including mills higher in the water catchment locally to the Site, i.e. Wellfield Mill.

Sladen Mill itself was ultimately repurposed as a "cotton raising and fulling mill", a mechanically dominated process, prior to the commercial use of PFAS within the UK textile market. It is however noted that bleaching and dying was completed at Sladen Mill over a short period of time (c. 1960s to 1980s) that does correspond with the same period that PFAS-based coatings were being developed at the separately owned Sladen Wood Mill. Locally, various mills were recorded as "finishing and dying mills" before and after this date.

The more recent use of the Site by Alderburgh Ltd involved the mechanical process of LDPE extrusion and moulding with any liquid based waterproofing products advertised on the company website, wholesaled from the Site in pre-packaged containers. Most of the waterproofing products were bituminous based coatings however, as noted by the Environment Agency, emerging research from Australia indicates plasticisers, that can be used during PE extrusion, have been found to contain PFAS.

Whilst two key Controlled Water receptors are identified; the bedrock aquifer and Castle Brook immediately to the west of the Site, the identification of the soils and groundwater beneath the Site as potential 'receptors' is guiding in the assessment of risk to Controlled Waters.

More specifically, there are multiple lines of evidence of soils and groundwater beneath the Site being impacted by PFAS the primary source of which is not on Site.

Therefore, the soils and groundwater beneath the Site have been, and continue to be, adversely impacted by PFAS compounds that have been transported onto Site.

It follows that any risk mitigation works in relation to PFAS on the Site itself, stand to have limited efficacy when the primary source is beyond both the control and responsibility of the Site owner.

Notwithstanding this pollutant-linkage, the soils and groundwater beneath the Site having been impacted by PFAS (and other chemicals) and therefore continue to represent sources of potentially polluting material albeit, with respect to PFAS – the main chemical of concern – to a much lower extent than off-Site sources.

Furthermore, further investigation of off-Site sources is not considered to be the duty of the Client.

Taken together, there are multiple lines of direct and indirect evidence indicating that the Site's soil and groundwater have been degraded by its historical, industrial uses however, with specific reference to PFAS (the main chemical of concern) the Site is: i) located within an area where PFAS is present in surface water and groundwater at concentrations orders of magnitude higher than the freshwater EQS; and, ii) represents a receptor itself, receiving high concentrations of PFAS from at least two confirm spring points (Spring 1 and Spring 2) but likely the full spring-line along the eastern boundary of the site.

6.6 Risk assessment conclusion

Based on this assessment, the risk presented to Controlled Waters from sources identified on the Site is assessed as **moderate** to **low** with the moderate classification acknowledging that:

> PFAS has been detected within the soils on Site at low concentrations. Across the lower portion of the Site, the groundwater flows from the spring-line along the eastern edge of the Site have likely influenced soil quality. Across the upper portion of the Site, locally to TP206 and TP303, the presence of PFAS within the shallow soils is unlikely to have been influenced by the groundwater however, various lines of evidence point towards them not having represent a specific source of PFAS adversely impacting groundwater beneath the Site; and,

> Concentrations of other chemicals have been recorded at elevated concentrations within the groundwater beneath the Site that have not been linked to the groundwater emerging from the spring-line. Notwithstanding this, the concentrations recorded are relatively low compared to both respective environmental standards and the concentrations of PFAS within groundwater emerging from the spring-line that is the primary source, and chemical of concern in this scenario.

The recommended risk mitigation measures are distinct from those inherent risk mitigation measures that will be incorporated as part of the development, e.g. reduction of infiltration through an increase in impermeable areas and introduction of new utility trenches.

6.7 Risk mitigation recommendations

The recommended risk mitigation measures are illustrated on the Ground Models (endline) within Section 7.0.

Soils (locally to TP206 and TP303): Recommended risk mitigation – source removal: Development proposals across this portion of the Site include for a reduced level excavation to suit formation levels (new access road to upper portion of the Site) resulting in a net 'cut' of soils from this portion of the Site. This action itself is anticipated to reduce the overall volume of PFAS-containing soils across this portion of the Site.

As a specific, Controlled Waters remedial measure, as part of this reduced level excavation it is recommended that at least 1.0 m of soil are removed from the area of TP206 and TP303.

Reasoning: to remove PFAS-containing soils from this area and therefore reducing PFAS concentrations across the Site as a whole to: max: 9.7 µg/kg; mean: 0.77 µg/kg; and, UCL 1.31 µg/kg.

Measurables: Check testing (for PFOA and PFOS) of the soils at the base and all edges of the excavation is recommended to validate the efficacy of this recommended remedial action details of which are set out within Soil and Structures' Remediation Strategy.

Soils (locally to TH2, TH7 and TH18): Recommended risk mitigation – source removal: Excavation, delineation and removal of hydrocarbon impacted soils locally to TH2, TH7 and TH18.

Reasoning: to further investigate and, through removal, reduce the mass of hydrocarbon impacted soils further details of which are set out within Soil and Structures' Remediation Strategy.

Measurables: As an 'in-principle' remedial action, visual and PID screening of materials (together with photographic evidence) is recommended to validate the efficacy of this recommended remedial action details of which are set out within Soil and Structures' Remediation Strategy.

Groundwater (general): Groundwater management system: Groundwater is emerging from the eastern boundary of the Site that is impacted by PFAS (PFOA dominated) the source of which lies outside of the Site boundary. The Site is serving as a pathway for this PFAS impacted groundwater to enter groundwater beneath the Site and thereafter, Castle Brook.

Reasoning and Measurables: Management of this PFAS impacted groundwater is key to both the management of risk on Site as well as to Castle Brook, the primary Controlled Waters 'receptor'. Treatment of this water will be completed under a Discharge Consent (to be agreed) to achieve a betterment of water quality within Castle Brook by limiting the discharge of poisonous, noxious or polluting matter (PFAS impacted groundwater).

Regulatory consultation: whilst inherent to the process of planning condition discharge for the proposed development, it is recommended that continued consultation with the Environment Agency is maintained throughout the project owing to the regionally significant concentrations of PFAS compounds that have been detected within groundwater flowing onto the Site and within surface waters locally to the Site.

In this scenario, further investigation on or around the Site by the Environment Agency may be warranted with the findings of any such study valuable information for both parties.

Remedial recommendation made within existing ground-related reporting: within their "*Hydrogeology and Potential Contaminant Transport*" dated May 2024 (Revision 0) TBJA recommended that a low permeability layer was incorporated within proposed soft landscaping areas as a form of pathway intervention, limiting the rate of drainage to ground and thus the flux of chemicals (all types) through the soils and groundwater across the Site.

Whilst practically difficult to install, e.g. ensuring thickness consistency and service corridors typically resulting in a 'leaky' cover layer, this remedial recommendation is discounted due to; i) the fact the dominant spring-fed recharge of groundwater will not be captured by this approach; and, ii) to the inclusion of a low permeability layer within cover systems liable to result in water logging or possible surface water flooding within soft landscaping areas.

6.8 Residual uncertainty

With specific reference to the penultimate consultation response from the Environment Agency, the following commentary addresses areas of residual uncertainty:

- It is assumed that '*other environmental data that the Environment Agency have access to*' relates to the background data relating to PFAS concentrations within groundwater locally, as discussed within Section 3.0;
- Whilst only two compounds were modelled as part of the analytical modelling presented within the existing reporting (the Remedial Targets Methodology), the use of any form of analytical modelling in this scenario is not recommended due to: i) the inherent heterogeneity of the Made Ground deposits rendering any analytical model a very crude approximation of the fate and transport of chemicals within groundwater, likely under-reporting the risk to Controlled Water receptors; and, ii) the presence of maximum concentrations of PFAS within groundwater beneath the Site (borehole M4) being located at a distance of around 10 m from Castle Brook that, of itself, would guide the requirement for further assessment and/or risk management (as detailed within this Report).
- As discussed previously within Section 6.5, the use of target concentrations in this scenario is not considered appropriate noting that a numerical value will be required for the PFAS impacted groundwater that is to be managed as part of the works
- The general remark that; "*We {the EA} continue to feel that the site will need the benefit of remediation*", is acknowledged through the remedial actions recommended within this Report.

More in-depth commentary in response to the Environment Agency's more recent consultation response and meeting minutes is provided separately to this Report.

6.9 Contingency planning

As part of any risk management, contingency planning is recommended. In this scenario, three key areas of contingency planning are recommended.

Unforeseen encounters: A general advisory, there remains the potential for unidentified sources of potentially polluting material to be encountered as part of the development works for which a response plan is recommended (and set out within Soil and Structures' Remediation Strategy).

In this scenario, the potential presence of residual sub-structures is highlighted with any relic drains or culverts potentially serving as both sources and critical pathways for the potentially polluting material to be present and to be transported across the Site and towards other key receptors, e.g. Castle Brook.

Third-party liabilities: There is evidence that the Site soils and groundwater have become impacted by PFAS compounds that have been transported onto Site from off Site sources. In having become impacted, the soils and groundwater on Site have themselves become a source of PFAS compounds. The requirement for any risk mitigation works therefore rests, to a certain extent, on the soils and groundwater having been impacted with evidence supporting this being due to the action of third parties (other landowners).

Investigation and assessment of the source of the PFAS compounds (and any other chemicals present within the spring water) may wish to be considered to further support a reduction in potential liability for the Client.

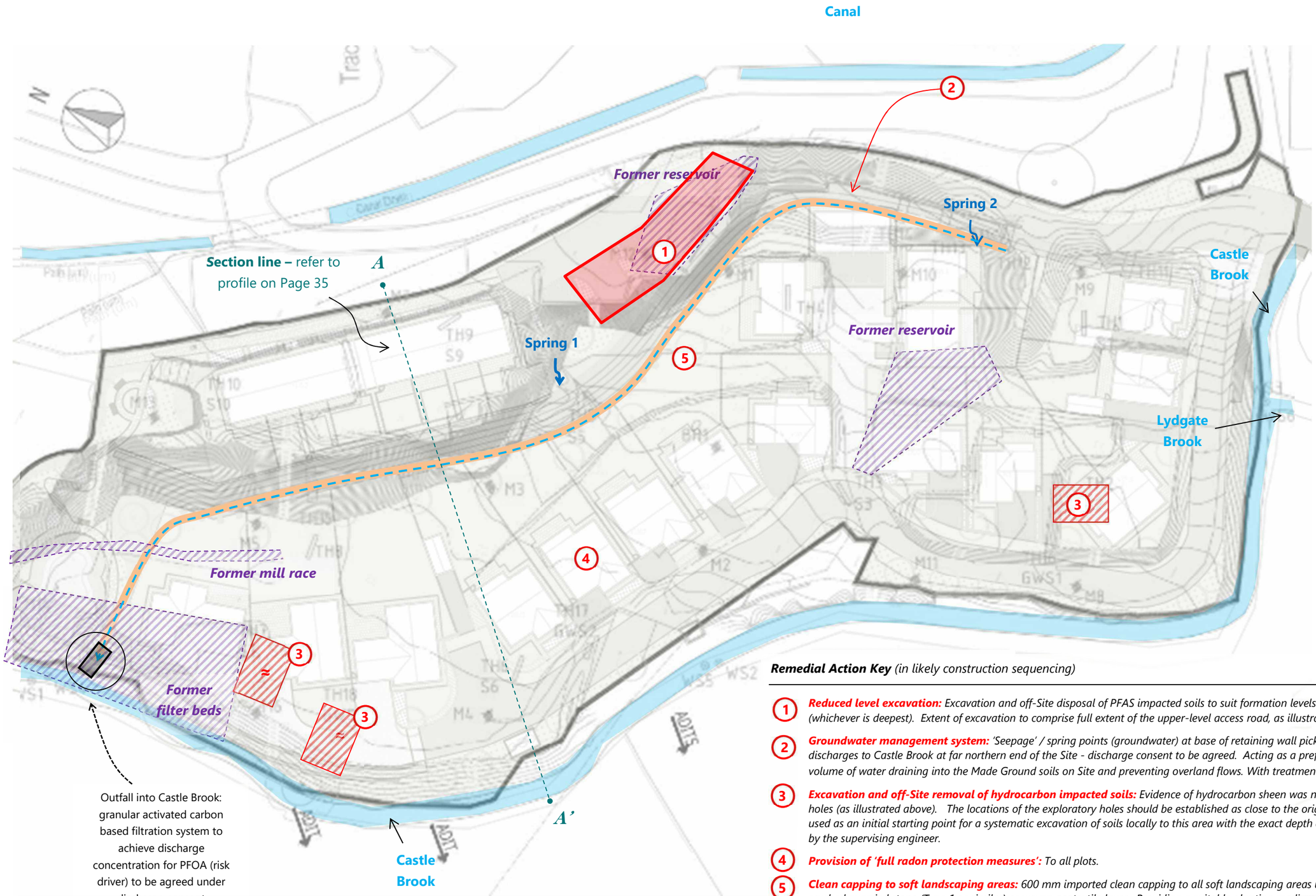
Residual liabilities: Related to third-party liabilities, even when the recommended risk mitigation is completed satisfactorily, there remains the potential for future investigations into water quality within the local catchment to include investigations on and around the Site that, in the absence of this Report or other clarifications, could lead to unnecessarily protracted and costly investigations where lines of responsibility are not easily established, e.g. why PFAS impacted water continues to discharge into Castle Brook?

Measures to limit the potential for this to occur include:

> Submission of this Report and the Soil and Structures Remediation Strategy (report ref. 20403-R-002-V04) to the local planning authority for upload onto the planning portal; and,

> The incorporation of this Report and the Soil and Structures Remediation Strategy (report ref. 20403-R-002-V04) within the Health and Safety File for the development.

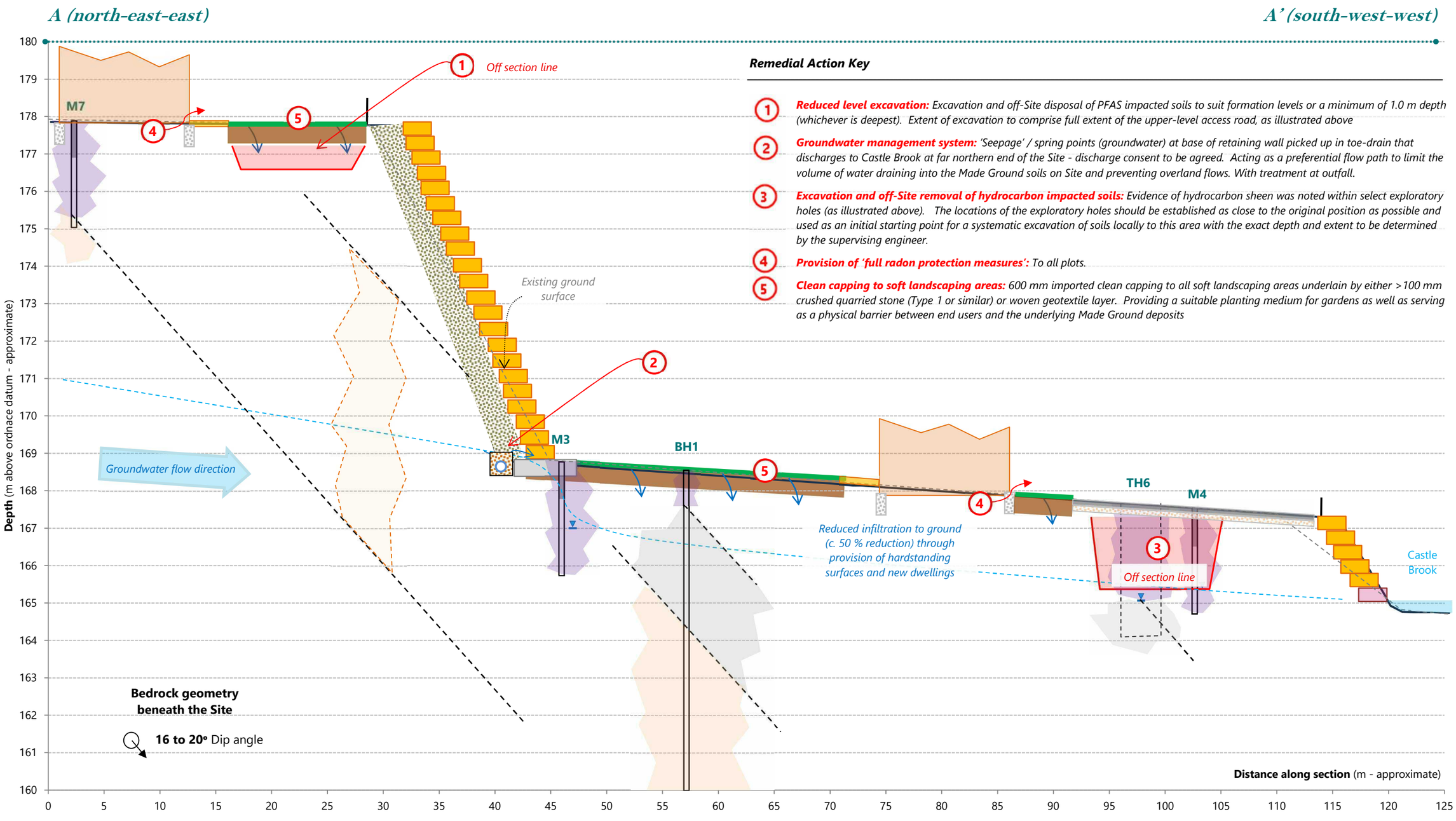
7.0 **Ground Model** – Endline (*Post-Development Condition*) – Plan *(presenting an overview of the Remedial Actions – including measures to reduce risk to human health)*



Remedial Action Key *(in likely construction sequencing)*

1. ***Reduced level excavation:*** *Excavation and off-Site disposal of PFAS impacted soils to suit formation levels or a minimum of 1.0 m depth (whichever is deepest). Extent of excavation to comprise full extent of the upper-level access road, as illustrated above*
2. ***Groundwater management system:*** *'Seepage' / spring points (groundwater) at base of retaining wall picked up in toe-drain that discharges to Castle Brook at far northern end of the Site - discharge consent to be agreed. Acting as a preferential flow path to limit the volume of water draining into the Made Ground soils on Site and preventing overland flows. With treatment at outfall.*
3. ***Excavation and off-Site removal of hydrocarbon impacted soils:*** *Evidence of hydrocarbon sheen was noted within select exploratory holes (as illustrated above). The locations of the exploratory holes should be established as close to the original position as possible and used as an initial starting point for a systematic excavation of soils locally to this area with the exact depth and extent to be determined by the supervising engineer.*
4. ***Provision of 'full radon protection measures':*** *To all plots.*
5. ***Clean capping to soft landscaping areas:*** *600 mm imported clean capping to all soft landscaping areas underlain by either >100 mm crushed quarried stone (Type 1 or similar) or woven geotextile layer. Providing a suitable planting medium for gardens as well as serving as a physical barrier between end users and the underlying Made Ground deposits*

3.0 **Ground Model** – Endline (*Post-Development Condition*) – Profile (*aligned with dip direction of bedrock; presenting an overview of the Remedial Actions)*



Illustrative / conceptual only – do not scale from drawing – note compressed horizontal axis

8.0 Conclusions and Recommendations

8.1 Conclusions

In conclusion, this Controlled Waters Risk Assessment finds that:

> The chemical quality of the soils and groundwater beneath the Site have been degraded by the former industrial use of the Site. The extent to which they have been degraded by sources of potentially polluting material on Site appears to be low.

  This is likely to be largely due to the hydrogeological setting of the Site that is characterised by a continuous, high flux of groundwater passing through the Site that will have resulted in a large proportion of the Site soils having been effectively 'washed' through. The pollution potential of the Site is expected to have been greater historically but, through the passage of time, has diminished to the state it is found today.

  This is not to say the Site has been rendered 'clean' through this action but rather highlights the significance of the groundwater regime.

> Multiple lines of evidence indicate that the chemical quality of the groundwater beneath the Site is primarily controlled by spring-fed discharges on the eastern boundary of the Site within which elevated concentrations of PFAS compounds have been detected. These spring-fed discharges will be collected and discharged to Castle Brook following treatment to levels agreed as part of a Discharge Consent - a key action that represents inherent risk mitigation.

> The risk presented to Controlled Waters is assessed as 'moderate to low'.

  The moderate rating acknowledging:

  a. In having been impacted by PFAS compounds emerging from the spring, the Site's groundwater has itself become 'sources' of PFAS compounds; and,

  b. Concentrations of other chemicals have been recorded at elevated concentrations within the groundwater beneath the Site that have not been linked to the spring water.

> Risk mitigation (remedial work) is recommended to further reduce the risk presented to Controlled Water receptors and achieve a betterment of soil and groundwater quality on the Site and within the wider water catchment.

  With reference to the groundwater regime, this remedial work is focused on reducing the mass of potential pollutants present within the unsaturated zone across the Site (above the groundwater surface) and through this reduce the risk to Controlled Waters.

> Whilst beyond the scope of this Report, the recommended remedial work is linked to, and reduces, the risk to human health both; through the management of PFAS impacted groundwater flows from the spring-line and, directly through a reduction in vapour generating material (removal and off-Site disposal of hydrocarbon impacted soils).

8.2 Recommendations

Recommended follow-on work includes:

1. Review of this Controlled Waters Risk Assessment and the advice herein.
2. Submission of this Controlled Waters Risk Assessment to the Local Planning Authority in support of the discharge of Condition 5 of the outline planning application.
3. Further assessment is not recommended noting that check testing and other fieldworks will be required as part of the recommended remedial works as set out within Soil and Structures' Remediation Strategy presented under separate cover.
4. Planning condition discharge of Parts i) and ii) of Condition 5 of Decision Notice ref. 15/01235/OUT.
5. Risk mitigation is recommended details of which are outlined within Section 6.7 of this Report with full details, including a validation plan, set out within the Soil and Structures' Remediation Strategy presented under separate cover.

8.3 Glossary of Abbreviations

AFFF	**Aqueous Film Forming Foam** (fire suppressant)
BTEX	**Benzene Toluene Ethylbenzene Xylene**
DWS	**Drinking Water Standard**
EQS	**Environmental Quality Standard**
PAH	**Polycyclic Aromatic Hydrocarbons** – 'aromatic' hydrocarbons that are commonly associated with combustion by-products, e.g. soot, dust and exhaust fumes.
PCB	**Polychlorinated Biphenyls** – chemicals now largely banned for use in the UK, commonly used as coolants and electrical insulators within power transmission transformers.
PET	**Polyethylene terephthalate**
PFOA	**Pefluorooctanoic Acid –** one the better studied PFAS compounds with numerous adverse health effects in humans and wildlife. Commonly a breakdown product from the degradation of more complex, precursor PFAS compounds (fluorotelomer-based polymers).
PFAS	**Per and polyfluoroalkyl substances** – the group or 'family' name for millions of chemical compounds that include PFOA, PFOS and PTFE.
PFOS	**Pefluorooctanesulphonic acid** – one the better studied PFAS compounds with numerous adverse health effects in humans and wildlife. Commonly a breakdown product from the degradation of more complex, precursor PFAS compounds (fluorotelomer-based polymers).
PTFE	**Polytetrafluoroethylene** – one of many PFAS compounds commonly referred to as 'forever chemicals' or persistent organic pollutants (POPs). Used alongside other PFAS compounds such as PFOA, PFOS and GenX to create non-stick materials.
PPM	**Parts per million** – a unit of concentration. For liquids this represents milligrams per litre (mg/l)
PPB	**Parts per billion** - a unit of concentration. For liquids this represents micrograms per litre (µg/l)
PPT	**Parts per trillion** - a unit of concentration. For liquids this represents nanograms per litre (ng/l)

Schedule of Accommodation:

Plot	Accommodation	sqm	sqft
1	3 Bedroom House	96	1032
2	3 Bedroom House	96	1032
3	3 Bedroom House	96	1032
4	3 Bedroom House	96	1032
5	3 Bedroom House	96	1032
6	3 Bedroom House	96	1032
7	3 Bedroom House	96	1032
8	3 Bedroom House	96	1032
9	4 Bedroom House	138	1484
10	4 Bedroom House	138	1484
11	4 Bedroom House	218	2346
12	4 Bedroom House	162	1744
13	4 Bedroom House	130	1398
14	4 Bedroom House	130	1398
15	4 Bedroom House	130	1398
16	4 Bedroom House	160	1722
17	4 Bedroom House	180	1937
18	5 Bedroom House	182	1959
19	5 Bedroom House	182	1959
20	5 Bedroom House	182	1959
21	3 Bedroom House	103	1108
22	3 Bedroom House	103	1108
23	5 Bedroom House	260	2800
24	5 Bedroom House	260	2800
25	5 Bedroom House	278	3000

See landscaping plan for full detail for green space

0m 10m 20m 30m 40m 50m

Visual Scale - 1:300

N



materials palette

rainwater goods to be black gutters, downpipes and waste pipes
fascias where applicable to be s/w painted black
doors: composite high security frong and rear entrance doors. Garage doors to be aluminium in finish to match main entrance doors

- Hedge with 1000mm metal wired fence seperating rear gardens
- Low level hedge to front garden
- Grass
- Green space
- Tegular Paviours/setts Vehicle Use
- Tegula Paviours/setts (Pedestrian use Contrasting)
- Tarmac Driveways/parking
- Tarmac Road
- Stone Wall - varies
  -900mm to front gardens
  -1000mm high to rear of retaining wall
  -1800mm when creating a privacy garden wall
- Timber fence
  -1800mm to plot perimeter
  -1500mm division to gardens(where hedging not proposed)
- 600mmx600mm Pavers
- Tegula Paviours/setts public footpath
- Pond

nicol thomas

Rev	Date	Description
N	02.12.22	pond changed to engineers drawing
O	06.12.22	Revised to EA comments
P	05.01.23	structual detail infomation included
Q	17.01.23	wall length increased
R	19.01.23	Wall decreased
S	24.01.23	Tim Booth revisions
T	13.02.23	Patio area updated

nicol thomas
architects project managers construction cost consultants CDM co-ordinators
Registered in England and Wales. Reg No. 2140639
Quality Assured to BS ENISO 9001:1994 Certificate Number GB 4723

Heyside House, Blackshaw Lane, Heyside, Royton, Oldham OL2 6NS
t 01706 290088 f 01207 290099 e. oldham@nicolthomas.com
Also at Birmingham (Registered Office)

Do not scale from this drawing. All dimensions must be checked and verified before preparing drawings or commencing works. This drawing and design is the copyright of Nicol Thomas Ltd and may not be reproduced i any form whatsoever without their prior express written consent.

Client	Mainly Mere
Job	Sladen Mill, Littleborough
Drawing title	Site Layout
Project number	M4856 (PL)02 Rev T
Scale	As indicated @ A1
Date	01/30/23
Drawn by	KS Checked by GRF

13.02.23

SOIL AND STRUCTURES

Key to exploratory hole symbols and abbreviations

SAMPLE TYPES

ACM - Asbestos sample
AMAL - Amalgamated sample
B - Bulk disturbed sample
BLK - Block sample
C - Core sample
CBR - CBR test sample
D - Disturbed sample
ES - Environmental sample
EW - Environmental water sample
G - Gas sample
J - Jar sample
L - Liner sample
TW - Pushed thin wall sample
U - Undisturbed sample
UT - Undisturbed thin wall sample
W - Water sample

IN-SITU TESTS

HV - Hand shear vane
HV(r) - Hand shear vane residual
PID - Photo ionisation detector
PP - Hand penetrometer
SPT - Standard penetration test
SPT(C) - SPT using cone

GROUNDWATER

 Groundwater strike

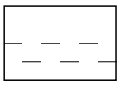
 Groundwater rest level

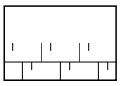
ROTARY CORE DETAILS

TCR - Total core recovery (%)
SCR - Solid core recovery (%)
RQD - Rock quality designation (%)
FI - Fracture index
NI - Non-intact core
AZCL - Assumed zone of core loss

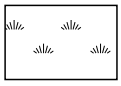
LEGEND

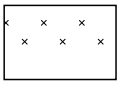
 Topsoil

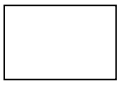
 Clay

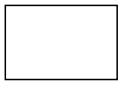
 Chalk

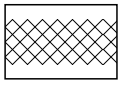
 Sand backfill

 Peat

 Silt

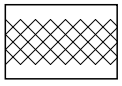
 Breccia

 Gravel backfill

 Made ground

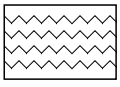
 Sand

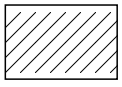
 Conglomerate

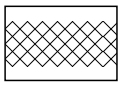
 Arisings

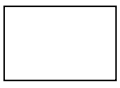
 Concrete

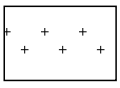
 Gravel

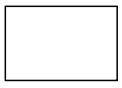
 Metamorphic

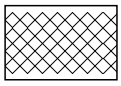
 Bentonite

 Wood

 Cobbles

 Igneous

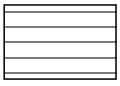
 Concrete

 Brick

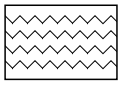
 Boulders

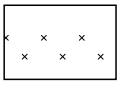
 Grout

 Bituminous material

 Mudstone

 Plain pipe

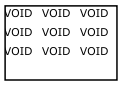
 Gypsum

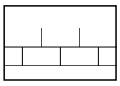
 Siltstone

 Coal

 Sandstone

 Slotted pipe

 Void

 Limestone

Created using Pebble Geo

SOIL AND STRUCTURES

Trial Pit

TP201

Sheet 1 of 1

Hole Type	Easting	Northing	Ground Level (m)	Scale
TP	394923.00	417446.00	167.50	1:25

Project Name	Project No.	Start Date	End Date
Sladen Mill, Littleborough	20403	2024-10-10	2024-10-10

Client
Mere Developments Ltd

Contractor

Consultant
Soil and Structures Ltd

Inst/ Backfill	Water Levels	Samples and Tests: Depth (m)	Samples and Tests: Type/ Ref	Samples and Tests: Results	Level (m)	Depth (thickness) (m)	Strata: Legend	Strata: Description
								Light yellowish and orangish brown locally dark grey and grey, silty, sandy, gravelly, small to large, angular to sub-angular COBBLES of sandstone. Sand is fine to coarse. Gravel is fine to coarse angular to sub-angular sandstone and rare mudstone. [MADE GROUND, REWORKED NATURAL BEDROCK]
		1.50	ES 1			(1.70)		
					165.80	1.70		Grey, dark grey and dark brown, ashy, silty, gravelly, fine to coarse SAND with low cobble content and rare, small to medium (100 mm long) timber fragments. Gravel is fine to coarse angular to sub-rounded sandstone, brick and rare concrete. Cobbles are small to large sub-angular to rounded sandstone and rare concrete and brick. [MADE GROUND, DEMOLITION ARISINGS WITH SUSPECTED ALLUVIAL COBBLES AND BOULDERS]
		3.00	ES 2			(2.10)		
	▼				163.70	3.80		Light yellowish brown with ochre staning, medium strong SANDSTONE recovered as medium to coarse, angular gravel and small, angular cobbles of sandstone. [SANDSTONE, SUSPECTED WOODHEAD HILL ROCK]
						(0.20)		
					163.50	4.00		*End of Trial Pit at 4.00m*

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0

Remarks
PURPOSE: Targeting the northern portion of the Site and former reservoir. TERMINATION: Practical refusal of 36 tonne excavator with toothed bucket on intact bedrock. GROUNDWATER: East to west basal flows. STABILITY: Spalling througout depth. OTHER: Ash present within deeper fill but otherwise no evidence of potentially polluting or harmful material. LOCATION: Referenced using free-ware on Site. GL: Estimated off May 2021 topographical survey.

Method, Plant, Stability, Dimensions
0.00 - 4.00m TP - Trial Pit 36 tonne tracked
Unstable
L = 2.80m
W = 1.20m

Logger
RB

Checked By: RB **Approved By:** RB **Status:** FINAL

SOIL AND STRUCTURES

Trial Pit

TP201

SUPPLEMENTARY INFO

Hole Type	Easting	Northing	Ground Level (m)	Scale
TP	394923.00	417446.00	167.50	1:25

Project Name	Project No.	Start Date	End Date
Sladen Mill, Littleborough	20403	2024-10-10	2024-10-10

Client	Contractor	Consultant
Mere Developments Ltd		Soil and Structures Ltd

Water Strike - General

Struck (m)	Seal Depth (m)	Casing Depth (m)	Date and Time	Remarks
3.80				

Water Strike - Details

Struck (m)	Rose To (m)	Time (mins)	Remarks
3.80	3.80	20	Fast rate, medium volume flows from east to west across base of excavation.

Remarks

PURPOSE: Targeting the northern portion of the Site and former reservoir. TERMINATION: Practical refusal of 36 tonne excavator with toothed bucket on intact bedrock. GROUNDWATER: East to west basal flows. STABILITY: Spalling througout depth. OTHER: Ash present within deeper fill but otherwise no evidence of potentially polluting or harmful material. LOCATION: Referenced using free-ware on Site. GL: Estimated off May 2021 topographical survey.

Method, Plant, Stability, Dimensions

0.00 - 4.00m TP - Trial Pit 36 tonne tracked
Unstable
L = 2.80m
W = 1.20m

Logger

RB

Checked By: RB **Approved By:** RB **Status:** FINAL

SOIL AND STRUCTURES

Trial Pit

TP201

PHOTO PAGE

Hole Type	Easting	Northing	Ground Level (m)	Scale
TP	394923.00	417446.00	167.50	1:25
Project Name		**Project No.**	**Start Date**	**End Date**
Sladen Mill, Littleborough		20403	2024-10-10	2024-10-10

Client
Mere Developments Ltd

Contractor

Consultant
Soil and Structures Ltd



Remarks
PURPOSE: Targeting the northern portion of the Site and former reservoir. TERMINATION: Practical refusal of 36 tonne excavator with toothed bucket on intact bedrock. GROUNDWATER: East to west basal flows. STABILITY: Spalling througout depth. OTHER: Ash present within deeper fill but otherwise no evidence of potentially polluting or harmful material. LOCATION: Referenced using free-ware on Site. GL: Estimated off May 2021 topographical survey.

Method, Plant, Stability, Dimensions

0.00 - 4.00m TP - Trial Pit 36 tonne tracked
Unstable
L = 2.80m
W = 1.20m

Logger
RB

Checked By: RB **Approved By:** RB **Status:** FINAL

SOIL AND STRUCTURES

Trial Pit

TP201

PHOTO PAGE

Hole Type	Easting	Northing	Ground Level (m)	Scale
TP	394923.00	417446.00	167.50	1:25
Project Name		**Project No.**	**Start Date**	**End Date**
Sladen Mill, Littleborough		20403	2024-10-10	2024-10-10

Client
Mere Developments Ltd

Contractor

Consultant
Soil and Structures Ltd



Remarks
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Method, Plant, Stability, Dimensions

0.00 - 4.00m TP - Trial Pit 36 tonne tracked
Unstable
L = 2.80m
W = 1.20m

Logger
RB

Checked By: RB **Approved By:** RB **Status:** FINAL

SOIL AND STRUCTURES

Trial Pit

TP201

PHOTO PAGE

Hole Type	Easting	Northing	Ground Level (m)	Scale
TP	394923.00	417446.00	167.50	1:25
Project Name		**Project No.**	**Start Date**	**End Date**
Sladen Mill, Littleborough		20403	2024-10-10	2024-10-10

Client
Mere Developments Ltd

Contractor

Consultant
Soil and Structures Ltd



Remarks
PURPOSE: Targeting the northern portion of the Site and former reservoir. TERMINATION: Practical refusal of 36 tonne excavator with toothed bucket on intact bedrock. GROUNDWATER: East to west basal flows. STABILITY: Spalling througout depth. OTHER: Ash present within deeper fill but otherwise no evidence of potentially polluting or harmful material. LOCATION: Referenced using free-ware on Site. GL: Estimated off May 2021 topographical survey.

Method, Plant, Stability, Dimensions

0.00 - 4.00m TP - Trial Pit 36 tonne tracked
Unstable
L = 2.80m
W = 1.20m

Logger
RB

Checked By: RB **Approved By:** RB **Status:** FINAL

SOIL AND STRUCTURES

Trial Pit

TP202

Sheet 1 of 1

Hole Type	Easting	Northing	Ground Level (m)	Scale
TP	394927.00	417391.00	167.70	1:25

Project Name	Project No.	Start Date	End Date
Sladen Mill, Littleborough	20403	2024-10-10	2024-10-10

Client
Mere Developments Ltd

Contractor

Consultant
Soil and Structures Ltd

Inst/ Backfill	Water Levels	Samples and Tests: Depth (m)	Samples and Tests: Type/ Ref	Samples and Tests: Results	Level (m)	Depth (thickness) (m)	Strata: Legend	Strata: Description
						(1.60)		Grey, dark grey and dark brown, ashy, silty, gravelly, fine to coarse SAND with medium cobble content and medium boulder content. Gravel is fine to coarse angular to sub-rounded sandstone, brick and rare concrete. Cobbles are small to large sub-angular to rounded sandstone and infrequent concrete and brick. Boulders are rounded to sub-rounded sandstone up to 750 mm across. N.B. Fill extends to a depth of 2.20 m on the western edge of the trial pit across which dark grey, weak to medium strong, tabular (thinly to thickly laminated), angular mudstone was recovered - suspected fault-zone / breccia. [MADE GROUND, DEMOLITION ARISINGS WITH SUSPECTED ALLUVIAL COBBLES AND BOULDERS]
		1.50	ES 1					
					166.10	1.60		ON EASTERN SIDE OF TRIAL PIT: Light yellowish and orangish brown, very weak SANDSTONE recovered as very sandy, medium to coarse, angular gravel and small, angular cobbles of sandstone. [SANDSTONE, SUSPECTED WOODHEAD HILL ROCK]
		1.90	ES 2			(0.70)		
	▼				165.40	2.30		*End of Trial Pit at 2.30m*

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0

Remarks
PURPOSE: Targeting the western portion of the Site and the location of the highest recorded concentration of PFOA (borehole M4). TERMINATION: Practical refusal of 36 tonne excavator with toothed bucket on intact bedrock. GROUNDWATER: East to west basal flows. STABILITY: Sidewall collapse througout depth. OTHER: Ash present within fill but otherwise no evidence of potentially polluting or harmful material. OTHER: Suspected breccia / fault zone - continuous collapse of side-walls limited further excavation/inspection. LOCATION: Referenced using free-ware on Site. GL: Estimated off May 2021 topographical survey.

Method, Plant, Stability, Dimensions
0.00 - 2.30m TP - Trial Pit 36 tonne tracked
Unstable
L = 2.80m
W = 1.20m

Logger
RB

Checked By: RB **Approved By:** RB **Status:** FINAL

Created using Pebble Geo

SOIL AND STRUCTURES

Trial Pit

TP202

SUPPLEMENTARY INFO

Hole Type	Easting	Northing	Ground Level (m)	Scale
TP	394927.00	417391.00	167.70	1:25

Project Name	Project No.	Start Date	End Date
Sladen Mill, Littleborough	20403	2024-10-10	2024-10-10

Client	Contractor	Consultant
Mere Developments Ltd		Soil and Structures Ltd

Water Strike - General

Struck (m)	Seal Depth (m)	Casing Depth (m)	Date and Time	Remarks
2.20				

Water Strike - Details

Struck (m)	Rose To (m)	Time (mins)	Remarks
2.20	2.20	20	Dampness evident within mudstone deposits towards base of excavation.

Remarks

PURPOSE: Targeting the western portion of the Site and the location of the highest recorded concentration of PFOA (borehole M4). TERMINATION: Practical refusal of 36 tonne excavator with toothed bucket on intact bedrock. GROUNDWATER: East to west basal flows. STABILITY: Sidewall collapse througout depth. OTHER: Ash present within fill but otherwise no evidence of potentially polluting or harmful material. OTHER: Suspected breccia / fault zone - continuous collapse of side-walls limited further excavation/inspection. LOCATION: Referenced using free-ware on Site. GL: Estimated off May 2021 topographical survey.

Method, Plant, Stability, Dimensions

0.00 - 2.30m TP - Trial Pit 36 tonne tracked
Unstable
L = 2.80m
W = 1.20m

Logger

RB

Checked By: RB **Approved By:** RB **Status:** FINAL

SOIL AND STRUCTURES

Trial Pit

TP202

PHOTO PAGE

Hole Type	Easting	Northing	Ground Level (m)	Scale
TP	394927.00	417391.00	167.70	1:25

Project Name	Project No.	Start Date	End Date
Sladen Mill, Littleborough	20403	2024-10-10	2024-10-10

Client
Mere Developments Ltd

Contractor

Consultant
Soil and Structures Ltd



Remarks
PURPOSE: Targeting the western portion of the Site and the location of the highest recorded concentration of PFOA (borehole M4). TERMINATION: Practical refusal of 36 tonne excavator with toothed bucket on intact bedrock. GROUNDWATER: East to west basal flows. STABILITY: Sidewall collapse througout depth. OTHER: Ash present within fill but otherwise no evidence of potentially polluting or harmful material. OTHER: Suspected breccia / fault zone - continuous collapse of side-walls limited further excavation/inspection. LOCATION: Referenced using free-ware on Site. GL: Estimated off May 2021 topographical survey.

Method, Plant, Stability, Dimensions

0.00 - 2.30m TP - Trial Pit 36 tonne tracked
Unstable
L = 2.80m
W = 1.20m

Logger
RB

Checked By: RB **Approved By:** RB **Status:** FINAL

SOIL AND STRUCTURES

Trial Pit

TP202

PHOTO PAGE

Hole Type	Easting	Northing	Ground Level (m)	Scale
TP	394927.00	417391.00	167.70	1:25

Project Name	Project No.	Start Date	End Date
Sladen Mill, Littleborough	20403	2024-10-10	2024-10-10

Client
Mere Developments Ltd

Contractor

Consultant
Soil and Structures Ltd



Remarks
PURPOSE: Targeting the western portion of the Site and the location of the highest recorded concentration of PFOA (borehole M4). TERMINATION: Practical refusal of 36 tonne excavator with toothed bucket on intact bedrock. GROUNDWATER: East to west basal flows. STABILITY: Sidewall collapse througout depth. OTHER: Ash present within fill but otherwise no evidence of potentially polluting or harmful material. OTHER: Suspected breccia / fault zone - continuous collapse of side-walls limited further excavation/inspection. LOCATION: Referenced using free-ware on Site. GL: Estimated off May 2021 topographical survey.

Method, Plant, Stability, Dimensions

0.00 - 2.30m TP - Trial Pit 36 tonne tracked
Unstable
L = 2.80m
W = 1.20m

Logger
RB

Checked By: RB **Approved By:** RB **Status:** FINAL

SOIL AND STRUCTURES

Trial Pit

TP202

PHOTO PAGE

Hole Type	Easting	Northing	Ground Level (m)	Scale
TP	394927.00	417391.00	167.70	1:25

Project Name	Project No.	Start Date	End Date
Sladen Mill, Littleborough	20403	2024-10-10	2024-10-10

Client
Mere Developments Ltd

Contractor

Consultant
Soil and Structures Ltd



Remarks
PURPOSE: Targeting the western portion of the Site and the location of the highest recorded concentration of PFOA (borehole M4). TERMINATION: Practical refusal of 36 tonne excavator with toothed bucket on intact bedrock. GROUNDWATER: East to west basal flows. STABILITY: Sidewall collapse througout depth. OTHER: Ash present within fill but otherwise no evidence of potentially polluting or harmful material. OTHER: Suspected breccia / fault zone - continuous collapse of side-walls limited further excavation/inspection. LOCATION: Referenced using free-ware on Site. GL: Estimated off May 2021 topographical survey.

Method, Plant, Stability, Dimensions

0.00 - 2.30m TP - Trial Pit 36 tonne tracked
Unstable
L = 2.80m
W = 1.20m

Logger
RB

Checked By: RB **Approved By:** RB **Status:** FINAL

SOIL AND STRUCTURES

Trial Pit

TP202

PHOTO PAGE

Hole Type	Easting	Northing	Ground Level (m)	Scale
TP	394927.00	417391.00	167.70	1:25
Project Name		**Project No.**	**Start Date**	**End Date**
Sladen Mill, Littleborough		20403	2024-10-10	2024-10-10

Client
Mere Developments Ltd

Contractor

Consultant
Soil and Structures Ltd



Remarks
PURPOSE: Targeting the western portion of the Site and the location of the highest recorded concentration of PFOA (borehole M4). TERMINATION: Practical refusal of 36 tonne excavator with toothed bucket on intact bedrock. GROUNDWATER: East to west basal flows. STABILITY: Sidewall collapse througout depth. OTHER: Ash present within fill but otherwise no evidence of potentially polluting or harmful material. OTHER: Suspected breccia / fault zone - continuous collapse of side-walls limited further excavation/inspection. LOCATION: Referenced using free-ware on Site. GL: Estimated off May 2021 topographical survey.

Method, Plant, Stability, Dimensions

0.00 - 2.30m TP - Trial Pit 36 tonne tracked
Unstable
L = 2.80m
W = 1.20m

Logger
RB

Checked By: RB **Approved By:** RB **Status:** FINAL

SOIL AND STRUCTURES

Trial Pit

TP203

Sheet 1 of 1

Hole Type	Easting	Northing	Ground Level (m)	Scale
TP	394987.00	417404.00	169.70	1:25

Project Name	Project No.	Start Date	End Date
Sladen Mill, Littleborough	20403	2024-10-10	2024-10-10

Client
Mere Developments Ltd

Contractor

Consultant
Soil and Structures Ltd

Inst/ Backfill	Water Levels	Samples and Tests: Depth (m)	Samples and Tests: Type/ Ref	Samples and Tests: Results	Level (m)	Depth (thickness) (m)	Strata: Legend	Strata: Description
		0.75	ES 1			(1.00)		Light yellowish and orangish brown locally grey and dark brown, slightly silty, sandy, gravelly, small to large, angular to sub-rounded COBBLES of sandstone with low boulder content. Sand is fine to coarse. Gravel is fine to coarse angular to sub-angular sandstone and rare mudstone. Boulders are sub-rounded to rounded sandstone up to 900 mm across. [MADE GROUND, REWORKED NATURAL BEDROCK WITH SUSPECTED ALLUVIAL COBBLES AND BOULDERS]
					168.70	1.00		
						(0.25)		Light yellowish brown with ochre staning, medium strong SANDSTONE recovered as medium to coarse, angular gravel and small, angular cobbles of sandstone. [SANDSTONE, SUSPECTED WOODHEAD HILL ROCK]
					168.45	1.25		*End of Trial Pit at 1.25m*

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0

Remarks
PURPOSE: Targeting the eastern portion of the Site and the ground locally to Spring 1. TERMINATION: Practical refusal of 36 tonne excavator with toothed bucket on intact bedrock. GROUNDWATER: East to west basal flows. STABILITY: Spalling througout depth. OTHER: No evidence of potentially polluting or harmful material. LOCATION: Referenced using free-ware on Site. GL: Estimated off May 2021 topographical survey.

Method, Plant, Stability, Dimensions
0.00 - 1.25m TP - Trial Pit 36 tonne tracked
Unstable
L = 2.20m
W = 1.20m

Logger
RB

Checked By: RB **Approved By:** RB **Status:** FINAL

SOIL AND STRUCTURES

Trial Pit

TP203

SUPPLEMENTARY INFO

Hole Type	Easting	Northing	Ground Level (m)	Scale
TP	394987.00	417404.00	169.70	1:25

Project Name	Project No.	Start Date	End Date
Sladen Mill, Littleborough	20403	2024-10-10	2024-10-10

Client	Contractor	Consultant
Mere Developments Ltd		Soil and Structures Ltd

Water Strike - General

Struck (m)	Seal Depth (m)	Casing Depth (m)	Date and Time	Remarks
0.30				

Water Strike - Details

Struck (m)	Rose To (m)	Time (mins)	Remarks
0.30	1.20	20	Two distinct medium rate, low volume flow points on eastern face of excavation flowing towards west and te...

Remarks

PURPOSE: Targeting the eastern portion of the Site and the ground locally to Spring 1. TERMINATION: Practical refusal of 36 tonne excavator with toothed bucket on intact bedrock. GROUNDWATER: East to west basal flows. STABILITY: Spalling througout depth. OTHER: No evidence of potentially polluting or harmful material. LOCATION: Referenced using free-ware on Site. GL: Estimated off May 2021 topographical survey.

Method, Plant, Stability, Dimensions **Logger**

0.00 - 1.25m TP - Trial Pit 36 tonne tracked RB
Unstable

Checked By: RB **Approved By:** RB **Status:** FINAL

SOIL AND STRUCTURES

Trial Pit

TP203

PHOTO PAGE

Hole Type	Easting	Northing	Ground Level (m)	Scale
TP	394987.00	417404.00	169.70	1:25

Project Name	Project No.	Start Date	End Date
Sladen Mill, Littleborough	20403	2024-10-10	2024-10-10

Client
Mere Developments Ltd

Contractor

Consultant
Soil and Structures Ltd



Remarks
PURPOSE: Targeting the eastern portion of the Site and the ground locally to Spring 1. TERMINATION: Practical refusal of 36 tonne excavator with toothed bucket on intact bedrock. GROUNDWATER: East to west basal flows. STABILITY: Spalling througout depth. OTHER: No evidence of potentially polluting or harmful material. LOCATION: Referenced using free-ware on Site. GL: Estimated off May 2021 topographical survey.

Method, Plant, Stability, Dimensions

0.00 - 1.25m TP - Trial Pit 36 tonne tracked
Unstable
L = 2.20m
W = 1.20m

Logger
RB

Checked By: RB **Approved By:** RB **Status:** FINAL

SOIL AND STRUCTURES

Trial Pit

TP203

PHOTO PAGE

Hole Type	Easting	Northing	Ground Level (m)	Scale
TP	394987.00	417404.00	169.70	1:25

Project Name	Project No.	Start Date	End Date
Sladen Mill, Littleborough	20403	2024-10-10	2024-10-10

Client
Mere Developments Ltd

Contractor

Consultant
Soil and Structures Ltd



Remarks
PURPOSE: Targeting the eastern portion of the Site and the ground locally to Spring 1. TERMINATION: Practical refusal of 36 tonne excavator with toothed bucket on intact bedrock. GROUNDWATER: East to west basal flows. STABILITY: Spalling througout depth. OTHER: No evidence of potentially polluting or harmful material. LOCATION: Referenced using free-ware on Site. GL: Estimated off May 2021 topographical survey.

Method, Plant, Stability, Dimensions **Logger**

0.00 - 1.25m TP - Trial Pit 36 tonne tracked RB
Unstable
L = 2.20m
W = 1.20m

Checked By: RB **Approved By:** RB **Status:** FINAL

SOIL AND STRUCTURES

Trial Pit

TP204

Sheet 1 of 1

Hole Type	Easting	Northing	Ground Level (m)	Scale
TP	395006.00	417347.00	170.00	1:25

Project Name	Project No.	Start Date	End Date
Sladen Mill, Littleborough	20403	2024-10-10	2024-10-10

Client
Mere Developments Ltd

Contractor

Consultant
Soil and Structures Ltd

Inst/ Backfill	Water Levels	Samples and Tests: Depth (m)	Samples and Tests: Type/ Ref	Samples and Tests: Results	Level (m)	Depth (thickness) (m)	Strata: Legend	Strata: Description
						(2.30)		Grey, dark grey and dark brown, slightly silty, very sandy, gravelly, fine to coarse, angular to sub-angular GRAVEL of sandstone, brick and concrete with medium cobble content. Sand is fine to coarse. Cobbles are small to medium angular to sub-angular sandstone and rare concrete and brick. [MADE GROUND, DEMOLITION ARISINGS (SUSPECTED 6F2)]
		1.50	ES 1					
	▼	2.50	ES 2		167.70	2.30		Light yellowish brown with ochre staning, weak to very weak SANDSTONE recovered as very sandy, medium to coarse, angular gravel and small, angular cobbles of sandstone. [SANDSTONE, SUSPECTED WOODHEAD HILL ROCK]
						(0.30)		
					167.40	2.60		*End of Trial Pit at 2.60m*

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0

Remarks
PURPOSE: Targeting the southern portion of the Site and former reservoir. TERMINATION: Practical refusal of 36 tonne excavator with toothed bucket on intact bedrock. GROUNDWATER: East to west basal flows. STABILITY: Spalling througout depth. OTHER: No evidence of potentially polluting or harmful material. LOCATION: Referenced using free-ware on Site. GL: Estimated off May 2021 topographical survey - TREAT WITH CAUTION - level changes across this portion of the Site.

Method, Plant, Stability, Dimensions
0.00 - 2.60m TP - Trial Pit 36 tonne tracked
Unstable
L = 2.60m
W = 1.20m

Logger
RB

Checked By: RB **Approved By:** RB **Status:** FINAL

SOIL AND STRUCTURES

Trial Pit

TP204

SUPPLEMENTARY INFO

Hole Type	Easting	Northing	Ground Level (m)	Scale
TP	395006.00	417347.00	170.00	1:25

Project Name	Project No.	Start Date	End Date
Sladen Mill, Littleborough	20403	2024-10-10	2024-10-10

Client	Contractor	Consultant
Mere Developments Ltd		Soil and Structures Ltd

Water Strike - General

Struck (m)	Seal Depth (m)	Casing Depth (m)	Date and Time	Remarks
2.50				

Water Strike - Details

Struck (m)	Rose To (m)	Time (mins)	Remarks
2.50	2.50	20	Medium rate, medium volume flows from east to west across base of excavation.

Remarks

PURPOSE: Targeting the southern portion of the Site and former reservoir. TERMINATION: Practical refusal of 36 tonne excavator with toothed bucket on intact bedrock. GROUNDWATER: East to west basal flows. STABILITY: Spalling througout depth. OTHER: No evidence of potentially polluting or harmful material. LOCATION: Referenced using free-ware on Site. GL: Estimated off May 2021 topographical survey - TREAT WITH CAUTION - level changes across this portion of the Site.

Method, Plant, Stability, Dimensions **Logger**

0.00 - 2.60m TP - Trial Pit 36 tonne tracked RB
Unstable
L = 2.60m
W = 1.20m

Checked By: RB **Approved By:** RB **Status:** FINAL

SOIL AND STRUCTURES

Trial Pit

TP204

PHOTO PAGE

Hole Type	Easting	Northing	Ground Level (m)	Scale
TP	395006.00	417347.00	170.00	1:25
Project Name		**Project No.**	**Start Date**	**End Date**
Sladen Mill, Littleborough		20403	2024-10-10	2024-10-10

Client
Mere Developments Ltd

Contractor

Consultant
Soil and Structures Ltd



Remarks
PURPOSE: Targeting the southern portion of the Site and former reservoir. TERMINATION: Practical refusal of 36 tonne excavator with toothed bucket on intact bedrock. GROUNDWATER: East to west basal flows. STABILITY: Spalling througout depth. OTHER: No evidence of potentially polluting or harmful material. LOCATION: Referenced using free-ware on Site. GL: Estimated off May 2021 topographical survey - TREAT WITH CAUTION - level changes across this portion of the Site.

Method, Plant, Stability, Dimensions

0.00 - 2.60m TP - Trial Pit 36 tonne tracked
Unstable
L = 2.60m
W = 1.20m

Logger
RB

Checked By: RB **Approved By:** RB **Status:** FINAL

SOIL AND STRUCTURES

Trial Pit

TP204

PHOTO PAGE

Hole Type	Easting	Northing	Ground Level (m)	Scale
TP	395006.00	417347.00	170.00	1:25
Project Name		**Project No.**	**Start Date**	**End Date**
Sladen Mill, Littleborough		20403	2024-10-10	2024-10-10

Client
Mere Developments Ltd

Contractor

Consultant
Soil and Structures Ltd



Remarks
PURPOSE: Targeting the southern portion of the Site and former reservoir. TERMINATION: Practical refusal of 36 tonne excavator with toothed bucket on intact bedrock. GROUNDWATER: East to west basal flows. STABILITY: Spalling througout depth. OTHER: No evidence of potentially polluting or harmful material. LOCATION: Referenced using free-ware on Site. GL: Estimated off May 2021 topographical survey - TREAT WITH CAUTION - level changes across this portion of the Site.

Method, Plant, Stability, Dimensions **Logger**

0.00 - 2.60m TP - Trial Pit 36 tonne tracked RB
Unstable
L = 2.60m
W = 1.20m

Checked By: RB **Approved By:** RB **Status:** FINAL

SOIL AND STRUCTURES

Trial Pit

TP205

Sheet 1 of 1

Hole Type	Easting	Northing	Ground Level (m)	Scale
TP	394969.00	417434.00	177.00	1:25
Project Name		**Project No.**	**Start Date**	**End Date**
Sladen Mill, Littleborough		20403	2024-10-10	2024-10-10

Client
Mere Developments Ltd

Contractor

Consultant
Soil and Structures Ltd

Inst/ Backfill	Water Levels	Samples and Tests: Depth (m)	Samples and Tests: Type/ Ref	Samples and Tests: Results	Level (m)	Depth (thickness) (m)	Strata: Legend	Strata: Description
						(0.20)		Black, bound bitumenous gravel over light whitish grey medium to coarse GRAVEL of limestone (SUB-BASE). [MADE GROUND, HARDSTANDING]
					176.80	0.20		Brown, dark brown and light yellowish brown, ashy, slightly silty, gravelly, fine to coarse SAND with medium cobble content. Gravel is fine to coarse angular to sub-rounded sandstone, brick and infrequent amorphous clinker. Cobbles are small to large sub-angular to rounded sandstone and rare concrete and brick. [MADE GROUND, DEMOLITION ARISINGS WITH REWORKED NATURAL BEDROCK]
						(1.40)		
		1.60	ES 1		175.40	1.60		Light yellowish brown with ochre staning, extremely weak to weak SANDSTONE recovered as very sandy, medium to coarse, angular gravel and small, angular cobbles of sandstone. [SANDSTONE, SUSPECTED WOODHEAD HILL ROCK]
						(0.80)		
		2.40	ES 2		174.60	2.40		*End of Trial Pit at 2.40m*

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0

Remarks
PURPOSE: Targeting the upper portion of the Site. TERMINATION: Practical refusal of 36 tonne excavator with toothed bucket on intact bedrock. GROUNDWATER: None encountered. STABILITY: Localised spalling in the Made Ground. OTHER: Ash present within fill but otherwise no evidence of potentially polluting or harmful material. LOCATION: Referenced using free-ware on Site. GL: Estimated off May 2021 topographical survey.

Method, Plant, Stability, Dimensions
0.00 - 2.40m TP - Trial Pit 36 tonne tracked
Unstable
L = 2.60m
W = 1.20m

Logger
RB

Checked By: RB **Approved By:** RB **Status:** FINAL

Created using Pebble Geo

SOIL AND STRUCTURES

Trial Pit

TP205

PHOTO PAGE

Hole Type	Easting	Northing	Ground Level (m)	Scale
TP	394969.00	417434.00	177.00	1:25

Project Name	Project No.	Start Date	End Date
Sladen Mill, Littleborough	20403	2024-10-10	2024-10-10

Client
Mere Developments Ltd

Contractor

Consultant
Soil and Structures Ltd



Remarks
PURPOSE: Targeting the upper portion of the Site. TERMINATION: Practical refusal of 36 tonne excavator with toothed bucket on intact bedrock. GROUNDWATER: None encountered. STABILITY: Localised spalling in the Made Ground. OTHER: Ash present within fill but otherwise no evidence of potentially polluting or harmful material. LOCATION: Referenced using free-ware on Site. GL: Estimated off May 2021 topographical survey.

Method, Plant, Stability, Dimensions

0.00 - 2.40m TP - Trial Pit 36 tonne tracked
Unstable
L = 2.60m
W = 1.20m

Logger
RB

Checked By: RB **Approved By:** RB **Status:** FINAL

SOIL AND STRUCTURES

Trial Pit

TP206

Sheet 1 of 1

Hole Type	Easting	Northing	Ground Level (m)	Scale
TP	395007.00	417406.00	178.25	1:25
Project Name		**Project No.**	**Start Date**	**End Date**
Sladen Mill, Littleborough		20403	2024-10-10	2024-10-10

Client
Mere Developments Ltd

Contractor

Consultant
Soil and Structures Ltd

Inst/ Backfill	Water Levels	Samples and Tests: Depth (m)	Samples and Tests: Type/ Ref	Samples and Tests: Results	Level (m)	Depth (thickness) (m)	Strata: Legend	Strata: Description
								Dark grey and dark brown SAND and GRAVEL of ash and clinker. Sand is fine to coarse. Gravel is fine to medium amorphous clinker and infrequent angular brick. [MADE GROUND, RESERVOIR FILL]
								Sandstone wall in side-wall of excavation formed of sub-angular large sandstone cobbles. (0.30 - 1.00m)
						(1.20)		
		1.00	ES 1					
					177.05	1.20		Light greyish brown slightly sandy, slightly gravelly CLAY with soft consistency. Sand is fine to coarse. Gravel is fine to coarse, angular to sub-rounded sandstone and infrequent brick. [MADE GROUND, RESERVOIR FILL]
						(0.80)		
					176.25	2.00		
						(0.10)		Dark greyish brown organic SILT with psuedofiberous organic content. [SUSPECTED ALLUVIUM, SUSPECTED RESERVOIR BASE]
					176.15	2.10		
						(0.10)		Light whitish grey slightly clayey slightly sandy SILT. Sand is fine to medium. [SUSPECTED ALLUVIUM, SUSPECTED RESERVOIR BASE. POSSIBLE 'PUDDLE CLAY']
					176.05	2.20		
								Light yellowish brown with ochre staning, extremely weak to weak SANDSTONE recovered as very sandy, medium to coarse, angular gravel and small, angular cobbles of sandstone. [SANDSTONE, SUSPECTED WOODHEAD HILL ROCK]
		2.60	ES 2			(0.70)		
					175.35	2.90		*End of Trial Pit at 2.90m*

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0

Remarks
PURPOSE: Targeting the upper portion of the Site, the former reservoir and ground up-gradient of Spring 1. TERMINATION: Practical refusal of 36 tonne excavator with toothed bucket on intact bedrock. GROUNDWATER: None encountered. STABILITY: Localised spalling in the Made Ground. OTHER: Ash present within fill but otherwise no evidence of potentially polluting or harmful material. LOCATION: Referenced using free-ware on Site. GL: Estimated off May 2021 topographical survey.

Method, Plant, Stability, Dimensions
0.00 - 2.90m TP - Trial Pit 36 tonne tracked
Unstable
L = 2.80m
W = 1.20m

Logger
RB

Checked By: RB **Approved By:** RB **Status:** FINAL

SOIL AND STRUCTURES

Trial Pit

TP206

PHOTO PAGE

Hole Type	Easting	Northing	Ground Level (m)	Scale
TP	395007.00	417406.00	178.25	1:25
Project Name		**Project No.**	**Start Date**	**End Date**
Sladen Mill, Littleborough		20403	2024-10-10	2024-10-10

Client
Mere Developments Ltd

Contractor

Consultant
Soil and Structures Ltd



Remarks
PURPOSE: Targeting the upper portion of the Site, the former reservoir and ground up-gradient of Spring 1. TERMINATION: Practical refusal of 36 tonne excavator with toothed bucket on intact bedrock. GROUNDWATER: None encountered. STABILITY: Localised spalling in the Made Ground. OTHER: Ash present within fill but otherwise no evidence of potentially polluting or harmful material. LOCATION: Referenced using free-ware on Site. GL: Estimated off May 2021 topographical survey.

Method, Plant, Stability, Dimensions

0.00 - 2.90m TP - Trial Pit 36 tonne tracked
Unstable
L = 2.80m
W = 1.20m

Logger
RB

Checked By: RB **Approved By:** RB **Status:** FINAL

SOIL AND STRUCTURES

Trial Pit

TP206

PHOTO PAGE

Hole Type	Easting	Northing	Ground Level (m)	Scale
TP	395007.00	417406.00	178.25	1:25
Project Name		**Project No.**	**Start Date**	**End Date**
Sladen Mill, Littleborough		20403	2024-10-10	2024-10-10

Client
Mere Developments Ltd

Contractor

Consultant
Soil and Structures Ltd



Remarks
PURPOSE: Targeting the upper portion of the Site, the former reservoir and ground up-gradient of Spring 1. TERMINATION: Practical refusal of 36 tonne excavator with toothed bucket on intact bedrock. GROUNDWATER: None encountered. STABILITY: Localised spalling in the Made Ground. OTHER: Ash present within fill but otherwise no evidence of potentially polluting or harmful material. LOCATION: Referenced using free-ware on Site. GL: Estimated off May 2021 topographical survey.

Method, Plant, Stability, Dimensions

0.00 - 2.90m TP - Trial Pit 36 tonne tracked
Unstable
L = 2.80m
W = 1.20m

Logger
RB

Checked By: RB **Approved By:** RB **Status:** FINAL



TP301



TP301



TP301



TP301



TP301



TP301 (relative to TP206 in foreground)



TP302



TP302



TP302



TP303



TP303



TP303



TP303



TP304



TP305



TP305



TP306



TP306



TP307



TP308



TP308



TP309



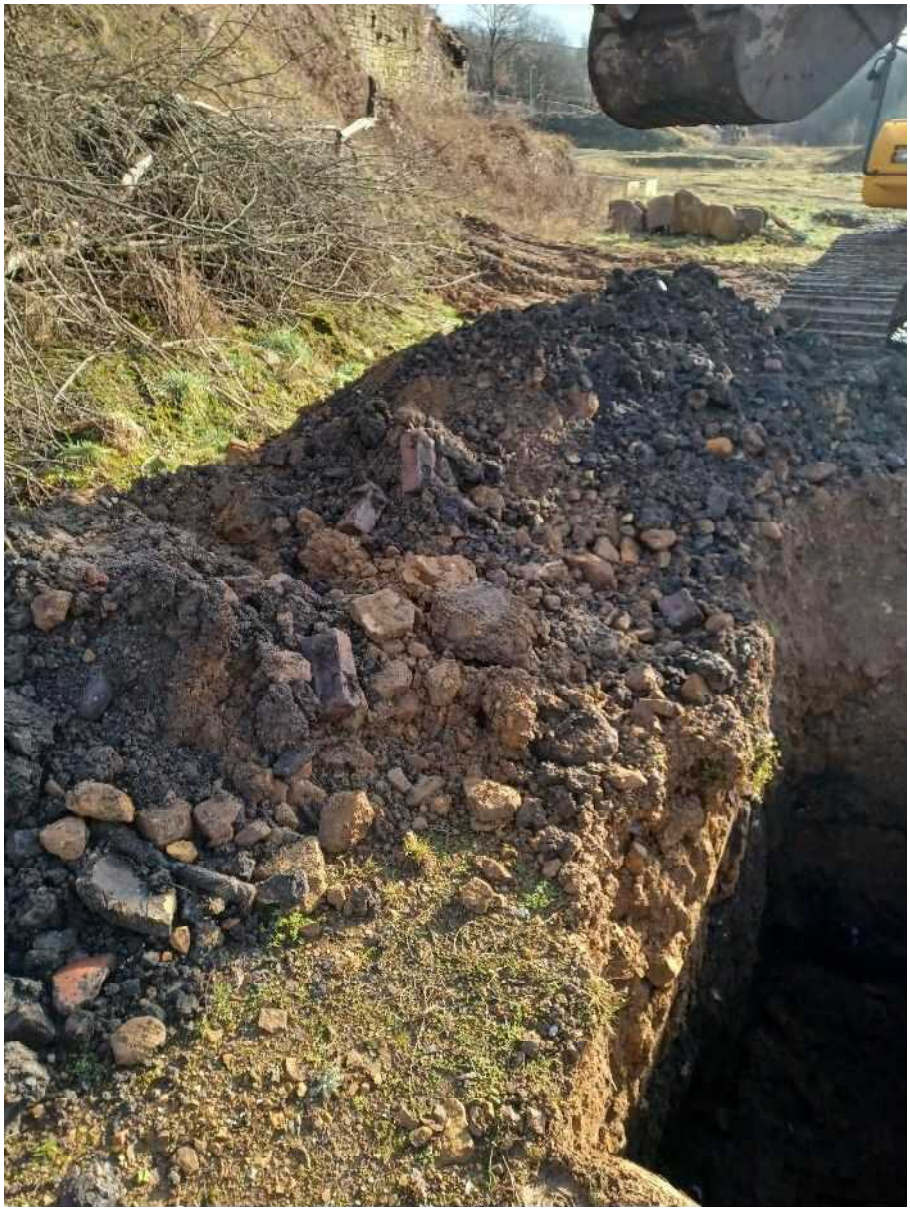
TP309



TP309



TP310



TP310



TP311



TP311



TP311 – Sprin line in burried rockface



TP312



TP312



TP313



TP315



TP315



TP316 – seepage flow of water from eastern edge of pit – towards PFAS impacted spring water



TP316 PFAS impacted spring water (overland flows) present at top of image



TP317 – cobble bed towards base of hole



TP317 – alluvial / river terrace cobbles in arisings



TP318 – cobble bed throughout depth of hole



TP318 – cobbles in arisings



TP319



TP319



TP319 – sandstone bedrock at base of hole



Spring 4 location

Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US
Tel: (01244) 528777
email: hawardencustomerservices@alsglobal.com
Website: www.alsenvironmental.co.uk

Soil and Structures Ltd
89 Moorhead Lane
Shipley
West Yorkshire
BD18 4JW

Attention: Russell Bowman

CERTIFICATE OF ANALYSIS

Date of report Generation:	25 November 2024
Customer:	Soil and Structures Ltd
Sample Delivery Group (SDG):	241012-71
Your Reference:	
Location:	Sladen Mill
Report No:	748012
Order Number:	

This report has been revised and directly supersedes 747601 in its entirety.

We received 13 samples on Saturday October 12, 2024 and 13 of these samples were scheduled for analysis which was completed on Monday November 25, 2024. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Laboratories (UK) Limited Hawarden.

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.
Incorrect sampling dates and/or sample information will affect the validity of results.
The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Lauren Ellis
General Manager Western Europe Environmental

CERTIFICATE OF ANALYSIS

SDG: 241012-71 Report Number: 748012 Superseded Report: 747601
Client Ref.: Location: Sladen Mill

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
30510932	SPRING 1			10/10/2024
30510933	TB			10/10/2024
30510934	TP201		1.50	10/10/2024
30510935	TP201		3.00	10/10/2024
30510936	TP202		1.50	10/10/2024
30510938	TP202		2.00	10/10/2024
30510940	TP203		0.75	10/10/2024
30510941	TP204		1.50	10/10/2024
30510942	TP204		2.50	10/10/2024
30510943	TP205		1.00	10/10/2024
30510945	TP205		2.20	10/10/2024
30510946	TP206		1.00	10/10/2024
30510947	TP206		2.60	10/10/2024

Only received samples which have had analysis scheduled will be shown on the following pages.

CERTIFICATE OF ANALYSIS

SDG: 241012-71 **Report Number:** 748012 **Superseded Report:** 747601
Client Ref.: **Location:** Sladen Mill

Results Legend

X Test

N No Determination Possible

Sample Types -
S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water
Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

			Lab Sample No(s)	Customer Sample Reference	AGS Reference	Depth (m)	Container	Sample Type
			30510932	SPRING 1			Digitube fo PFAS analysis.	GW
			30510933	TB			1kg TUB with Handle (ALE260)	S
			30510934	TP201		1.50	1kg TUB with Handle (ALE260)	S
			30510935	TP201		3.00	1kg TUB with Handle (ALE260)	S
			30510936	TP202		1.50	1kg TUB with Handle (ALE260)	S
			30510938	TP202		2.00	1kg TUB with Handle (ALE260)	S
			30510940	TP203		0.75	1kg TUB with Handle (ALE260)	S
			30510941	TP204		1.50	1kg TUB with Handle (ALE260)	S
			30510942	TP204		2.50	1kg TUB with Handle (ALE260)	S
			30510943	TP205		1.00	1kg TUB with Handle (ALE260)	S
			30510945	TP205		2.20	1kg TUB with Handle (ALE260)	S
			30510946	TP206		1.00	1kg TUB with Handle (ALE260)	S
			30510947	TP206		2.60	1kg TUB with Handle (ALE260)	S
PFAS (Post Ox.) Liquids	All	NDPs: 0 Tests: 1	X					
PFAS (Post Ox.) Solids	All	NDPs: 0 Tests: 12		X	X	X	X	X	X	X	X	X	X	X	X	X
PFAS Liquids (Full Suite)	All	NDPs: 0 Tests: 1	X					
PFAS Solids	All	NDPs: 0 Tests: 12		X	X	X	X	X	X	X	X	X	X	X	X	X
Sample description	All	NDPs: 0 Tests: 12		X	X	X	X	X	X	X	X	X	X	X	X	X

CERTIFICATE OF ANALYSIS

SDG: 241012-71 Report Number: 748012 Superseded Report: 747601
Client Ref.: Location: Sladen Mill

Sample Descriptions

Grain Sizes

very fine	<0.063mm	fine	0.063mm - 0.1mm	medium	0.1mm - 2mm	coarse	2mm - 10mm	very coarse	>10mm

Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Description	Inclusions	Inclusions 2
30510933	TB		Cream	Sand	None	None
30510934	TP201	1.50	Dark Brown	Sandy Clay Loam	Stones	Vegetation
30510935	TP201	3.00	Dark Brown	Loamy Sand	Stones	Vegetation
30510936	TP202	1.50	Dark Brown	Sandy Clay Loam	Stones	Brick
30510938	TP202	2.00	Light Brown	Sandy Clay Loam	Stones	None
30510940	TP203	0.75	Light Brown	Loamy Sand	Stones	None
30510941	TP204	1.50	Dark Brown	Sandy Clay Loam	Stones	Brick
30510942	TP204	2.50	Dark Brown	Sandy Clay Loam	Stones	None
30510943	TP205	1.00	Dark Brown	Sand	Stones	None
30510945	TP205	2.20	Light Brown	Sand	Stones	None
30510946	TP206	1.00	Black	Sand	Stones	Crushed Brick
30510947	TP206	2.60	Light Brown	Sand	Stones	None

These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally ocurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

CERTIFICATE OF ANALYSIS

SDG: 241012-71 **Report Number:** 748012 **Superseded Report:** 747601
Client Ref.: **Location:** Sladen Mill

Results Legend
- # ISO17025 accredited.
- M mCERTS accredited.
- aq Aqueous / settled sample.
- diss.filt Dissolved / filtered sample.
- tot.unfilt Total / unfiltered sample.
- * Subcontracted - refer to subcontractor report for accreditation status.
- ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
- (F) Trigger breach confirmed
- 1-4♦§@ Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	SPRING 1	TB	TP201	TP201	TP202	TP202
			Depth (m)	.	.	1.50	3.00	1.50	2.00
			Sample Type	Ground Water (GW)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
			Date Sampled	10/10/2024	10/10/2024	10/10/2024	10/10/2024	10/10/2024	10/10/2024
			Sample Time	.	.	.	.	.	.
			Date Received	12/10/2024	12/10/2024	12/10/2024	12/10/2024	12/10/2024	12/10/2024
			SDG Ref	241012-71	241012-71	241012-71	241012-71	241012-71	241012-71
			Lab Sample No.(s)	30510932	30510933	30510934	30510935	30510936	30510938
			AGS Reference						
PFBA (Post Ox.) (375-22-4)	<4 ng/l	TM405		<20					
PFPA (Post Ox.) (2706-90-3)	<2 ng/l	TM405		<10					
PFHxA (Post Ox.) (307-24-4)	<2 ng/l	TM405		37					
PFBS (Post Ox.) (375-73-5)	<2 ng/l	TM405		<10					
PFHpA (Post Ox.) (375-85-9)	<2 ng/l	TM405		68					
6:2 FTS (Post Ox.) (27619-97-2)	<2 ng/l	TM405		<10					
PFOA (Post Ox.) (335-67-1)	<2 ng/l	TM405		3010					
PFHxS (Post Ox.) (355-46-4)	<2 ng/l	TM405		<10					
PFNA (Post Ox.) (375-95-1)	<2 ng/l	TM405		<10					
PFHpS (Post Ox.) (375-92-8)	<2 ng/l	TM405		<10					
PFDA (Post Ox.) (335-76-2)	<2 ng/l	TM405		<10					
Linear PFOS (Post Ox.) (1763-23-1)	<2 ng/l	TM405		<10					
Branched PFOS (Post Ox.)	<2 ng/l	TM405		<10					
PFUnA (Post Ox.) (2058-94-8)	<2 ng/l	TM405		<10					
PFDoA (Post Ox.) (307-55-1)	<2 ng/l	TM405		<10					
PFOSA (Post Ox.) (754-91-6)	<4 ng/l	TM405		<20					
PFDS (Post Ox.) (335-77-3)	<2 ng/l	TM405		<10					
PFPeS (Post Ox.) (2706-91-4)	<2 ng/l	TM405		<10					
Total PFOS (Post Ox.)	<2 ng/l	TM405		<10					
PFBA (375-22-4)	<2 ng/l	TM434		4.63 @ #					
PFPA (2706-90-3)	<1 ng/l	TM434		5.32 @ #					
PFBS (375-73-5)	<1 ng/l	TM434		1.6 @ #					
PFHxA (307-24-4)	<1 ng/l	TM434		30.5 @ #					
PFHpA (375-85-9)	<1 ng/l	TM434		58.6 @ #					
PFPeS (2706-91-4)	<1 ng/l	TM434		<1 @ #					
6:2 FTS (27619-97-2)	<1 ng/l	TM434		<1 @ #					
PFOA (335-67-1)	<0.65 ng/l	TM434		1190 @ #					
PFHxS (355-46-4)	<1 ng/l	TM434		1.15 @ #					
PFNA (375-95-1)	<1 ng/l	TM434		<1 @ #					
PFHpS (375-92-8)	<1 ng/l	TM434		<1 @ #					
PFDA (335-76-2)	<2 ng/l	TM434		<2 @ #					
Linear PFOS (1763-23-1)	<0.65 ng/l	TM434		1.59 @ #					
Branched PFOS	<0.65 ng/l	TM434		2.09 @ #					

CERTIFICATE OF ANALYSIS

SDG: 241012-71 **Report Number:** 748012 **Superseded Report:** 747601
Client Ref.: **Location:** Sladen Mill

Results Legend
ISO17025 accredited.
M mCERTS accredited.
aq Aqueous / settled sample.
diss.filt Dissolved / filtered sample.
tot.unfilt Total / unfiltered sample.
* Subcontracted - refer to subcontractor report for accreditation status.
** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F) Trigger breach confirmed
1-4+§@ Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	SPRING 1	TB	TP201	TP201	TP202	TP202
			Depth (m)	.	.	1.50	3.00	1.50	2.00
			Sample Type	Ground Water (GW)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
			Date Sampled	10/10/2024	10/10/2024	10/10/2024	10/10/2024	10/10/2024	10/10/2024
			Sample Time	.	.	.	.	.	.
			Date Received	12/10/2024	12/10/2024	12/10/2024	12/10/2024	12/10/2024	12/10/2024
			SDG Ref	241012-71	241012-71	241012-71	241012-71	241012-71	241012-71
			Lab Sample No.(s)	30510932	30510933	30510934	30510935	30510936	30510938
			AGS Reference						
PFUnA (2058-94-8)	<2 ng/l	TM434		<2 @ #					
PFDoA (307-55-1)	<2 ng/l	TM434		<2 @ #					
PFDS (335-77-3)	<2 ng/l	TM434		<2 @ #					
PFOSA (754-91-6)	<2 ng/l	TM434		<2 @ #					
Total PFOS	<0.65 ng/l	TM434		3.68 @ #					
Moisture Content Ratio (% of as received sample)	%	PM024			0	9.4	17	17	15
PFBA (375-22-4) Perfluoro-n-butanoic acid	<3 µg/kg	TM338			<3	<3	<3	<3	<3
PFPA (2706-90-3) Perfluoro-n-pentanoic acid	<3 µg/kg	TM338			<3	<3	<3	<3	<3
PFHxA (307-24-4) Perfluoro-n-hexanoic acid	<2 µg/kg	TM338			<2	<2	<2	<2	<2
PFBS (375-73-5) Perfluoro-1-butanesulfonate	<1 µg/kg	TM338			<1	<1	<1	<1	<1
PFHpA (375-85-9) Perfluoro-n-heptanoic acid	<1 µg/kg	TM338			<1	<1	<1	<1	<1
PFOA (335-67-1) Perfluoro-n-octanoic acid	<1 µg/kg	TM338			<1	<1	<1	<1	<1
PFHxS (355-46-4) Perfluoro-1-hexanesulfonate	<1 µg/kg	TM338			<1	<1	<1	<1	<1
PFNA (375-95-1) Perfluoro-n-nonanoic acid	<1 µg/kg	TM338			<1	<1	<1	<1	<1
PFHpS (375-92-8) Perfluoro-1-heptanesulfonate	<1 µg/kg	TM338			<1	<1	<1	<1	<1
PFDA (335-76-2) Perfluoro-n-decanoic acid	<1 µg/kg	TM338			<1	<1	<1	<1	<1
Linear PFOS(1763-23-1) Perfluoro-1-octanesulfonate	<1 µg/kg	TM338			<1	<1	<1	<1	<1
Branched PFOS	<1 µg/kg	TM338			<1	<1	<1	<1	<1
PFUnA (2058-94-8) Perfluoro-n-undecanoic acid	<1 µg/kg	TM338			<1	<1	<1	<1	<1
PFDoA (307-55-1) Perfluoro-n-dodecanoic acid	<1 µg/kg	TM338			<1	<1	<1	<1	<1
PFOSA (754-91-6) Perfluoro-octanesulfonamide	<1 µg/kg	TM338			<1	<1	<1	<1	<1
6:2-FTS (27619-97-2)	<1 µg/kg	TM338			<1	<1	<1	<1	<1
PFDS (335-73-3) Perfluoro-1-decanesulfonate	<1 µg/kg	TM338			<1	<1	<1	<1	<1
PFPeS (2706-91-4) Perfluoro-1-pentanesulfonate	<1 µg/kg	TM338			<1	<1	<1	<1	<1
Total PFOS	<1 µg/kg	TM338			<1	<1	<1	<1	<1
PFBA (Post Ox.) Perfluoro-n-butanoic acid	<3 µg/kg	TM428			<3	<3	<3	<3	<3
PFPA (Post Ox.) Perfluoro-n-pentanoic acid	<3 µg/kg	TM428			<3	<3	<3	<3	<3
PFHxA (Post Ox.) Perfluoro-n-hexanoic acid	<2 µg/kg	TM428			<2	<2	<2	<2	<2
PFBS (Post Ox.) Perfluoro-1-butanesulfonate	<1 µg/kg	TM428			<1	<1	<1	<1	<1
PFHpA (Post Ox.) Perfluoro-n-heptanoic acid	<1 µg/kg	TM428			<1	<1	<1	<1	<1
6:2 FTS (Post Ox.) Perfluoro-octane sulfonate 6:2	<1 µg/kg	TM428			<1	<1	<1	<1	<1
PFOA (Post Ox.) Perfluoro-n-octanoic acid	<1 µg/kg	TM428			<1	<1	<1	<1	<1
PFHxS (Post Ox.) Perfluoro-1-hexanesulfonate	<1 µg/kg	TM428			<1	<1	<1	<1	<1

CERTIFICATE OF ANALYSIS

SDG: 241012-71 **Report Number:** 748012 **Superseded Report:** 747601

Client Ref.: **Location:** Sladen Mill

Results Legend

#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted - refer to subcontractor report for accreditation status.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-4+§@	Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	SPRING 1	TB	TP201	TP201	TP202	TP202
			Depth (m)	.	.	1.50	3.00	1.50	2.00
			Sample Type	Ground Water (GW)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
			Date Sampled	10/10/2024	10/10/2024	10/10/2024	10/10/2024	10/10/2024	10/10/2024
			Sample Time	.	.	.	.	.	.
			Date Received	12/10/2024	12/10/2024	12/10/2024	12/10/2024	12/10/2024	12/10/2024
			SDG Ref	241012-71	241012-71	241012-71	241012-71	241012-71	241012-71
			Lab Sample No.(s)	30510932	30510933	30510934	30510935	30510936	30510938
			AGS Reference						
PFNA (Post Ox.) Perfluoro-n-nonanoic acid	<1 µg/kg	TM428			<1	<1	<1	<1	<1
PFHpS (Post Ox.) Perfluoro-1-heptanesulfonate	<1 µg/kg	TM428			<1	<1	<1	<1	<1
PFDA (Post Ox.) Perfluoro-n-decanoic acid	<1 µg/kg	TM428			<1	<1	<1	<1	<1
Linear PFOS (Post Ox.) Perfluoro-1-octanesulfonate	<1 µg/kg	TM428			<1	<1	<1	<1	<1
Branched PFOS (Post Ox.)	<1 µg/kg	TM428			<1	<1	<1	<1	<1
PFUnA (Post Ox.) Perfluoro-n-undecanoic acid	<1 µg/kg	TM428			<1	<1	<1	<1	<1
PFDoA (Post Ox.) Perfluoro-n-dodecanoic acid	<1 µg/kg	TM428			<1	<1	<1	<1	<1
PFOSA (Post Ox.) Perfluoro-octanesulfonamide	<1 µg/kg	TM428			<1	<1	<1	<1	<1
PFDS (Post Ox.) Perfluoro-1-decanesulfonate	<1 µg/kg	TM428			<1	<1	<1	<1	<1
PFPeS (Post Ox.) Perfluoro-1-pentanesulfonate	<1 µg/kg	TM428			<1	<1	<1	<1	<1
Total PFOS (Post Ox.)	<2 µg/kg	TM428			<2	<2	<2	<2	<2

CERTIFICATE OF ANALYSIS

SDG: 241012-71 **Report Number:** 748012 **Superseded Report:** 747601
Client Ref.: **Location:** Sladen Mill

Results Legend
ISO17025 accredited.
M mCERTS accredited.
aq Aqueous / settled sample.
diss.filt Dissolved / filtered sample.
tot.unfilt Total / unfiltered sample.
* Subcontracted - refer to subcontractor report for accreditation status.
** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F) Trigger breach confirmed
1-4+§@ Sample deviation (see appendix)

Customer Sample Ref.	TP203	TP204	TP204	TP205	TP205	TP206
Depth (m)	0.75	1.50	2.50	1.00	2.20	1.00
Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
Date Sampled	10/10/2024	10/10/2024	10/10/2024	10/10/2024	10/10/2024	10/10/2024
Sample Time	.	.	.	.	.	.
Date Received	12/10/2024	12/10/2024	12/10/2024	12/10/2024	12/10/2024	12/10/2024
SDG Ref	241012-71	241012-71	241012-71	241012-71	241012-71	241012-71
Lab Sample No.(s)	30510940	30510941	30510942	30510943	30510945	30510946
AGS Reference						

Component	LOD/Units	Method						
Moisture Content Ratio (% of as received sample)	%	PM024	10	13	11	10	16	21
PFBA (375-22-4) Perfluoro-n-butanoic acid	<3 µg/kg	TM338	<3	<3	<3	<3	<3	<3
PFPA (2706-90-3) Perfluoro-n-pentanoic acid	<3 µg/kg	TM338	<3	<3	<3	<3	<3	<3
PFHxA (307-24-4) Perfluoro-n-hexanoic acid	<2 µg/kg	TM338	<2	<2	<2	<2	<2	<2
PFBS (375-73-5) Perfluoro-1-butanesulfonate	<1 µg/kg	TM338	<1	<1	<1	<1	<1	<1
PFHpA (375-85-9) Perfluoro-n-heptanoic acid	<1 µg/kg	TM338	<1	<1	<1	<1	<1	<1
PFOA (335-67-1) Perfluoro-n-octanoic acid	<1 µg/kg	TM338	<1	<1	<1	<1	<1	27.5
PFHxS (355-46-4) Perfluoro-1-hexanesulfonate	<1 µg/kg	TM338	<1	<1	<1	<1	<1	<1
PFNA (375-95-1) Perfluoro-n-nonanoic acid	<1 µg/kg	TM338	<1	<1	<1	<1	<1	<1
PFHpS (375-92-8) Perfluoro-1-heptanesulfonate	<1 µg/kg	TM338	<1	<1	<1	<1	<1	<1
PFDA (335-76-2) Perfluoro-n-decanoic acid	<1 µg/kg	TM338	<1	<1	<1	<1	<1	<1
Linear PFOS(1763-23-1) Perfluoro-1-octanesulfonate	<1 µg/kg	TM338	<1	<1	<1	<1	<1	<1
Branched PFOS	<1 µg/kg	TM338	<1	<1	<1	<1	<1	<1
PFUnA (2058-94-8) Perfluoro-n-undecanoic acid	<1 µg/kg	TM338	<1	<1	<1	<1	<1	<1
PFDoA (307-55-1) Perfluoro-n-dodecanoic acid	<1 µg/kg	TM338	<1	<1	<1	<1	<1	<1
PFOSA (754-91-6) Perfluoro-octanesulfonamide	<1 µg/kg	TM338	<1	<1	<1	<1	<1	<1
6:2-FTS (27619-97-2)	<1 µg/kg	TM338	<1	<1	<1	<1	<1	<1
PFDS (335-73-3) Perfluoro-1-decanesulfonate	<1 µg/kg	TM338	<1	<1	<1	<1	<1	<1
PFPeS (2706-91-4) Perfluoro-1-pentanesulfonate	<1 µg/kg	TM338	<1	<1	<1	<1	<1	<1
Total PFOS	<1 µg/kg	TM338	<1	<1	<1	<1	<1	<1
PFBA (Post Ox.) Perfluoro-n-butanoic acid	<3 µg/kg	TM428	<3	<3	<3	<3	<3	<3
PFPA (Post Ox.) Perfluoro-n-pentanoic acid	<3 µg/kg	TM428	<3	<3	<3	<3	<3	<3
PFHxA (Post Ox.) Perfluoro-n-hexanoic acid	<2 µg/kg	TM428	<2	<2	<2	<2	<2	<2
PFBS (Post Ox.) Perfluoro-1-butanesulfonate	<1 µg/kg	TM428	<1	<1	<1	<1	<1	<1
PFHpA (Post Ox.) Perfluoro-n-heptanoic acid	<1 µg/kg	TM428	<1	<1	<1	<1	<1	<1
6:2 FTS (Post Ox.) Perfluoro-octane sulfonate 6:2	<1 µg/kg	TM428	<1	<1	<1	<1	<1	<1
PFOA (Post Ox.) Perfluoro-n-octanoic acid	<1 µg/kg	TM428	<1	<1	<1	<1	<1	<1
PFHxS (Post Ox.) Perfluoro-1-hexanesulfonate	<1 µg/kg	TM428	<1	<1	<1	<1	<1	<1
PFNA (Post Ox.) Perfluoro-n-nonanoic acid	<1 µg/kg	TM428	<1	<1	<1	<1	<1	<1
PFHpS (Post Ox.) Perfluoro-1-heptanesulfonate	<1 µg/kg	TM428	<1	<1	<1	<1	<1	<1
PFDA (Post Ox.) Perfluoro-n-decanoic acid	<1 µg/kg	TM428	<1	<1	<1	<1	<1	<1
Linear PFOS (Post Ox.) Perfluoro-1-octanesulfonate	<1 µg/kg	TM428	<1	<1	<1	<1	<1	<1
Branched PFOS (Post Ox.)	<1 µg/kg	TM428	<1	<1	<1	<1	<1	<1

CERTIFICATE OF ANALYSIS

SDG: 241012-71 **Report Number:** 748012 **Superseded Report:** 747601
Client Ref.: **Location:** Sladen Mill

Results Legend
- # ISO17025 accredited.
- M mCERTS accredited.
- aq Aqueous / settled sample.
- diss.filt Dissolved / filtered sample.
- tot.unfilt Total / unfiltered sample.
- * Subcontracted - refer to subcontractor report for accreditation status.
- ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
- (F) Trigger breach confirmed
- 1-4+§@ Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	TP203	TP204	TP204	TP205	TP205	TP206
			Depth (m)	0.75	1.50	2.50	1.00	2.20	1.00
			Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
			Date Sampled	10/10/2024	10/10/2024	10/10/2024	10/10/2024	10/10/2024	10/10/2024
			Sample Time	.	.	.	.	.	.
			Date Received	12/10/2024	12/10/2024	12/10/2024	12/10/2024	12/10/2024	12/10/2024
			SDG Ref	241012-71	241012-71	241012-71	241012-71	241012-71	241012-71
			Lab Sample No.(s)	30510940	30510941	30510942	30510943	30510945	30510946
			AGS Reference						
PFUnA (Post Ox.) Perfluoro-n-undecanoic acid	<1 µg/kg	TM428		<1	<1	<1	<1	<1	<1
PFDoA (Post Ox.) Perfluoro-n-dodecanoic acid	<1 µg/kg	TM428		<1	<1	<1	<1	<1	<1
PFOSA (Post Ox.) Perfluoro-octanesulfonamide	<1 µg/kg	TM428		<1	<1	<1	<1	<1	<1
PFDS (Post Ox.) Perfluoro-1-decanesulfonate	<1 µg/kg	TM428		<1	<1	<1	<1	<1	<1
PFPeS (Post Ox.) Perfluoro-1-pentanesulfonate	<1 µg/kg	TM428		<1	<1	<1	<1	<1	<1
Total PFOS (Post Ox.)	<2 µg/kg	TM428		<2	<2	<2	<2	<2	<2

CERTIFICATE OF ANALYSIS

SDG: 241012-71 **Report Number:** 748012 **Superseded Report:** 747601
Client Ref.: **Location:** Sladen Mill

Results Legend		
#	ISO17025 accredited.	
M	mCERTS accredited.	
aq	Aqueous / settled sample.	
diss.filt	Dissolved / filtered sample.	
tot.unfilt	Total / unfiltered sample.	
*	Subcontracted - refer to subcontractor report for accreditation status.	
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery	
(F)	Trigger breach confirmed	
1-4+$@	Sample deviation (see appendix)	

Component	LOD/Units	Method	Customer Sample Ref.					
			TP206					
Depth (m)			2.60					
Sample Type			Soil/Solid (S)					
Date Sampled			10/10/2024					
Sample Time			.					
Date Received			12/10/2024					
SDG Ref			241012-71					
Lab Sample No.(s)			30510947					
AGS Reference								
Moisture Content Ratio (% of as received sample)	%	PM024	11					
PFBA (375-22-4) Perfluoro-n-butanoic acid	<3 µg/kg	TM338	<3					
PFPA (2706-90-3) Perfluoro-n-pentanoic acid	<3 µg/kg	TM338	<3					
PFHxA (307-24-4) Perfluoro-n-hexanoic acid	<2 µg/kg	TM338	<2					
PFBS (375-73-5) Perfluoro-1-butanesulfonate	<1 µg/kg	TM338	<1					
PFHpA (375-85-9) Perfluoro-n-heptanoic acid	<1 µg/kg	TM338	<1					
PFOA (335-67-1) Perfluoro-n-octanoic acid	<1 µg/kg	TM338	<1					
PFHxS (355-46-4) Perfluoro-1-hexanesulfonate	<1 µg/kg	TM338	<1					
PFNA (375-95-1) Perfluoro-n-nonanoic acid	<1 µg/kg	TM338	<1					
PFHpS (375-92-8) Perfluoro-1-heptanesulfonate	<1 µg/kg	TM338	<1					
PFDA (335-76-2) Perfluoro-n-decanoic acid	<1 µg/kg	TM338	<1					
Linear PFOS(1763-23-1) Perfluoro-1-octanesulfonate	<1 µg/kg	TM338	<1					
Branched PFOS	<1 µg/kg	TM338	<1					
PFUnA (2058-94-8) Perfluoro-n-undecanoic acid	<1 µg/kg	TM338	<1					
PFDoA (307-55-1) Perfluoro-n-dodecanoic acid	<1 µg/kg	TM338	<1					
PFOSA (754-91-6) Perfluoro-octanesulfonamide	<1 µg/kg	TM338	<1					
6:2-FTS (27619-97-2)	<1 µg/kg	TM338	<1					
PFDS (335-73-3) Perfluoro-1-decanesulfonate	<1 µg/kg	TM338	<1					
PFPeS (2706-91-4) Perfluoro-1-pentanesulfonate	<1 µg/kg	TM338	<1					
Total PFOS	<1 µg/kg	TM338	<1					
PFBA (Post Ox.) Perfluoro-n-butanoic acid	<3 µg/kg	TM428	<3					
PFPA (Post Ox.) Perfluoro-n-pentanoic acid	<3 µg/kg	TM428	<3					
PFHxA (Post Ox.) Perfluoro-n-hexanoic acid	<2 µg/kg	TM428	<2					
PFBS (Post Ox.) Perfluoro-1-butanesulfonate	<1 µg/kg	TM428	<1					
PFHpA (Post Ox.) Perfluoro-n-heptanoic acid	<1 µg/kg	TM428	<1					
6:2 FTS (Post Ox.) Perfluoro-octane sulfonate 6:2	<1 µg/kg	TM428	<1					
PFOA (Post Ox.) Perfluoro-n-octanoic acid	<1 µg/kg	TM428	<1					
PFHxS (Post Ox.) Perfluoro-1-hexanesulfonate	<1 µg/kg	TM428	<1					
PFNA (Post Ox.) Perfluoro-n-nonanoic acid	<1 µg/kg	TM428	<1					
PFHpS (Post Ox.) Perfluoro-1-heptanesulfonate	<1 µg/kg	TM428	<1					
PFDA (Post Ox.) Perfluoro-n-decanoic acid	<1 µg/kg	TM428	<1					
Linear PFOS (Post Ox.) Perfluoro-1-octanesulfonate	<1 µg/kg	TM428	<1					
Branched PFOS (Post Ox.)	<1 µg/kg	TM428	<1					

Validated

CERTIFICATE OF ANALYSIS

SDG: 241012-71 **Report Number:** 748012 **Superseded Report:** 747601

Client Ref.: **Location:** Sladen Mill

Results Legend		Customer Sample Ref.	TP206
#	ISO17025 accredited.		
M	mCERTS accredited.		
aq	Aqueous / settled sample.		
diss.filt	Dissolved / filtered sample.		
tot.unfilt	Total / unfiltered sample.		
*	Subcontracted - refer to subcontractor report for accreditation status.		
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery		
(F)	Trigger breach confirmed		
1-4+§@	Sample deviation (see appendix)		
		Depth (m)	2.60
		Sample Type	Soil/Solid (S)
		Date Sampled	10/10/2024
		Sample Time	.
		Date Received	12/10/2024
		SDG Ref	241012-71
		Lab Sample No.(s)	30510947
		AGS Reference	

Component	LOD/Units	Method	
PFUnA (Post Ox.) Perfluoro-n-undecanoic acid	<1 µg/kg	TM428	<1
PFDoA (Post Ox.) Perfluoro-n-dodecanoic acid	<1 µg/kg	TM428	<1
PFOSA (Post Ox.) Perfluoro-octanesulfonamide	<1 µg/kg	TM428	<1
PFDS (Post Ox.) Perfluoro-1-decanesulfonate	<1 µg/kg	TM428	<1
PFPeS (Post Ox.) Perfluoro-1-pentanesulfonate	<1 µg/kg	TM428	<1
Total PFOS (Post Ox.)	<2 µg/kg	TM428	<2

Table of Results - Appendix

Method No	Description
PM024	Soil preparation including homogenisation, moisture, screens of soils for Asbestos Containing Material
TM405	Analysis of perfluoroalkylsulfonates and perfluorocarboxylic acids - Total Oxidizable Precursor Assay
TM338	Analysis of perfluoroalkylsulfonates and perfluorocarboxylic acids in Solids
TM434	Analysis of PFAS
TM428	Analysis of perfluoroalkylsulfonates and perfluorocarboxylic acids - Total Oxidizable Precursor Assay

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Laboratories (UK) Limited Hawarden (Method codes TM).

Test Completion Dates

Lab Sample No(s)	30510932	30510933	30510934	30510935	30510936	30510938	30510940	30510941	30510942	30510943
Customer Sample Ref.	SPRING 1	TB	TP201	TP201	TP202	TP202	TP203	TP204	TP204	TP205
AGS Ref.										
Depth			1.50	3.00	1.50	2.00	0.75	1.50	2.50	1.00
Type	Ground Water	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
PFAS (Post Ox.) Liquids	07-Nov-2024									
PFAS (Post Ox.) Solids		24-Oct-2024	24-Oct-2024	24-Oct-2024	24-Oct-2024	25-Nov-2024	24-Oct-2024	24-Oct-2024	03-Nov-2024	24-Oct-2024
PFAS Liquids (Full Suite)	21-Nov-2024									
PFAS Solids		24-Oct-2024	24-Oct-2024	24-Oct-2024	24-Oct-2024	24-Oct-2024	24-Oct-2024	24-Oct-2024	24-Oct-2024	24-Oct-2024
Sample description		17-Oct-2024	17-Oct-2024	17-Oct-2024	17-Oct-2024	16-Oct-2024	16-Oct-2024	16-Oct-2024	17-Oct-2024	17-Oct-2024

Lab Sample No(s)	30510945	30510946	30510947
Customer Sample Ref.	TP205	TP206	TP206
AGS Ref.			
Depth	2.20	1.00	2.60
Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
PFAS (Post Ox.) Solids	24-Oct-2024	06-Nov-2024	24-Oct-2024
PFAS Solids	24-Oct-2024	30-Oct-2024	24-Oct-2024
Sample description	17-Oct-2024	17-Oct-2024	17-Oct-2024

Appendix

General

1. Results are expressed on a dry weight basis (dried at 35ºC) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH4 by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 15 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of 15 days after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. For dried and crushed preparations of soils volatile loss may occur e.g volatile mercury

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17 Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

18. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as “mixed hydrocarbons”. Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

19. **Sample Deviations**

If a sample is classed as deviated then the associated results may be compromised.

1	**Container with Headspace provided for volatiles analysis**
2	**Incorrect container received**
3	**Deviation from method**
4	**Matrix interference**
♦	**Sample holding time exceeded in laboratory**
@	**Sample holding time exceeded due to late arrival of instructions or samples**
§	**Sampled on date not provided**

20. **Asbestos**

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2021), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as “Not detected”. If no asbestos fibre types are found all will be reported as “Not detected” and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials and soils are obtained from supplied bulk materials andd soils which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2021).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining.

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US
Tel: (01244) 528777
email: hawardencustomerservices@alsglobal.com
Website: www.alsenvironmental.co.uk

Soil and Structures Ltd
89 Moorhead Lane
Shipley
West Yorkshire
BD18 4JW

Attention: Russell Bowman

CERTIFICATE OF ANALYSIS

Date of report Generation:	18 February 2025
Customer:	Soil and Structures Ltd
Sample Delivery Group (SDG):	250205-38
Your Reference:	
Location:	Sladen Mill
Report No:	756610
Order Number:	

This report has been revised and directly supersedes 756601 in its entirety.

We received 44 samples on Wednesday February 05, 2025 and 42 of these samples were scheduled for analysis which was completed on Tuesday February 18, 2025. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Laboratories (UK) Limited Hawarden.

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.
Incorrect sampling dates and/or sample information will affect the validity of results.
The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Justin Keeton
Business Unit Leader - Land

1291

CERTIFICATE OF ANALYSIS

SDG: 250205-38 **Report Number:** 756610 **Superseded Report:** 756601
Client Ref.: **Location:** Sladen Mill

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
31031045	SPRING 3			03/02/2025
31031046	SPRING 4			03/02/2025
31031005	TP301		0.50	03/02/2025
31031006	TP301		1.00	03/02/2025
31031007	TP301		2.00	03/02/2025
31031008	TP302		0.25	03/02/2025
31031009	TP302		1.00	03/02/2025
31031010	TP302		1.50	03/02/2025
31031011	TP303		0.25	03/02/2025
31031012	TP303		1.00	03/02/2025
31031013	TP303		1.50	03/02/2025
31031014	TP304		0.75	03/02/2025
31031015	TP304		1.50	03/02/2025
31031016	TP305		0.50	03/02/2025
31031017	TP305		1.10	03/02/2025
31031018	TP306		0.25	03/02/2025
31031019	TP306		0.75	03/02/2025
31031020	TP307		0.25	03/02/2025
31031021	TP307		0.50	03/02/2025
31031022	TP308		0.25	03/02/2025
31034853	TP308		0.50	03/01/2025
31031023	TP309		0.50	03/02/2025
31031024	TP309		1.50	03/02/2025
31031025	TP310		0.25	03/02/2025
31031026	TP310		1.00	03/02/2025
31031027	TP310		2.00	03/02/2025
31031028	TP312		0.50	03/02/2025
31031029	TP312		1.00	03/02/2025
31031030	TP312		1.50	03/02/2025
31031031	TP313		0.25	03/02/2025
31031032	TP313		0.75	03/02/2025
31031033	TP314		0.50	03/02/2025
31031034	TP315		0.25	03/02/2025
31031035	TP316		0.50	03/02/2025
31031036	TP316		1.00	03/02/2025
31031037	TP317		0.25	03/02/2025
31031038	TP317		0.75	03/02/2025
31031039	TP317		1.25	03/02/2025
31031040	TP318		0.30	03/02/2025
31031041	TP318		0.60	03/01/2025
31031042	TP318		0.90	03/02/2025
31031043	TP319		0.50	03/02/2025
31031044	TP319		1.50	03/02/2025
31031047	UPSTREAM			03/02/2025

Only received samples which have had analysis scheduled will be shown on the following pages.

Validated

CERTIFICATE OF ANALYSIS

SDG: 250205-38 **Report Number:** 756610 **Superseded Report:** 756601
Client Ref.: **Location:** Sladen Mill

Results Legend

X Test

N No Determination Possible

Sample Types -
S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water
Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

			Lab Sample No(s)	31031045	31031046	31031005	31031006	31031007	31031008	31031009	31031010	31031011	31031012	31031013	31031014	31031015	31031016	31031017	31031018	31031019	31031020	31031021
			Customer Sample Reference	SPRING 3	SPRING 4	TP301	TP301	TP301	TP302	TP302	TP302	TP303	TP303	TP303	TP304	TP304	TP305	TP305	TP306	TP306	TP307	TP307
			AGS Reference																			
			Depth (m)			0.50	1.00	2.00	0.25	1.00	1.50	0.25	1.00	1.50	0.75	1.50	0.50	1.10	0.25	0.75	0.25	0.50
			Container	500ml Plastic (ALE208)	500ml Plastic (ALE208)	1kg TUB with Handle (ALE260)	1kg TUB with Handle (ALE260)	1kg TUB with Handle (ALE260)	1kg TUB with Handle (ALE260)	1kg TUB with Handle (ALE260)	1kg TUB with Handle (ALE260)	1kg TUB with Handle (ALE260)	1kg TUB with Handle (ALE260)	1kg TUB with Handle (ALE260)	1kg TUB with Handle (ALE260)	1kg TUB with Handle (ALE260)	1kg TUB with Handle (ALE260)	1kg TUB with Handle (ALE260)	1kg TUB with Handle (ALE260)	1kg TUB with Handle (ALE260)	1kg TUB with Handle (ALE260)	1kg TUB with Handle (ALE260)
			Sample Type	GW	GW	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
PFAS (Post Ox.) Solids	All	NDPs: 0 Tests: 12					X		X				X		X		X			X		
PFAS Liquids (Full Suite)	All	NDPs: 0 Tests: 3		X	X																	
PFAS Solids	All	NDPs: 0 Tests: 39				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Sample description	All	NDPs: 0 Tests: 39				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

31031043	TP319		0.50	1kg TUB with Handle (ALE260)	S				X	X	X
31031042	TP318		0.90	1kg TUB with Handle (ALE260)	S				X	X	X
31031041	TP318		0.60	1kg TUB with Handle (ALE260)	S		X		X	X	X
31031040	TP318		0.30	1kg TUB with Handle (ALE260)	S				X	X	X
31031037	TP317		0.25	1kg TUB with Handle (ALE260)	S				X	X	X
31031036	TP316		1.00	1kg TUB with Handle (ALE260)	S				X	X	X
31031035	TP316		0.50	1kg TUB with Handle (ALE260)	S		X		X	X	X
31031034	TP315		0.25	1kg TUB with Handle (ALE260)	S				X	X	X
31031033	TP314		0.50	1kg TUB with Handle (ALE260)	S				X	X	X
31031032	TP313		0.75	1kg TUB with Handle (ALE260)	S				X	X	X
31031031	TP313		0.25	1kg TUB with Handle (ALE260)	S				X	X	X
31031030	TP312		1.50	1kg TUB with Handle (ALE260)	S				X	X	X
31031029	TP312		1.00	1kg TUB with Handle (ALE260)	S		X		X	X	X
31031028	TP312		0.50	1kg TUB with Handle (ALE260)	S				X	X	X
31031027	TP310		2.00	1kg TUB with Handle (ALE260)	S				X	X	X
31031026	TP310		1.00	1kg TUB with Handle (ALE260)	S				X	X	X
31031025	TP310		0.25	1kg TUB with Handle (ALE260)	S				X	X	X
31031024	TP309		1.50	1kg TUB with Handle (ALE260)	S		X		X	X	X
31031023	TP309		0.50	1kg TUB with Handle (ALE260)	S				X	X	X
31034853	TP308		0.50	1kg TUB with Handle (ALE260)	S				X	X	X
31031022	TP308		0.25	1kg TUB with Handle (ALE260)	S		X		X	X	X

CERTIFICATE OF ANALYSIS

SDG: 250205-38 **Report Number:** 756610 **Superseded Report:** 756601
Client Ref.: **Location:** Sladen Mill

Results Legend

X Test

N No Determination Possible

Sample Types -
S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water
Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

			Lab Sample No(s)	31031044	31031047
			Customer Sample Reference	TP319	UPSTREAM
			AGS Reference		
			Depth (m)	1.50	
			Container	1kg TUB with Handle (ALE260)	500ml Plastic (ALE208)
			Sample Type	S	SW
PFAS (Post Ox.) Solids	All	NDPs: 0 Tests: 12		X	
PFAS Liquids (Full Suite)	All	NDPs: 0 Tests: 3			X
PFAS Solids	All	NDPs: 0 Tests: 39		X	
Sample description	All	NDPs: 0 Tests: 39		X	

Sample Descriptions

Grain Sizes

very fine	<0.063mm	fine	0.063mm - 0.1mm	medium	0.1mm - 2mm	coarse	2mm - 10mm	very coarse	>10mm

Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Description	Inclusions	Inclusions 2
31031005	TP301	0.50	Dark Brown	Sand	Stones	None
31031006	TP301	1.00	Black	Sand	Stones	None
31031007	TP301	2.00	Dark Brown	Loamy Sand	Stones	None
31031008	TP302	0.25	Black	Sand	Stones	None
31031009	TP302	1.00	Dark Brown	Sand	None	None
31031010	TP302	1.50	Dark Brown	Loamy Sand	Stones	None
31031011	TP303	0.25	Dark Brown	Loamy Sand	Stones	None
31031012	TP303	1.00	Black	Sand	None	None
31031013	TP303	1.50	Dark Brown	Sand	Stones	None
31031014	TP304	0.75	Black	Sand	Stones	None
31031015	TP304	1.50	Dark Brown	Sand	Stones	None
31031016	TP305	0.50	Dark Brown	Sandy Loam	Stones	Crushed Brick
31031017	TP305	1.10	Dark Brown	Sand	Stones	None
31031018	TP306	0.25	Dark Brown	Sand	Stones	Vegetation
31031019	TP306	0.75	Dark Brown	Sand	Stones	None
31031020	TP307	0.25	Black	Sand	Stones	Vegetation
31031021	TP307	0.50	Dark Brown	Sand	Stones	None
31031022	TP308	0.25	Dark Brown	Sandy Loam	Stones	Crushed Brick
31034853	TP308	0.50	Dark Brown	Sandy Loam	Stones	None
31031023	TP309	0.50	Dark Brown	Sandy Loam	Stones	None
31031024	TP309	1.50	Dark Brown	Sandy Loam	Stones	Vegetation
31031025	TP310	0.25	Dark Brown	Sandy Loam	Stones	None
31031026	TP310	1.00	Dark Brown	Loamy Sand	Stones	Vegetation
31031027	TP310	2.00	Black	Sand	Stones	None
31031028	TP312	0.50	Dark Brown	Loamy Sand	Stones	Vegetation
31031029	TP312	1.00	Dark Brown	Sandy Loam	Stones	Glass
31031030	TP312	1.50	Dark Brown	Sandy Loam	Stones	Vegetation
31031031	TP313	0.25	Dark Brown	Sandy Loam	Stones	Vegetation
31031032	TP313	0.75	Dark Brown	Sandy Clay Loam	Stones	Vegetation
31031033	TP314	0.50	Light Brown	Loamy Sand	Stones	Vegetation
31031034	TP315	0.25	Dark Brown	Sand	Stones	Crushed Brick
31031035	TP316	0.50	Dark Brown	Sand	Stones	None
31031036	TP316	1.00	Dark Brown	Loamy Sand	Stones	Vegetation
31031037	TP317	0.25	Dark Brown	Sandy Loam	Stones	Vegetation
31031040	TP318	0.30	Dark Brown	Sand	Stones	None
31031041	TP318	0.60	Dark Brown	Sandy Loam	Stones	Vegetation
31031042	TP318	0.90	Dark Brown	Loamy Sand	Stones	None
31031043	TP319	0.50	Dark Brown	Sandy Loam	Stones	Brick
31031044	TP319	1.50	Dark Brown	Sandy Clay Loam	Stones	Vegetation

These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally ocurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

CERTIFICATE OF ANALYSIS

SDG: 250205-38 **Report Number:** 756610 **Superseded Report:** 756601

Client Ref.: **Location:** Sladen Mill

Results Legend

#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted - refer to subcontractor report for accreditation status.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
***	6:2 FTAB (see appendix)
1-4+§@	Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	SPRING 3	SPRING 4	TP301	TP301	TP301	TP302
			Depth (m)	.	.	0.50	1.00	2.00	0.25
			Sample Type	Ground Water (GW)	Ground Water (GW)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
			Date Sampled	03/02/2025	03/02/2025	03/02/2025	03/02/2025	03/02/2025	03/02/2025
			Sample Time	.	.	.	.	.	.
			Date Received	05/02/2025	05/02/2025	05/02/2025	05/02/2025	05/02/2025	05/02/2025
			SDG Ref	250205-38	250205-38	250205-38	250205-38	250205-38	250205-38
			Lab Sample No.(s)	31031045	31031046	31031005	31031006	31031007	31031008
			AGS Reference						
PFBA (375-22-4)	<2 ng/l	TM434		<4 2 #	<4 2 #				
PFPA (2706-90-3)	<1 ng/l	TM434		2.11 2 #	<2 2 #				
PFBS (375-73-5)	<1 ng/l	TM434		19 2 #	<2 2 #				
PFHxA (307-24-4)	<1 ng/l	TM434		6.66 2 #	2.41 2 #				
PFHpA (375-85-9)	<1 ng/l	TM434		7.76 2 #	3.78 2 #				
PFPeS (2706-91-4)	<1 ng/l	TM434		<2 2 #	<2 2 #				
6:2 FTS (27619-97-2)	<1 ng/l	TM434		<2 2 #	2.45 2 #				
PFOA (335-67-1)	<0.65 ng/l	TM434		294 2 #	108 2 #				
PFHxS (355-46-4)	<1 ng/l	TM434		<2 2 #	<2 2 #				
PFNA (375-95-1)	<1 ng/l	TM434		<2 2 #	<2 2 #				
PFHpS (375-92-8)	<1 ng/l	TM434		<2 2 #	<2 2 #				
PFDA (335-76-2)	<2 ng/l	TM434		<4 2 #	<4 2 #				
Linear PFOS (1763-23-1)	<0.65 ng/l	TM434		<1.3 2 #	<1.3 2 #				
Branched PFOS	<0.65 ng/l	TM434		2.15 2 #	<1.3 2 #				
PFUnA (2058-94-8)	<2 ng/l	TM434		<4 2 #	<4 2 #				
PFDoA (307-55-1)	<2 ng/l	TM434		<4 2 #	<4 2 #				
PFDS (335-77-3)	<2 ng/l	TM434		<4 2 #	<4 2 #				
PFOSA (754-91-6)	<2 ng/l	TM434		<4 2 #	<4 2 #				
Total PFOS	<0.65 ng/l	TM434		2.15 2 #	<1.3 2 #				
Moisture Content Ratio (% of as received sample)	%	PM024				18	18	18	19
PFBA (375-22-4) Perfluoro-n-butanoic acid	<3 µg/kg	TM338				<3	<3	<3	<3
PFPA (2706-90-3) Perfluoro-n-pentanoic acid	<3 µg/kg	TM338				<3	<3	<3	<3
PFHxA (307-24-4) Perfluoro-n-hexanoic acid	<2 µg/kg	TM338				<2	<2	<2	<2
PFBS (375-73-5) Perfluoro-1-butanesulfonate	<1 µg/kg	TM338				<1	<1	<1	<1
PFHpA (375-85-9) Perfluoro-n-heptanoic acid	<1 µg/kg	TM338				<1	<1	<1	<1
PFOA (335-67-1) Perfluoro-n-octanoic acid	<1 µg/kg	TM338				<1	<1	<1	6.79
PFHxS (355-46-4) Perfluoro-1-hexanesulfonate	<1 µg/kg	TM338				<1	<1	<1	<1
PFNA (375-95-1) Perfluoro-n-nonanoic acid	<1 µg/kg	TM338				<1	<1	<1	<1
PFHpS (375-92-8) Perfluoro-1-heptanesulfonate	<1 µg/kg	TM338				<1	<1	<1	<1
PFDA (335-76-2) Perfluoro-n-decanoic acid	<1 µg/kg	TM338				<1	<1	<1	<1
Linear PFOS(1763-23-1) Perfluoro-1-octanesulfonate	<1 µg/kg	TM338				2.34	<1	<1	<1
Branched PFOS	<1 µg/kg	TM338				2.75	<1	<1	<1
PFUnA (2058-94-8) Perfluoro-n-undecanoic acid	<1 µg/kg	TM338				<1	<1	<1	<1

CERTIFICATE OF ANALYSIS

SDG: 250205-38 **Report Number:** 756610 **Superseded Report:** 756601
Client Ref.: **Location:** Sladen Mill

Results Legend
- # ISO17025 accredited.
- M mCERTS accredited.
- aq Aqueous / settled sample.
- diss.filt Dissolved / filtered sample.
- tot.unfilt Total / unfiltered sample.
- * Subcontracted - refer to subcontractor report for accreditation status.
- ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
- *** 6:2 FTAB (see appendix)
- 1-4♦§@ Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	SPRING 3	SPRING 4	TP301	TP301	TP301	TP302
			Depth (m)	.	.	0.50	1.00	2.00	0.25
			Sample Type	Ground Water (GW)	Ground Water (GW)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
			Date Sampled	03/02/2025	03/02/2025	03/02/2025	03/02/2025	03/02/2025	03/02/2025
			Sample Time	.	.	.	.	.	.
			Date Received	05/02/2025	05/02/2025	05/02/2025	05/02/2025	05/02/2025	05/02/2025
			SDG Ref	250205-38	250205-38	250205-38	250205-38	250205-38	250205-38
			Lab Sample No.(s)	31031045	31031046	31031005	31031006	31031007	31031008
			AGS Reference						
PFDoA (307-55-1) Perfluoro-n-dodecanoic acid	<1 µg/kg	TM338				<1	<1	<1	<1
PFOSA (754-91-6) Perfluoro-octanesulfonamide	<1 µg/kg	TM338				<1	<1	<1	<1
6:2-FTS (27619-97-2)	<1 µg/kg	TM338				<1	<1	<1	<1
PFDS (335-73-3) Perfluoro-1-decanesulfonate	<1 µg/kg	TM338				<1	<1	<1	<1
PFPeS (2706-91-4) Perfluoro-1-pentanesulfonate	<1 µg/kg	TM338				<1	<1	<1	<1
Total PFOS	<1 µg/kg	TM338				5.09	<1	<1	<1
PFBA (Post Ox.) Perfluoro-n-butanoic acid	<3 µg/kg	TM428					<3		<3
PFPA (Post Ox.) Perfluoro-n-pentanoic acid	<3 µg/kg	TM428					<3		<3
PFHxA (Post Ox.) Perfluoro-n-hexanoic acid	<2 µg/kg	TM428					<2		<2
PFBS (Post Ox.) Perfluoro-1-butanesulfonate	<1 µg/kg	TM428					<1		<1
PFHpA (Post Ox.) Perfluoro-n-heptanoic acid	<1 µg/kg	TM428					<1		<1
6:2 FTS (Post Ox.) Perfluoro-octane sulfonate 6:2	<1 µg/kg	TM428					<1		<1
PFOA (Post Ox.) Perfluoro-n-octanoic acid	<1 µg/kg	TM428					<1		7.7
PFHxS (Post Ox.) Perfluoro-1-hexanesulfonate	<1 µg/kg	TM428					<1		<1
PFNA (Post Ox.) Perfluoro-n-nonanoic acid	<1 µg/kg	TM428					<1		<1
PFHpS (Post Ox.) Perfluoro-1-heptanesulfonate	<1 µg/kg	TM428					<1		<1
PFDA (Post Ox.) Perfluoro-n-decanoic acid	<1 µg/kg	TM428					<1		<1
Linear PFOS (Post Ox.) Perfluoro-1-octanesulfonate	<1 µg/kg	TM428					<1		<1
Branched PFOS (Post Ox.)	<1 µg/kg	TM428					<1		<1
PFUnA (Post Ox.) Perfluoro-n-undecanoic acid	<1 µg/kg	TM428					<1		<1
PFDoA (Post Ox.) Perfluoro-n-dodecanoic acid	<1 µg/kg	TM428					<1		<1
PFOSA (Post Ox.) Perfluoro-octanesulfonamide	<1 µg/kg	TM428					<1		<1
PFDS (Post Ox.) Perfluoro-1-decanesulfonate	<1 µg/kg	TM428					<1		<1
PFPeS (Post Ox.) Perfluoro-1-pentanesulfonate	<1 µg/kg	TM428					<1		<1
Total PFOS (Post Ox.)	<2 µg/kg	TM428					<2		<2

Results Legend

#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted - refer to subcontractor report for accreditation status.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
***	6:2 FTAB (see appendix)
1-4+§@	Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	TP302	TP302	TP303	TP303	TP303	TP304
			Depth (m)	1.00	1.50	0.25	1.00	1.50	0.75
			Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
			Date Sampled	03/02/2025	03/02/2025	03/02/2025	03/02/2025	03/02/2025	03/02/2025
			Sample Time	.	.	.	.	.	.
			Date Received	05/02/2025	05/02/2025	05/02/2025	05/02/2025	05/02/2025	05/02/2025
			SDG Ref	250205-38	250205-38	250205-38	250205-38	250205-38	250205-38
			Lab Sample No.(s)	31031009	31031010	31031011	31031012	31031013	31031014
			AGS Reference						
Moisture Content Ratio (% of as received sample)	%	PM024		17	11	23	32	18	19
PFBA (375-22-4) Perfluoro-n-butanoic acid	<3 µg/kg	TM338		<3	<3	<3	<3	<3	<3
PFPA (2706-90-3) Perfluoro-n-pentanoic acid	<3 µg/kg	TM338		<3	<3	<3	<3	<3	<3
PFHxA (307-24-4) Perfluoro-n-hexanoic acid	<2 µg/kg	TM338		<2	<2	<2	<2	<2	<2
PFBS (375-73-5) Perfluoro-1-butanesulfonate	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
PFHpA (375-85-9) Perfluoro-n-heptanoic acid	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
PFOA (335-67-1) Perfluoro-n-octanoic acid	<1 µg/kg	TM338		<1	<1	30.1	2.68	<1	1.37
PFHxS (355-46-4) Perfluoro-1-hexanesulfonate	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
PFNA (375-95-1) Perfluoro-n-nonanoic acid	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
PFHpS (375-92-8) Perfluoro-1-heptanesulfonate	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
PFDA (335-76-2) Perfluoro-n-decanoic acid	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
Linear PFOS(1763-23-1) Perfluoro-1-octanesulfonate	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
Branched PFOS	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
PFUnA (2058-94-8) Perfluoro-n-undecanoic acid	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
PFDoA (307-55-1) Perfluoro-n-dodecanoic acid	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
PFOSA (754-91-6) Perfluoro-octanesulfonamide	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
6:2-FTS (27619-97-2)	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
PFDS (335-73-3) Perfluoro-1-decanesulfonate	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
PFPeS (2706-91-4) Perfluoro-1-pentanesulfonate	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
Total PFOS	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
PFBA (Post Ox.) Perfluoro-n-butanoic acid	<3 µg/kg	TM428					<3		<3
PFPA (Post Ox.) Perfluoro-n-pentanoic acid	<3 µg/kg	TM428					<3		<3
PFHxA (Post Ox.) Perfluoro-n-hexanoic acid	<2 µg/kg	TM428					<2		<2
PFBS (Post Ox.) Perfluoro-1-butanesulfonate	<1 µg/kg	TM428					<1		<1
PFHpA (Post Ox.) Perfluoro-n-heptanoic acid	<1 µg/kg	TM428					<1		<1
6:2 FTS (Post Ox.) Perfluoro-octane sulfonate 6:2	<1 µg/kg	TM428					<1		<1
PFOA (Post Ox.) Perfluoro-n-octanoic acid	<1 µg/kg	TM428					<1		1.15
PFHxS (Post Ox.) Perfluoro-1-hexanesulfonate	<1 µg/kg	TM428					<1		<1
PFNA (Post Ox.) Perfluoro-n-nonanoic acid	<1 µg/kg	TM428					<1		<1
PFHpS (Post Ox.) Perfluoro-1-heptanesulfonate	<1 µg/kg	TM428					<1		<1
PFDA (Post Ox.) Perfluoro-n-decanoic acid	<1 µg/kg	TM428					<1		<1
Linear PFOS (Post Ox.) Perfluoro-1-octanesulfonate	<1 µg/kg	TM428					<1		<1
Branched PFOS (Post Ox.)	<1 µg/kg	TM428					<1		<1

CERTIFICATE OF ANALYSIS

SDG: 250205-38 **Report Number:** 756610 **Superseded Report:** 756601
Client Ref.: **Location:** Sladen Mill

Results Legend
- # ISO17025 accredited.
- M mCERTS accredited.
- aq Aqueous / settled sample.
- diss.filt Dissolved / filtered sample.
- tot.unfilt Total / unfiltered sample.
- * Subcontracted - refer to subcontractor report for accreditation status.
- ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
- *** 6:2 FTAB (see appendix)
- 1-4+§@ Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	TP302	TP302	TP303	TP303	TP303	TP304
			Depth (m)	1.00	1.50	0.25	1.00	1.50	0.75
			Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
			Date Sampled	03/02/2025	03/02/2025	03/02/2025	03/02/2025	03/02/2025	03/02/2025
			Sample Time	.	.	.	.	.	.
			Date Received	05/02/2025	05/02/2025	05/02/2025	05/02/2025	05/02/2025	05/02/2025
			SDG Ref	250205-38	250205-38	250205-38	250205-38	250205-38	250205-38
			Lab Sample No.(s)	31031009	31031010	31031011	31031012	31031013	31031014
			AGS Reference						
PFUnA (Post Ox.) Perfluoro-n-undecanoic acid	<1 µg/kg	TM428					<1		<1
PFDoA (Post Ox.) Perfluoro-n-dodecanoic acid	<1 µg/kg	TM428					<1		<1
PFOSA (Post Ox.) Perfluoro-octanesulfonamide	<1 µg/kg	TM428					<1		<1
PFDS (Post Ox.) Perfluoro-1-decanesulfonate	<1 µg/kg	TM428					<1		<1
PFPeS (Post Ox.) Perfluoro-1-pentanesulfonate	<1 µg/kg	TM428					<1		<1
Total PFOS (Post Ox.)	<2 µg/kg	TM428					<2		<2

CERTIFICATE OF ANALYSIS

SDG: 250205-38 **Report Number:** 756610 **Superseded Report:** 756601

Client Ref.: **Location:** Sladen Mill

Results Legend

#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted - refer to subcontractor report for accreditation status.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
***	6:2 FTAB (see appendix)
1-4+§@	Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	TP304	TP305	TP305	TP306	TP306	TP307
			Depth (m)	1.50	0.50	1.10	0.25	0.75	0.25
			Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
			Date Sampled	03/02/2025	03/02/2025	03/02/2025	03/02/2025	03/02/2025	03/02/2025
			Sample Time	.	.	.	.	.	.
			Date Received	05/02/2025	05/02/2025	05/02/2025	05/02/2025	05/02/2025	05/02/2025
			SDG Ref	250205-38	250205-38	250205-38	250205-38	250205-38	250205-38
			Lab Sample No.(s)	31031015	31031016	31031017	31031018	31031019	31031020
			AGS Reference						
Moisture Content Ratio (% of as received sample)	%	PM024		14	24	14	10	16	24
PFBA (375-22-4) Perfluoro-n-butanoic acid	<3 µg/kg	TM338		<3	<3	<3	<3	<3	<3
PFPA (2706-90-3) Perfluoro-n-pentanoic acid	<3 µg/kg	TM338		<3	<3	<3	<3	<3	<3
PFHxA (307-24-4) Perfluoro-n-hexanoic acid	<2 µg/kg	TM338		<2	<2	<2	<2	<2	<2
PFBS (375-73-5) Perfluoro-1-butanesulfonate	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
PFHpA (375-85-9) Perfluoro-n-heptanoic acid	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
PFOA (335-67-1) Perfluoro-n-octanoic acid	<1 µg/kg	TM338		1.19	1.49	<1	<1	<1	<1
PFHxS (355-46-4) Perfluoro-1-hexanesulfonate	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
PFNA (375-95-1) Perfluoro-n-nonanoic acid	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
PFHpS (375-92-8) Perfluoro-1-heptanesulfonate	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
PFDA (335-76-2) Perfluoro-n-decanoic acid	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
Linear PFOS(1763-23-1) Perfluoro-1-octanesulfonate	<1 µg/kg	TM338		<1	<1	<1	<1	<1	1.46
Branched PFOS	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
PFUnA (2058-94-8) Perfluoro-n-undecanoic acid	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
PFDoA (307-55-1) Perfluoro-n-dodecanoic acid	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
PFOSA (754-91-6) Perfluoro-octanesulfonamide	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
6:2-FTS (27619-97-2)	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
PFDS (335-73-3) Perfluoro-1-decanesulfonate	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
PFPeS (2706-91-4) Perfluoro-1-pentanesulfonate	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
Total PFOS	<1 µg/kg	TM338		<1	<1	<1	<1	<1	1.46
PFBA (Post Ox.) Perfluoro-n-butanoic acid	<3 µg/kg	TM428			<3			<3	
PFPA (Post Ox.) Perfluoro-n-pentanoic acid	<3 µg/kg	TM428			<3			<3	
PFHxA (Post Ox.) Perfluoro-n-hexanoic acid	<2 µg/kg	TM428			<2			<2	
PFBS (Post Ox.) Perfluoro-1-butanesulfonate	<1 µg/kg	TM428			<1			<1	
PFHpA (Post Ox.) Perfluoro-n-heptanoic acid	<1 µg/kg	TM428			<1			<1	
6:2 FTS (Post Ox.) Perfluoro-octane sulfonate 6:2	<1 µg/kg	TM428			<1			<1	
PFOA (Post Ox.) Perfluoro-n-octanoic acid	<1 µg/kg	TM428			<1			<1	
PFHxS (Post Ox.) Perfluoro-1-hexanesulfonate	<1 µg/kg	TM428			<1			<1	
PFNA (Post Ox.) Perfluoro-n-nonanoic acid	<1 µg/kg	TM428			<1			<1	
PFHpS (Post Ox.) Perfluoro-1-heptanesulfonate	<1 µg/kg	TM428			<1			<1	
PFDA (Post Ox.) Perfluoro-n-decanoic acid	<1 µg/kg	TM428			<1			<1	
Linear PFOS (Post Ox.) Perfluoro-1-octanesulfonate	<1 µg/kg	TM428			<1			<1	
Branched PFOS (Post Ox.)	<1 µg/kg	TM428			<1			<1	

CERTIFICATE OF ANALYSIS

SDG: 250205-38 **Report Number:** 756610 **Superseded Report:** 756601
Client Ref.: **Location:** Sladen Mill

Results Legend
- # ISO17025 accredited.
- M mCERTS accredited.
- aq Aqueous / settled sample.
- diss.filt Dissolved / filtered sample.
- tot.unfilt Total / unfiltered sample.
- * Subcontracted - refer to subcontractor report for accreditation status.
- ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
- *** 6:2 FTAB (see appendix)
- 1-4+§@ Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	TP304	TP305	TP305	TP306	TP306	TP307
			Depth (m)	1.50	0.50	1.10	0.25	0.75	0.25
			Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
			Date Sampled	03/02/2025	03/02/2025	03/02/2025	03/02/2025	03/02/2025	03/02/2025
			Sample Time	.	.	.	.	.	.
			Date Received	05/02/2025	05/02/2025	05/02/2025	05/02/2025	05/02/2025	05/02/2025
			SDG Ref	250205-38	250205-38	250205-38	250205-38	250205-38	250205-38
			Lab Sample No.(s)	31031015	31031016	31031017	31031018	31031019	31031020
			AGS Reference						
PFUnA (Post Ox.) Perfluoro-n-undecanoic acid	<1 µg/kg	TM428			<1			<1	
PFDoA (Post Ox.) Perfluoro-n-dodecanoic acid	<1 µg/kg	TM428			<1			<1	
PFOSA (Post Ox.) Perfluoro-octanesulfonamide	<1 µg/kg	TM428			<1			<1	
PFDS (Post Ox.) Perfluoro-1-decanesulfonate	<1 µg/kg	TM428			<1			<1	
PFPeS (Post Ox.) Perfluoro-1-pentanesulfonate	<1 µg/kg	TM428			<1			<1	
Total PFOS (Post Ox.)	<2 µg/kg	TM428			<2			<2	

CERTIFICATE OF ANALYSIS

SDG: 250205-38 **Report Number:** 756610 **Superseded Report:** 756601

Client Ref.: **Location:** Sladen Mill

Results Legend

#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted - refer to subcontractor report for accreditation status.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
***	6:2 FTAB (see appendix)
1-4+§@	Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	TP307	TP308	TP308	TP309	TP309	TP310
			Depth (m)	0.50	0.25	0.50	0.50	1.50	0.25
			Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
			Date Sampled	03/02/2025	03/02/2025	03/01/2025	03/02/2025	03/02/2025	03/02/2025
			Sample Time	.	.	.	.	.	.
			Date Received	05/02/2025	05/02/2025	05/02/2025	05/02/2025	05/02/2025	05/02/2025
			SDG Ref	250205-38	250205-38	250205-38	250205-38	250205-38	250205-38
			Lab Sample No.(s)	31031021	31031022	31034853	31031023	31031024	31031025
			AGS Reference						
Moisture Content Ratio (% of as received sample)	%	PM024		16	17	24	17	16	11
PFBA (375-22-4) Perfluoro-n-butanoic acid	<3 µg/kg	TM338		<3	<3	<3	<3	<3	<3
PFPA (2706-90-3) Perfluoro-n-pentanoic acid	<3 µg/kg	TM338		<3	<3	<3	<3	<3	<3
PFHxA (307-24-4) Perfluoro-n-hexanoic acid	<2 µg/kg	TM338		<2	<2	<2	<2	<2	<2
PFBS (375-73-5) Perfluoro-1-butanesulfonate	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
PFHpA (375-85-9) Perfluoro-n-heptanoic acid	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
PFOA (335-67-1) Perfluoro-n-octanoic acid	<1 µg/kg	TM338		<1	<1	1.36	<1	<1	<1
PFHxS (355-46-4) Perfluoro-1-hexanesulfonate	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
PFNA (375-95-1) Perfluoro-n-nonanoic acid	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
PFHpS (375-92-8) Perfluoro-1-heptanesulfonate	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
PFDA (335-76-2) Perfluoro-n-decanoic acid	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
Linear PFOS(1763-23-1) Perfluoro-1-octanesulfonate	<1 µg/kg	TM338		<1	2.05	<1	<1	<1	<1
Branched PFOS	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
PFUnA (2058-94-8) Perfluoro-n-undecanoic acid	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
PFDoA (307-55-1) Perfluoro-n-dodecanoic acid	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
PFOSA (754-91-6) Perfluoro-octanesulfonamide	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
6:2-FTS (27619-97-2)	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
PFDS (335-73-3) Perfluoro-1-decanesulfonate	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
PFPeS (2706-91-4) Perfluoro-1-pentanesulfonate	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
Total PFOS	<1 µg/kg	TM338		<1	2.05	<1	<1	<1	<1
PFBA (Post Ox.) Perfluoro-n-butanoic acid	<3 µg/kg	TM428			<3			<3	
PFPA (Post Ox.) Perfluoro-n-pentanoic acid	<3 µg/kg	TM428			<3			<3	
PFHxA (Post Ox.) Perfluoro-n-hexanoic acid	<2 µg/kg	TM428			<2			<2	
PFBS (Post Ox.) Perfluoro-1-butanesulfonate	<1 µg/kg	TM428			<1			<1	
PFHpA (Post Ox.) Perfluoro-n-heptanoic acid	<1 µg/kg	TM428			<1			<1	
6:2 FTS (Post Ox.) Perfluoro-octane sulfonate 6:2	<1 µg/kg	TM428			<1			<1	
PFOA (Post Ox.) Perfluoro-n-octanoic acid	<1 µg/kg	TM428			<1			<1	
PFHxS (Post Ox.) Perfluoro-1-hexanesulfonate	<1 µg/kg	TM428			<1			<1	
PFNA (Post Ox.) Perfluoro-n-nonanoic acid	<1 µg/kg	TM428			<1			<1	
PFHpS (Post Ox.) Perfluoro-1-heptanesulfonate	<1 µg/kg	TM428			<1			<1	
PFDA (Post Ox.) Perfluoro-n-decanoic acid	<1 µg/kg	TM428			<1			<1	
Linear PFOS (Post Ox.) Perfluoro-1-octanesulfonate	<1 µg/kg	TM428			<1			<1	
Branched PFOS (Post Ox.)	<1 µg/kg	TM428			<1			<1	

CERTIFICATE OF ANALYSIS

SDG: 250205-38 **Report Number:** 756610 **Superseded Report:** 756601
Client Ref.: **Location:** Sladen Mill

Results Legend
- # ISO17025 accredited.
- M mCERTS accredited.
- aq Aqueous / settled sample.
- diss.filt Dissolved / filtered sample.
- tot.unfilt Total / unfiltered sample.
- * Subcontracted - refer to subcontractor report for accreditation status.
- ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
- *** 6:2 FTAB (see appendix)
- 1-4+§@ Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	TP307	TP308	TP308	TP309	TP309	TP310
			Depth (m)	0.50	0.25	0.50	0.50	1.50	0.25
			Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
			Date Sampled	03/02/2025	03/02/2025	03/01/2025	03/02/2025	03/02/2025	03/02/2025
			Sample Time	.	.	.	.	.	.
			Date Received	05/02/2025	05/02/2025	05/02/2025	05/02/2025	05/02/2025	05/02/2025
			SDG Ref	250205-38	250205-38	250205-38	250205-38	250205-38	250205-38
			Lab Sample No.(s)	31031021	31031022	31034853	31031023	31031024	31031025
			AGS Reference						
PFUnA (Post Ox.) Perfluoro-n-undecanoic acid	<1 µg/kg	TM428			<1			<1	
PFDoA (Post Ox.) Perfluoro-n-dodecanoic acid	<1 µg/kg	TM428			<1			<1	
PFOSA (Post Ox.) Perfluoro-octanesulfonamide	<1 µg/kg	TM428			<1			<1	
PFDS (Post Ox.) Perfluoro-1-decanesulfonate	<1 µg/kg	TM428			<1			<1	
PFPeS (Post Ox.) Perfluoro-1-pentanesulfonate	<1 µg/kg	TM428			<1			<1	
Total PFOS (Post Ox.)	<2 µg/kg	TM428			<2			<2	

CERTIFICATE OF ANALYSIS

SDG: 250205-38 **Report Number:** 756610 **Superseded Report:** 756601

Client Ref.: **Location:** Sladen Mill

Results Legend

#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted - refer to subcontractor report for accreditation status.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
***	6:2 FTAB (see appendix)
1-4+§@	Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	TP310	TP310	TP312	TP312	TP312	TP313
			Depth (m)	1.00	2.00	0.50	1.00	1.50	0.25
			Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
			Date Sampled	03/02/2025	03/02/2025	03/02/2025	03/02/2025	03/02/2025	03/02/2025
			Sample Time	.	.	.	.	.	.
			Date Received	05/02/2025	05/02/2025	05/02/2025	05/02/2025	05/02/2025	05/02/2025
			SDG Ref	250205-38	250205-38	250205-38	250205-38	250205-38	250205-38
			Lab Sample No.(s)	31031026	31031027	31031028	31031029	31031030	31031031
			AGS Reference						
Moisture Content Ratio (% of as received sample)	%	PM024		13	22	13	21	19	18
PFBA (375-22-4) Perfluoro-n-butanoic acid	<3 µg/kg	TM338		<3	<3	<3	<3	<3	<3
PFPA (2706-90-3) Perfluoro-n-pentanoic acid	<3 µg/kg	TM338		<3	<3	<3	<3	<3	<3
PFHxA (307-24-4) Perfluoro-n-hexanoic acid	<2 µg/kg	TM338		<2	<2	<2	<2	<2	<2
PFBS (375-73-5) Perfluoro-1-butanesulfonate	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
PFHpA (375-85-9) Perfluoro-n-heptanoic acid	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
PFOA (335-67-1) Perfluoro-n-octanoic acid	<1 µg/kg	TM338		<1	<1	<1	2.16	<1	4.57
PFHxS (355-46-4) Perfluoro-1-hexanesulfonate	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
PFNA (375-95-1) Perfluoro-n-nonanoic acid	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
PFHpS (375-92-8) Perfluoro-1-heptanesulfonate	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
PFDA (335-76-2) Perfluoro-n-decanoic acid	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
Linear PFOS(1763-23-1) Perfluoro-1-octanesulfonate	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
Branched PFOS	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
PFUnA (2058-94-8) Perfluoro-n-undecanoic acid	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
PFDoA (307-55-1) Perfluoro-n-dodecanoic acid	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
PFOSA (754-91-6) Perfluoro-octanesulfonamide	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
6:2-FTS (27619-97-2)	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
PFDS (335-73-3) Perfluoro-1-decanesulfonate	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
PFPeS (2706-91-4) Perfluoro-1-pentanesulfonate	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
Total PFOS	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
PFBA (Post Ox.) Perfluoro-n-butanoic acid	<3 µg/kg	TM428					<3		
PFPA (Post Ox.) Perfluoro-n-pentanoic acid	<3 µg/kg	TM428					<3		
PFHxA (Post Ox.) Perfluoro-n-hexanoic acid	<2 µg/kg	TM428					<2		
PFBS (Post Ox.) Perfluoro-1-butanesulfonate	<1 µg/kg	TM428					<1		
PFHpA (Post Ox.) Perfluoro-n-heptanoic acid	<1 µg/kg	TM428					<1		
6:2 FTS (Post Ox.) Perfluoro-octane sulfonate 6:2	<1 µg/kg	TM428					<1		
PFOA (Post Ox.) Perfluoro-n-octanoic acid	<1 µg/kg	TM428					1.32		
PFHxS (Post Ox.) Perfluoro-1-hexanesulfonate	<1 µg/kg	TM428					<1		
PFNA (Post Ox.) Perfluoro-n-nonanoic acid	<1 µg/kg	TM428					<1		
PFHpS (Post Ox.) Perfluoro-1-heptanesulfonate	<1 µg/kg	TM428					<1		
PFDA (Post Ox.) Perfluoro-n-decanoic acid	<1 µg/kg	TM428					<1		
Linear PFOS (Post Ox.) Perfluoro-1-octanesulfonate	<1 µg/kg	TM428					<1		
Branched PFOS (Post Ox.)	<1 µg/kg	TM428					<1		

CERTIFICATE OF ANALYSIS

SDG: 250205-38 **Report Number:** 756610 **Superseded Report:** 756601
Client Ref.: **Location:** Sladen Mill

Results Legend
- # ISO17025 accredited.
- M mCERTS accredited.
- aq Aqueous / settled sample.
- diss.filt Dissolved / filtered sample.
- tot.unfilt Total / unfiltered sample.
- * Subcontracted - refer to subcontractor report for accreditation status.
- ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
- *** 6:2 FTAB (see appendix)
- 1-4+§@ Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	TP310	TP310	TP312	TP312	TP312	TP313
			Depth (m)	1.00	2.00	0.50	1.00	1.50	0.25
			Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
			Date Sampled	03/02/2025	03/02/2025	03/02/2025	03/02/2025	03/02/2025	03/02/2025
			Sample Time	.	.	.	.	.	.
			Date Received	05/02/2025	05/02/2025	05/02/2025	05/02/2025	05/02/2025	05/02/2025
			SDG Ref	250205-38	250205-38	250205-38	250205-38	250205-38	250205-38
			Lab Sample No.(s)	31031026	31031027	31031028	31031029	31031030	31031031
			AGS Reference						
PFUnA (Post Ox.) Perfluoro-n-undecanoic acid	<1 µg/kg	TM428					<1		
PFDoA (Post Ox.) Perfluoro-n-dodecanoic acid	<1 µg/kg	TM428					<1		
PFOSA (Post Ox.) Perfluoro-octanesulfonamide	<1 µg/kg	TM428					<1		
PFDS (Post Ox.) Perfluoro-1-decanesulfonate	<1 µg/kg	TM428					<1		
PFPeS (Post Ox.) Perfluoro-1-pentanesulfonate	<1 µg/kg	TM428					<1		
Total PFOS (Post Ox.)	<2 µg/kg	TM428					<2		

CERTIFICATE OF ANALYSIS

SDG: 250205-38 **Report Number:** 756610 **Superseded Report:** 756601

Client Ref.: **Location:** Sladen Mill

Results Legend

#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted - refer to subcontractor report for accreditation status.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
***	6:2 FTAB (see appendix)
1-4+§@	Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	TP313	TP314	TP315	TP316	TP316	TP317
			Depth (m)	0.75	0.50	0.25	0.50	1.00	0.25
			Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
			Date Sampled	03/02/2025	03/02/2025	03/02/2025	03/02/2025	03/02/2025	03/02/2025
			Sample Time	.	.	.	.	.	.
			Date Received	05/02/2025	05/02/2025	05/02/2025	05/02/2025	05/02/2025	05/02/2025
			SDG Ref	250205-38	250205-38	250205-38	250205-38	250205-38	250205-38
			Lab Sample No.(s)	31031032	31031033	31031034	31031035	31031036	31031037
			AGS Reference						
Moisture Content Ratio (% of as received sample)	%	PM024		19	10	11	18	14	15
PFBA (375-22-4) Perfluoro-n-butanoic acid	<3 µg/kg	TM338		<3	<3	<3	<3	<3	<3
PFPA (2706-90-3) Perfluoro-n-pentanoic acid	<3 µg/kg	TM338		<3	<3	<3	<3	<3	<3
PFHxA (307-24-4) Perfluoro-n-hexanoic acid	<2 µg/kg	TM338		<2	<2	<2	<2	<2	<2
PFBS (375-73-5) Perfluoro-1-butanesulfonate	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
PFHpA (375-85-9) Perfluoro-n-heptanoic acid	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
PFOA (335-67-1) Perfluoro-n-octanoic acid	<1 µg/kg	TM338		1.41	<1	<1	2.69	<1	<1
PFHxS (355-46-4) Perfluoro-1-hexanesulfonate	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
PFNA (375-95-1) Perfluoro-n-nonanoic acid	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
PFHpS (375-92-8) Perfluoro-1-heptanesulfonate	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
PFDA (335-76-2) Perfluoro-n-decanoic acid	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
Linear PFOS(1763-23-1) Perfluoro-1-octanesulfonate	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
Branched PFOS	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
PFUnA (2058-94-8) Perfluoro-n-undecanoic acid	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
PFDoA (307-55-1) Perfluoro-n-dodecanoic acid	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
PFOSA (754-91-6) Perfluoro-octanesulfonamide	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
6:2-FTS (27619-97-2)	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
PFDS (335-73-3) Perfluoro-1-decanesulfonate	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
PFPeS (2706-91-4) Perfluoro-1-pentanesulfonate	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
Total PFOS	<1 µg/kg	TM338		<1	<1	<1	<1	<1	<1
PFBA (Post Ox.) Perfluoro-n-butanoic acid	<3 µg/kg	TM428					<3		
PFPA (Post Ox.) Perfluoro-n-pentanoic acid	<3 µg/kg	TM428					<3		
PFHxA (Post Ox.) Perfluoro-n-hexanoic acid	<2 µg/kg	TM428					<2		
PFBS (Post Ox.) Perfluoro-1-butanesulfonate	<1 µg/kg	TM428					<1		
PFHpA (Post Ox.) Perfluoro-n-heptanoic acid	<1 µg/kg	TM428					<1		
6:2 FTS (Post Ox.) Perfluoro-octane sulfonate 6:2	<1 µg/kg	TM428					<1		
PFOA (Post Ox.) Perfluoro-n-octanoic acid	<1 µg/kg	TM428					3.74		
PFHxS (Post Ox.) Perfluoro-1-hexanesulfonate	<1 µg/kg	TM428					<1		
PFNA (Post Ox.) Perfluoro-n-nonanoic acid	<1 µg/kg	TM428					<1		
PFHpS (Post Ox.) Perfluoro-1-heptanesulfonate	<1 µg/kg	TM428					<1		
PFDA (Post Ox.) Perfluoro-n-decanoic acid	<1 µg/kg	TM428					<1		
Linear PFOS (Post Ox.) Perfluoro-1-octanesulfonate	<1 µg/kg	TM428					<1		
Branched PFOS (Post Ox.)	<1 µg/kg	TM428					<1		

CERTIFICATE OF ANALYSIS

SDG: 250205-38 **Report Number:** 756610 **Superseded Report:** 756601
Client Ref.: **Location:** Sladen Mill

Results Legend
- # ISO17025 accredited.
- M mCERTS accredited.
- aq Aqueous / settled sample.
- diss.filt Dissolved / filtered sample.
- tot.unfilt Total / unfiltered sample.
- * Subcontracted - refer to subcontractor report for accreditation status.
- ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
- *** 6:2 FTAB (see appendix)
- 1-4+§@ Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	TP313	TP314	TP315	TP316	TP316	TP317
			Depth (m)	0.75	0.50	0.25	0.50	1.00	0.25
			Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
			Date Sampled	03/02/2025	03/02/2025	03/02/2025	03/02/2025	03/02/2025	03/02/2025
			Sample Time	.	.	.	.	.	.
			Date Received	05/02/2025	05/02/2025	05/02/2025	05/02/2025	05/02/2025	05/02/2025
			SDG Ref	250205-38	250205-38	250205-38	250205-38	250205-38	250205-38
			Lab Sample No.(s)	31031032	31031033	31031034	31031035	31031036	31031037
			AGS Reference						
PFUnA (Post Ox.) Perfluoro-n-undecanoic acid	<1 µg/kg	TM428					<1		
PFDoA (Post Ox.) Perfluoro-n-dodecanoic acid	<1 µg/kg	TM428					<1		
PFOSA (Post Ox.) Perfluoro-octanesulfonamide	<1 µg/kg	TM428					<1		
PFDS (Post Ox.) Perfluoro-1-decanesulfonate	<1 µg/kg	TM428					<1		
PFPeS (Post Ox.) Perfluoro-1-pentanesulfonate	<1 µg/kg	TM428					<1		
Total PFOS (Post Ox.)	<2 µg/kg	TM428					<2		

CERTIFICATE OF ANALYSIS

SDG: 250205-38 **Report Number:** 756610 **Superseded Report:** 756601

Client Ref.: **Location:** Sladen Mill

Results Legend

#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted - refer to subcontractor report for accreditation status.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
***	6:2 FTAB (see appendix)
1-4+§@	Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	TP318	TP318	TP318	TP319	TP319	UPSTREAM
			Depth (m)	0.30	0.60	0.90	0.50	1.50	.
			Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Surface Water (SW)
			Date Sampled	03/02/2025	03/01/2025	03/02/2025	03/02/2025	03/02/2025	03/02/2025
			Sample Time	.	.	.	.	.	.
			Date Received	05/02/2025	05/02/2025	05/02/2025	05/02/2025	05/02/2025	05/02/2025
			SDG Ref	250205-38	250205-38	250205-38	250205-38	250205-38	250205-38
			Lab Sample No.(s)	31031040	31031041	31031042	31031043	31031044	31031047
			AGS Reference						
PFBA (375-22-4)	<2 ng/l	TM434							<2 2 #
PFPA (2706-90-3)	<1 ng/l	TM434							<1 2 #
PFBS (375-73-5)	<1 ng/l	TM434							<1 2 #
PFHxA (307-24-4)	<1 ng/l	TM434							1.42 2 #
PFHpA (375-85-9)	<1 ng/l	TM434							1.89 2 #
PFPeS (2706-91-4)	<1 ng/l	TM434							<1 2 #
6:2 FTS (27619-97-2)	<1 ng/l	TM434							1.3 2 #
PFOA (335-67-1)	<0.65 ng/l	TM434							55.8 2 #
PFHxS (355-46-4)	<1 ng/l	TM434							<1 2 #
PFNA (375-95-1)	<1 ng/l	TM434							<1 2 #
PFHpS (375-92-8)	<1 ng/l	TM434							<1 2 #
PFDA (335-76-2)	<2 ng/l	TM434							<2 2 #
Linear PFOS (1763-23-1)	<0.65 ng/l	TM434							<0.65 2 #
Branched PFOS	<0.65 ng/l	TM434							<0.65 2 #
PFUnA (2058-94-8)	<2 ng/l	TM434							<2 2 #
PFDoA (307-55-1)	<2 ng/l	TM434							<2 2 #
PFDS (335-77-3)	<2 ng/l	TM434							<2 2 #
PFOSA (754-91-6)	<2 ng/l	TM434							<2 2 #
Total PFOS	<0.65 ng/l	TM434							<0.65 2 #
Moisture Content Ratio (% of as received sample)	%	PM024		11	18	16	20	13	
PFBA (375-22-4) Perfluoro-n-butanoic acid	<3 µg/kg	TM338		<3	<3	<3	<3	<3	
PFPA (2706-90-3) Perfluoro-n-pentanoic acid	<3 µg/kg	TM338		<3	<3	<3	<3	<3	
PFHxA (307-24-4) Perfluoro-n-hexanoic acid	<2 µg/kg	TM338		<2	<2	<2	<2	<2	
PFBS (375-73-5) Perfluoro-1-butanesulfonate	<1 µg/kg	TM338		<1	<1	<1	<1	<1	
PFHpA (375-85-9) Perfluoro-n-heptanoic acid	<1 µg/kg	TM338		<1	<1	<1	<1	<1	
PFOA (335-67-1) Perfluoro-n-octanoic acid	<1 µg/kg	TM338		<1	<1	1.24	9.66	<1	
PFHxS (355-46-4) Perfluoro-1-hexanesulfonate	<1 µg/kg	TM338		<1	<1	<1	<1	<1	
PFNA (375-95-1) Perfluoro-n-nonanoic acid	<1 µg/kg	TM338		<1	<1	<1	<1	<1	
PFHpS (375-92-8) Perfluoro-1-heptanesulfonate	<1 µg/kg	TM338		<1	<1	<1	<1	<1	
PFDA (335-76-2) Perfluoro-n-decanoic acid	<1 µg/kg	TM338		<1	<1	<1	<1	<1	
Linear PFOS(1763-23-1) Perfluoro-1-octanesulfonate	<1 µg/kg	TM338		1.8	<1	1.58	<1	<1	
Branched PFOS	<1 µg/kg	TM338		<1	<1	<1	<1	<1	
PFUnA (2058-94-8) Perfluoro-n-undecanoic acid	<1 µg/kg	TM338		<1	<1	<1	<1	<1	

CERTIFICATE OF ANALYSIS

SDG: 250205-38 **Report Number:** 756610 **Superseded Report:** 756601

Client Ref.: **Location:** Sladen Mill

Results Legend

#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted - refer to subcontractor report for accreditation status.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
***	6:2 FTAB (see appendix)
1-4+§@	Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	TP318	TP318	TP318	TP319	TP319	UPSTREAM
			Depth (m)	0.30	0.60	0.90	0.50	1.50	.
			Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Surface Water (SW)
			Date Sampled	03/02/2025	03/01/2025	03/02/2025	03/02/2025	03/02/2025	03/02/2025
			Sample Time	.	.	.	.	.	.
			Date Received	05/02/2025	05/02/2025	05/02/2025	05/02/2025	05/02/2025	05/02/2025
			SDG Ref	250205-38	250205-38	250205-38	250205-38	250205-38	250205-38
			Lab Sample No.(s)	31031040	31031041	31031042	31031043	31031044	31031047
			AGS Reference						
PFDoA (307-55-1) Perfluoro-n-dodecanoic acid	<1 µg/kg	TM338		<1	<1	<1	<1	<1	
PFOSA (754-91-6) Perfluoro-octanesulfonamide	<1 µg/kg	TM338		<1	<1	<1	<1	<1	
6:2-FTS (27619-97-2)	<1 µg/kg	TM338		<1	<1	<1	<1	<1	
PFDS (335-73-3) Perfluoro-1-decanesulfonate	<1 µg/kg	TM338		<1	<1	<1	<1	<1	
PFPeS (2706-91-4) Perfluoro-1-pentanesulfonate	<1 µg/kg	TM338		<1	<1	<1	<1	<1	
Total PFOS	<1 µg/kg	TM338		1.8	<1	1.58	<1	<1	
PFBA (Post Ox.) Perfluoro-n-butanoic acid	<3 µg/kg	TM428			<3			<3	
PFPA (Post Ox.) Perfluoro-n-pentanoic acid	<3 µg/kg	TM428			<3			<3	
PFHxA (Post Ox.) Perfluoro-n-hexanoic acid	<2 µg/kg	TM428			<2			<2	
PFBS (Post Ox.) Perfluoro-1-butanesulfonate	<1 µg/kg	TM428			<1			<1	
PFHpA (Post Ox.) Perfluoro-n-heptanoic acid	<1 µg/kg	TM428			<1			<1	
6:2 FTS (Post Ox.) Perfluoro-octane sulfonate 6:2	<1 µg/kg	TM428			<1			<1	
PFOA (Post Ox.) Perfluoro-n-octanoic acid	<1 µg/kg	TM428			<1			<1	
PFHxS (Post Ox.) Perfluoro-1-hexanesulfonate	<1 µg/kg	TM428			<1			<1	
PFNA (Post Ox.) Perfluoro-n-nonanoic acid	<1 µg/kg	TM428			<1			<1	
PFHpS (Post Ox.) Perfluoro-1-heptanesulfonate	<1 µg/kg	TM428			<1			<1	
PFDA (Post Ox.) Perfluoro-n-decanoic acid	<1 µg/kg	TM428			<1			<1	
Linear PFOS (Post Ox.) Perfluoro-1-octanesulfonate	<1 µg/kg	TM428			<1			<1	
Branched PFOS (Post Ox.)	<1 µg/kg	TM428			<1			<1	
PFUnA (Post Ox.) Perfluoro-n-undecanoic acid	<1 µg/kg	TM428			<1			<1	
PFDoA (Post Ox.) Perfluoro-n-dodecanoic acid	<1 µg/kg	TM428			<1			<1	
PFOSA (Post Ox.) Perfluoro-octanesulfonamide	<1 µg/kg	TM428			<1			<1	
PFDS (Post Ox.) Perfluoro-1-decanesulfonate	<1 µg/kg	TM428			<1			<1	
PFPeS (Post Ox.) Perfluoro-1-pentanesulfonate	<1 µg/kg	TM428			<1			<1	
Total PFOS (Post Ox.)	<2 µg/kg	TM428			<2			<2	

Table of Results - Appendix

Method No	Description
PM024	Soil preparation including homogenisation, moisture, screens of soils for Asbestos Containing Material
TM338	Analysis of perfluoroalkylsulfonates and perfluorocarboxylic acids in Solids
TM428	Analysis of perfluoroalkylsulfonates and perfluorocarboxylic acids - Total Oxidizable Precursor Assay
TM434	Analysis of PFAS

NA = not applicable.
Chemical testing (unless subcontracted) performed at ALS Laboratories (UK) Limited Hawarden (Method codes TM).

CERTIFICATE OF ANALYSIS

SDG: 250205-38 Report Number: 756610 Superseded Report: 756601
Client Ref.: Location: Sladen Mill

Test Completion Dates

Lab Sample No(s)	31031045	31031046	31031005	31031006	31031007	31031008	31031009	31031010	31031011	31031012
Customer Sample Ref.	SPRING 3	SPRING 4	TP301	TP301	TP301	TP302	TP302	TP302	TP303	TP303
AGS Ref.										
Depth			0.50	1.00	2.00	0.25	1.00	1.50	0.25	1.00
Type	Ground Water	Ground Water	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
PFAS (Post Ox.) Solids				18-Feb-2025		18-Feb-2025				18-Feb-2025
PFAS Liquids (Full Suite)	13-Feb-2025	13-Feb-2025								
PFAS Solids			13-Feb-2025	13-Feb-2025	13-Feb-2025	13-Feb-2025	13-Feb-2025	13-Feb-2025	13-Feb-2025	13-Feb-2025
Sample description			05-Feb-2025	05-Feb-2025	05-Feb-2025	05-Feb-2025	05-Feb-2025	06-Feb-2025	06-Feb-2025	05-Feb-2025

Lab Sample No(s)	31031013	31031014	31031015	31031016	31031017	31031018	31031019	31031020	31031021	31031022
Customer Sample Ref.	TP303	TP304	TP304	TP305	TP305	TP306	TP306	TP307	TP307	TP308
AGS Ref.										
Depth	1.50	0.75	1.50	0.50	1.10	0.25	0.75	0.25	0.50	0.25
Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
PFAS (Post Ox.) Solids		18-Feb-2025		18-Feb-2025			18-Feb-2025			18-Feb-2025
PFAS Solids	13-Feb-2025	13-Feb-2025	13-Feb-2025	13-Feb-2025	13-Feb-2025	13-Feb-2025	13-Feb-2025	13-Feb-2025	13-Feb-2025	13-Feb-2025
Sample description	05-Feb-2025	05-Feb-2025	05-Feb-2025	05-Feb-2025	05-Feb-2025	05-Feb-2025	05-Feb-2025	05-Feb-2025	05-Feb-2025	05-Feb-2025

Lab Sample No(s)	31034853	31031023	31031024	31031025	31031026	31031027	31031028	31031029	31031030	31031031
Customer Sample Ref.	TP308	TP309	TP309	TP310	TP310	TP310	TP312	TP312	TP312	TP313
AGS Ref.										
Depth	0.50	0.50	1.50	0.25	1.00	2.00	0.50	1.00	1.50	0.25
Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
PFAS (Post Ox.) Solids			18-Feb-2025					18-Feb-2025		
PFAS Solids	13-Feb-2025	13-Feb-2025	13-Feb-2025	13-Feb-2025	13-Feb-2025	13-Feb-2025	13-Feb-2025	13-Feb-2025	13-Feb-2025	13-Feb-2025
Sample description	06-Feb-2025	05-Feb-2025	06-Feb-2025	06-Feb-2025	06-Feb-2025	05-Feb-2025	05-Feb-2025	05-Feb-2025	05-Feb-2025	05-Feb-2025

Lab Sample No(s)	31031032	31031033	31031034	31031035	31031036	31031037	31031040	31031041	31031042	31031043
Customer Sample Ref.	TP313	TP314	TP315	TP316	TP316	TP317	TP318	TP318	TP318	TP319
AGS Ref.										
Depth	0.75	0.50	0.25	0.50	1.00	0.25	0.30	0.60	0.90	0.50
Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
PFAS (Post Ox.) Solids				18-Feb-2025				18-Feb-2025		
PFAS Solids	13-Feb-2025	13-Feb-2025	13-Feb-2025	13-Feb-2025	13-Feb-2025	13-Feb-2025	13-Feb-2025	13-Feb-2025	13-Feb-2025	13-Feb-2025
Sample description	05-Feb-2025	05-Feb-2025	05-Feb-2025	05-Feb-2025	05-Feb-2025	05-Feb-2025	05-Feb-2025	06-Feb-2025	05-Feb-2025	05-Feb-2025

Lab Sample No(s)	31031044	31031047
Customer Sample Ref.	TP319	UPSTREAM
AGS Ref.		
Depth	1.50	
Type	Soil/Solid (S)	Surface Water
PFAS (Post Ox.) Solids	18-Feb-2025	
PFAS Liquids (Full Suite)		13-Feb-2025
PFAS Solids	13-Feb-2025	
Sample description	05-Feb-2025	

Appendix

General

1. Results are expressed on a dry weight basis (dried at 35ºC) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH4 by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 15 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of 15 days after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised.
This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. For dried and crushed preparations of soils volatile loss may occur -
e.g volatile mercury.

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis.
The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l.
Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only.
It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17 Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

18. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as “mixed hydrocarbons”. Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

19. **Sample Deviations**

If a sample is classed as deviated then the associated results may be compromised.

1	**Container with Headspace provided for volatiles analysis**
2	**Incorrect container received**
3	**Deviation from method**
4	**Matrix interference**
♦	**Sample holding time exceeded in laboratory**
@	**Sample holding time exceeded due to late arrival of instructions or samples**
§	**Sampled on date not provided**

20. **Asbestos**

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2021), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as “Not detected”. If no asbestos fibre types are found all will be reported as “Not detected” and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

If during the search of the two ‘pinch’ samples by PLM only 1 or 2 fibres or fibre bundles are seen and identified as asbestos, the term ‘trace asbestos identified’ is reported.

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials and soils are obtained from supplied bulk materials and soils which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2021).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining.

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.
Potentially respirable fibres are identified by using a Phase Contrast Microscope.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.
The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

21. 6:2 FTAB

Recovery of 6:2 FTAB in the quality control samples has been observed to be <50% of the target value. Please note the 6:2 FTAB result is supplied as indicative only.

ALS Laboratories (UK) Limited
Torrington Avenue
Coventry
CV4 9GU

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www.alsenvironmental.co.uk

Mr Bowman
Soil and Structures Ltd
89 Moorhead Lane
Shipley BD18 4JW
West Yorkshire

14 June 2024

Test Report: COV/2669225/2024

Dear Mr Bowman

Analysis of your sample(s) submitted on 07 June 2024 is now complete and we have pleasure in enclosing the appropriate test report(s).

An invoice for the analysis carried out will be sent under separate cover.

Should you have any queries regarding this report(s) or any part of our service, please contact Customer Services on +44 (0)24 7642 1213 who will be happy to discuss your requirements.

If you would like to arrange any further analysis, please contact Customer Services. To arrange container delivery or sample collection, please call the Couriers Department directly on 024 7685 6562.

Thank you for using ALS Laboratories (UK) Limited and we look forward to receiving your next samples.

Yours Sincerely,

Signed:

Name: A. Zunzunegui

Title: Organics Chemistry Manager

UKAS TESTING 1314

bsi ISO 14001 Environmental Management CERTIFIED EMS675527 ISO 45001 Occupational Health and Safety Management CERTIFIED OHS 542058

mCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

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Registered Office: ALS Laboratories (UK) Limited, Torrington Avenue, Coventry, CV4 9GU.

Report Summary

ANALYSED BY

UKAS TESTING 1314

Mr Russell Bowman
Soil and Structures Ltd
89 Moorhead Lane
Shipley
West Yorkshire
BD18 4JW

Date of Issue: **14 June 2024**

Report Number: **COV/2669225/2024** Issue **1**

This issue replaces all previous issues

Job Description: Master Quote 2024

Job Location: 89 Moorhead Lane, Shipley, BD18 4JW

Number of Samples included in this report **3**

Job Received: **07 June 2024**

Number of Test Results included in this report **60**

Analysis Commenced: **08 June 2024**

Signed:

Name: **A. Zunzunegui** Date: **14 June 2024**

Title: **Organics Chemistry Manager**

ALS Laboratories (UK) Limited was not responsible for sampling unless otherwise stated.

Information on the methods of analysis and performance characteristics are available on request.
Opinions and interpretations expressed herein are outside the scope of UKAS accreditation. The results relate only to the items tested and where relevant sampled.
Tests marked 'Not UKAS Accredited' in this Report/Certificate are not included in the UKAS Accreditation Schedule for our laboratory.
This test report is not a statement of conformity to any specification or standard.

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Certificate of Analysis

ANALYSED BY

UKAS TESTING 1314

Report Number:	**COV/2669225/2024**	Issue	**1**
Laboratory Number:	**24108157**	Sample	**1** of **3**
Sample Source:	**Soil and Structures Ltd**		
Sample Point Description:			
Sample Description:	**Surface Water (Upstream)**		
Sample Matrix:	**Surface Water**		
Sample Date/Time:	**05 June 2024** **10:04**		
Sample Received:	**07 June 2024**		
Analysis Complete:	**14 June 2024**		

Test Description	Result	Units	Completed	Accreditation	Method
Sulphate as SO4	6.6	mg/l	10/06/2024	Y Cov	WAS036
PFOS	0.00081	ug/l	08/06/2024	Y Cov	GEO82
PFOA	0.0327	ug/l	11/06/2024	Y Cov	GEO82
Naphthalene	<0.010	ug/l	11/06/2024	Y Cov	GEO81
Acenaphthylene	<0.010	ug/l	11/06/2024	Y Cov	GEO81
Acenaphthene	<0.010	ug/l	11/06/2024	Y Cov	GEO81
Fluorene	<0.010	ug/l	11/06/2024	Y Cov	GEO81
Phenanthrene	<0.010	ug/l	11/06/2024	Y Cov	GEO81
Anthracene	<0.010	ug/l	11/06/2024	Y Cov	GEO81
Fluoranthene	<0.010	ug/l	11/06/2024	Y Cov	GEO81
Pyrene	<0.010	ug/l	11/06/2024	Y Cov	GEO81
Benzo(a)anthracene	<0.010	ug/l	11/06/2024	Y Cov	GEO81
Chrysene	<0.010	ug/l	11/06/2024	Y Cov	GEO81
Benzo(b)fluoranthene	<0.010	ug/l	11/06/2024	Y Cov	GEO81
Benzo(k)fluoranthene	<0.010	ug/l	11/06/2024	Y Cov	GEO81
Benzo(a)pyrene	<0.010	ug/l	11/06/2024	Y Cov	GEO81
Indeno(123cd)pyrene	<0.010	ug/l	11/06/2024	Y Cov	GEO81
Dibenzo(ah)anthracene	<0.010	ug/l	11/06/2024	Y Cov	GEO81
Benzo(ghi)perylene	<0.010	ug/l	11/06/2024	Y Cov	GEO81
PAH, Total of 16	<0.010	ug/l	11/06/2024	N Cov	GEO81

Analyst Comments for 24108157: No Analyst Comment

ALS Laboratories (UK) Limited
Torrington Avenue, Coventry, CV4 9GU
Tel:+44 (0)24 7642 1213 Fax:+44 (0)24 7685 6575

This issue replaces all previous issues
Accreditation Codes: Y = UKAS / ISO17025 Accredited, N = Not UKAS / ISO17025 Accredited, M = MCERTS.
Analysed at: CHE = Chester(CH5 3US), COV = Coventry(CV4 9GU), S = Subcontracted, TRB = Subcontracted to Trowbridge(BA14 0XD), WAK = Wakefield(WF5 9TG).
For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered.
I/S=Insufficient sample For soil/sludge samples: AR=As received, DW=Dry weight.

Signed: 

Name: **A. Zunzunegui** Date: **14 June 2024**

Title: **Organics Chemistry Manager**

Certificate of Analysis

ANALYSED BY

UKAS TESTING 1314

Report Number:	**COV/2669225/2024**	Issue	**1**
Laboratory Number:	**24108158**	Sample	**2** of **3**
Sample Source:	**Soil and Structures Ltd**		
Sample Point Description:			
Sample Description:	**Surface Water (Midstream)**		
Sample Matrix:	**Surface Water**		
Sample Date/Time:	**05 June 2024** **10:07**		
Sample Received:	**07 June 2024**		
Analysis Complete:	**14 June 2024**		

Test Description	Result	Units	Completed	Accreditation	Method
Sulphate as SO4	6.7	mg/l	10/06/2024	Y Cov	WAS036
PFOS	0.00081	ug/l	08/06/2024	Y Cov	GEO82
PFOA	0.0346	ug/l	11/06/2024	Y Cov	GEO82
Naphthalene	<0.010	ug/l	11/06/2024	Y Cov	GEO81
Acenaphthylene	<0.010	ug/l	11/06/2024	Y Cov	GEO81
Acenaphthene	<0.010	ug/l	11/06/2024	Y Cov	GEO81
Fluorene	<0.010	ug/l	11/06/2024	Y Cov	GEO81
Phenanthrene	<0.010	ug/l	11/06/2024	Y Cov	GEO81
Anthracene	<0.010	ug/l	11/06/2024	Y Cov	GEO81
Fluoranthene	<0.010	ug/l	11/06/2024	Y Cov	GEO81
Pyrene	<0.010	ug/l	11/06/2024	Y Cov	GEO81
Benzo(a)anthracene	<0.010	ug/l	11/06/2024	Y Cov	GEO81
Chrysene	<0.010	ug/l	11/06/2024	Y Cov	GEO81
Benzo(b)fluoranthene	<0.010	ug/l	11/06/2024	Y Cov	GEO81
Benzo(k)fluoranthene	<0.010	ug/l	11/06/2024	Y Cov	GEO81
Benzo(a)pyrene	<0.010	ug/l	11/06/2024	Y Cov	GEO81
Indeno(123cd)pyrene	<0.010	ug/l	11/06/2024	Y Cov	GEO81
Dibenzo(ah)anthracene	<0.010	ug/l	11/06/2024	Y Cov	GEO81
Benzo(ghi)perylene	<0.010	ug/l	11/06/2024	Y Cov	GEO81
PAH, Total of 16	<0.010	ug/l	11/06/2024	N Cov	GEO81

Analyst Comments for 24108158: No Analyst Comment

This issue replaces all previous issues
Accreditation Codes: Y = UKAS / ISO17025 Accredited, N = Not UKAS / ISO17025 Accredited, M = MCERTS.
Analysed at: CHE = Chester(CH5 3US), COV = Coventry(CV4 9GU), S = Subcontracted, TRB = Subcontracted to Trowbridge(BA14 0XD), WAK = Wakefield(WF5 9TG).
For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered.
I/S=Insufficient sample For soil/sludge samples: AR=As received, DW=Dry weight.

Signed: 

Name: **A. Zunzunegui** Date: **14 June 2024**

Title: **Organics Chemistry Manager**

Certificate of Analysis

ANALYSED BY

UKAS TESTING 1314

Report Number:	**COV/2669225/2024**	Issue	**1**
Laboratory Number:	**24108159**	Sample	**3** of **3**
Sample Source:	**Soil and Structures Ltd**		
Sample Point Description:			
Sample Description:	**Surface Water (Downstream)**		
Sample Matrix:	**Surface Water**		
Sample Date/Time:	**05 June 2024** **10:12**		
Sample Received:	**07 June 2024**		
Analysis Complete:	**14 June 2024**		

Test Description	Result	Units	Completed	Accreditation	Method
Sulphate as SO4	6.8	mg/l	10/06/2024	Y Cov	WAS036
PFOS	0.00089	ug/l	08/06/2024	Y Cov	GEO82
PFOA	0.0359	ug/l	11/06/2024	Y Cov	GEO82
Naphthalene	<0.010	ug/l	11/06/2024	Y Cov	GEO81
Acenaphthylene	<0.010	ug/l	11/06/2024	Y Cov	GEO81
Acenaphthene	<0.010	ug/l	11/06/2024	Y Cov	GEO81
Fluorene	<0.010	ug/l	11/06/2024	Y Cov	GEO81
Phenanthrene	<0.010	ug/l	11/06/2024	Y Cov	GEO81
Anthracene	<0.010	ug/l	11/06/2024	Y Cov	GEO81
Fluoranthene	<0.010	ug/l	11/06/2024	Y Cov	GEO81
Pyrene	<0.010	ug/l	11/06/2024	Y Cov	GEO81
Benzo(a)anthracene	<0.010	ug/l	11/06/2024	Y Cov	GEO81
Chrysene	<0.010	ug/l	11/06/2024	Y Cov	GEO81
Benzo(b)fluoranthene	<0.010	ug/l	11/06/2024	Y Cov	GEO81
Benzo(k)fluoranthene	<0.010	ug/l	11/06/2024	Y Cov	GEO81
Benzo(a)pyrene	<0.010	ug/l	11/06/2024	Y Cov	GEO81
Indeno(123cd)pyrene	<0.010	ug/l	11/06/2024	Y Cov	GEO81
Dibenzo(ah)anthracene	<0.010	ug/l	11/06/2024	Y Cov	GEO81
Benzo(ghi)perylene	<0.010	ug/l	11/06/2024	Y Cov	GEO81
PAH, Total of 16	<0.010	ug/l	11/06/2024	N Cov	GEO81

Analyst Comments for 24108159: No Analyst Comment

This issue replaces all previous issues
Accreditation Codes: Y = UKAS / ISO17025 Accredited, N = Not UKAS / ISO17025 Accredited, M = MCERTS.
Analysed at: CHE = Chester(CH5 3US), COV = Coventry(CV4 9GU), S = Subcontracted, TRB = Subcontracted to Trowbridge(BA14 0XD), WAK = Wakefield(WF5 9TG).
For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered.
I/S=Insufficient sample For soil/sludge samples: AR=As received, DW=Dry weight.

Signed: 

Name: **A. Zunzunegui** Date: **14 June 2024**

Title: **Organics Chemistry Manager**

ANALYST COMMENTS FOR REPORT COV/2669225/2024 Issue 1

This issue replaces all previous issues

Date of Issue: **14 June 2024**

Sample No	Analysis Comments
24108157	
24108158	
24108159	

Signed: 

Name: **A. Zunzunegui** Date: **14 June 2024**

Title: **Organics Chemistry Manager**

DETERMINAND COMMENTS FOR REPORT COV/2669225/2024

ISSUE 1

This issue replaces all previous issues

Date of Issue: 14 June 2024

Sample No	Description	Determinand	Comments

Signed: 

Name: **A. Zunzunegui** Date: **14 June 2024**

Title: **Organics Chemistry Manager**

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ALS Laboratories (UK) Limited
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Mr Bowman
Soil and Structures Ltd
89 Moorhead Lane
Shipley BD18 4JW
West Yorkshire

17 July 2024

Test Report: COV/2687173/2024

Dear Mr Bowman

Analysis of your sample(s) submitted on 11 July 2024 is now complete and we have pleasure in enclosing the appropriate test report(s).

An invoice for the analysis carried out will be sent under separate cover.

Should you have any queries regarding this report(s) or any part of our service, please contact Customer Services on +44 (0)24 7642 1213 who will be happy to discuss your requirements.

If you would like to arrange any further analysis, please contact Customer Services. To arrange container delivery or sample collection, please call the Couriers Department directly on 024 7685 6562.

Thank you for using ALS Laboratories (UK) Limited and we look forward to receiving your next samples.

Yours Sincerely,

Signed:

Name: D. Lewis

Title: Technical Inorganic Manager

UKAS TESTING 1314

bsi EMS675527 ISO 14001 Environmental Management CERTIFIED OHS 542058 ISO 45001 Occupational Health and Safety Management CERTIFIED

mCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

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Registered Office: ALS Laboratories (UK) Limited, Torrington Avenue, Coventry, CV4 9GU.

Report Summary

ANALYSED BY

UKAS TESTING 1314

Mr Russell Bowman
Soil and Structures Ltd
89 Moorhead Lane
Shipley
West Yorkshire
BD18 4JW

Date of Issue: **17 July 2024**

Report Number: **COV/2687173/2024** Issue **1**

This issue replaces all previous issues

Job Description: Master Quote 2024

Job Location: 89 Moorhead Lane Shipley BD184JW

Number of Samples included in this report **5**

Job Received: **11 July 2024**

Number of Test Results included in this report **10**

Analysis Commenced: **13 July 2024**

Signed: D. Lewis

Name: **D. Lewis** Date: **17 July 2024**

Title: **Technical Inorganic Manager**

ALS Laboratories (UK) Limited was not responsible for sampling unless otherwise stated.

Information on the methods of analysis and performance characteristics are available on request.
Opinions and interpretations expressed herein are outside the scope of UKAS accreditation. The results relate only to the items tested and where relevant sampled.
Tests marked 'Not UKAS Accredited' in this Report/Certificate are not included in the UKAS Accreditation Schedule for our laboratory.
This test report is not a statement of conformity to any specification or standard.

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Certificate of Analysis

ANALYSED BY

UKAS TESTING 1314

Report Number:	**COV/2687173/2024**	Issue	**1**
Laboratory Number:	**24234575**	Sample	**1** of **5**
Sample Source:	**Soil and Structures Ltd**		
Sample Point Description:			
Sample Description:	**Surface Water (Castle Brook)**		
Sample Matrix:	**Surface Water**		
Sample Date/Time:	**08 July 2024** **14:00**		
Sample Received:	**11 July 2024**		
Analysis Complete:	**17 July 2024**		

Test Description	Result	Units	Completed	Accreditation	Method
PFOS	0.00081	ug/l	13/07/2024	Y Cov	GEO82
PFOA	0.0440	ug/l	16/07/2024	Y Cov	GEO82

Analyst Comments for 24234575: No Analyst Comment

This issue replaces all previous issues
Accreditation Codes: Y = UKAS / ISO17025 Accredited, N = Not UKAS / ISO17025 Accredited, M = MCERTS.
Analysed at: CHE = Chester(CH5 3US), COV = Coventry(CV4 9GU), S = Subcontracted, TRB = Subcontracted to Trowbridge(BA14 0XD), WAK = Wakefield(WF5 9TG).
For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered.
I/S=Insufficient sample For soil/sludge samples: AR=As received, DW=Dry weight.

Signed: D. Lewis

Name: **D. Lewis** Date: **17 July 2024**

Title: **Technical Inorganic Manager**

Certificate of Analysis

ANALYSED BY

UKAS TESTING 1314

Report Number:	**COV/2687173/2024**	Issue	**1**
Laboratory Number:	**24234576**	Sample	**2** of **5**
Sample Source:	**Soil and Structures Ltd**		
Sample Point Description:			
Sample Description:	**Surface Water (Lydgate Brook)**		
Sample Matrix:	**Surface Water**		
Sample Date/Time:	**08 July 2024** **14:02**		
Sample Received:	**11 July 2024**		
Analysis Complete:	**17 July 2024**		

Test Description	Result	Units	Completed	Accreditation	Method
PFOS	0.00072	ug/l	13/07/2024	Y Cov	GEO82
PFOA	0.0144	ug/l	16/07/2024	Y Cov	GEO82

Analyst Comments for 24234576: No Analyst Comment

This issue replaces all previous issues
Accreditation Codes: Y = UKAS / ISO17025 Accredited, N = Not UKAS / ISO17025 Accredited, M = MCERTS.
Analysed at: CHE = Chester(CH5 3US), COV = Coventry(CV4 9GU), S = Subcontracted, TRB = Subcontracted to Trowbridge(BA14 0XD), WAK = Wakefield(WF5 9TG).
For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered.
I/S=Insufficient sample For soil/sludge samples: AR=As received, DW=Dry weight.

Signed: D. Lewis

Name: **D. Lewis** Date: **17 July 2024**

Title: **Technical Inorganic Manager**

Certificate of Analysis

ANALYSED BY

UKAS TESTING 1314

Report Number:	**COV/2687173/2024**	Issue	**1**
Laboratory Number:	**24234577**	Sample	**3** of **5**
Sample Source:	**Soil and Structures Ltd**		
Sample Point Description:			
Sample Description:	**Surface Water (Downstream)**		
Sample Matrix:	**Surface Water**		
Sample Date/Time:	**08 July 2024** **13:50**		
Sample Received:	**11 July 2024**		
Analysis Complete:	**17 July 2024**		

Test Description	Result	Units	Completed	Accreditation	Method
PFOS	0.00075	ug/l	13/07/2024	Y Cov	GEO82
PFOA	0.0323	ug/l	16/07/2024	Y Cov	GEO82

Analyst Comments for 24234577: No Analyst Comment

This issue replaces all previous issues
Accreditation Codes: Y = UKAS / ISO17025 Accredited, N = Not UKAS / ISO17025 Accredited, M = MCERTS.
Analysed at: CHE = Chester(CH5 3US), COV = Coventry(CV4 9GU), S = Subcontracted, TRB = Subcontracted to Trowbridge(BA14 0XD), WAK = Wakefield(WF5 9TG).
For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered.
I/S=Insufficient sample For soil/sludge samples: AR=As received, DW=Dry weight.

Signed: D. Lewis

Name: **D. Lewis** Date: **17 July 2024**

Title: **Technical Inorganic Manager**

Certificate of Analysis

ANALYSED BY

UKAS TESTING 1314

Report Number:	**COV/2687173/2024**	Issue	**1**
Laboratory Number:	**24234578**	Sample	**4** of **5**
Sample Source:	**Soil and Structures Ltd**		
Sample Point Description:			
Sample Description:	**Surface Water (25m Downstream)**		
Sample Matrix:	**Surface Water**		
Sample Date/Time:	**08 July 2024** **13:52**		
Sample Received:	**11 July 2024**		
Analysis Complete:	**17 July 2024**		

Test Description	Result	Units	Completed	Accreditation	Method
PFOS	0.00089	ug/l	13/07/2024	Y Cov	GEO82
PFOA	0.364	ug/l	16/07/2024	Y Cov	GEO82

Analyst Comments for 24234578: No Analyst Comment

This issue replaces all previous issues
Accreditation Codes: Y = UKAS / ISO17025 Accredited, N = Not UKAS / ISO17025 Accredited, M = MCERTS.
Analysed at: CHE = Chester(CH5 3US), COV = Coventry(CV4 9GU), S = Subcontracted, TRB = Subcontracted to Trowbridge(BA14 0XD), WAK = Wakefield(WF5 9TG).
For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered.
I/S=Insufficient sample For soil/sludge samples: AR=As received, DW=Dry weight.

Signed: D. Lewis

Name: **D. Lewis** Date: **17 July 2024**

Title: **Technical Inorganic Manager**

Certificate of Analysis

ANALYSED BY

UKAS TESTING 1314

Report Number:	**COV/2687173/2024**	Issue	**1**
Laboratory Number:	**24234579**	Sample	**5** of **5**
Sample Source:	**Soil and Structures Ltd**		
Sample Point Description:			
Sample Description:	**Surface Water (Spring)**		
Sample Matrix:	**Surface Water**		
Sample Date/Time:	**08 July 2024** **13:58**		
Sample Received:	**11 July 2024**		
Analysis Complete:	**17 July 2024**		

Test Description	Result	Units	Completed	Accreditation	Method
PFOS	0.00177	ug/l	13/07/2024	Y Cov	GEO82
PFOA	0.318	ug/l	16/07/2024	Y Cov	GEO82

Analyst Comments for 24234579: No Analyst Comment

This issue replaces all previous issues
Accreditation Codes: Y = UKAS / ISO17025 Accredited, N = Not UKAS / ISO17025 Accredited, M = MCERTS.
Analysed at: CHE = Chester(CH5 3US), COV = Coventry(CV4 9GU), S = Subcontracted, TRB = Subcontracted to Trowbridge(BA14 0XD), WAK = Wakefield(WF5 9TG).
For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered.
I/S=Insufficient sample For soil/sludge samples: AR=As received, DW=Dry weight.

Signed: D. Lewis

Name: **D. Lewis** Date: **17 July 2024**

Title: **Technical Inorganic Manager**

ANALYST COMMENTS FOR REPORT COV/2687173/2024 Issue 1

This issue replaces all previous issues

Date of Issue: **17 July 2024**

Sample No	Analysis Comments
24234575	
24234576	
24234577	
24234578	
24234579	

Signed: D. Lewis

Name: **D. Lewis** Date: **17 July 2024**

Title: **Technical Inorganic Manager**

DETERMINAND COMMENTS FOR REPORT COV/2687173/2024

ISSUE 1

This issue replaces all previous issues

Date of Issue: 17 July 2024

Sample No	Description	Determinand	Comments

Signed: D. Lewis

Name: **D. Lewis** Date: **17 July 2024**

Title: **Technical Inorganic Manager**

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ALS Laboratories (UK) Limited
Torrington Avenue
Coventry
CV4 9GU

T: +44 (0)24 7642 1213
F: +44 (0)24 7685 6575
www.alsenvironmental.co.uk

Mr Bowman
Soil and Structures Ltd
89 Moorhead Lane
Shipley BD18 4JW
West Yorkshire

18 November 2024

Test Report: COV/2736186/2024

Dear Mr Bowman

Analysis of your sample(s) submitted on 17 October 2024 is now complete and we have pleasure in enclosing the appropriate test report(s).

An invoice for the analysis carried out will be sent under separate cover.

Should you have any queries regarding this report(s) or any part of our service, please contact Customer Services on +44 (0)24 7642 1213 who will be happy to discuss your requirements.

If you would like to arrange any further analysis, please contact Customer Services. To arrange container delivery or sample collection, please call the Couriers Department directly on 024 7685 6562.

Thank you for using ALS Laboratories (UK) Limited and we look forward to receiving your next samples.

Yours Sincerely,

Signed: 

Name: P. Patel

Title: Inorganics Chemistry Manager

UKAS TESTING 1314

bsi ISO 14001 Environmental Management CERTIFIED EMS675527 ISO 45001 Occupational Health and Safety Management CERTIFIED OHS 542058

mCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

This communication has been sent to you by ALS Laboratories (UK) Limited. Registered in England and Wales. Registration No.02391955.
Registered Office: ALS Laboratories (UK) Limited, Torrington Avenue, Coventry, CV4 9GU.

Report Summary

ANALYSED BY

UKAS TESTING 1314

Mr Russell Bowman
Soil and Structures Ltd
89 Moorhead Lane
Shipley
West Yorkshire
BD18 4JW

Date of Issue: **18 November 2024**

Report Number: **COV/2736186/2024** Issue **3**

This issue replaces all previous issues

Job Description: Master Quote 2024

Job Location: Sladen Mill, Littleborough

Number of Samples included in this report **4**

Job Received: **17 October 2024**

Number of Test Results included in this report **151**

Analysis Commenced: **18 October 2024**

Signed:

Name: **P. Patel** Date: **18 November 2024**

Title: **Inorganics Chemistry Manager**

ALS Laboratories (UK) Limited was not responsible for sampling unless otherwise stated.

Information on the methods of analysis and performance characteristics are available on request.
Opinions and interpretations expressed herein are outside the scope of UKAS accreditation. The results relate only to the items tested and where relevant sampled. Information supplied by the customer may affect the validity of results.
Tests marked 'Not UKAS Accredited' in this Report/Certificate are not included in the UKAS Accreditation Schedule for our laboratory. This test report is not a statement of conformity to any specification or standard.

This communication has been sent to you by ALS Laboratories (UK) Limited. Registered in England and Wales. Registration No. 02391955. Registered Office: ALS Laboratories (UK) Limited, Torrington Avenue, Coventry, CV4 9GU.
(c) ALS Laboratories (UK) Limited 2024. All rights reserved. We, ALS Laboratories (UK) Limited, are the owner of all copyright in this report. You must not copy, reproduce, amend or adapt this report, its contents or any format in which it is delivered without our prior written agreement. If you copy, reproduce, amend, or adapt this report in any way without our agreement you will be liable for any damage or loss to us. In the event of a dispute the copy of the report held by us shall be the reference copy.

Certificate of Analysis

ANALYSED BY

UKAS TESTING 1314

Report Number:	**COV/2736186/2024**	Issue	**3**
Laboratory Number:	**24572653**	Sample	**1** of **4**
Sample Source:	**Soil and Structures Ltd**		
Sample Point Description:			
Sample Description:	**Spring 1**		
Sample Matrix:	**Not In Project**		
Sample Date/Time:	**10 October 2024**		
Sample Received:	**17 October 2024**		
Analysis Complete:	**18 November 2024**		

Test Description	Result	Units	Completed	Accreditation	Method
Phenols Mono (Phenol Index)	<0.10	mg/l	18/10/2024	N Cov	WAS019

Analyst Comments for 24572653: {/*}Incorrect sample container received for Monophenol, testing performed on sample from 500 ml PET. It is therefore possible that the provided results may be compromised.{*/}

This issue replaces all previous issues
Accreditation Codes: Y = UKAS / ISO17025 Accredited, N = Not UKAS / ISO17025 Accredited, M = MCERTS.
Analysed at: CHE = Chester(CH5 3US), COV = Coventry(CV4 9GU), S = Subcontracted, TRB = Subcontracted to Trowbridge(BA14 0XD), WAK = Wakefield(WF5 9TG), F = Data supplied by customer.
For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered.
I/S=Insufficient sample For soil/sludge samples: AR=As received, DW=Dry weight.

Signed: P. Patel

Name: **P. Patel** Date: **18 November 2024**

Title: **Inorganics Chemistry Manager**

Certificate of Analysis

ANALYSED BY

UKAS TESTING 1314

Report Number:	**COV/2736186/2024**		Issue	**3**	
Laboratory Number:	**24572654**		Sample	**2**	of **4**
Sample Source:	**Soil and Structures Ltd**				
Sample Point Description:					
Sample Description:	**Spring 2**				
Sample Matrix:	**Not In Project**				
Sample Date/Time:	**10 October 2024**				
Sample Received:	**17 October 2024**				
Analysis Complete:	**18 November 2024**				

Test Description	Result	Units	Completed	Accreditation		Method
Phenols Mono (Phenol Index)	<0.10	mg/l	18/10/2024	N	Cov	WAS019
PFBA (375-22-4)	0.003	ug/l	08/11/2024	N	Cov	GEO88
PFPeA (2706-90-3)	0.003	ug/l	08/11/2024	N	Cov	GEO88
PFHxA (307-24-4)	0.025	ug/l	08/11/2024	N	Cov	GEO88
PFHpA (375-85-9)	0.036	ug/l	08/11/2024	N	Cov	GEO88
PFOA (335-67-1)	Analyst Com	ug/l	14/11/2024	N	Cov	GEO88
PFNA (375-95-1)	0.001	ug/l	08/11/2024	N	Cov	GEO88
PFDA (335-76-2)	<0.001	ug/l	08/11/2024	N	Cov	GEO88
PFUnA (2058-94-8)	<0.001	ug/l	08/11/2024	N	Cov	GEO88
PFDoA (307-55-1)	<0.001	ug/l	08/11/2024	N	Cov	GEO88
PFTrDA (72629-94-8)	<0.001	ug/l	08/11/2024	N	Cov	GEO88
PFTeA (376-06-7)	<0.001	ug/l	08/11/2024	N	Cov	GEO88
PFHxDA (67905-19-5)	<0.001	ug/l	08/11/2024	N	Cov	GEO88
PFODA (16517-11-6)	<0.001	ug/l	08/11/2024	N	Cov	GEO88
PFBS (375-73-5)	<0.001	ug/l	08/11/2024	N	Cov	GEO88
PFPeS (2706-91-4)	<0.001	ug/l	08/11/2024	N	Cov	GEO88
PFHxS (355-46-4)	<0.001	ug/l	08/11/2024	N	Cov	GEO88
PFHpS (375-92-8)	<0.001	ug/l	08/11/2024	N	Cov	GEO88
PFOS (1763-23-1)	0.004	ug/l	08/11/2024	N	Cov	GEO88
PFNS (68259-12-1)	<0.001	ug/l	08/11/2024	N	Cov	GEO88
PFDS(335-77-3)	<0.001	ug/l	08/11/2024	N	Cov	GEO88
PFUnDS (749786-16-1)	<0.001	ug/l	08/11/2024	N	Cov	GEO88
PFDoS (79780-39-5)	<0.001	ug/l	08/11/2024	N	Cov	GEO88

Certificate of Analysis

ANALYSED BY

UKAS TESTING 1314

Report Number:	**COV/2736186/2024**	Issue	**3**
Laboratory Number:	**24572654**	Sample	**2** of **4**

Sample Source:	**Soil and Structures Ltd**
Sample Point Description:	
Sample Description:	**Spring 2**
Sample Matrix:	**Not In Project**
Sample Date/Time:	**10 October 2024**
Sample Received:	**17 October 2024**
Analysis Complete:	**18 November 2024**

Test Description	Result	Units	Completed	Accreditation	Method
HFPO-DA (Gen X) (13252-13-6)	0.001	ug/l	08/11/2024	N Cov	GEO88
HFPO-TA (13252-14-7)	0.017	ug/l	08/11/2024	N Cov	GEO88
DONA (919005-14-4)	<0.001	ug/l	08/11/2024	N Cov	GEO88
PFMOPrA (377-73-1)	<0.001	ug/l	08/11/2024	N Cov	GEO88
NFDHA (151772-58-6)	<0.001	ug/l	08/11/2024	N Cov	GEO88
PFMOBA (863090-89-5)	<0.001	ug/l	08/11/2024	N Cov	GEO88
PFecHS (133201-07-7/646-83-3)	<0.001	ug/l	08/11/2024	N Cov	GEO88
3:3 FTCA (356-02-5)	<0.010	ug/l	08/11/2024	N Cov	GEO88
5:3 FTCA (914637-49-3)	<0.001	ug/l	08/11/2024	N Cov	GEO88
7:3 FTCA (812-70-4)	<0.001	ug/l	08/11/2024	N Cov	GEO88
PFEESA (113507-82-7)	<0.001	ug/l	08/11/2024	N Cov	GEO88
6:2 Cl-PFESA (756426-58-1)	<0.001	ug/l	08/11/2024	N Cov	GEO88
8:2 Cl-PFESA (763051-92-9)	<0.001	ug/l	08/11/2024	N Cov	GEO88
4:2 FTSA (757124-72-4)	<0.001	ug/l	08/11/2024	N Cov	GEO88
6:2 FTSA (27619-97-2)	<0.001	ug/l	08/11/2024	N Cov	GEO88
8:2 FTSA (39108-34-4)	<0.001	ug/l	08/11/2024	N Cov	GEO88
FBSA (30334-69-1)	<0.001	ug/l	08/11/2024	N Cov	GEO88
FHxSA (41997-13-1)	<0.001	ug/l	08/11/2024	N Cov	GEO88
FOSA (754-91-6)	<0.001	ug/l	08/11/2024	N Cov	GEO88
MeFOSA (31506-32-8)	<0.001	ug/l	08/11/2024	N Cov	GEO88
EtFOSA (4151-50-2)	<0.001	ug/l	08/11/2024	N Cov	GEO88
MeFOSE (24448-09-7)	<0.001	ug/l	08/11/2024	N Cov	GEO88
EtFOSE (1691-99-2)	<0.001	ug/l	08/11/2024	N Cov	GEO88
NMeFOSAA (2355-31-9)	<0.001	ug/l	08/11/2024	N Cov	GEO88

Certificate of Analysis

ANALYSED BY

UKAS TESTING 1314

Report Number:	**COV/2736186/2024**	Issue	**3**
Laboratory Number:	**24572654**	Sample	**2** of **4**
Sample Source:	**Soil and Structures Ltd**		
Sample Point Description:			
Sample Description:	**Spring 2**		
Sample Matrix:	**Not In Project**		
Sample Date/Time:	**10 October 2024**		
Sample Received:	**17 October 2024**		
Analysis Complete:	**18 November 2024**		

Test Description	Result	Units	Completed	Accreditation	Method
NEtFOSAA (2991-50-6)	<0.001	ug/l	08/11/2024	N Cov	GEO88
6:2 FTAB (34455-29-3)	<0.001	ug/l	08/11/2024	N Cov	GEO88
PFAS, Sum of 48	Analyst Com	ug/l	14/11/2024	N Cov	GEO88

Analyst Comments for 24572654: This sample has been analysed for DWI PFAS 47 method GEO88 outside recommended stability times. It is therefore possible that the results provided may be compromised. {/*}Sample filtered through 0.45um filter prior to Monophenol analysis. Incorrect sample container received for Monophenol and PFAS, testing performed on sample from 500 ml PET. It is therefore possible that the provided results may be compromised. See A/C for GEO88 PFOA at customer request. Indicative result 1255.265ng/l.{*/} Unable to report total PFAS.

This issue replaces all previous issues
Accreditation Codes: Y = UKAS / ISO17025 Accredited, N = Not UKAS / ISO17025 Accredited, M = MCERTS.
Analysed at: CHE = Chester(CH5 3US), COV = Coventry(CV4 9GU), S = Subcontracted, TRB = Subcontracted to Trowbridge(BA14 0XD), WAK = Wakefield(WF5 9TG), F = Data supplied by customer.
For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered.
I/S=Insufficient sample For soil/sludge samples: AR=As received, DW=Dry weight.

Signed: P. Patel

Name: **P. Patel** Date: **18 November 2024**

Title: **Inorganics Chemistry Manager**

Certificate of Analysis

ANALYSED BY

UKAS TESTING 1314

Report Number:	**COV/2736186/2024**		Issue	**3**	
Laboratory Number:	**24572655**		Sample	**3**	of **4**
Sample Source:	**Soil and Structures Ltd**				
Sample Point Description:					
Sample Description:	**Spring 3**				
Sample Matrix:	**Not In Project**				
Sample Date/Time:	**10 October 2024**				
Sample Received:	**17 October 2024**				
Analysis Complete:	**18 November 2024**				

Test Description	Result	Units	Completed	Accreditation		Method
Phenols Mono (Phenol Index)	<0.10	mg/l	18/10/2024	N	Cov	WAS019
PFBA (375-22-4)	<0.001	ug/l	08/11/2024	N	Cov	GEO88
PFPeA (2706-90-3)	<0.001	ug/l	08/11/2024	N	Cov	GEO88
PFHxA (307-24-4)	0.008	ug/l	08/11/2024	N	Cov	GEO88
PFHpA (375-85-9)	0.009	ug/l	08/11/2024	N	Cov	GEO88
PFOA (335-67-1)	Analyst Com	ug/l	14/11/2024	N	Cov	GEO88
PFNA (375-95-1)	<0.001	ug/l	08/11/2024	N	Cov	GEO88
PFDA (335-76-2)	<0.001	ug/l	08/11/2024	N	Cov	GEO88
PFUnA (2058-94-8)	<0.001	ug/l	08/11/2024	N	Cov	GEO88
PFDoA (307-55-1)	<0.001	ug/l	08/11/2024	N	Cov	GEO88
PFTrDA (72629-94-8)	<0.001	ug/l	08/11/2024	N	Cov	GEO88
PFTeA (376-06-7)	<0.001	ug/l	08/11/2024	N	Cov	GEO88
PFHxDA (67905-19-5)	<0.001	ug/l	08/11/2024	N	Cov	GEO88
PFODA (16517-11-6)	<0.001	ug/l	08/11/2024	N	Cov	GEO88
PFBS (375-73-5)	0.028	ug/l	08/11/2024	N	Cov	GEO88
PFPeS (2706-91-4)	<0.001	ug/l	08/11/2024	N	Cov	GEO88
PFHxS (355-46-4)	<0.001	ug/l	08/11/2024	N	Cov	GEO88
PFHpS (375-92-8)	<0.001	ug/l	08/11/2024	N	Cov	GEO88
PFOS (1763-23-1)	0.002	ug/l	08/11/2024	N	Cov	GEO88
PFNS (68259-12-1)	<0.001	ug/l	08/11/2024	N	Cov	GEO88
PFDS(335-77-3)	<0.001	ug/l	08/11/2024	N	Cov	GEO88
PFUnDS (749786-16-1)	<0.001	ug/l	08/11/2024	N	Cov	GEO88
PFDoS (79780-39-5)	<0.001	ug/l	08/11/2024	N	Cov	GEO88

Certificate of Analysis

ANALYSED BY

UKAS TESTING 1314

Report Number:	**COV/2736186/2024**	Issue	**3**
Laboratory Number:	**24572655**	Sample	**3** of **4**
Sample Source:	**Soil and Structures Ltd**		
Sample Point Description:			
Sample Description:	**Spring 3**		
Sample Matrix:	**Not In Project**		
Sample Date/Time:	**10 October 2024**		
Sample Received:	**17 October 2024**		
Analysis Complete:	**18 November 2024**		

Test Description	Result	Units	Completed	Accreditation	Method
HFPO-DA (Gen X) (13252-13-6)	<0.001	ug/l	08/11/2024	N Cov	GEO88
HFPO-TA (13252-14-7)	<0.005	ug/l	08/11/2024	N Cov	GEO88
DONA (919005-14-4)	<0.001	ug/l	08/11/2024	N Cov	GEO88
PFMOPrA (377-73-1)	<0.001	ug/l	08/11/2024	N Cov	GEO88
NFDHA (151772-58-6)	<0.001	ug/l	08/11/2024	N Cov	GEO88
PFMOBA (863090-89-5)	<0.001	ug/l	08/11/2024	N Cov	GEO88
PFecHS (133201-07-7/646-83-3)	<0.001	ug/l	08/11/2024	N Cov	GEO88
3:3 FTCA (356-02-5)	<0.010	ug/l	08/11/2024	N Cov	GEO88
5:3 FTCA (914637-49-3)	<0.001	ug/l	08/11/2024	N Cov	GEO88
7:3 FTCA (812-70-4)	<0.001	ug/l	08/11/2024	N Cov	GEO88
PFEESA (113507-82-7)	<0.001	ug/l	08/11/2024	N Cov	GEO88
6:2 Cl-PFESA (756426-58-1)	<0.001	ug/l	08/11/2024	N Cov	GEO88
8:2 Cl-PFESA (763051-92-9)	<0.001	ug/l	08/11/2024	N Cov	GEO88
4:2 FTSA (757124-72-4)	<0.001	ug/l	08/11/2024	N Cov	GEO88
6:2 FTSA (27619-97-2)	<0.001	ug/l	08/11/2024	N Cov	GEO88
8:2 FTSA (39108-34-4)	<0.001	ug/l	08/11/2024	N Cov	GEO88
FBSA (30334-69-1)	0.003	ug/l	08/11/2024	N Cov	GEO88
FHxSA (41997-13-1)	<0.001	ug/l	08/11/2024	N Cov	GEO88
FOSA (754-91-6)	<0.001	ug/l	08/11/2024	N Cov	GEO88
MeFOSA (31506-32-8)	<0.001	ug/l	08/11/2024	N Cov	GEO88
EtFOSA (4151-50-2)	<0.001	ug/l	08/11/2024	N Cov	GEO88
MeFOSE (24448-09-7)	<0.001	ug/l	08/11/2024	N Cov	GEO88
EtFOSE (1691-99-2)	<0.001	ug/l	08/11/2024	N Cov	GEO88
NMeFOSAA (2355-31-9)	<0.001	ug/l	08/11/2024	N Cov	GEO88

Certificate of Analysis

ANALYSED BY

1314

Report Number:	**COV/2736186/2024**	Issue	**3**
Laboratory Number:	**24572655**	Sample	**3** of **4**
Sample Source:	**Soil and Structures Ltd**		
Sample Point Description:			
Sample Description:	**Spring 3**		
Sample Matrix:	**Not In Project**		
Sample Date/Time:	**10 October 2024**		
Sample Received:	**17 October 2024**		
Analysis Complete:	**18 November 2024**		

Test Description	Result	Units	Completed	Accreditation	Method
NEtFOSAA (2991-50-6)	<0.001	ug/l	08/11/2024	N Cov	GEO88
6:2 FTAB (34455-29-3)	<0.001	ug/l	08/11/2024	N Cov	GEO88
PFAS, Sum of 48	Analyst Com	ug/l	14/11/2024	N Cov	GEO88

Analyst Comments for 24572655:

This sample has been analysed for DWI PFAS 47 method GEO88 outside recommended stability times. It is therefore possible that the results provided may be compromised. {/*}Sample filtered through 0.45um filter prior to Monophenol analysis.
Incorrect sample container received for Monophenol and PFAS, testing performed on sample from 500 ml PET. It is therefore possible that the provided results may be compromised.
See A/C for GEO88 PFOA at customer request. Indicative result 236.229ng/l.{*/} Unable to report total PFAS.

This issue replaces all previous issues
Accreditation Codes: Y = UKAS / ISO17025 Accredited, N = Not UKAS / ISO17025 Accredited, M = MCERTS.
Analysed at: CHE = Chester(CH5 3US), COV = Coventry(CV4 9GU), S = Subcontracted, TRB = Subcontracted to Trowbridge(BA14 0XD), WAK = Wakefield(WF5 9TG), F = Data supplied by customer.
For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered.
I/S=Insufficient sample For soil/sludge samples: AR=As received, DW=Dry weight.

Signed:

Name: **P. Patel** Date: **18 November 2024**

Title: **Inorganics Chemistry Manager**

Certificate of Analysis

ANALYSED BY

UKAS TESTING 1314

Report Number:	**COV/2736186/2024**	Issue	**3**	
Laboratory Number:	**24572656**	Sample	**4**	of **4**
Sample Source:	**Soil and Structures Ltd**			
Sample Point Description:				
Sample Description:	**Castle Brook (Upstream 2)**			
Sample Matrix:	**Surface Water**			
Sample Date/Time:	**10 October 2024**			
Sample Received:	**17 October 2024**			
Analysis Complete:	**18 November 2024**			

Test Description	Result	Units	Completed	Accreditation		Method
Phenols Mono (Phenol Index)	<0.10	mg/l	18/10/2024	N	Cov	WAS019
PFBA (375-22-4)	<0.001	ug/l	08/11/2024	Y	Cov	GEO88
PFPeA (2706-90-3)	<0.001	ug/l	08/11/2024	Y	Cov	GEO88
PFHxA (307-24-4)	0.002	ug/l	08/11/2024	Y	Cov	GEO88
PFHpA (375-85-9)	0.003	ug/l	08/11/2024	Y	Cov	GEO88
PFOA (335-67-1)	Analyst Com	ug/l	14/11/2024	Y	Cov	GEO88
PFNA (375-95-1)	<0.001	ug/l	08/11/2024	Y	Cov	GEO88
PFDA (335-76-2)	<0.001	ug/l	08/11/2024	Y	Cov	GEO88
PFUnA (2058-94-8)	<0.001	ug/l	08/11/2024	Y	Cov	GEO88
PFDoA (307-55-1)	<0.001	ug/l	08/11/2024	Y	Cov	GEO88
PFTrDA (72629-94-8)	<0.001	ug/l	08/11/2024	Y	Cov	GEO88
PFTeA (376-06-7)	<0.001	ug/l	08/11/2024	Y	Cov	GEO88
PFHxDA (67905-19-5)	<0.001	ug/l	08/11/2024	Y	Cov	GEO88
PFODA (16517-11-6)	<0.001	ug/l	08/11/2024	Y	Cov	GEO88
PFBS (375-73-5)	<0.001	ug/l	08/11/2024	Y	Cov	GEO88
PFPeS (2706-91-4)	<0.001	ug/l	08/11/2024	Y	Cov	GEO88
PFHxS (355-46-4)	<0.001	ug/l	08/11/2024	Y	Cov	GEO88
PFHpS (375-92-8)	<0.001	ug/l	08/11/2024	Y	Cov	GEO88
PFOS (1763-23-1)	<0.001	ug/l	08/11/2024	Y	Cov	GEO88
PFNS (68259-12-1)	<0.001	ug/l	08/11/2024	Y	Cov	GEO88
PFDS(335-77-3)	<0.001	ug/l	08/11/2024	Y	Cov	GEO88
PFUnDS (749786-16-1)	<0.001	ug/l	08/11/2024	Y	Cov	GEO88
PFDoS (79780-39-5)	<0.001	ug/l	08/11/2024	Y	Cov	GEO88

Certificate of Analysis

ANALYSED BY

UKAS TESTING 1314

Report Number:	**COV/2736186/2024**	Issue	**3**
Laboratory Number:	**24572656**	Sample	**4** of **4**
Sample Source:	**Soil and Structures Ltd**		
Sample Point Description:			
Sample Description:	**Castle Brook (Upstream 2)**		
Sample Matrix:	**Surface Water**		
Sample Date/Time:	**10 October 2024**		
Sample Received:	**17 October 2024**		
Analysis Complete:	**18 November 2024**		

Test Description	Result	Units	Completed	Accreditation	Method
HFPO-DA (Gen X) (13252-13-6)	<0.001	ug/l	08/11/2024	Y Cov	GEO88
HFPO-TA (13252-14-7)	<0.005	ug/l	08/11/2024	Y Cov	GEO88
DONA (919005-14-4)	<0.001	ug/l	08/11/2024	Y Cov	GEO88
PFMOPrA (377-73-1)	<0.001	ug/l	08/11/2024	Y Cov	GEO88
NFDHA (151772-58-6)	<0.001	ug/l	08/11/2024	Y Cov	GEO88
PFMOBA (863090-89-5)	<0.001	ug/l	08/11/2024	Y Cov	GEO88
PFecHS (133201-07-7/646-83-3)	<0.001	ug/l	08/11/2024	Y Cov	GEO88
3:3 FTCA (356-02-5)	<0.010	ug/l	08/11/2024	Y Cov	GEO88
5:3 FTCA (914637-49-3)	<0.001	ug/l	08/11/2024	Y Cov	GEO88
7:3 FTCA (812-70-4)	<0.001	ug/l	08/11/2024	Y Cov	GEO88
PFEESA (113507-82-7)	<0.001	ug/l	08/11/2024	Y Cov	GEO88
6:2 Cl-PFESA (756426-58-1)	<0.001	ug/l	08/11/2024	Y Cov	GEO88
8:2 Cl-PFESA (763051-92-9)	<0.001	ug/l	08/11/2024	Y Cov	GEO88
4:2 FTSA (757124-72-4)	<0.001	ug/l	08/11/2024	Y Cov	GEO88
6:2 FTSA (27619-97-2)	<0.001	ug/l	08/11/2024	Y Cov	GEO88
8:2 FTSA (39108-34-4)	<0.001	ug/l	08/11/2024	Y Cov	GEO88
FBSA (30334-69-1)	<0.001	ug/l	08/11/2024	Y Cov	GEO88
FHxSA (41997-13-1)	<0.001	ug/l	08/11/2024	Y Cov	GEO88
FOSA (754-91-6)	<0.001	ug/l	08/11/2024	Y Cov	GEO88
MeFOSA (31506-32-8)	<0.001	ug/l	08/11/2024	Y Cov	GEO88
EtFOSA (4151-50-2)	<0.001	ug/l	08/11/2024	Y Cov	GEO88
MeFOSE (24448-09-7)	<0.001	ug/l	08/11/2024	Y Cov	GEO88
EtFOSE (1691-99-2)	<0.001	ug/l	08/11/2024	Y Cov	GEO88
NMeFOSAA (2355-31-9)	<0.001	ug/l	08/11/2024	Y Cov	GEO88

Certificate of Analysis

ANALYSED BY

UKAS TESTING 1314

Report Number:	**COV/2736186/2024**	Issue	**3**
Laboratory Number:	**24572656**	Sample	**4** of **4**
Sample Source:	**Soil and Structures Ltd**		
Sample Point Description:			
Sample Description:	**Castle Brook (Upstream 2)**		
Sample Matrix:	**Surface Water**		
Sample Date/Time:	**10 October 2024**		
Sample Received:	**17 October 2024**		
Analysis Complete:	**18 November 2024**		

Test Description	Result	Units	Completed	Accreditation	Method
NEtFOSAA (2991-50-6)	<0.001	ug/l	08/11/2024	Y Cov	GEO88
6:2 FTAB (34455-29-3)	<0.001	ug/l	08/11/2024	Y Cov	GEO88
PFAS, Sum of 48	Analyst Com	ug/l	14/11/2024	N Cov	GEO88

Analyst Comments for 24572656: This sample has been analysed for DWI PFAS 47 method GEO88 outside recommended stability times. It is therefore possible that the results provided may be compromised. {/*}Sample filtered through 0.45um filter prior to Monophenol analysis. Incorrect sample container received for Monophenol and PFAS, testing performed on sample from 500 ml PET. It is therefore possible that the provided results may be compromised. See A/C for GEO88 PFOA at customer request. Indicative result 97.449ng/l{*/} Unable to report total PFAS.

This issue replaces all previous issues
Accreditation Codes: Y = UKAS / ISO17025 Accredited, N = Not UKAS / ISO17025 Accredited, M = MCERTS.
Analysed at: CHE = Chester(CH5 3US), COV = Coventry(CV4 9GU), S = Subcontracted, TRB = Subcontracted to Trowbridge(BA14 0XD), WAK = Wakefield(WF5 9TG), F = Data supplied by customer.
For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered.
I/S=Insufficient sample For soil/sludge samples: AR=As received, DW=Dry weight.

Signed: P. Patel

Name: **P. Patel** Date: **18 November 2024**

Title: **Inorganics Chemistry Manager**

ANALYST COMMENTS FOR REPORT COV/2736186/2024 Issue 3

This issue replaces all previous issues

Date of Issue: **18 November 2024**

Sample No	Analysis Comments
24572653	{/*}Incorrect sample container received for Monophenol, testing performed on sample from 500 ml PET. It is therefore possible that the provided results may be compromised.{*/}
24572654	This sample has been analysed for DWI PFAS 47 method GEO88 outside recommended stability times. It is therefore possible that the results provided may be compromised. {/*}Sample filtered through 0.45um filter prior to Monophenol analysis. Incorrect sample container received for Monophenol and PFAS, testing performed on sample from 500 ml PET. It is therefore possible that the provided results may be compromised. See A/C for GEO88 PFOA at customer request. Indicative result 1255.265ng/l.{*/} Unable to report total PFAS.
24572655	This sample has been analysed for DWI PFAS 47 method GEO88 outside recommended stability times. It is therefore possible that the results provided may be compromised. {/*}Sample filtered through 0.45um filter prior to Monophenol analysis. Incorrect sample container received for Monophenol and PFAS, testing performed on sample from 500 ml PET. It is therefore possible that the provided results may be compromised. See A/C for GEO88 PFOA at customer request. Indicative result 236.229ng/l.{*/} Unable to report total PFAS.
24572656	This sample has been analysed for DWI PFAS 47 method GEO88 outside recommended stability times. It is therefore possible that the results provided may be compromised. {/*}Sample filtered through 0.45um filter prior to Monophenol analysis. Incorrect sample container received for Monophenol and PFAS, testing performed on sample from 500 ml PET. It is therefore possible that the provided results may be compromised. See A/C for GEO88 PFOA at customer request. Indicative result 97.449ng/l{*/} Unable to report total PFAS.

Signed: 

Name: **P. Patel** Date: **18 November 2024**

Title: **Inorganics Chemistry Manager**

DETERMINAND COMMENTS FOR REPORT COV/2736186/2024

ISSUE 3

This issue replaces all previous issues

Date of Issue: 18 November 2024

Sample No	Description	Determinand	Comments

Signed: 

Name: **P. Patel** Date: **18 November 2024**

Title: **Inorganics Chemistry Manager**

Report Changes

Job Changes

Field Changed	Before Value	After Value

Sample Changes

Sample Number	Field Changed	Before Value	After Value
24572656	analystComment	This sample has been analysed for DWI PFAS 47 method GEO88 outside recommended stability times. It is therefore possible that the results provided may be compromised. {/*}Sample filtered through 0.45um filter prior to Monophenol analysis. Incorrect sample container received for Monophenol and PFAS, testing performed on sample from 500 ml PET. It is therefore possible that the provided results may be compromised. See A/C for GEO88 PFOA at customer request. Indicative result 1255.265ng/l{*/} Unable to report total PFAS.	This sample has been analysed for DWI PFAS 47 method GEO88 outside recommended stability times. It is therefore possible that the results provided may be compromised. {/*}Sample filtered through 0.45um filter prior to Monophenol analysis. Incorrect sample container received for Monophenol and PFAS, testing performed on sample from 500 ml PET. It is therefore possible that the provided results may be compromised. See A/C for GEO88 PFOA at customer request. Indicative result 97.449ng/l{*/} Unable to report total PFAS.

Result Changes

Sample Number	Det	Before Value	After Value

Moved Samples

Sample Number	Added/Removed

Project ref: **ENVPAC/1/GMC/00524**
Our ref: SO/2023/123384/02-L01
Your ref: Ben James

Date: 02 August 2023

Ben James
651a Mauldeth Road West
Chorlton Cum Hardy
Manchester
M21 7SA

Dear Ben

EMAIL 26/07/2023 OUTLINING BOREHOLES ON THE SITE. SLADEN MILL OFF HALIFAX ROAD LITTLEBOROUGH

Thank you for accepting our offer to provide detailed planning advice on the following submitted:

- Plan (dwg-tjba-luxure-sladen mill-090621) showing the proposed ground investigation location for planned groundwater investigation locations to further characterise the former Sladen Mill site.

We are providing this advice under Agreement No. **ENVPAC/1/GMC/00524.** Please note we have taken 2 hours to review and provide our advice. *[Please note there is 1 hour remaining on this agreement]*

Environment Agency Advice

We have reviewed the submission together with the previously reporting for the site to consider whether the proposed work sufficiently addresses the information gaps, which we discussed during our meeting earlier in July 2023. We have identified that the proposed additional works only cover the centre of the site. The work does not include the addition of boreholes on the Southern and Northern sectors of the site. We do not consider this to be adequate.

Consideration of the historic information for the site has identified the eastern parts of the southern section were formerly used for waste disposal. Therefore, there is a likelihood of mobile contamination migrating through the ground towards the western boundary where the surface watercourse is located.

Following the procedure set out in the Land Contamination Risk Management (LCRM) guidance, 2023, we consider there to be a significant possibility of a significant contaminant linkage between a possible source of contamination and a relevant receptor which will need investigating.

The same is true of the Northern sections of the site where the available information suggests tanks and filter beds/tanks were located.

By focusing on the central portion of the site, where the main mill buildings were located, the proposed additional works appear to exclude these potential sources of contamination and, potentially maintain the information gaps that we explained to you in our meeting in July 2023.

This additional work on your behalf has also identified that the site was previously occupied by Alderburgh Ltd. The manufacturing processes that were used during the companies' activities on site included plastics and waterproofing agents.

Recent research into emerging contaminants of concern has identified this process to be linked to the presence of Per- and Polyfluoroalkyl substances (PFAS).
PFAS [per- or polyfluoroalkyl substances] are an emerging contaminant of concern in the UK. Perfluorooctane sulfonate (PFOS) and Perfluorooctanoic acid (PFOA) are common components of PFAS however there are over 9000 individual compounds that make up the umbrella term PFAS.

PFAS substances are known to be highly persistent in the environment, can be extremely mobile depending on their carbon chain length and very difficult to deal with when in an environmental setting.

Therefore, with this new information we advise you that with the potential for PFAS substances to be present these will likely be added to the list of determinants which are tested for and that, where those concentrations exceed the relevant water quality standard of 0.65 nanograms per litre in water a fuller risk assessment and, where necessary, remediation will be required.

We additionally advise you that, in line with current guidance on sampling groundwaters, a single round of sampling and testing would be considered insufficient. The exact number of rounds of sampling is a matter for the external project team and is likely to be based on the initial results from your testing (i.e., where the groundwater is found to be lesser impacted then a low number of testing rounds should be insufficient; conversely where contamination is present at higher concentrations then more rounds should be considered to confirm the values found).

Careful consideration should be given to these previously discarded/deposited materials as, if they need to be excavated / disturbed, they will retain their classification of being a waste and, as such, will require treatment to meet the end of waste status and be suitable for reuse without appropriate permitting.

Cont/d..

Under the current environmental legislation and regulations the use of a mobile treatment permit would not provide scope for you to meet a relevant end of waste criteria as prescribed in Article 6 of the Waste Framework Directive 2008/98/EC allowing for reuse under the CL:aire Code of Practice; Definition of Waste procedure. In order for you to show that you have met the end-of-waste criteria that is identified in this paragraph, it must be shown that the

…agreed end of waste criteria which means that waste has undergone a recovery (including recycling) operation and the substance or object:

- *is commonly used for a specific purpose.*
- *has a market demand.*
- *fulfils the technical requirements for the purpose; it meets existing legislation and standards for products will not result in an unacceptable impact on the environment or human health.*

In this circumstance you need to fully, and adequately, delineate the extent and nature of the materials within the area of deposited waste as it pertains to the proposed development land parcel.

A check of our records shows that this approach to former industrial parcels of land is not uncommon. Dealing with former industrial sites and legacy issues that they may present is not a straightforward process and often requires more resource and technical consideration than first thought.

Understanding the characterising industrial legacy issues is an iterative process where further sampling and assessment is frequently required as previously unidentified issues are uncovered and the risks associated with them need addressing such that they meet the requirements of the national planning policy framework guidance document (NPPF, 2021), specifically sections 174, 183 (a)–(c) and 184.

Next Steps
I hope the above advice is helpful. If there is any further work, you anticipate needing our detailed advice on in relation to this project, additional hours will need to be agreed.

Yours sincerely

Mrs. SYLVIA WHITTINGHAM
Planning Advisor

Direct dial 0203 0251059
Direct e-mail sylvia.whittingham@environment-agency.gov.uk

Disclaimer
Our opinion is based on the information available to us at the time of the enquiry. When the formal planning application is submitted, our position may change if there have been changes to environmental risk or evidence, and/or planning policy.

Our ref: SO/2023/123238/01-L02
Your ref: 23/00549/DOC

Date: 03 July 2023

Rochdale Metropolitan Borough Council
Development Control
Number One Riverside
Smith Street
ROCHDALE
Lancashire
OL16 1XU

Dear Sir/Madam

SUBMISSION OF DETAILS TO COMPLY WITH CONDITION 5 (INVESTIGATION AND RISK ASSESSMENT ON PLANNING PERMISSION 15/01235/OUT

SLADEN MILL OFF HALIFAX ROAD LITTLEBOROUGH

Thank you for referring the above application for the discharge of condition 5 and 17, to the Environment Agency, which we received on the 6 June 2023.

We have reviewed the following report: Geo-Environmental Audit, reference: rep-tjba mere grp-sladen mill-Phs 2 3 Env-250322.docx, dated 21/11/22 by T J Booth Associates, for submission of details to comply with condition 5 (investigation and risk assessment)

Environment Agency position
We note from the submission that the investigation comprised of a single borehole located in the centre of the site to determine coal presence and 10No. trial holes, some identifying hydrocarbon contamination of the groundwater. There have been no groundwater investigations to characterise the site. Also noted is the presence of concrete ground slabs to the former buildings which are still in place and comprise the entire footprint of this area; these areas need better characterisation of ground conditions. We also request more detail related to activities from the previous manufacturer Alderburgh Ltd.

Based on this, we are therefore unable to recommend the discharge of condition 5

We recommend that consideration is given to further intrusive ground investigation and groundwater sampling to confirm the condition of the site (as well as the associated risks).

Advice to applicant
Model Procedures and good practice
Due to the former land use(s), soil and /or groundwater contamination may exist at the site and the associated risks to controlled waters should be addressed by:

We recommend that developers should:

• Follow the risk management framework provided in Guidance on Land contamination risk management (LCRM) Land contamination risk management (LCRM) - GOV.UK (www.gov.uk), when dealing with land affected by contamination
• Refer to our Guiding principles for land contamination for the type of information that we require to assess risks to controlled waters from the site - the local authority can advise on risk to other receptors, such as human health
• Consider using the National Quality Mark Scheme for Land Contamination Management which involves the use of competent persons to ensure that land contamination risks are appropriately managed
• Refer to the contaminated land pages on gov.uk for more information
• Refer to 'The Environment Agency's approach to groundwater protection'

All investigations of land potentially affected by contamination should be conducted by or under the direction of a suitably qualified competent person and in accordance with BS 10175 (2001) Code of practice for the investigation of potentially contaminated sites.

Additional support
Should you wish us to review any technical documents or want further advice to address any of the environmental issues raised in this response, we may be able to do this as part of our charged for planning advice service. Further engagement will provide you with certainty of our position as to what our response to a planning application will be. It should also result in a better quality and more environmentally sensitive development.

As part of our charged for service we will provide a dedicated project manager to act as a single point of contact to help resolve any problems. We currently charge £100 per person per hour, plus VAT. We will provide you with an estimated cost for any further discussions or review of documents. Our standard terms and conditions are available to view online at www.gov.uk/government/publications/planning-and-marine-licenceadvice-standard-terms-for-our-charges/planning-and-marine-licence-for-our-charges

If you would like more information on our planning advice service, including a cost estimate, please contact us at SPPlanning.RFH@environment-agency.gov.uk
--
Should you have any queries regarding this response, then please do not hesitate to contact me

Please forward a copy of this letter to the applicant

Yours faithfully

Mrs. SYLVIA WHITTINGHAM
Planning Advisor
Direct e-mail sylvia.whittingham@environment-agency.gov.uk

Cont/d..

End

Rochdale Metropolitan Borough Council
Number One Riverside
Rochdale
Lancashire
OL16 1JH

Our ref: SO/2024/123863/01-L01
Your ref: 24/00001/DOC

Date: 14 February 2024

Dear Sir/Madam

SUBMISSION OF DETAILS TO COMPLY WITH CONDITION 5 (INVESTIGATION AND RISK ASSESSMENT) 15/01235/OUT SLADEN MILL OFF HALIFAX ROAD LITTLEBOROUGH

Thank you for referring the above application for the discharge of condition 5 to the Environment Agency. We would wish to make the following comments.

Environment Agency position

We have previously engaged with the developer and their environmental consultant through the Environment Agency's chargeable advice service providing verbal and written advice. Furthermore, we shared relevant industry guidance documents to support their further investigation and assessment of the former industrial site.

We have carefully reviewed the submitted report Geo-Environmental Audit (Phase 2 Site Investigation & Risk Assessment and Phase 3 Remediation Statement) by T J Booth & Associates Ltd (dated Dec. 2023). In keeping with the wording of condition 5 of outline planning permission 15/01235/OUT we advise as follows:

Condition 5

- We are satisfied that sufficient information has been submitted to support part (i) of condition 5.
- We consider that part (ii) of condition 5 has not provided sufficient assessment details to meet a standard that allows us to recommend discharge of part (ii) of the condition.
- We consider that there is deficiency in the limited assessments that have been made to satisfy part (iii) of the condition and as such do not recommend discharge of part (iii) of the condition.

Advice to the LPA,
We are satisfied that the development would prevent pollution of the water environment and ensure the safe development of the site in the interests of the amenity of future occupiers in accordance with Policy G9 of the adopted Rochdale Core Strategy, saved Policy EM/8 of the adopted Rochdale Unitary Development Plan and the National Planning Policy Framework 2023 paragraph 189(b) – '*land should not be capable of being determined as contaminated land under Part IIA of the Environmental Protection Act 1990*'.

Please forward a copy of this letter to the applicant.

Yours faithfully

Mrs. SYLVIA WHITTINGHAM
Planning Advisor

Direct dial 0203 0251059
Direct e-mail sylvia.whittingham@environment-agency.gov.uk

End

Our ref: SO/2023/123238/01-L01
Your ref: 23/00549/DOC

Date: 26 June 2023

Rochdale Metropolitan Borough Council
Development Control
Number One Riverside
Smith Street
ROCHDALE
Lancashire
OL16 1XU

Dear Sir/Madam

SUBMISSION OF DETAILS TO COMPLY WITH CONDITION 5 (INVESTIGATION AND RISK ASSESSMENT), CONDITION 7 (CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN), CONDITION 10 (INVASIVE PLANS), CONDITION 11 (ARCHAEOLOGICAL RECORD & WRITTEN SCHEME OF INVESTIGATION), CONDITION 16 (EARTHMOVING) AND CONDITION 17 (METHOD STATEMENT AND MITIGATION STRATEGY) ON PLANNING PERMISSION 15/01235/OUT

SLADEN MILL OFF HALIFAX ROAD LITTLEBOROUGH

Thank you for referring the above application for the discharge of conditions 5 and 17, to the Environment Agency, which we received on the 6 June 2023. We have no objection in principle to the proposed development, but we would wish to make the following comments.

Environment Agency position

We have reviewed the following report: Geo-Environmental Audit, reference: rep-tjba-mere grp-sladen mill-Phs 2 3 Env-250322.docx, dated 21/11/22 by T J Booth Associates, for submission of details to comply with condition 5 (investigation and risk assessment) and condition 17 (Method Statement and Mitigation Strategy).

We note from the submission that the investigation comprised of a single borehole located in the centre of the site to determine coal presence and 10No. trial holes, some identifying hydrocarbon contamination of the groundwater. There have been no groundwater investigations to characterise the site. Also noted is the presence of concrete ground slabs to the former buildings which are still in place and comprise almost the entire footprint of this area; these areas need better characterisation of ground conditions. We also request more detail related to activities from the previous manufacturer Alderburgh Ltd. Based on this, we are therefore unable to recommend the discharge of condition 5 (and 17) attached to planning permission 15/01235/OUT in this circumstance.

We recommend that consideration is given to further intrusive ground investigation and groundwater sampling to confirm the condition of the site (as well as the associated risks).

Advice to applicant

Model Procedures and good practice
Due to the former land use(s), soil and /or groundwater contamination may exist at the site and the associated risks to controlled waters should be addressed by:
We recommend that developers should:

- Follow the risk management framework provided in Guidance on Land contamination risk management (LCRM) Land contamination risk management (LCRM) - GOV.UK (www.gov.uk), when dealing with land affected by contamination
- Refer to our Guiding principles for land contamination for the type of information that we require in order to assess risks to controlled waters from the site - the local authority can advise on risk to other receptors, such as human health
- Consider using the National Quality Mark Scheme for Land Contamination Management which involves the use of competent persons to ensure that land contamination risks are appropriately managed
- Refer to the contaminated land pages on gov.uk for more information
- Refer to 'The Environment Agency's approach to groundwater protection'

All investigations of land potentially affected by contamination should be carried out by or under the direction of a suitably qualified competent person and in accordance with BS 10175 (2001) Code of practice for the investigation of potentially contaminated sites.

Additional support
Should you wish us to review any technical documents or want further advice to address any of the environmental issues raised in this response, we may be able to do this as part of our charged for planning advice service. Further engagement will provide you with certainty of our position as to what our response to a planning application will be. It should also result in a better quality and more environmentally sensitive development.

As part of our charged for service we will provide a dedicated project manager to act as a single point of contact to help resolve any problems. We currently charge £100 per person per hour, plus VAT. We will provide you with an estimated cost for any further discussions or review of documents. Our standard terms and conditions are available to view online at www.gov.uk/government/publications/planning-and-marine-licenceadvice-standard-terms-for-our-charges/planning-and-marine-licence-advice-standardterms-for-our-charges.

If you would like more information on our planning advice service, including a cost estimate, please contact us at SPPlanning.RFH@environment-agency.gov.uk
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Should you have any queries regarding this response, then please do not hesitate to contact me.

Please forward a copy of this letter to the applicant.

Yours faithfully

Mrs. SYLVIA WHITTINGHAM
Planning Advisor

Direct e-mail sylvia.whittingham@environment-agency.gov.uk

End

Project ref: **ENVPAC/1/GMC/00524**
Our ref: SO/2023/123384/01-L01
Your ref: Ben James

Date: 27 July 2023

Ben James
651a Mauldeth Road West
Chorlton Cum Hardy
Manchester
M21 7SA

Dear Ben,

MEETING 21/07/2023 SLADEN MILL OFF HALIFAX ROAD LITTLEBOROUGH

Thank you for accepting our offer to meet with us on the 21 July 2023, to provide detailed planning advice. We are providing this advice under Agreement No. **ENVPAC/1/GMC/00524**. Please note we have taken 5 hours to meet, review and provide our advice. *[There are 3 hours remaining on this agreement]*

Attendees

Sylvia Whittingham	EA
William Hartley	EA
Lee Beveridge	EA
Ben James	Mere Development
Tim Booth	TJ Booth Associates
Daniel Slattery	TJ Booth Associates

Summary

It is our understanding that the site is to be redeveloped for residential units. From the information that has been previously provided to us we are aware that the site has been subject to a prolonged period of industrial land uses such that adverse concentrations of contamination may have been introduced into the environment such that there could be risks to the aquatic environment that must be addressed as a part of this redevelopment process.

As the Sladen Mill site is a former industrial site there is a good chance land contamination is present. Mills have operated there from the 1850s to 1950, and records show that Alderburgh Ltd once operated from the Sladen Mill site producing waterproofing materials for various industrial uses. The historic maps of the site show there to be potential sources of land contamination (including an old refuse tip/landfill) which should be subject to investigation as a part of the wider site characterisation.

This approach is governed and promoted by the National Planning Policy framework guidance (2021).

Paragraphs 174, 183 and 184 specifically require the developer to adequately investigate, characterise and assess their site to ascertain if the site does indeed pose a risk and, if so, to address those risks such that the land becomes fit for the intended purpose and suitable for the required use.

This approach is supported by the Land Contamination Risk Management guidance (LCRM, 2023) which describes the process whereby the site is investigated using appropriate techniques and adequate coverage such that there can be a reliance on the information, which has been collected and from where across the site. Supporting these approaches are a wealth of industry guidance and other advice reports from industry bodies.

Environment Agency Advice

Minutes of the meeting
During our meeting we outlined the necessary resources required to support you and your environmental consultant as you endeavour to meet the requirements to address the relevant discharge of conditions attached to your planning permission. We outlined what we considered to be an adequate standard and the methods by which this information could be reliably collected. We pointed to a variety of standards, including the industry recognised British Standard 10175, that could use to address our concerns.

We pointed to other suitable guidance to help you develop a conceptual site model that describes all possible sources of contamination, pathways by which that contamination may be mobilised and could be migrated and the relevant receptors that you should consider for the assessment of risk.

As we explained we are unable to give you specific numbers and locations for additional boreholes etc as this is not our role and we are not professionally able to accept that liability should something untoward occur or the number/locations be incorrect or insufficient.

We can confirm that only two additional boreholes are not sufficient as this would not meet the basic confidence level and density of investigation points that we would be seeking.

Informatives
The DoE Industrial Profile series is available online through an appropriate search engine that can provide guidance on the types of contamination which different types of industries in the UK produced as a result of their operations, we can point you to an NHBC Land Contamination guidance for small brownfield sites (A guide to small brownfield sites and land contamination (nhbc.co.uk)) as well as the Defra/EA website for land contamination (Land contamination: technical guidance - GOV.UK (www.gov.uk)) if that would help clarify matters.

It is important to undertake a thorough ground investigation so that you are aware of site conditions and can make important decisions about risk, materials retention and where assessment indicates remediation and validation.

Cont/d..

Whilst we did not speak about the presence of a former landfill on site this is one such example where improved investigation should be undertaken (but not limited to) as this is a ready source of land and groundwater contamination.

Given as the site is immediately next to a surface watercourse and your consultant has identified a body of groundwater, there is evidence of sensitive environmental receptors present and in potential need of protection.

The Environment Agency is not opposed to development on brownfield land. We are committed to ensuring that land impacted by land contamination is brought back into beneficial use but we cannot and will not accept developments that fail to safeguard the environment and as a result will continue with our current position until such time that sufficient and suitable information is presented that shows, beyond a level of reasonable doubt, that your site does not and will not pose an unacceptable risk to Controlled Waters now and in the future.

Next Steps
Details should be submitted to show you have adequately investigated, characterised, and assessed the site to a standard we can safely discharge the relevant planning condition(s).

I hope the above advice is helpful.

Yours sincerely

Mrs. SYLVIA WHITTINGHAM
Planning Advisor

Direct dial 0203 0251059
Direct e-mail sylvia.whittingham@environment-agency.gov.uk

Disclaimer
Our opinion is based on the information available to us at the time of the enquiry. When the formal planning application is submitted, our position may change if there have been changes to environmental risk or evidence, and/or planning policy.

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End

Rochdale Metropolitan Borough Council
Number One Riverside
Smith Street
Rochdale
OL16 1XU

Our ref: SO/2023/123238/02-L02
Your ref: 23/00549/DOC

Date: 28 July 2023

Dear Sir/Madam

SUBMISSION OF DETAILS TO COMPLY WITH CONDITION 5 (INVESTIGATION AND RISK ASSESSMENT), CONDITION 7 (CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN), CONDITION 10 (INVASIVE PLANS), CONDITION 11 (ARCHAEOLOGICAL RECORD & WRITTEN SCHEME OF INVESTIGATION), CONDITION 16 (EARTHMOVING) AND CONDITION 17 (METHOD STATEMENT AND MITIGATION STRATEGY) ON PLANNING PERMISSION 15/01235/OUT SLADEN MILL OFF HALIFAX ROAD LITTLEBOROUGH

Thank you for referring the above application for the discharge of condition 5 to the Environment Agency.

Environment Agency position

Condition 5
We have reviewed the following report and would wish to make the following comments. We do not recommend discharge of condition 5.

Geo-Environmental Audit, reference: rep-tjba-mere grp-sladen mill-Phs 2+3 Env-250322.docx, dated 21/11/22 by T J Booth Associates.

The site needs to to be adequately investigated, characterised, and assessed before we can recommend discharge of condition 5. We recommend that consideration is given to further intrusive ground investigation and groundwater sampling to confirm the condition of the site (as well as the associated risks).

Informatives
Following a meeting with the applicant/developer (21 July 2023), we are working with them to address the above issues.

Please forward a copy of this letter to the applicant.

Yours faithfully

Mrs. SYLVIA WHITTINGHAM
Planning Advisor

Direct dial 0203 0251059
Direct e-mail sylvia.whittingham@environment-agency.gov.uk

End

Rochdale Metropolitan Borough Council
Number One Riverside
Smith Street
Rochdale
OL16 1XU

Our ref: SO/2024/123863

Your ref: 24/00001/DOC

Date: 28 March 2024

Dear Majid Mir,

Submission of details to comply with condition 5 (investigation and risk assessment) 15/01235/OUT.

Sladen Mill Halifax Road Littleborough Rochdale OL15 0LB.

Thank you for the submission of a Geo-Environmental Audit (Phase 2 Site Investigation & Risk Assessment and Phase 3 Remediation Statement) [Version 5] by T J Booth & Associates ltd (dated February 2024) for the Proposed Residential Development on land at the former Sladen Mill, Littleborough in Rochdale pursuant to the application discharge conditions in compliance with condition 5 (investigation and risk assessment) attached to planning permission 15/01235/OUT.

Environment Agency position

At the request of Rochdale Metropolitan Borough Council, we have reviewed the submission of version 5 of the above report to ascertain if it contains sufficient information to allow us to recommend the discharge of condition 5 of planning permission 15/01235/OUT.

We have carefully considered the information that is contained in the context of our recommendations to the applicant following the review of version 4 of the same report. We have reviewed the report in the context of the Land Contamination Risk Management guidance (LCRM, 2023) and the National planning policy framework guidance document (NPPF, 2023).

We again welcome the additional ground investigation work that has been undertaken as it continues to improve the characterisation and understanding of the site allowing for a more thorough assessment of risks to controlled waters.

We have therefore considered the results of this additional information and identified that certain contaminants of concern are present in the identified groundwaters beneath the site, but the final conceptual model has assessed this to be of very low risk.

We disagree with this position as the ground investigation logs confirm the absence of a lower permeability layer that is protective of the underlying sandstone bedrock deposits suggesting that there is indeed a likely pathway between the source and receptors. A good number of the reported logs show a likely direct linkage between the upper made ground deposits and the underlying natural deposits and therefore the underlying aquifer.

Cont/d..

Based on the principles of LCRM, 2023 we strongly disagree with this evaluation as the presence of contaminants of concern in relevant receptors (i.e. the groundwater body identified beneath the site in the attached borehole and trial pit logs) is in itself at least a moderate to high risk as this is, in itself, a source, pathway and relevant receptor.

When we previously recommended that further assessment was undertaken, we anticipated that the principles of LCRM, 2023 would be applied and that a suitable (numeric) detailed quantitative risk assessment would be undertaken especially as some of the contaminants of concern are considered hazardous and assessment of their risk to relevant receptors undertaken. We feel that this is additionally supported by the Groundwater (Daughter) directive 2006/118/EC.

This version does not undertake that work therefore we are unable to agree that no remediation is required.

In undertaking this work we advise that you consider and follow the Remedial Targets Methodology guidance document (Remedial Targets Methodology: Hydrogeological Risk Assessment for Land Contamination (RTM P20) ref. LIT 6627, EA, 2006) which can be found at this website address Land contamination: remedial targets methodology (RTM) - GOV.UK (www.gov.uk).

Further, we recommend that where possible site specific input parameters are used to populate your chosen model so that the risk assessment reflects ground conditions as closely as possible and only used academic or generic values in the absence of real-world alternatives.

Therefore, regretfully, we are unable to recommend the discharge of condition 5 attached to planning permission 15/01235/OUT at this time.

-

Should you have any queries regarding this response, please do not hesitate to contact me.

Yours sincerely,

Miss India Blythin
Planning Advisor

Spplanning.rfh@environment-agency.gov.uk

End

creating a better place

Environment Agency

Majid Mir
Rochdale Borough Council
Floor 3
Number One Riverside
Smith Street
Rochdale
OL16 1XU

Our ref: SO/2024/123863/04
Your ref: 24/00001/DOC

Date: 16 September 2024

Dear Majid,

Submission of details to comply with condition 5 (investigation and risk assessment) 15/01235/OUT.

Sladen Mill, Halifax Road, Littleborough, Rochdale, OL15 0LB

Thank you for re-consulting us on the above application, with the latest additional information being submitted on 2 September 2024.

Environment Agency Position
As part of the re-consultation, we have reviewed the following additional information:

- A Controlled Waters Risk Assessment prepared by Soil & Structures Ltd and dated 23 August 2024 (ref. 2403-R-001-V03)
- Remediation Strategy prepared by Soil & Structures Ltd and dated 23 August 2024 (ref. 2403-R-002-V02).

The additional information does not satisfactorily address our earlier concerns. We therefore cannot recommend that condition 5 (investigation and risk assessment), as attached to planning permission 15/01235/OUT, can be discharged at this time.

Reasons
The additional information submitted does not satisfy our earlier concerns, as clarified in recent discussions, conclusions, and agreed next steps with the applicant's consultants facilitated through our charged for planning advice service. Most notably, this includes the need for additional, adequate ground investigation and assessment. We do not believe the additional information is sufficient to satisfy this requirement.

Cont/d..

INVESTOR IN PEOPLE

The salient points being:

- Further investigation of the Bedrock Sandstone Aquifer is required to determine whether the aquifer should be considered within the risk assessment as a receptor.
- Further consideration through additional investigation of the presence of PFAS (Per- and Polyfluoroalkyl Substances) in the soils and shallow groundwaters needed to be undertaken. The current scope of information is insufficient.
- We advised that simply sampling for PFOA and PFOS was not sufficient in the context of historic industrial activity and that a fuller suite of PFAS compounds was needed including TOP Assay and Pre-oxidisation testing especially as the site has undergone extensive reprofiling.
- In regards of the Remedial Target Methodology [RTM P20] (and the accompanying Remedial Targets Worksheets); consideration and assessment should be based on maximum identified values rather than average or mean values. As per the RTM P20 guidance variation should be achieved through sensitivity analysis.
- We understand earth movements on site have already taken place meaning that, potentially, contaminants of concern already identified might have been moved elsewhere on site. Additional work (ground investigation, risk assessment and likely remediation strategy) to be undertaken, including any surveys/logs of on-site movements, should be take this into account.
- Amendment to the Flood Risk Activity Permit is required for any proposed management plans for the pipes found within 8 metres of the main river's top of bank.

These submissions are based on existing information which we have already identified as being inadequate/insufficient.

Advice to Applicant
Regarding the requirement for the Flood Risk Activity Permit (FRAP) amendment, please see the below for more information regarding FRAP requirements.

The Environmental Permitting (England and Wales) Regulations 2016 require a permit or exemption to be obtained for any activities which will take place:

- on or within 8 metres of a main river (16 metres if tidal)
- on or within 8 metres of a flood defence structure or culverted main river (16 metres if tidal)
- on or within 16 metres of a sea defence
- involving quarrying or excavation within 16 metres of any main river, flood defence (including a remote defence) or culvert
- in the floodplain of a main river if the activity could affect flood flow or storage and potential impacts are not controlled by a planning permission

For further guidance please visit https://www.gov.uk/guidance/flood-risk-activities-environmental-permits or contact our National Customer Contact Centre on 03708 506 506 (Monday to Friday, 8am to 6pm) or by emailing enquiries@environment-agency.gov.uk.

Cont/d..

The applicant should not assume that a permit will automatically be forthcoming once planning permission has been granted, and we advise them to consult with us at the earliest opportunity.

Advice to LPA

If you are minded to approve the discharge of condition application contrary to our concerns raised, please contact us to explain why material considerations outweigh our concerns. This will allow us to make further representations.

Please forward a copy of this letter to the applicant.

Should you have any queries regarding this response, please do not hesitate to contact me.

Yours sincerely,

Jamie Malone
Planning Advisor

E-mail: SPPlanning.RFH@environment-agency.gov.uk

End

russell@soilandstructures.co.uk

From: David Marsden <>
Sent: 31 May 2024 08:55
To: 'Ben James'
Cc: Russell Bowman
Subject: RE: Sladen Mill

Good Morning Ben,

Please see the groundwater sampling methodology below:

- The standpipes were purged prior to sampling.
- The monitoring wells and river were sampled using 39mm diameter disposable bailers fitted with non-return ball valves in general accordance with BS ISO 5667-11, 2009.
- The bailers were emptied directly into 50ml vial which were transported from site in insulated containers with ice packs to maintain a low temperature.
- Fresh clean bailers were used for each sample location.
- The groundwater levels were recorded before carrying out the purging/sampling.
- The sampling containers, insulated boxes and ice packs were supplied by the testing laboratory (ALS) and were certified as PFAS free. The bailers, were also certified as PFAS free by our suppliers.

If you need anything further, please do not hesitate to get in touch.

Kind regards
David Marsden MEng (Hons.) CEng MICE
Director

For and on behalf of
Sub Surface North West Ltd
3 Peel Street, Preston, Lancashire, PR2 2QS

Phone:
Email:
Website: www.subsurface.co.uk

Conditions of Use and Disclaimer

russell@soilandstructures.co.uk

From: David Marsden <dmarsden@subsurface.co.uk>
Sent: 31 May 2024 08:55
To: 'Ben James'
Cc: russell@soilandstructures.co.uk
Subject: RE: Sladen Mill

Good Morning Ben,

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If you need anything further, please do not hesitate to get in touch.

Kind regards
David Marsden MEng (Hons.) CEng MICE
Director

For and on behalf of
Sub Surface North West Ltd
3 Peel Street, Preston, Lancashire, PR2 2QS

Phone: 01772 561135
Email: dmarsden@subsurface.co.uk
Website: www.subsurface.co.uk

Conditions of Use and Disclaimer

Heritage Note

CLIENT:	**Mere Development Group**
PROJECT:	**Sladen Mill, Littleborough**
SUBJECT:	**Historical research into the industrial uses and practises at Sladen Mill in comparison with nearby Wellfield Mill, Rock Nook Mill and Sladen Wood Mill**
JOB NO.:	**GM12948**
DATE:	**14th August 2024**
PREPARED BY:	**Gabriella Amos BA MSc PCIfA**
CHECKED BY:	**Mike Birtles Bsc (Hons) Msc ACIfA**

1.1 Introduction

This Heritage Note has been prepared to provide an overview of the historical and industrial uses and practises that occurred at Sladen Mill (the 'Site'), in comparison with other historical mills including Wellfield Mill, Rock Nook Mill and Sladen Wood Mill. This Heritage Note has been prepared on behalf of Mere Development Group (the 'Client') in response to an ongoing enquiry with the Environment Agency regarding the historical use of contaminant material at the Site during its function as a mill. The Environment Agency has highlighted the presence of chemical contaminants at the Site:

> *"Our review is based on previous submissions of ground investigation and assessments that have been undertaken for the proposed development site. This work identified a prolonged industrial land usage on site which, most recently included the manufacturing of textiles, plastics, and waterproof coatings. The submitted reports have identified several contaminants of concern that include Per- and Polyfluoroalkyl substances (PFAS) and PFOS and PFOA. Based on the history of the site and its use in conjunction with the previous submissions we have considered and assessed the risk assessment process in this submission. We have reviewed the report in the context of the Remedial Targets Methodology guidance document (Remedial Targets Methodology: Hydrogeological Risk Assessment for Land Contamination (RTM P20) ref. LIT 6627, EA, 2006)"* (pers comms from Client, dated 05.08.2024).

The Client has noted that other textile-producing mills within the vicinity of the Site were undertaking practises using the abovementioned chemicals, which they believe may have infiltrated into watercourses or groundwater, and thus point to a wider-scale problem within the area of Littleborough not solely isolated to the Client's site (pers comms, dated 05.08.2024).

This document is intended to set out the historical narrative of each of the four mills: Sladen Mill; Wellfield Mill; Rock Nook Mill and Sladen Wood Mill, based on the available historical evidence. It is important to note that Sladen Mill (the Client's site) and Sladen Wood Mill are two separate sites that functioned under different corporations during their history. There is no clear relationship between these two sites beyond their proximity to Littleborough and the use of the local placename 'Sladen' in their titles.

A historical appraisal of the Site was previously conducted by Wardell Armstrong in 2015. A Heritage Impact Assessment was written in support of a planning application for a proposed residential development at the Site. This Heritage Note is not intended to act as a replica of the Impact Assessment, although elements of the assessment have been consulted to inform this report (Wardell Armstrong 2015). In conjunction with the above, the following baseline data has been consulted for this Heritage Note:

- Greater Manchester Historic Environment Record (GMHER)
- Rochdale Local Studies Archive Centre
- Ordnance Survey (OS) Historic Mapping, via the National Library of Scotland
- Historic England's Aerial Photography Archive

Documentary and online sources which have been consulted are cited within the text and listed in the Bibliography of this report.

This report has been prepared in accordance with documents published by the Chartered Institute for Archaeologists (CIfA 2022).

1.2 **Sladen Mill**

The earliest known document considered to be related to the Site dates to 1789 and refers to an auction, comprising '*a farmhold and mill called Sladon Mill, containing 25 acres land, in the occupation of Mr. Richard Hold and Samuel Lomar*' (GMHER 2024). A document dated to 1804 records a lease for the duration of twenty-one years by Charles Chadwick to Samuel Lomax, a woollen manufacturer of Sladen Mill (National Archives Ref: RYCH/3550). Lomax and Holt are mentioned later in Pigot's Directory of 1841 as 'woollen manufacturers' in the area of Rochdale (Pigot & Co. 1841).

Further evidence of occupation at the Site during the late-18th century can be seen in the 1970 discovery of a coin, 'truck token', dating to 1791 and uncovered during demolition works on former workers cottages associated with the mill. The coin was inscribed with the following text: 'payable at the warehouse of John Kershaw' (Rochdale Observer, 1970). John Kershaw and his brothers Isaac and Charles ran Sladen Mill until the partnership was dissolved in 1867. John and Isaac continued operating Sladen Mill, while Charles operated Field [Wellfield] Mill under Charles Kershaw Limited from c.1867 onwards (Seyd & Co. 1885-6).

Sladen Mill is referenced in several trade directories from the 19th to 20th centuries. Wright's directory from 1871-2 lists the Kershaw Brothers at Sladen Mill as flannel manufacturers (Wright 1871), whilst the Cotton Spinners & Manufacturers' Directory of 1891 notes the Site manufactured wool and flannel (Worrall 1891). Furthermore, a newspaper article from 1889 records that a warehouse was constructed at Sladen Mill, on the site of the 'woolen mills' (Wade 1889). Kelly's directory of 1907 also notes that Sladen Mill manufactured flannel, and that the Kershaw Brothers were wool merchants (Kelly's Directories Ltd 1907).

The mill suffered from a fire in 1926, which caused extensive damage to most of the buildings on site. This event led to the site being advertised for auction in The Guardian paper, which describes the 'fire salvage of flannel, flannelette, wool' (The Guardian 1926).

Further trade directories from 1967 and 1971 show that Sladen Mill was still functioning under the Kershaw name of 'Kershaw Chas Ltd', undertaking business in wool manufacturing of 'imitation Welsh and Lancashire flannels' (John Worrell Publishers 1967) as well as bleaching, dyeing, raising and finishing flannelettes, winceyettes and cotton blankets, which was introduced at the Site during the 1960s (Thomas Skinner Directories 1971). The Site ceased its function as a working mill and was separated into industrial units during the 1980s (Wardell Armstrong 2015), prior to its demolition and clearing over the past 10 years.

Cartographic sources can be used to show the development of the Site over time from the mid-19th century to the mid-20th century. In Lancashire map of 1851, the mill is depicted as a series of buildings in an irregular form, adjacent to a watercourse to the south (identifiable as Lydgate Brook / Lydgate Clough / Red Brook) and a canal drain to the north (Plate 1). Lydgate Brook is marked on the first edition OS map of 1893 with arrows pointing to indicate the direction of flow, marked as flowing downstream from south to north. This watercourse meanders from south towards the Site, around the Site heading north, then travelling west to pass underneath the Rochdale Canal via a weir. This course is largely unchanged and is still visible as an earthwork today (Google Earth 2024). The canal drain to the north of the Site appears to be shown extending from Wellfield Mill and heading south towards the Site, then

meandering northwest towards Rock Nook Mill (Plate 2). It is noted that the drain was constructed to transport water from surrounding reservoirs such as Hollingbrook Lake, located 2.5km south of the Site, to infill the Rochdale Canal (MBA Ltd 2020). The OS map of 1911 depicts the direction of water flow of the canal drain indicated by an arrow pointing northwest, adjacent to Rock Nook Mill (Plate 3).

Over time, the Site changes in shape and form, reflecting the rebuilding of Sladen Mill after the destructive 1926 fire. The surrounding vicinity is largely unchanged, with Lydgate Brook and the canal drain maintaining their general trajectory running between Wellfield Mill, Sladen Mill and Rock Nook Mill (Plates 3–5).

Similarly, aerial photographs can provide an understanding of the historical changes which have occurred on Site. An aerial photograph from 1948 depicts the Site within its industrialised rural landscape, located in the background of the photograph looking southeast. Within the foreground is the nearby Greenvale Mill, operated at this time by Fothergill & Harvey (see Section 1.4 below). The tramway identifiable on the OS 1893 map (Plate 2) appears to have been turned into a road, and the canal drain is located on a higher level to most of the mill buildings to the north. Lydgate Brook to the south of the Site disappears underneath the elevated canal at the point where it joins to the southeast of Greenvale Mill, entering a culvert or weir as shown on historic mapping from this period (Plate 4) (Historic England Ref: EAW020428). Further aerial photographs from the 1980s were provided by the Greater Manchester HER. These depict the Site as more built-up, with the addition of more modernised warehouse buildings on the southern side of the mill. The canal drain appears to be largely dried out at this time, although Lydgate Brook to the south of Sladen Mill seems to contain water (GMHER Refs: SF316355 – SF316358).

In consideration of the evidence presented above, the historical use of the Site seems to have comprised the manufacturing of cotton, wool and flannel materials, with a later addition of dyeing and bleaching in the 1960s, prior to the cessation of mill workings during the 1980s when the Site was converted into industrial units (Wardell Armstrong 2015).

1.3 **Wellfield Mill**

Situated 450m northeast of the Site is the location of the former Wellfield Mill. The earliest evidence of Wellfield Mill is shown on the Lancashire Map of 1851, where the site is labelled as a ‘fulling’ mill (Plate 1). As previously noted, Charles Kershaw operated the site under his own company name from c.1867 onwards (Seyd & Co. 1885-6). Twenty years after this event, the mill is referenced in Leuchs’ Directory as a ‘Fulling Mill’ under the ownership of Charles

Kershaw (C. Leuchs & Co. 1888). In 1891, the mill is mentioned in the Cotton Spinners & Manufacturers' Directory as a dyers and finishers mill (Worrall 1891).

Between the late 19th and mid-20th centuries, historical evidence of the use of Wellfield Mill is limited. However, this can be insinuated from the descriptions of the mill on historic mapping during this time. For instance, the OS map of 1911 depicts Wellfield Mill with the description of 'Fuelling, Dyeing, etc.' (Plate 3). It is clear there was a slight change in working processes at the site, as the following map of 1930 describes Wellfield Mill as a 'bleaching & dyeing' mill (Plate 4).

The next available historical reference of Wellfield Mill is within the Cotton Spinners' and Manufacturers' Directory of 1962, which described the mill as a 'bleachers, dyers, raisers and finishers' (John Worrell Publishers 1962). In 1967, the same directory describes the site as manufacturing 'flannels, flannelettes and serges' under the ownership of Kershaw Chas Ltd, now listed in combination with the Kershaw's site at Sladen Mill (John Worrell Publishers 1967). Wellfield Mill and Sladen Mill are both described as bleachers, dyers, raisers and finishers of flannelettes, winceyettes and cotton blankets under Kershaw Chas Ltd in The Lancashire Textile Industry directory of 1971 (Thomas Skinner Directories 1971).

Aerial photographs from the mid-20th century were reviewed as part of this assessment, but the available photographs were captured at a far distance, making it difficult to form an interpretation of the mill during this time period.

In summary, the available evidence suggests that Wellfield Mill functioned as a fulling mill, working with cotton materials for the recorded periods of its operation. The mill diversified into bleaching, dyeing and finishing during the early to mid-20th century. Historical evidence detailing the types of chemicals which may have been used in these processes has not been identified as part of this assessment. However, it is clear that the relationship between the Site and Wellfield Mill extends beyond their physical proximity, with Wellfield Mill located upstream from Sladen Mill. The connection between these two mills is reflected in their shared ownership under the Kershaw name, and their involvement in the wool and cotton industries for a recorded period of around 130 years.

1.4 **Rock Nook Mill**

Located 550m northwest of the Site is the former Rock Nook Mill. This mill was established in 1886 by Fothergill & Harvey, a company formed in 1847 (Fothergill Group 2024; GMHER 2024). The mill formed part of the Rock Nook Conservation Area prior to its recent demolition

in 2023 (GMHER 2024), and a Statement of Heritage Significance of the mill was produced in 2020 (MBA Ltd 2020).

Early evidence indicates that the mill was originally used for spinning cotton, as reflected on historic mapping from 1893 (Plate 2). Kelly's Directory of 1907 also notes that the mill operated as a cotton manufacturer (Kelly's Directories Ltd 1907). During the decline of the cotton trade in the mid-20th century, Fothergill & Harvey diversified into producing synthetic fabrics such as glass and carbon fibre, whilst also creating products under the trading name of 'Tygaflor' [also referred to as 'Tygan', 'Tyglas', 'Tygadure'] at Rock Nook Mill and other mills around Littleborough, including Sladen Wood Mill, detailed in Section 1.5 below (MBA Ltd 2020). The company conducted business in the manufacturing of synthetic materials which were advertised as moth-proof, waterproof, and resistant to 'acids, alkalis, alcohol and many other organic solvents' (Plate 6). The reports and accounts of Fothergill & Harvey from 1980, available from Companies House, further describe the materials manufactured under the 'Tygaflor' trademark, including fluorocarbon-based products and advanced composite materials (Fothergill & Harvey Ltd 1980).

The gradual expansion of the business is reflected in historic mapping and aerial photographs throughout the 20th century. Between the OS maps of 1893 and 1911, the site underwent expansion to the south, following the trajectory of the Rochdale Canal (Plates 2–3). By the publication of the 1930 OS map, new buildings had been constructed to the southeast of the site. Further expansion southeast occurred during the mid-20th century, reflected on the OS Plan of 1963 (Plate 5). It is noted that the company built across the Rochdale Canal when the canal officially closed to traffic in 1952, and that after the reopening of the canal 50 years later these features were removed (Evans 2023). Aerial photographs taken as part of the Greater Manchester Textile Mills Survey of 1985–6 reflect this, showing part of the canal covered with concrete, resulting in the surrounding area of the canal drying out (GMHER Ref: SF316348).

Adjacent to east of the former Rock Nook Mill buildings is the canal drain. As mentioned previously, this drain was likely constructed as a means of infilling the Rochdale Canal during its original construction and passes within the immediate vicinity to Sladen Mill (MBA Ltd 2020). By the 1980s aerial photography survey, it appears that much of this drain had dried out, but some water remained present towards the south of the site (GMHER Refs: SF316345 - SF316349).

The historical evidence consulted above describes the development of Rock Nook Mill over the course of its history. Functioning primarily as a cotton mill during its early history, the mill

later diversified into the production of synthetic fabrics under the direction of Fothergill & Harvey Group. The Group later formed the trademark name 'Tygaflor', producing fluorocarbon-based products and advanced composite materials at Fothergill & Harvey mills around Littleborough, including Rock Nook Mill. The mill itself was demolished in 2023 following concerns on public safety and the stability of the structure after it was subject to a destructive fire in 2015 (GMAAS 2024). However, the remaining buildings and structures at the site still form part of the Fothergill Engineered Fabrics Ltd premises today.

1.5 Sladen Wood Mill

Sladen Wood Mill is situated immediately north of Rock Nook Mill on the western side of the Rochdale Canal, around 880m northwest of the Site. This mill was also established by the group Fothergill & Harvey, who purchased the site containing a weaving shed adjacent to Punch Bowl Lock. The original weaving shed displays a plaque which reads "F & H Ltd. Built 1852 Rebuilt 1949" (GMHER 2024). In 1907, the mill is listed within the directory of cotton manufacturers under the name of 'Sladen Wood Mill Co', referencing the nearby Rock Nook and Greenvale mills (Kelly's Directories Ltd 1907). Following a similar business development as Rock Nook Mill during the 20th century, Sladen Wood Mill also diversified into the development of synthetic fabrics and fibreglass clothes, as described within the Cotton Spinners' and Manufacturers' Directory of 1962 (John Worrell Publishers 1962). The 1971 Lancashire Textile Industry directory provides an account of the workings of Fothergill & Harvey Ltd, comprising yarn preparation and sizing, the weaving of glass, nylon, "Terylene", saran, polyethylene and other man-made fibres, and the production of 'industrial fabrics for coating, filtration, reinforcement'. The directory also states that the group ran sites across Littleborough at Sladen Wood, Rock Nook, Greenvale, Ealees and Gale Mills (Thomas Skinner Directories 1971).

The most notable changes identifiable on historic mapping of this area occurred between the OS maps of 1851 and 1893, with the construction and establishment of Sladen Wood Mill during the mid to late 19th century. Some expansion occurred to the southern and northern extents of the mill between the 1911 and 1930 OS maps, however beyond this point very little change is discernible within the OS map of 1963. Aerial photographs from the 1980s show the site and its proximity to Rock Nook Mill, located south of Sladen Wood Mill. In the same way as the aerial photographs captured of Rock Nook Mill, images of Sladen Wood Mill show that the canal had been constructed over, which resulted in the immediate areas of the Rochdale Canal becoming dried out (GMHER Ref: SF316350 – SF316353).

Analysis of the available historical records and data concerning the practises undertaken at Sladen Wood Mill shows that Fothergill & Harvey were involved in the production and manufacturing of synthetic fibres, including fluorocarbon-based products and advanced composite materials (Fothergill & Harvey Ltd 1980). The site followed a similar development to the nearby Rock Nook Mill, producing cotton in the 19th century and later diversifying into synthetic and man-made fabrics during the 20th century. By 1999, the Sladen Wood Mill site was transformed into a business centre (GMAAS 2024). It appears that Fothergill & Harvey moved from the premises slightly south, where they remain under the trading name of Fothergill Engineered Fabrics Ltd at the former Rock Nook Mill site (Google Earth 2024).

1.6 Discussion

The historical evidence consulted within this Technical Note provides an insight into the manufacturing processes of the Site at Sladen Mill and the three other mills located within its vicinity, including: Wellfield Mill; Rock Nook Mill; and Sladen Wood Mill.

Historically, Sladen Mill and Wellfield Mill both operated under the Kershaw name and are recorded to have operated primarily as a cotton and wool manufacturers, diversifying into dyeing and bleaching from the mid-20th century onwards. The two mills operated by Fothergill & Harvey, Rock Nook Mill and Sladen Wood Mill, are recorded to have functioned as cotton spinning factories during the late 19th century, expanding their services to produce synthetic materials in the 20th century. These synthetic materials comprised the use of fluorocarbon-based products and advanced composite materials, which may have contained chemicals similar to those identified within geo-environmental investigations at the Client's Site (T J Booth Associates 2022).

A newspaper cutting from 1974 details an event which occurred at Greenvale Mill, one of the several Littleborough mills owned by Fothergill & Harvey. The article describes a fine issued to the company due to the release of pollutant materials into Lydgate Brook. The pollutant is reported to have entered the Brook and flowed downstream to Smithy Bridge. It is unclear which course of the Brook this pollutant took but, taking into consideration the flow of stream indicated on historic mapping (Plates 2–3), it is likely the pollution headed west from Greenvale Mill and south along the western side of the Rochdale Canal, instead of travelling upstream towards the Client's site at Sladen Mill. The pollutant comprised heating fuel oil which was reported to have 'escaped from a tank', and the company was ordered to pay £25 to cover the lawyer's fees (Rochdale Observer 1974).

1.7 Conclusion

This Technical Note was produced to provide a historical appraisal of the Site at Sladen Mill, in conjunction with three other mills located within the area of Littleborough: Wellfield Mill; Rock Nook Mill; and Sladen Wood Mill. It is important to note that Sladen Mill (the Site) and Sladen Wood Mill are two separate sites that historically functioned under two separate companies. Sladen Mill operated under the Kershaw Brothers, while Sladen Wood Mill was owned by the group Fothergill & Harvey. Although both sites originated within the cotton industry, the available historical evidence notes that Sladen Mill continued processing and manufacturing cotton, wool and flannel materials, introducing bleaching and dyeing processes during the mid to late 20th century. In comparison, the group Fothergill & Harvey diversified into the production of synthetic materials, comprising fluorocarbon-based products and advanced composite materials at their sites in Littleborough (comprising Rock Nook, Sladen Wood, Greenvale, Ealees and Gale Mills).

Although there has been no evidence yet identified which suggests the use of Per- and Polyfluoroalkyl substances (PFAS) and PFOS and PFOA chemicals at the Sladen Mill site, unless a full record of all imported and exported materials to and from the Site is available for examination, the historic evidence alone is not sufficient to explain the presence of these chemicals within deposits at the Site. It would be recommended that geo-environmental specialists are consulted for further advice and support.

This report was written in accordance with documents published by the Chartered Institute for Archaeologists (CIfA 2022).

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Appendix 1: Plates

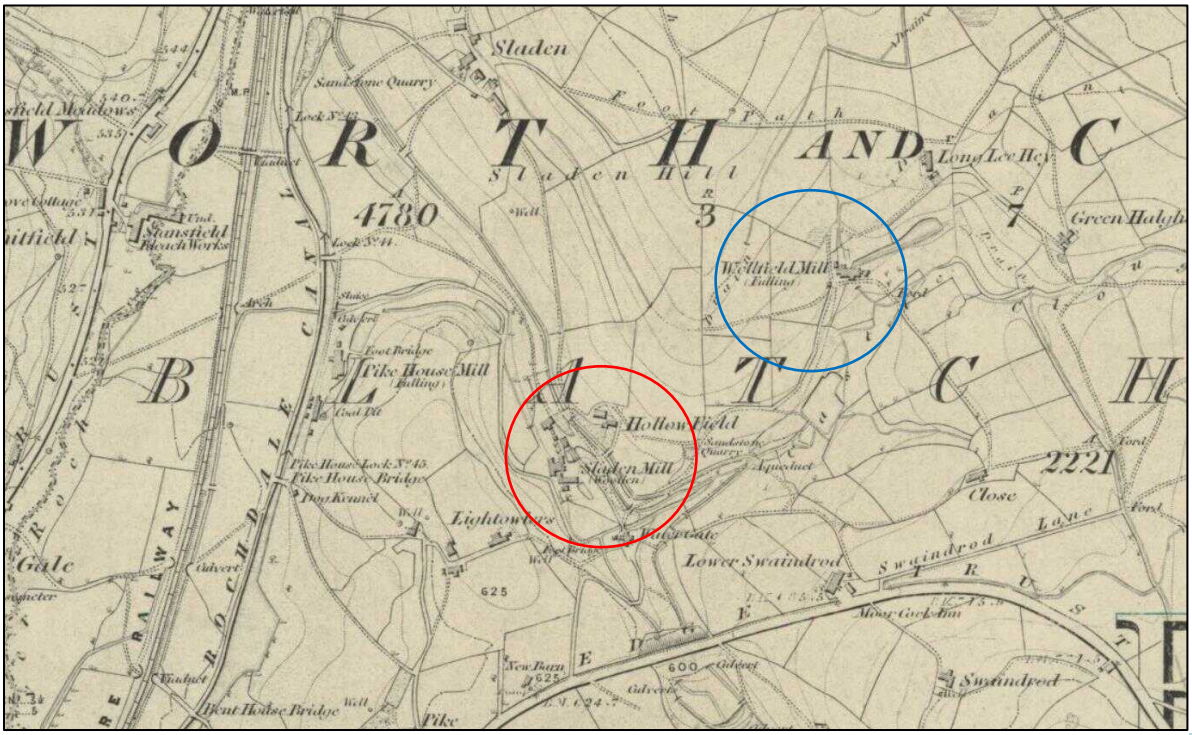


Plate 1: *Sladen Mill on the Lancashire Map of 1851, indicated in red. Wellfield Mill indicated in blue. Reproduced with the permission of the National Library of Scotland (2024)*

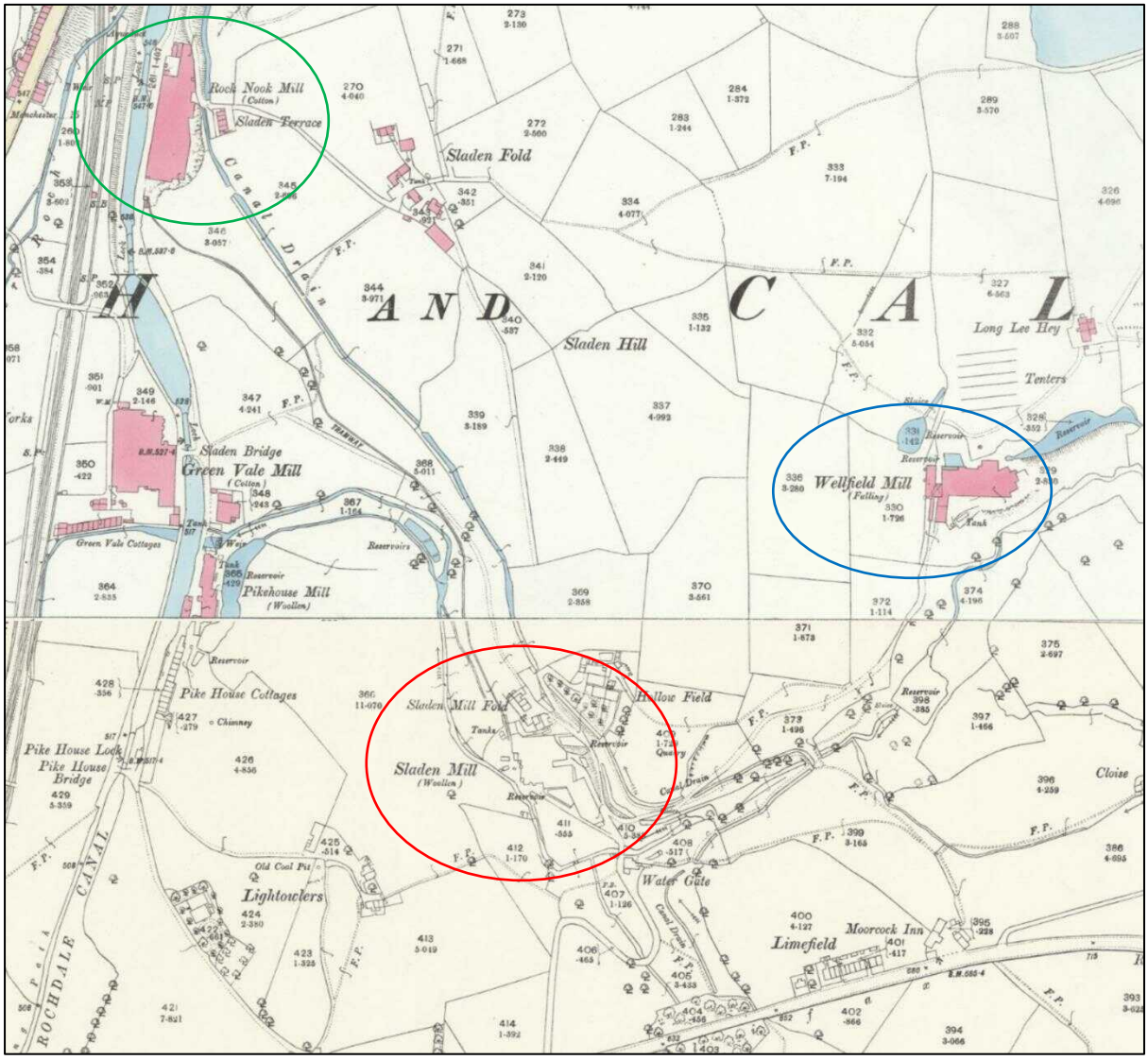


Plate 2: *Sladen Mill on the First Edition OS Map of 1893, indicated in red. Wellfield Mill indicated in blue, and Rock Nook Mill in green. Reproduced with the permission of the National Library of Scotland (2024)*

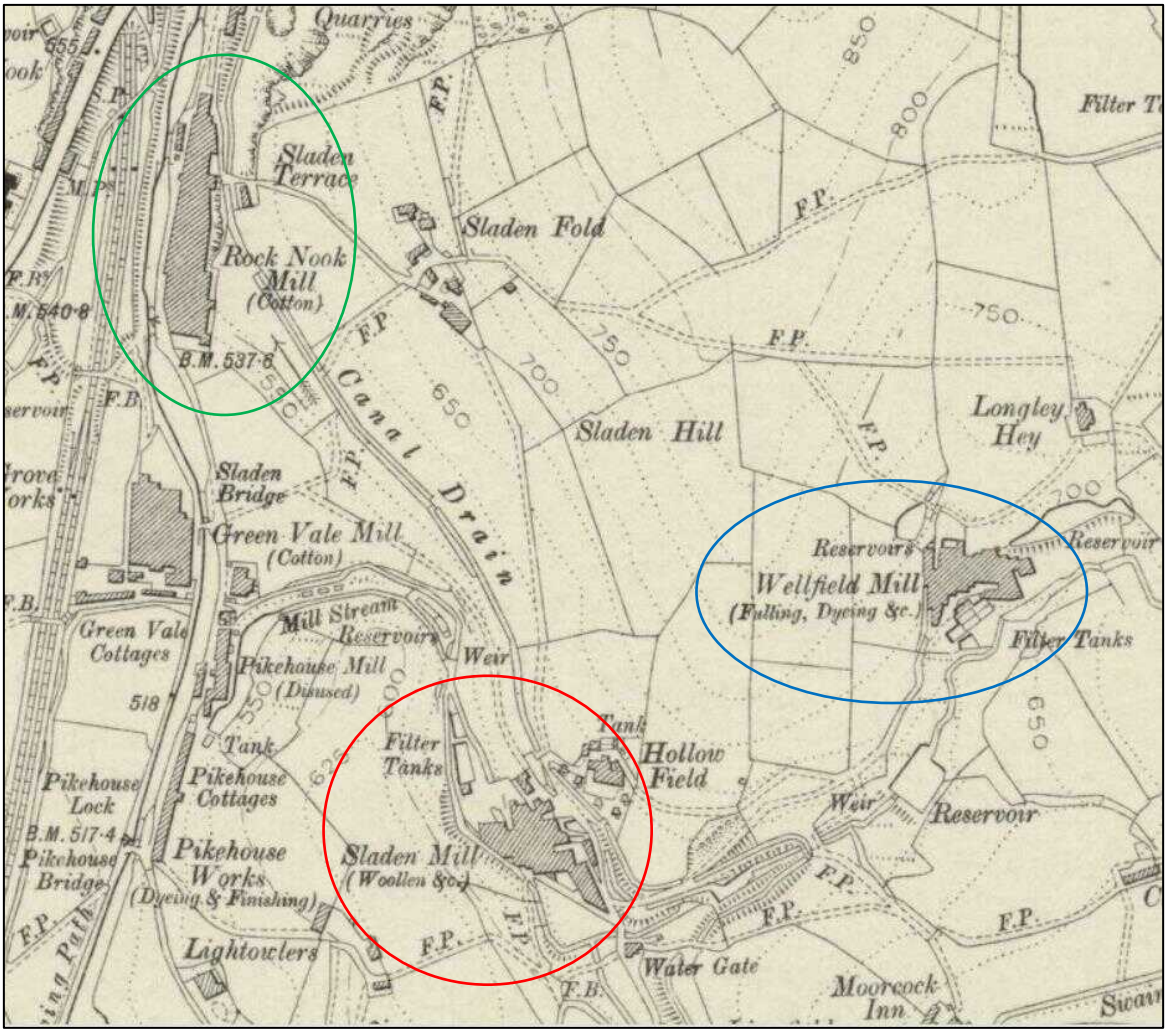


Plate 3: *Sladen Mill on the OS Map of 1911, indicated in red. Wellfield Mill indicated in blue, and Rock Nook Mill in green. Reproduced with the permission of the National Library of Scotland (2024)*

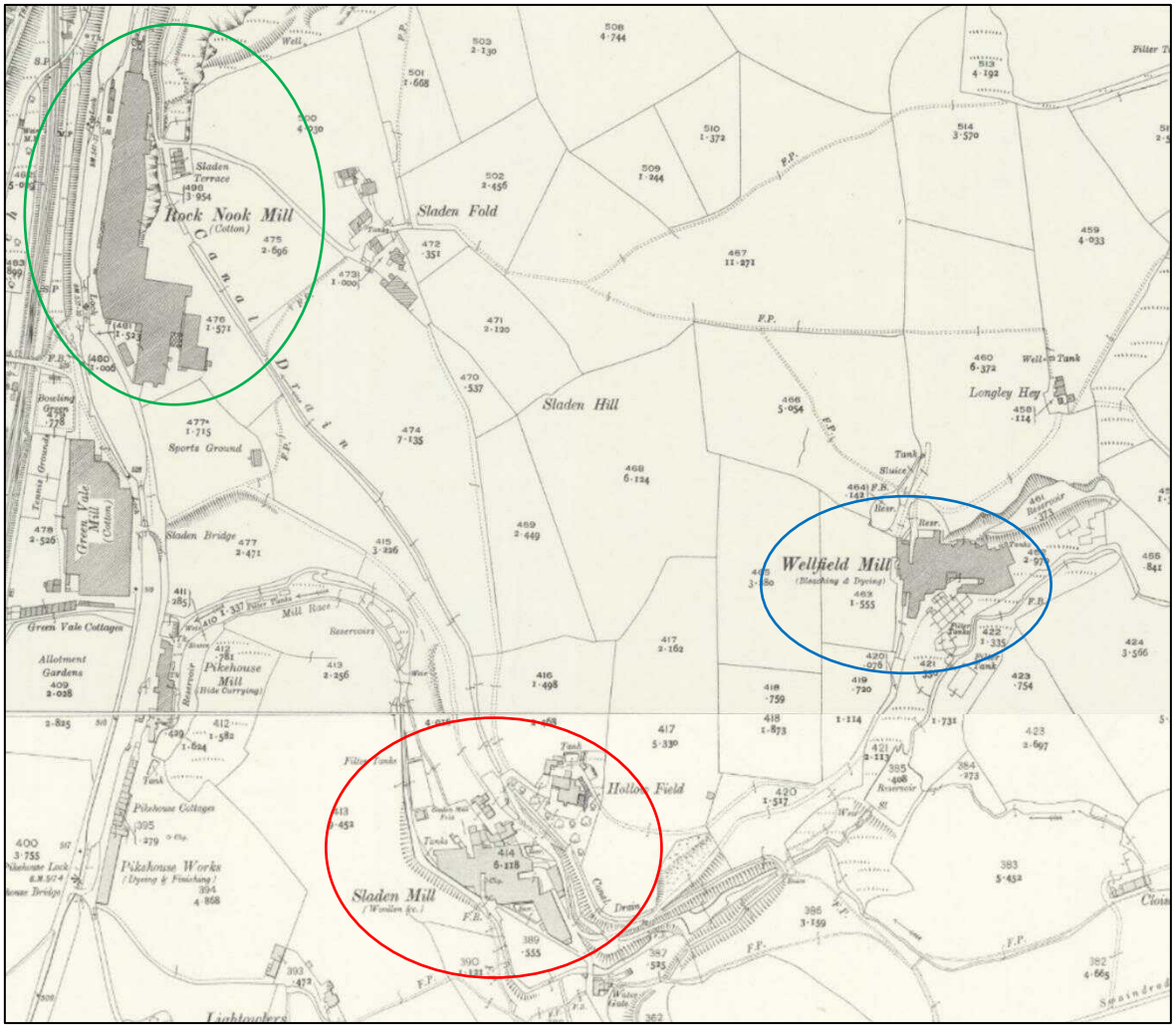


Plate 4: *Sladen Mill depicted on the OS Map of 1930, indicated in red. Wellfield Mill indicated in blue, and Rock Nook Mill in green. Reproduced with the permission of the National Library of Scotland (2024)*

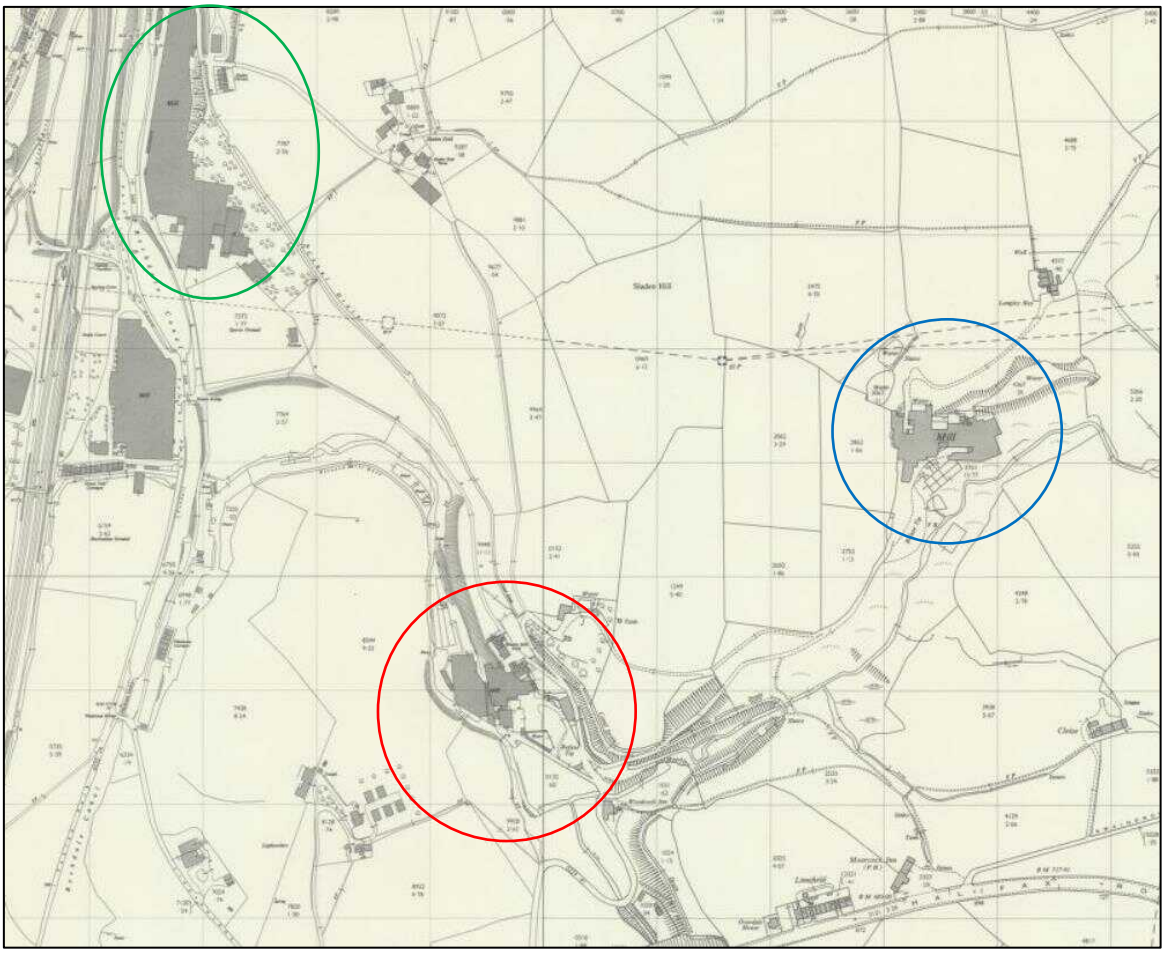


Plate 5: *Sladen Mill on the OS Plan of 1963, indicated in red. Wellfield Mill indicated in blue, and Rock Nook Mill in green. Reproduced with the permission of the National Library of Scotland (2024)*



Plate 6: *An advertisement in 1948 showcasing Fothergill & Harvey's material products. Image retrieved from Grace's Guides (2024)*

Drawing Issue Pack – Clarification of Groundwater and Site Level Changes

Project: Sladen Mill, Halifax Road, Littleborough, OL15 0LB

Prepared by: Mere Development Group

Issued to: Paul Nathanail

Date: 12 June 2023

1. Summary Note

This pack of drawings and documents has been compiled to demonstrate the relationship between ground-level changes during temporary construction phases and the recent appearance of two surface springs on site.

As shown in the attached documents:
- The original site levels were recorded in the May 2021 topographical survey submitted as part of the Reserved Matters application (21/00950/REM). These levels were higher across key areas of the site.
- During temporary works, levels were reduced in certain areas, particularly near the retaining wall. This resulted in the emergence of two temporary surface springs (Spring 1 and Spring 2), which were not present in the original ground conditions.
- The attached updated topographical survey (WCG 23-1954 Rev B) shows the springs appearing post-works.
- The annotated copy of the 2021 survey includes the location and current ground levels at both spring points for reference, highlighting the level change.
- The approved General Arrangement Plan (Rev6) confirms that upon completion, site levels will return to a higher state, reinstating the original ground conditions and thereby suppressing both springs, which will revert to groundwater.
- The accompanying Non-Material Amendment Decision Notice (ref: 24/01041/ANM) formally confirms approval of these revised levels by Rochdale Metropolitan Borough Council.

This pack is submitted to provide clear evidence that the surface springs are a temporary consequence of interim groundworks and will not persist once final site levels are implemented.

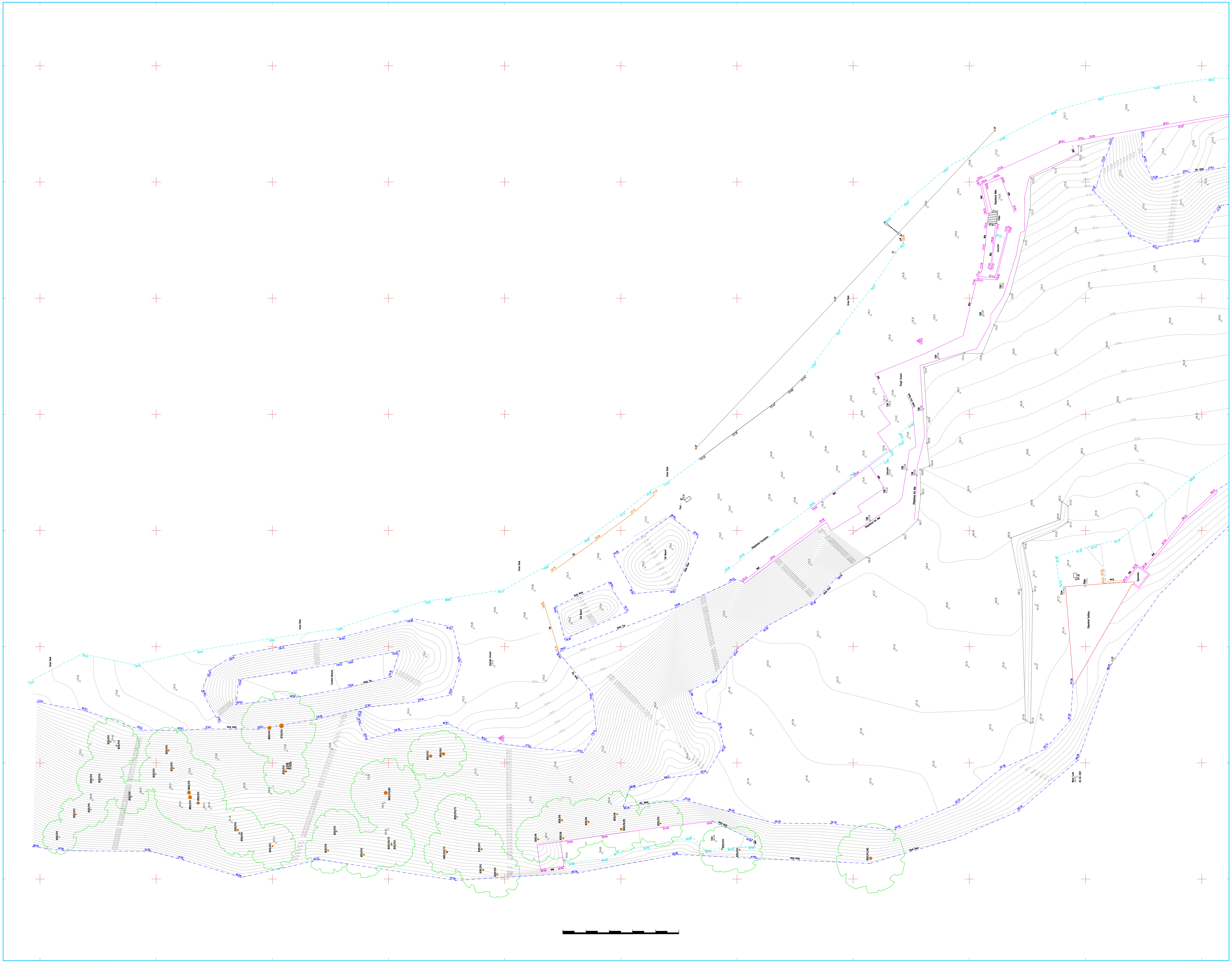
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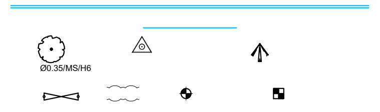
Ref No.	Drawing / Document Title	Drawing / Ref No.	Date / Rev	Purpose
1	Topographical Survey (Sheets 1–3)	WCG 21-1575-1:3 to 3:3	May 2021	Original topographical survey from Reserved Matters application (21/00950/REM). Downloaded from the planning portal. Demonstrates higher pre-works ground levels.
2	Updated 3D Topographical Survey (Sheets 1–2)	WCG 23-1954-T-1:2 to 2:2	Issued Oct 2023 Rev B: Jun 2025	Issued by Mere Development Group. Shows Spring 1 (Rev A) and Spring 2 (Rev B) emerging due to reduced levels during temporary works.
3	Updated Topographical Survey (Original Base with Spring References)	WCG 21-1575 (annotated version)	May 2021, annotated Jun 2025	Annotated version of original topo with positions and levels of Springs 1 and 2 added for reference. Demonstrates site level reductions.
4	General Arrangement Site Plan	DWG-TJBA-LUXURE-SLADEN MILL – 090621 Rev6	Rev6 – Approved Nov 2024	Approved finished levels as confirmed by Rochdale Council. Confirms springs will revert to groundwater

				post-completion.
5	Decision Notice – Non-Material Amendment Approval	24/01041/ANM	Issued 18 Nov 2024	Confirms planning approval of revised site layout and finished levels. Lists the GA Plan (Rev6) as an approved drawing.

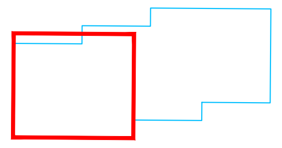
Document 1 – Topographical Survey (May 2021)

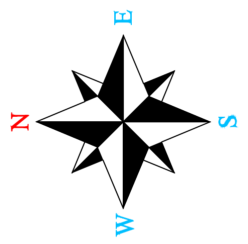
Title: Original Topographical Survey
Drawing No.: WCG 21-1575-1:3 to 3:3
Purpose:
Submitted as part of Reserved Matters application (21/00950/REM).
Represents original ground levels across the site prior to temporary works.

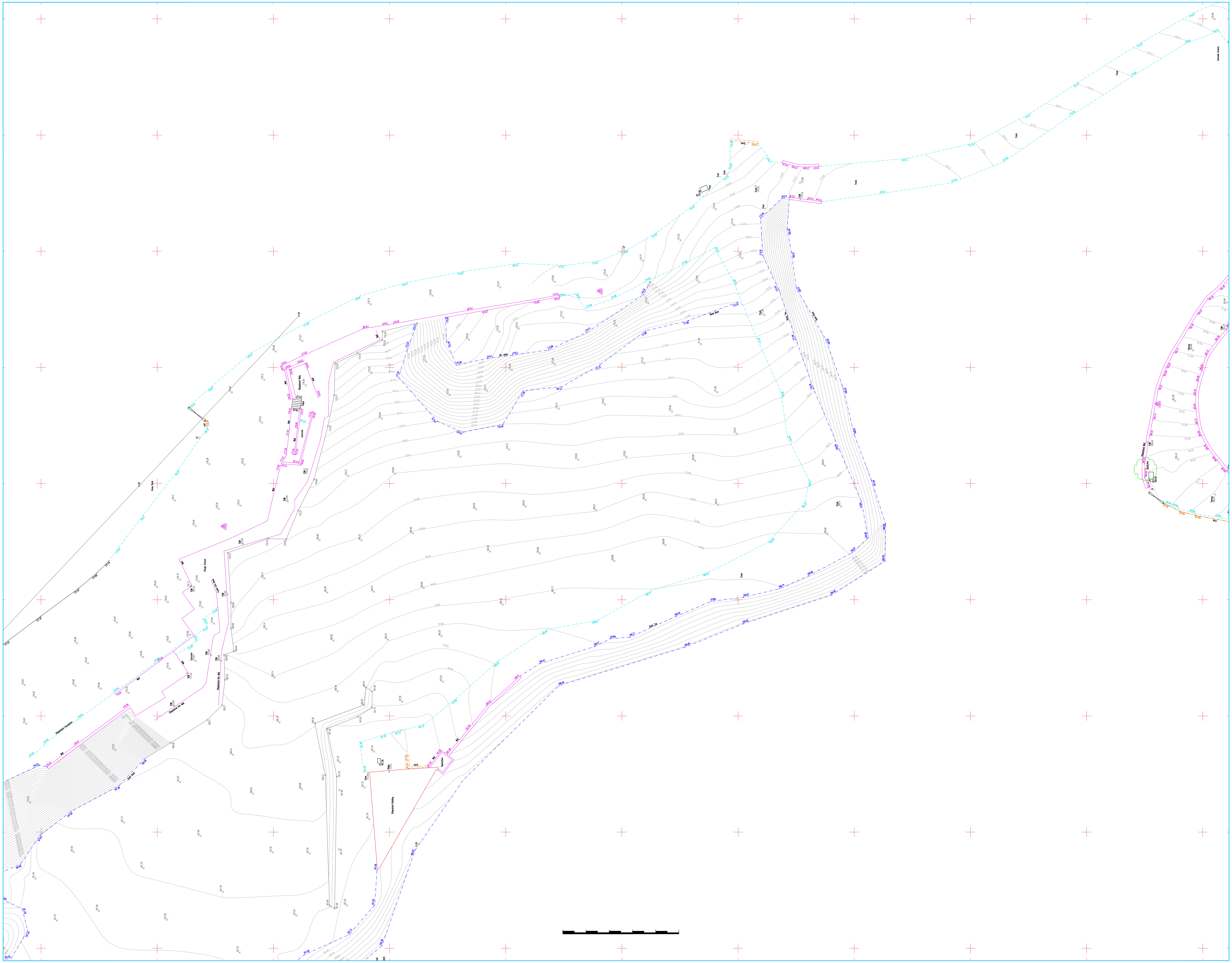

Grass Bank
EP
FPP
LP
STN2
STN3
Wall
Dilapidated Walls
Steps
Concrete
TOW
Rough Ground
Fades into Bank
Dilapidated Ret Wall
Dilapidated Foundation
Post
BT
177.14
FIR
Soil Mound
Bank Base
Bank Top
Unmade Ground
Crushed Material
Conc
Substation
Drain
Ridge
172.12
Eave
IC
167.38
Dilapidated Building
Water Level
165.25
28-04-2021
Ø750/H10
Ø600/H10
Ø500/H10
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S=8.00
R=10.00
Ø300/H10
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Ø500/H12/MS
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175.48
175.94
176.41
176.94
177.59
177.23
177.35
177.47
177.60
177.74
170.45
170.49
175.06
161.80
162.16
162.42
162.47
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167.12
167.48
167.53
167.43

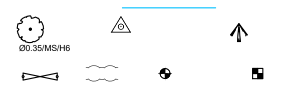

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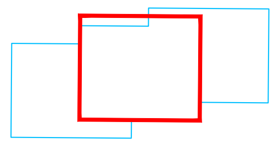
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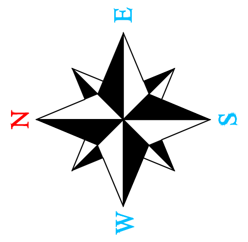



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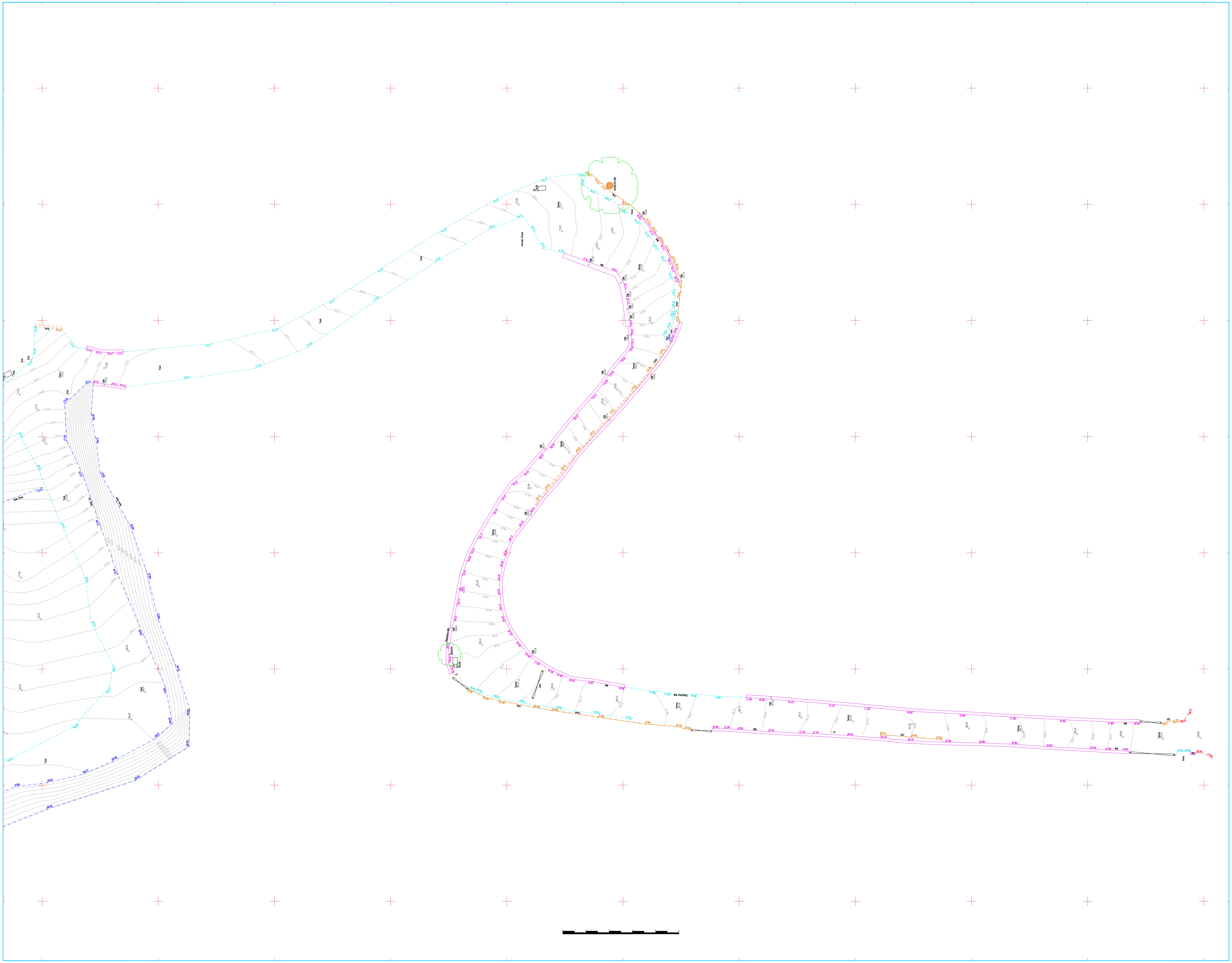


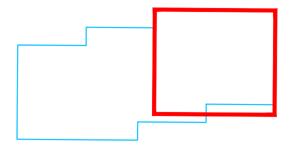


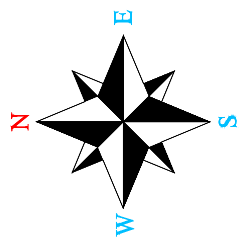




WEST COAST
GEOMATICS







WEST COAST GEOMATICS

Document 2 – Updated 3D Topographical Survey (Rev B)

Title: Updated 3D Topographical Survey
Drawing No.: WCG 23-1954-T-1:2 to 2:2
Purpose:
Prepared by Mere Development Group.
Captures reduced site levels and shows emergence of Spring 1 and Spring 2 post-works.

STN4	395013.726	417247.881	183.526
STN1	395033.174	417343.936	174.881
STN3	394924.240	417480.719	175.579
R1	395000.460	417249.546	185.537
R2	395059.935	417366.458	187.907
R50	395017.472	417293.683	173.743
R51	394931.571	417325.665	188.874
R52	395028.881	417395.555	183.086
R53	394999.576	417423.153	183.205
R4	394949.823	417383.414	169.558
R5	394934.478	417382.177	169.391
R3	394950.908	417375.838	169.462

0.00 4.00 8.00 12.00 16.00 20.00

R52
E: 395028.881
N: 417395.555
Z: 183.086

R53
E: 394999.576
N: 417423.153
Z: 183.205

STN3
E: 394924.240
N: 417480.719
Z: 175.579

R4
E: 394949.823
N: 417383.414
Z: 169.558

R3
E: 394950.908
N: 417375.838

R5
E: 394934.478
N: 417382.177
Z: 169.391

Spring 1
Surface Running Water Surveyed Nov 2023

Spring 2
Surface Running Water Surveyed June 2025

Abbreviations where applicable:

AB	Air Brick	JTN	Junction Box
AV	Air Valve	KL	Keep Left
BB	Ballsha Beacon	KO	Kerb Gulley
BC	Bollard Canopy	LPS	Lamp Post
BH	Borehole	LT	Leat Trench
BL	Bed Level	MB	Mooring Bollard
BM	Bench Mark	ME	Meter Manhole
BNDY	Boundary	MH	Manhole
BO	Blow Off	MK	Mark Post
BS	Bi-Stem (Tree)	MS	Multi-Stem (Tree)
BST	Bus Stop	MY	Mercury Manhole
BT	British Telecom Manhole	NP	Notice Board
BW	Brick Wall	NP	Road Name Plate
C	Cable	OH	Overhead
CCTV	Closed Circuit Television	OS	Ordnance Survey
CL	Ceiling Level	PB	Pillar Box
CONC	Concrete	PED	Pedestrian Pad
CP	Concrete Post	PI	Pipe
CR	Cattle Grid	PM	Parking Meter
CTV	Cable Television Manhole	PO	Post Office Manhole
CUL	Culvert	PP	Power Point
DP	Drop Kerb	RE	Rodding Eye
DR	Drain Pipe	RS	Road Sign
DPC	Damp Proof Course	RTW	Retaining Wall
DR	Drain	RWP	Rainwater Pipe
DWB	Dog Waste Bin	SDP	Stand Pipe
EB	Electric Box	SIG	Signal Box
ES	Electricity Manhole	SOF	Soffit Level
EP	Electricity Pole	SMH	Surface Water Manhole
ER	Earthing Rod	ST	Stop Tap
FB	Flower Bed	SU	Stump (Tree)
FCB	Fence Bollard	SV	Sluice Valve
FCL	False Ceiling Level	SVP	Soil Vent Pipe
FFL	Finished Floor Level	SW	Surface Water
FIR	Fence Iron Railing	SY	Stay (Eg. Pylon, TP)
FL	Floor Level	TBM	Temporary Benchmark
FMH	Foul Water Manhole	TEL	Telephone Box
FP	Flag Pole	TH	Threshold Level
FPC	Fence Post & Chain	TL	Traffic Light
FPH	Fence Post & Hedge	TOW	Top of Wall
FPR	Fence Post & Rail	TP	Telegraph Pole
FPW	Fence Post & Wire	TPT	Test Pit
FSB	Fence Safety Barrier	TS	Tri-Stem (Tree)
FW	Foul Water	TSI	Traffic Signal Manhole
FWM	Fence Wire Mesh	UC	Unidentified
GAS	Gas Valve	UTR	Unable To Raise
GL	Ground Level	VP	Vent Pipe
GP	Gate Post	WB	Waste Bin
GU	Gulley	WCL	Window Cill Level
HL	Hedge Line	WCL	Window Head Level
HY	Hydrant	WL	Wall Level
IS	Information Sign	WM	Water Meter

General Legend:

Tree | Survey Station | OSBM/TBM | Hedge | Borehole | Trial Pit

Survey Control:

Relative to Ordnance Survey grid via Active Network RTK GPS Plane Table Grid

Sheet Layout:

S1
S2

Disclaimer - West Coast Geomatics Limited 2023:

This survey has been produced with its accuracy commensurate with the indicated scale and should only be used for its original intended purpose. Any scaling should only be undertaken using a digital media product. Unless using a digital media product, no responsibility is accepted to any third party for the whole or part of its contents. Any third party using this survey for any purpose does so at their own risk. Any discrepancies between this survey and any other information should be reported to West Coast Geomatics Limited.

Additional Notes:

Amendments:

Rev A: January 2024
Additional Levels Added to Survey and Contours Updated

Rev B: June 2025
Re-Surveyed to Show Location of Spring 2

WEST COAST GEOMATICS
LAND & MEASURED BUILDING SURVEYORS

Address:
Suites 3 & 4 Orchard House
Hallsall Business Centre
Lancashire
L39 8RG

Contact details:
Tel.: +44 (0) 1704 840 938
Email: info@wcgeo.co.uk
Web: www.wcgeo.co.uk

Client:
Mere Development Group

Drawing Title:
3D Topographical Survey Sheet 1 of 2

Rev: A

Site Address / Project Reference:
Sladen Mill
Todmorden Road
Littleborough - OL15 9EW

Surveyed:	JJD	Document No.	WCG 23-1954-T-1-2
Processed:	JJD	Plotted Scale:	ISO_A0_@_1:100
Checked & QA:	SN	Date of Issue	October 2023

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Z: 187.907

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N: 417343.936
Z: 174.881

R52
E: 395028.881
N: 417395.555
Z: 183.086

R53
E: 394999.576
N: 417423.153
Z: 183.205

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N: 417247.881
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R4
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R3
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STN4	395013.726	417247.881	183.526
STN1	395033.174	417343.936	174.881
STN3	394924.240	417480.719	175.579
R1	395000.460	417249.546	185.537
R2	395059.935	417366.458	187.907
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R5	394934.478	417382.177	169.391
R3	394950.908	417375.838	169.462

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BO	Bollard	MK	Marker
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BT	British Telecom Manhole	NP	Notice Board
BW	Brick Wall	NP	Road Name Plate
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CCTV	Closed Circuit Television	OS	Ordnance Survey
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CONC	Concrete	PED	Pedestrian Pad
CP	Concrete Post	PI	Pipe
CR	Cast Iron Rail	PM	Parking Meter
CTV	Cable Television Manhole	PO	Post Office Manhole
CUL	Culvert	PP	Power Point
DP	Drop Pipe	RE	Rodding Eye
DR	Drain Pipe	RS	Road Sign
DPC	Damp Proof Course	RTW	Retaining Wall
DR	Drain	RWP	Rainwater Pipe
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EP	Electricity Pole	SMH	Surface Water Manhole
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FB	Flower Bed	SU	Stump (Tree)
FC	Fence Corner	SV	Sluice Valve
FCL	False Ceiling Level	SVP	Soil Vent Pipe
FFL	Finished Floor Level	SW	Surface Water
FIR	Fence Iron Railing	SY	Stay (Eg. Pylon, TP)
FL	Floor Level	TBM	Temporary Benchmark
FMH	Foul Water Manhole	TCH	Telephone Cable
FP	Flag Pole	TH	Threshold Level
FPC	Fence Post & Chain	TL	Traffic Light
FPE	Fence Post & Panel	TOW	Top of Wall
FPR	Fence Post & Rail	TP	Telegraph Pole
FPW	Fence Post & Wire	TPT	Test Pit
FSB	Fence Safety Barrier	TS	Tri-Stem (Tree)
FW	Foul Water	TSI	Traffic Signal Manhole
FWM	Fence Wire Mesh	UC	Unable To Close
GAS	Gas Valve	UTR	Unable To Raise
GL	Ground Level	VP	Vent Pipe
GP	Gate Post	WB	Waste Bin
GU	Gulley	WCL	Window Cill Level
HH	Hand Hole	WHL	Window Head Level
HY	Hydrant	WL	Wall Level
IS	Information Sign	WM	Water Meter

General Legend:

Tree (20.50/MS/HE) · Survey Station · OSBM/TBM · Gate · Hedge · Borehole · Trial Pit

Survey Control:

Relative to Ordnance Survey grid via Active Network RTK GPS
Plane Table Grid

Sheet Layout:

S1
S2

Disclaimer - West Coast Geomatics Limited 2023:

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Additional Notes:

Amendments:

Rev A: January 2024
Additional Levels Added to Survey and Contours Updated

Rev B: June 2025
Re-Surveyed to Show Location of Spring 2

WEST COAST GEOMATICS
LAND & MEASURED BUILDING SURVEYORS

Address:
Suites 3 & 4 Orchard House
Halsall Business Centre
Lancashire
L39 8RG

Contact details:
Tel: +44 [0] 1704 840 938
Email: info@wcgeo.co.uk
Web: www.wcgeo.co.uk

Client:
Mere Development Group

Drawing Title:
3D Topographical Survey Sheet 2 of 2

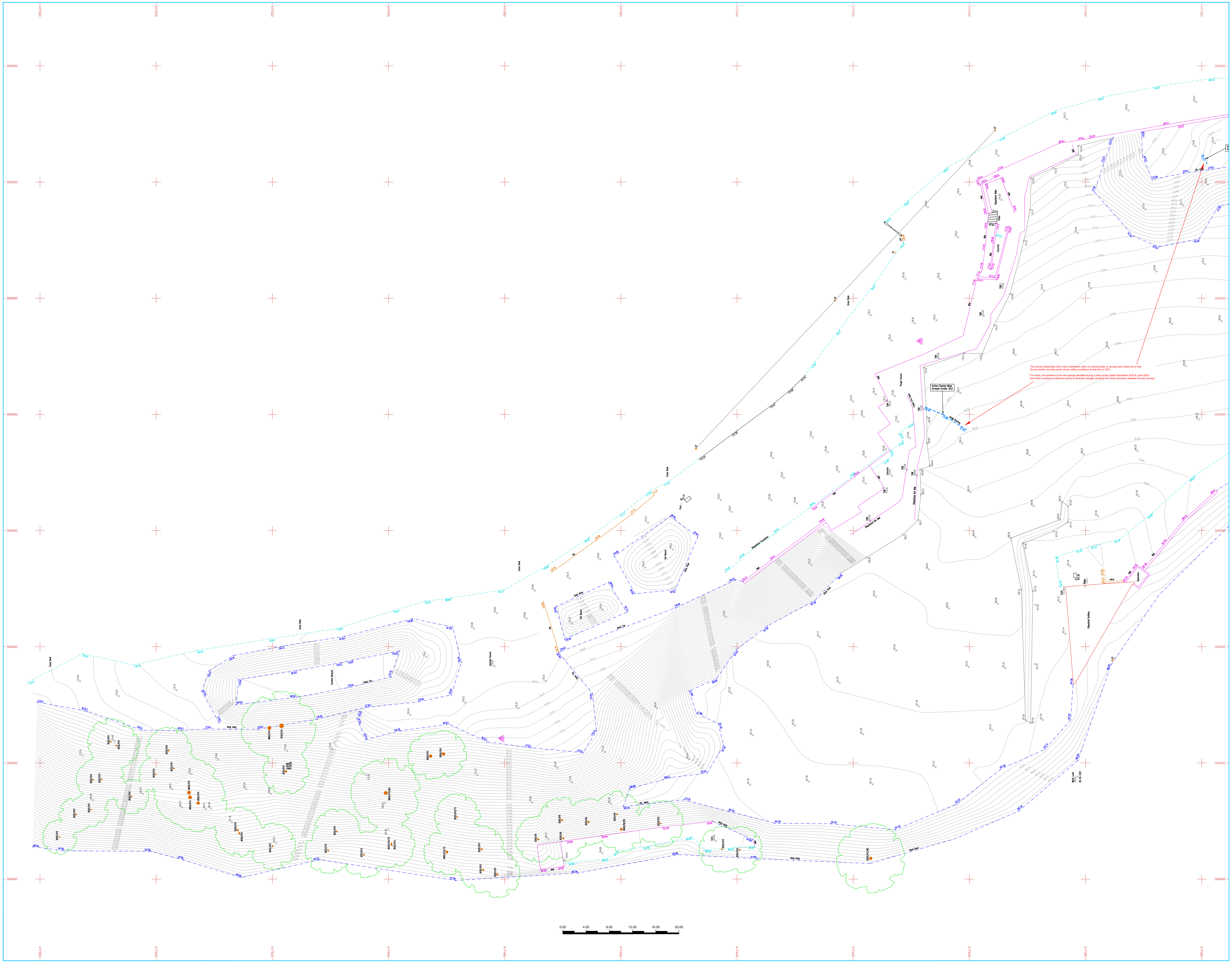
Rev: A

Site Address / Project Reference:
Sladen Mill
Todmorden Road
Littleborough - OL15 9EW

Surveyed:	JJD	Document No.	WCG 23-1954-T-2-2
Processed:	JJD	Plotted Scale:	ISO_A0_@ 1:100
Checked & QA:	SN	Date of Issue	October 2023

Document 3 – Annotated Version of Original Survey

Title: Annotated Topographical Survey (Reference Update)
Drawing No.: WCG 21-1575 (annotated version)
Purpose:
Original survey annotated to mark the location and current levels of both springs.
Demonstrates site level changes and confirms the springs are temporary.



This survey (dated May 2021) was undertaken when no running water or springs were observed on site.
Ground levels and data points shown reflect conditions at that time in 2021.

For clarity, the positions of the two springs identified during a later survey (dated November 2023 & June 2025) have been overlaid as reference points to illustrate changes resulting from level reductions between the two surveys.

Abbreviations where applicable:

AB	Air Brick	JTN	Junction Box
AV	Air Valve	KL	Keep Left
BB	Belisha Beacon	KO	Kerb Gulley
BC	Building Canopy	LFB	Lifebuoy
BH	Borehole	LP	Lamp Post
BL	Bed Level	MB	Mooring Bollard
BM	Bench Mark	ME	Meter Manhole
BNDY	Boundary	MH	Manhole
BO	Bollard	MK	Marker
BS	Bi-Stem (Tree)	MS	Multi-Stem (Tree)
BST	Bus Stop	MY	Mercury Manhole
BT	British Telecom Manhole	NP	Notice Board
BW	Brick Wall	NP	Road Name Plate
C	Crest	OB	Out Building
CCTV	Closed Circuit Television	OS	Ordnance Survey
CL	Ceiling Level	PB	Pillar Box
CONC	Concrete	PED	Pedestrian Pad
CP	Concrete Post	PI	Pipe
CR	Cycle Rack	PM	Parking Meter
CTV	Cable Television Manhole	PO	Post Office Manhole
CUL	Culvert	PP	Power Point
DK	Drop Kerb	RE	Rodding Eye
DP	Drain Pipe	RS	Road Sign
DPC	Damp Proof Course	RTW	Retaining Wall
DR	Drain	RWP	Rainwater Pipe
DWB	Dog Waste Bin	SDP	Stand Pipe
EB	Electricity Box	SK	Soakaway
EL	Electricity Manhole	SOF	Soffit Level
EP	Electricity Pole	SMH	Surface Water Manhole
ER	Earthing Rod	ST	Stop Tap
FB	Flower Bed	SU	Stump (Tree)
FBR	Foot Bridge	SV	Stop Valve
FCL	False Ceiling Level	SVP	Soil Vent Pipe
FFL	Finished Floor Level	SW	Surface Water
FIR	Fence Iron Railing	SY	Stay (Eg. Pylon, TP)
FL	Floor Level	TBM	Temporary Benchmark
FMH	Foul Water Manhole	TCB	Telephone Call Box
FP	Flag Pole	TH	Threshold Level
FPC	Fence Post & Chain	TL	Traffic Light
FPP	Fence Post & Panel	TOW	Top of Wall
FPR	Fence Post & Rail	TP	Telegraph Pole
FPW	Fence Post & Wire	TPT	Trial Pit
FSB	Fence Safety Barrier	TS	Tri-Stem (Tree)
FW	Foul Water	TSI	Traffic Signal Manhole
FWM	Fence Wire Mesh	U/B	Under Beam
GAS	Gas Valve	UTR	Unable To Raise
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HY	Hydrant	W/L	Wall Level
IS	Information Sign	WM	Water Meter

General Legend:

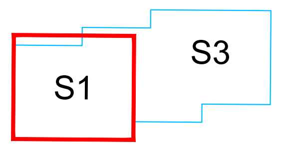
Tree Ø0.35/MS/H6
Survey Station STNX
OSBM/TBM
Gate
Hedge
Borehole
Trial Pit

Survey Control:

	-E/X-	-N/Y-	-Ht/Z-
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STN3	394924.240	417480.719	175.579
STN4	395013.726	417247.881	183.526

Relative to Ordnance Survey grid via Active Network RTK GPS Plane Table Grid

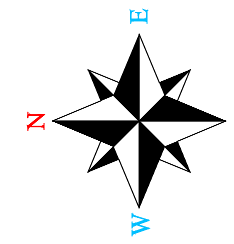
Sheet Layout:



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Additional Notes:



Amendments:

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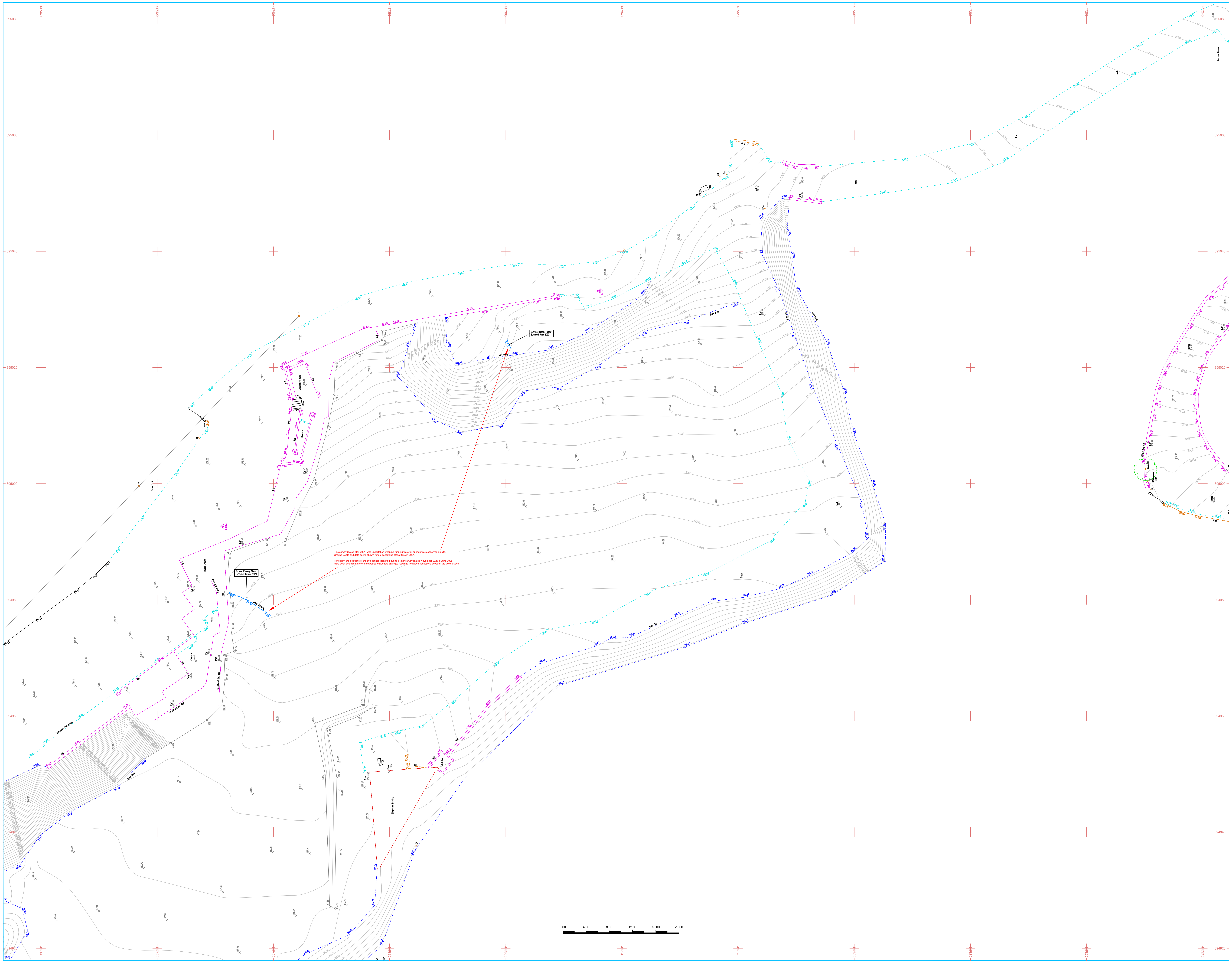
Client:
Mainly Mere

Drawing Title:
Topographical Survey - Sheet 1 of 3

Rev: -

Site Address / Project Reference:
Sladen Mill
Todmorden Road
Littleborough - OL15 9EW

Surveyed:	JJD	Document No.	WCG 21-1575-1:3
Processed:	JD	Plotted Scale:	ISO_A0_@_1:200
Checked & QA:	SN	Date of Issue	May 2021



This survey (dated May 2021) was undertaken when no running water or springs were observed on site.
Ground levels and data points shown reflect conditions at that time in 2021.

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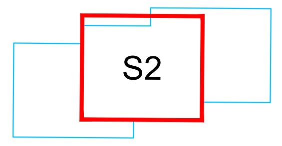
Tree Ø0.35/MS/H6
STNX Survey Station
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Gate
Hedge
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Relative to Ordnance Survey grid via Active Network RTK GPS Plane Table Grid

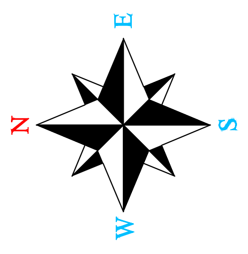
Sheet Layout:



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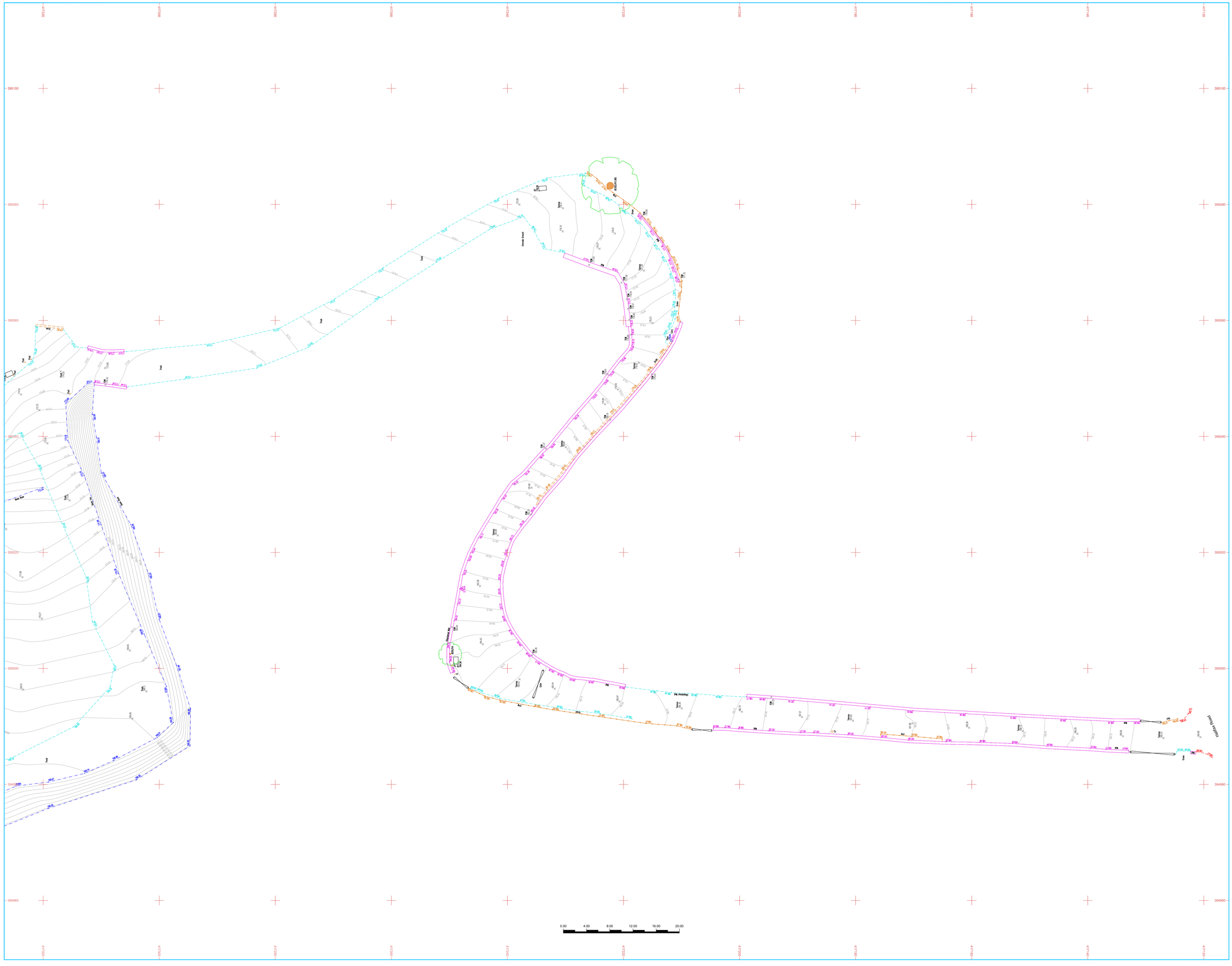
Client:
Mainly Mere

Drawing Title:
Topographical Survey - Sheet 2 of 3

Rev:
-

Site Address / Project Reference:
Sladen Mill
Todmorden Road
Littleborough - OL15 9EW

Surveyed:	JJD	Document No.	WCG 21-1575-2:3
Processed:	JD	Plotted Scale:	ISO_A0_@_1:200
Checked & QA:	SN	Date of Issue	May 2021



Abbreviations where applicable:

AB	Air Brick	JTN	Junction Box
AV	Air Valve	KL	Kerp Left
BB	Ballsha Beacon	KO	Kerb Gulley
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BH	Borehole	LT	Letterbox
BL	Bed Level	MB	Mooring Bollard
BM	Bench Mark	ME	Meter Manhole
BNDY	Boundary	MH	Manhole
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BT	British Telecom Manhole	NP	Notice Board
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FPW	Fence Post & Wire	TPT	Test Pit
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FW	Foul Water	TSI	Traffic Signal Manhole
FWM	Fence Wire Mesh	UC	Unidentified
GAS	Gas Valve	UTR	Unable To Raise
GL	Ground Level	VP	Vent Pipe
GP	Gate Post	WB	Waste Bin
GU	Gulley	WCL	Window Cill Level
HC	Hedge	WHL	Window Head Level
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IS	Information Sign	WM	Water Meter

General Legend:

Tree
Survey Station
OSBM/TBM
Gate
Hedge
Borehole
Trial Pit

Survey Control:

	-E/X-	-N/Y-	-H/Z-
STN1	395033.174	417343.936	174.881
STN2	394992.653	417408.696	178.204
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STN4	395013.726	417247.881	183.526

Relative to Ordnance Survey grid via Active Network RTK GPS Plane Table Grid

Sheet Layout:



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Additional Notes:

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Contact details:
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Email: info@wcgeo.co.uk
Web: www.wcgeo.co.uk

Client:
Mainly Mere

Drawing Title:
Topographical Survey - Sheet 3 of 3

Rev:
-

Site Address / Project Reference:
Sladen Mill
Todmorden Road
Littleborough - OL15 9EW

Surveyed:	JJD	Document No.	WCG 21-1575-3:3
Processed:	JD	Plotted Scale:	ISO_A0_@_1:200
Checked & QA:	SN	Date of Issue	May 2021

Document 4 – General Arrangement Site Plan (Rev6)

Title: Approved General Arrangement Plan
Drawing No.: DWG-TJBA-LUXURE-SLADEN MILL – 090621 Rev6
Purpose:
Approved finished levels as per planning approval.
Demonstrates that surface springs will be reabsorbed as groundwater post-completion.

corner to milk churn platform cut back & radiused

ex wall repaired to provide nlt 1.1m high parapet

contrasting sett strip to entrance

lamp post to remain

public right of way

low masonry ret wall

landscaped & planted area

plots 1-4 FFL 176.25

plots 5-8 FFL 176.25

Bin standing

stepped footpath

earth reinforced slope

bot of engineered bedrock slope

posn of buried ret wall slope to keep min 500mm structure below prop GL

posn of buried berm & slope to keep min 500mm structure below prop GL

ex wall repaired

ex slope landscaped

1:2 earth slope

1000h x 500 gabion wall

grassed verge area

zone 4.5 wide road

carport FFL 172.50

Car port 4 parking spaces

earth reinforced ret wall

plot 15 FFL 172.00

plot 16 FFL 171.55

plot 14 FFL 171.50 g FFL 171.35

plot 17 FFL 170.25 g FFL 170.10

plot 18 FFL 169.75 g FFL 169.60

plot 19 FFL 169.25 g FFL 169.10

plot 20 FFL 168.75 g FFL 168.60

plot 21 FFL 168.55

plot 22 FFL 168.55

plot 23 FFL 168.45 g FFL 168.30

plot 24 FFL 168.35 g FFL 168.20

plot 25 FFL 168.25 g FFL 168.10

plot 13 FFL 170.50 g FFL 170.35

plot 12 FFL 170.50 g FFL 170.35

plot 11 FFL 171.40 g FFL 171.25

plot 9 FFL 173.00

plot 10 FFL 172.00

FFL 172.10

FFL 171.15

natural stone/stone faced pcc ego block

grassed verge area

contrasting sett strip to entrance

stone faced pcc ego block

sliding Gate

flow control MH

FW pump stn

existing Sud station

greenslope embankment

planted boundary

footpath

rainwater attenuation pond +165.90

+167.40

+152.40

+168.25

+168.10

+168.20

+168.40

+168.60

+168.80

+169.10

+169.40

+169.70

+170.00

+170.10

+170.20

+170.35

+170.40

+170.55

+170.70

+170.85

+171.0

+171.17

+171.33

+171.50

+171.66

+171.83

+172.00

+172.33

+172.66

+173.0

+173.6

+173.8

+174.0

+174.3

+174.75

+175.0

+175.5

+176.0

+176.10

+176.80

+177.20

+177.58

+177.8

+178.1

+179.10

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

N

planning/tender

AMENDMENTS/ ISSUES			
6	plot 11 fflr to 171.40	sept 2024	cs
5	path & ret walls to plots 5+8 & 16	jul 2024	cs
4	prop ext'd & prop lvls site wide	jun 2024	cs
3	updated topo, bridge topo added, plan amended, tender issue	mar 24	tjb
2	update topo added & plan amended	oct 23	tjb
1	plots, earthworks & road layout updated	aug 23	tjb
0	original	jun 23	tjb
REVISION	REASON/ CHANGE	DATE	BY

T J BOOTH ASSOCIATES
CONSULTING CIVIL & GEOTECHNICAL ENGINEERS
20A Eastgate Street
Rochdale
Lancashire
OL16 1DH
Tel:01706 868288

Luxure Developments / Sladen Mill, Littleborough

general arrangement site plan

FILE NAME: dwg-tjba-luxure-sladen mill-090621

SCALE: 1 : 250 @ A1

Document 5 – NMA Decision Notice (24/01041/ANM)

Title: Decision Notice – Non-Material Amendment
Reference: 24/01041/ANM
Purpose:
Confirms that the revised General Arrangement Plan (Rev6) has been formally approved by Rochdale Council.
Provides planning context and authorisation for final site levels.

ROCHDALE BOROUGH COUNCIL

Town and Country Planning Act 1990 (as amended)

NON MATERIAL AMENDMENT TO EXISTING PLANNING PERMISSION

APPLICATION REFERENCE: 24/01041/ANM

Name and address for correspondence:	Applicant name:
Mr Paul Ambrose R&R Planning Consultants 11 Bankfield Lane Rochdale OL11 5RJ	Ben James

Part I - Particulars of Application

Date of Application: 21 October 2024

Proposal:	**Non-material amendment to planning permission 21/00950/REM for alterations to the vehicular access and parking layout for plots 1-8, amendments to plots 16, 17 and 18 and amendments to private footpaths which serve plots 1-8**
Location:	**Sladen Mill , Halifax Road, Littleborough, Rochdale, OL15 0LB**

Part II - Particulars of decision

The Rochdale Metropolitan Borough Council hereby give notice in pursuance of the provisions of the Town and Country Planning Act 1990 (as amended) that the revised details listed in Part I above have been approved as a non-material amendment to the existing planning permission.

The Council hereby **GRANTS** the above development in accordance with the revised details as stated on the application form subject to the following conditions and reasons:

Conditions and Reasons:

2 This permission relates to the following plans:-

PL01 Location Plan
General Arrangement Site Plan - dwg-tjba-luxure-sladen mill - 090621 Rev6
PL03 Existing Levels Rev. G
PL04 Existing and Proposed Levels Rev. G
PL05 Wider Context Plan Rev. E
PL06 Site Sections 1-3 Rev. L
PL07 Site Sections 4-6 Rev. K
PL08 Site Sections 7-9 Rev. M
PL09 Site Sections 10-11 Rev. L
PL14 Sections 14-15 Rev. J
PL15 Site Section Location Plan (incl. accommodation schedule and levels)

PL16 External Works Rev. D
PL20 Plot 1-8 Rev. B
PL21 Plot 9 & 10 Rev. C
PL22 Plot 11 Rev. B
PL23 Plot 13 Rev. D
PL24 Plot 14 Rev. B
PL25 Plot 16 Rev. D
PL26 Plots 14, 15 Front Elevations & 16 Side Elevations Rev. E
PL27 Plots 14, 15 Rear Elevations & 16 Side Elevations Rev. G Page 2 of 7
PL28 Plot 17 Rev. D
PL29 Plot 18 and 20 Rev. B
PL30 Plot 19 Rev. B
PL31 Plot 21 and 22 Rev. C
PL32 Plot 23 Rev. B
PL33 Plot 24 Rev. B
PL34 Plot 25 Plans Rev. D
PL35 Plot 25 Side Elevations Rev. D
PL36 Proposed Ownership Boundaries Rev. A
UG_1404_LAN_SL_DRW_04 Soft Landscape Plan Sheet 1 of 2 P10
UG_1404_LAN_SL_DRW_05 Soft Landscape Plan Sheet 2 of 2 P09

and the development shall be carried out in complete accordance with these drawings hereby approved.

Reason: For the avoidance of doubt and to ensure a satisfactory standard of development in accordance with the policies contained within the adopted Rochdale Core Strategy, the saved Rochdale Unitary Development Plan and the National Planning Policy Framework.

Date Decision Issued 18 November 2024

Melanie Hale
Head of Planning Services

IMPORTANT

PLEASE ENSURE THAT YOU HAVE READ AND FULLY UNDERSTOOD THE CONTENTS OF THIS DECISION NOTICE.

INFORMATIVE:
The Local Planning Authority's reasons for its decision are set out in the accompanying officer's report.

INFORMATIVE:
This decision notice is to be read alongside that issued with planning permission 21/00950/REM and all conditions that were imposed on all previous applications and amendments, with the exception of those conditions which are explicitly varied in accordance with the provisions of this decision or which have been explicitly varied by way of other S96A non-material amendments.