



# Abbeydale Geoscience

## GROUND INVESTIGATION REPORT

**Turnbridge Mill, Quay Street, Huddersfield, West Yorkshire**

**Report: 25072-GI-2**

**Date: March 2026**

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## Turnbridge Mill, Quay Street, Huddersfield, West Yorkshire

### DOCUMENT VERIFICATION SHEET

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### SUMMARY

**Grid Ref:** 414886(E), 416861(N)    **Elevation:** 65.5 mAOD    **Site Area:** 1.40 ha

**Development proposals:** New industrial buildings, car parking and service yard.

**Past site development:** Industrial usage since at least the 1850s.

**Made Ground:** Made Ground found to maximum depth of 2.00m bgl.

**Natural Soils:** Stiff clay found to a maximum depth of 5.45m bgl.

**Bedrock:** No bedrock positively identified.

**Groundwater:** Not encountered during ground investigation. Monitoring visits found groundwater from 1.19m bgl - 3.75m bgl.

**Shallow mining:** Risk of unrecorded shallow mine workings is considered to be very low.

**Environmental Assessment:** Existing soils chemically suitable for retention or reuse. Also no pathways between soils and future receptors.

**Ground gases:** The calculated Gas Screening Values (GSVs) fall within Characteristic Situation 1 (CS1).

**Remediation:** No remediation required.

**Foundations:** Stone column / rigid inclusion foundations proposed.

**Drainage:** Soakaways not suitable for this site.

**Geotechnical Considerations:** Stone columns would need to be taken below coal seam.

**Further Investigation:** Not necessary unless needed for geotechnical design.

# GROUND INVESTIGATION REPORT

## Turnbridge Mill, Quay Street, Huddersfield, West Yorkshire

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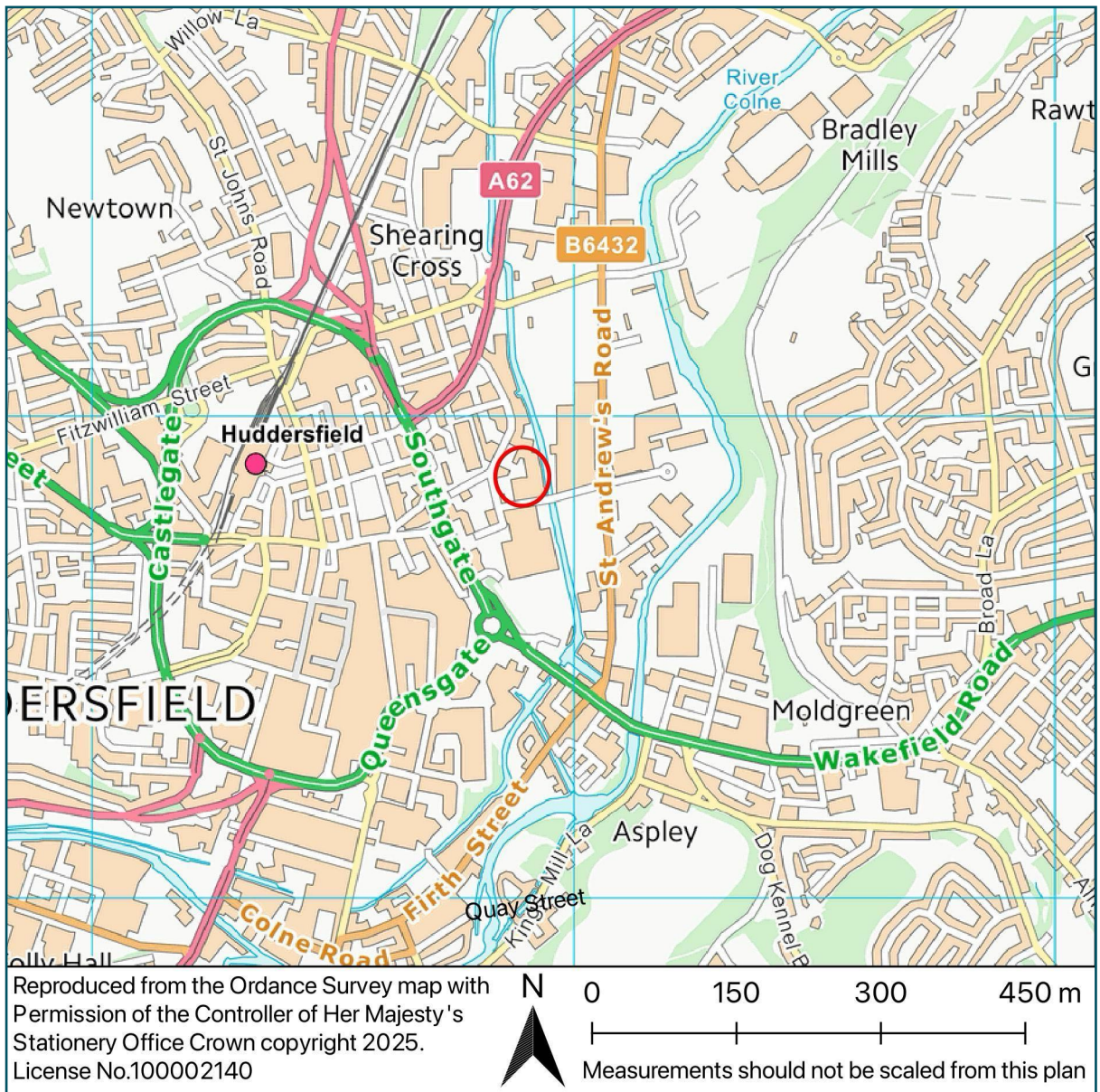
# GROUND INVESTIGATION REPORT

## Turnbridge Mill, Quay Street, Huddersfield, West Yorkshire

### 1. INTRODUCTION

On the instruction of T D Jagger, on behalf of John L. Brierley Ltd, a Phase 2 Ground Investigation was carried out by Abbeydale Geoscience Limited (AGL) on a site off Quay Street in Huddersfield, West Yorkshire.

The site is situated on the north-east side of Huddersfield, centred on National Grid Reference 414886, 416861, with a site area of around 1.40 ha. See Figure 1.



**FIGURE 1 - LOCATION PLAN**

This report was produced for our client, John L. Brierley Ltd, and their advisors and financiers. It should not be relied upon or transferred to any other parties without the express written authorisation of Abbeydale Geoscience Limited and our client. If any other unauthorised third party comes into possession of this report they rely on it at their own risk and the authors owe them no duty of care or skill.

The comments and recommendations presented in this Ground Investigation report are based on the findings of a review of available information; ground conditions encountered during the intrusive investigation work and the associated laboratory testing results. There may be other conditions prevailing on the site which have not been disclosed by this investigation and which have therefore not been taken in to account by this report. Responsibility cannot be accepted for conditions not revealed by this investigation.

When writing this report the proposed development was to construct new industrial buildings, car parking and a service yard area at, or close to, existing ground levels. If there are changes to these proposals then some modification to the comments and recommendations given may be required. The proposed site layout is shown on the site plan in Appendix A.

A previous Phase 1 Desk Study has already been prepared for this site by Abbeydale Geoscience Limited (previously known as Abbeydale BEC) ref: 744010-DS, dated July 2023. Extracts from this previous report have been included where necessary. Where information has been used from the previous Desk Study it is clearly referenced.

## **2. OBJECTIVES**

This report presents the findings of a ground investigation undertaken to characterise the subsurface conditions at the site and to provide an assessment of potential risks associated with the ground. The investigation has been designed to address both geo-environmental and geotechnical considerations, in order to inform the feasibility, design, and construction of future development.

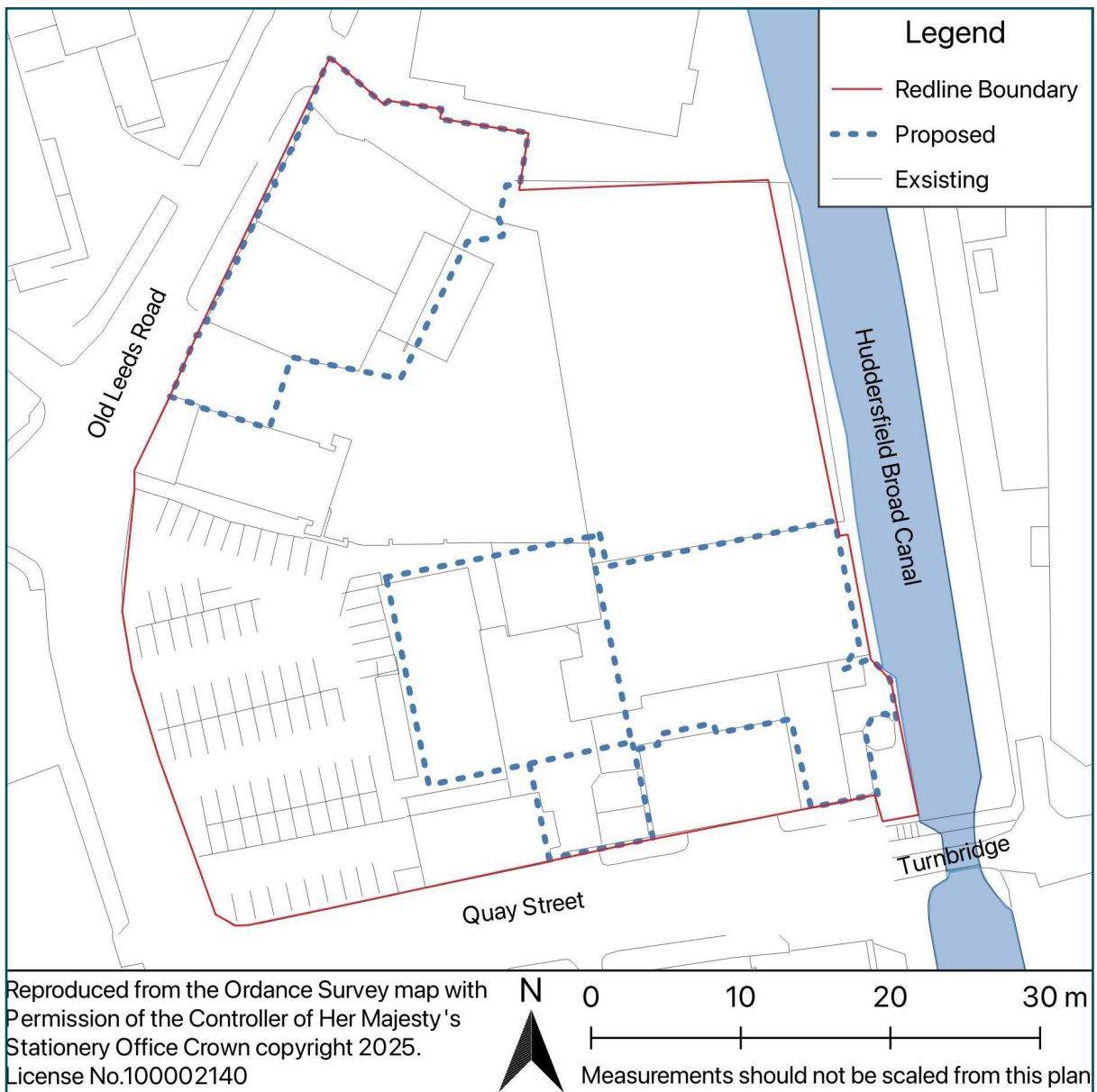
The geo-environmental assessment considers the potential presence of soil and groundwater contamination, as well as any associated risks to human health, controlled waters, and the wider environment. The geotechnical assessment evaluates the physical and mechanical properties of the ground and their implications for foundation design, earthworks, slope stability, and other engineering aspects of the proposed development.

Where appropriate the report gives recommendations for further investigations and / or remediation options to mitigate any potential risks to future receptors.

## **3. THE SITE**

The site comprises an irregularly shaped parcel of land located to the north of Quay Street, from which it is directly accessed via an electronic gate. The site includes several warehouses and yard areas.

In the south-eastern portion of the site stands Turnbridge Mills, a seven-storey former mill building with an adjacent free-standing chimney. To the south-west, there is a large car park. Between this car park and the former mill is a concrete yard containing several waste bins and a waste oil storage facility.



**FIGURE 2 - SITE PLAN**

In the north-eastern corner of the site are two warehouses, while a garage is located in the north-western corner. A centrally located car park is accessed via Old Leeds Road. The access road to this car park slopes downwards, resulting in the central car park being approximately 4m lower than the south-western car park. This change in elevation is supported by a masonry retaining wall.

The northern portion of the site is bounded to the west by Old Leeds Road, to the north by a tool hire warehouse, and to the east by the canal.

## 4. HISTORY

A Phase 1 Desk Study report was carried out by Abbeydale Geoscience (Previously know as Abbeydale BEC) in July 2023, report reference 744010-DS. This included historical Ordnance Survey (OS) maps of the site and surrounding area. Below is a summary of the findings; for further details refer back to the previous Phase 1 Desk Study report.

The site and surrounding area were heavily developed since at least 1854, with the site originally comprising multiple industrial buildings. Over time, the site evolved from Turnbridge Mills (Cotton Spinning) and Eagle Mills (Sawing & Planing) in the late 19th century, to a more diversified industrial layout including a cooperage, garage, guide hall, and various unspecified warehouses. Key features such as mill ponds and chimneys were gradually replaced by new industrial buildings, with Turnbridge Mill eventually designated as a Grade II listed building in 1978.

The surrounding area mirrored this industrial character, with numerous mills, gas works, dye works, boiler and machine works, foundries, and chemical works established within 50m–500 metres of the site between the mid-19th and 20th centuries. While parts of the wider area transitioned to residential or commercial use from the mid-20th century, particularly to the south and west, much of the land to the north, east, and south-east retained its industrial use into the late 20th century. By 2023, the site remains on the fringe of Huddersfield's industrial core, with the town centre lying immediately to the west.

## 5. GEOLOGY

The geological survey maps of the area 1:10,000 scale Sheet SE11NW, BGS Sheet 77 (Huddersfield & Halifax) and Yorkshire County Series sheet 246SE have been examined, along with the memoir of the area.

The site is shown to be underlain by Pennine Lower Coal Measures formation (mudstone, siltstone and sandstone); dipping 4° towards the east from an assessment of outcrop patterns and dip indicators on the geological maps. The site is situated stratigraphically above the Middle Band Coal which is recorded to outcrop to the west of the site.

The nearest geological fault is located 231m north-east of the site, trending roughly north-west to south-east with strata downthrown to the north-east.

Superficial drift deposits are recorded over the solid geology in the form of head deposits (clay, silt, sand and gravel).

Made ground is not recorded on the published maps, however some made ground should be expected across the site to superficial depth associated with past development at the site.

## 6. HYDROGEOLOGY AND HYDROLOGY

The hydrogeological and hydrological settings of the site were detailed in the Phase 1 Desk Study report, summarised below for ease of reference.

The Environment Agency (EA) classifies the bedrock beneath the site as a Secondary A aquifer, while the superficial soils are designated as a Secondary undifferentiated aquifer.

The soils on-site are identified as having a high leaching potential, indicating a greater likelihood for contaminants to migrate through the soil.

No potable water abstractions or groundwater abstraction licenses were identified within 250 metres of the site, and the site does not fall within a designated groundwater Source Protection Zone (SPZ).

The closest surface water feature is the Huddersfield Broad Canal, located approximately 5 metres east of the site at its nearest point.

It is understood that a separate Flood Risk Assessment will be conducted by a specialist consultant to assess potential flood risk issues at the site in detail.

## 7. MINING RISK ASSESSMENT & QUARRYING

The risk from mining and quarrying of the site was assessed in the Phase 1 Desk Study report, and is summarised below for ease of reference.

No recorded underground mine workings were highlighted beneath the site; however, the potential for unrecorded shallow workings was identified in two shallow coal seams beneath the site: the Middle Band Coal and the Soft Bed Coal.

The Middle Band Coal seam outcrops approximately 5m west of the site boundary and dips gently eastward beneath the site, reaching a depth of around 7.00m to 7.50m below ground level (bgl) at the eastern boundary. This seam is typically very thin, less than 0.10m in thickness and is unlikely to have been economically extracted. Furthermore, superficial deposits across the area may have eroded this seam or made it difficult to extract in the past.

The Soft Bed Coal seam lies deeper, at approximately 18.50m bgl beneath the western boundary and 25.00m bgl beneath the eastern boundary, with a maximum thickness of around 0.60 metres. Due to the likely presence of groundwater in the superficial soils under the site, and the limitations of early drainage and pumping technologies, it is unlikely that these seams will have been mined beneath the site. Additionally, the site's long-standing industrial use since the 1850s further reduces the likelihood of shallow mining activity. Overall the potential risk of unrecorded shallow mine workings was deemed to be **low** and no further investigation was considered necessary.

No recorded mine entries were noted within 100m of the site, and while the risk of encountering unrecorded mine entries is considered **very low**, it cannot be entirely discounted at this stage.

There was also no evidence of quarrying activity within or near the site, with the risk of unrecorded quarrying impacting the site deemed to be **very low**.

## **8. FIELDWORK**

### **8.1. General**

Fieldwork was undertaken on 19<sup>th</sup> and 20<sup>th</sup> June in general accordance with Eurocode 7, BS5930:2015 and BS10175:2011(+A2:2017). The Conceptual Site Model formulated as part of the Phase 1 Desk Study assessment guided the scope of investigation undertaken, to provide further information on the ground conditions present and refine the potential risks to future receptors.

Detailed descriptions of the strata encountered are recorded in the exploratory hole logs in Appendix C.

### **8.2. Exploratory Hole Locations**

The positions of the exploratory holes undertaken were assessed relative to existing features using a tape measure; the approximate locations are shown on Figure 3.

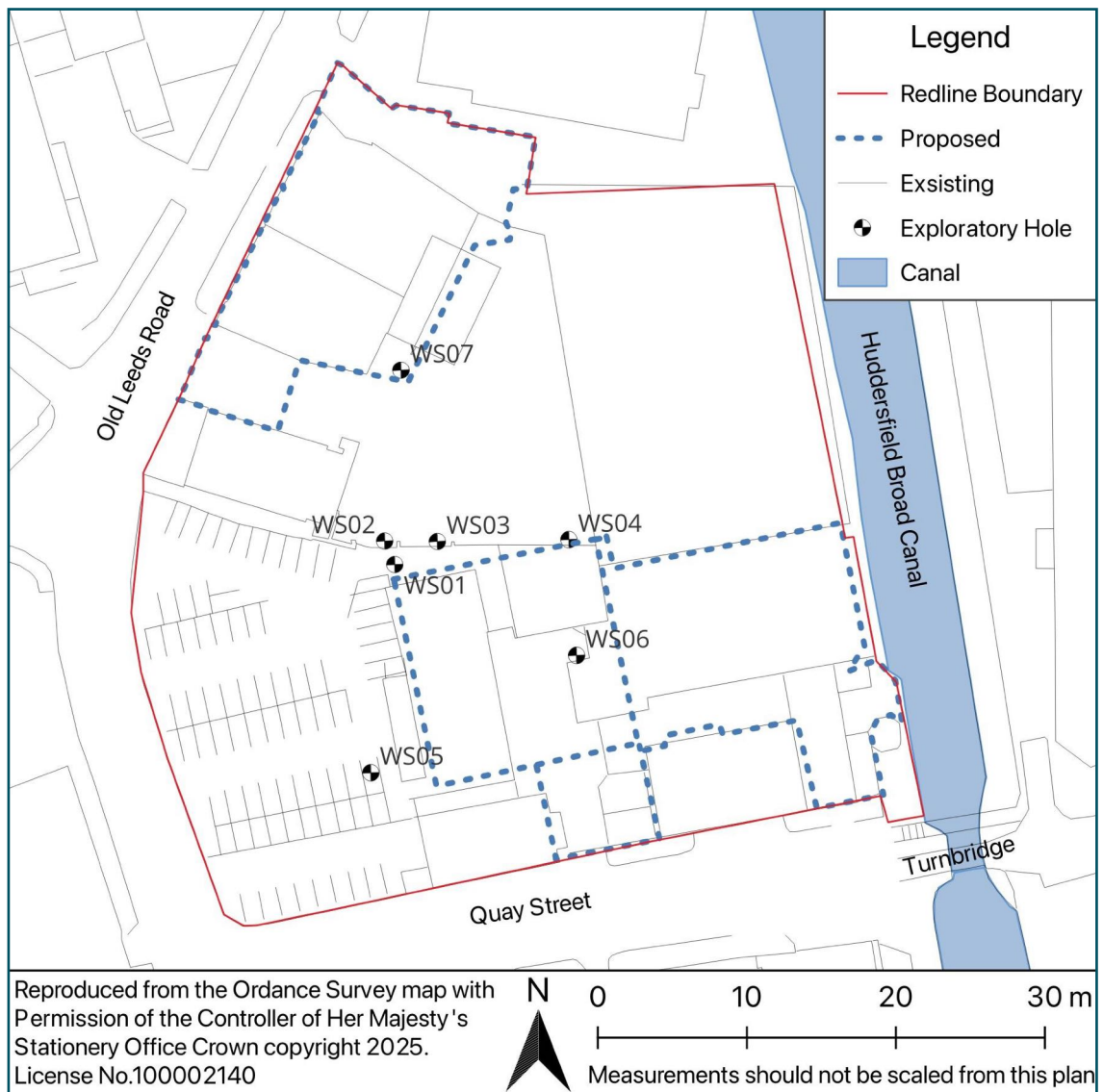
As no specific source of potential contamination was identified from the Phase 1 Desk Study information and preliminary Conceptual Site Model, generally non-targeted exploratory hole locations were employed to confirm the ground conditions across the site and allow representative samples to be taken for geotechnical and chemical laboratory testing.

### **8.3. Sampling Strategy**

Representative disturbed samples of the soils encountered were taken throughout the course of the intrusive investigation works to facilitate subsequent geotechnical and environmental laboratory testing.

The sampling depths were taken based on a combination of professional judgement or the ground conditions encountered, or at regular depths through the soil profile. Where known the sampling depths took account of proposed finished ground levels post-development, the likely source of potential contamination and the likely receptors.

On completion of fieldwork the samples were returned to Abbeydale Geoscience's office for scheduling of laboratory testing.



**FIGURE 3 - EXPLORATORY HOLE PLAN**

#### 8.4. Window Sample Holes

A total of seven window sample holes (WS01 to WS07) were carried out across the site, ranging in depth from 4.42m bgl to 5.45m bgl, using a tracked window sample rig.

As part of the window sampling in situ Standard Penetration Tests (SPTs) or Cone Penetration Tests (CPTs) were undertaken based on the ground conditions encountered, to provide in situ relative strength information. The SPTs utilised a 50mm split spoon sampler with a 70° taper, with the CPTs using a solid cone with a 90° taper, driven using a 63.5kg hammer dropping 750mm. The blow counts are recorded for every 75mm driven, as detailed on the appended exploratory logs along with the resultant N values for each test. Where a refusal ( $N > 50$ ) was encountered the total number of blows over the total penetration distance is recorded.

## 8.5. Monitoring Installations

To facilitate post-investigation monitoring of the underlying ground gas and groundwater regimes four gas monitoring standpipes were installed in exploratory holes; see Figure 4. The individual installation details are shown on the relevant logs for each exploratory hole, with standpipes installed in WS01, WS04, WS05 and WS07.

A total of nine post investigation monitoring visits were undertaken following installation of the monitoring standpipes. The results are included on Table 3 in Appendix B. The findings of the monitoring and ground gas risk assessment are discussed later in this report.

## 9. LABORATORY TESTING

Geotechnical laboratory testing was undertaken by Professional Soils Laboratory Ltd (PSL) in accordance with BS1377. To assess the geotechnical characteristics of the natural soils a total of four samples were sent to PSL for Plasticity Index (Atterberg Limits) testing, with natural moisture content testing carried out on the remainder of samples of natural soils obtained for comparison with the plasticity index testing results. The geotechnical testing results are summarised on Table 1 and shown graphically on Figure 6.

Samples were also sent to i2 Analytics for chemical analysis for a range of compounds that pose a potential risk to human health receptors. The results are summarised on Tables 2A to 2C in Appendix B.

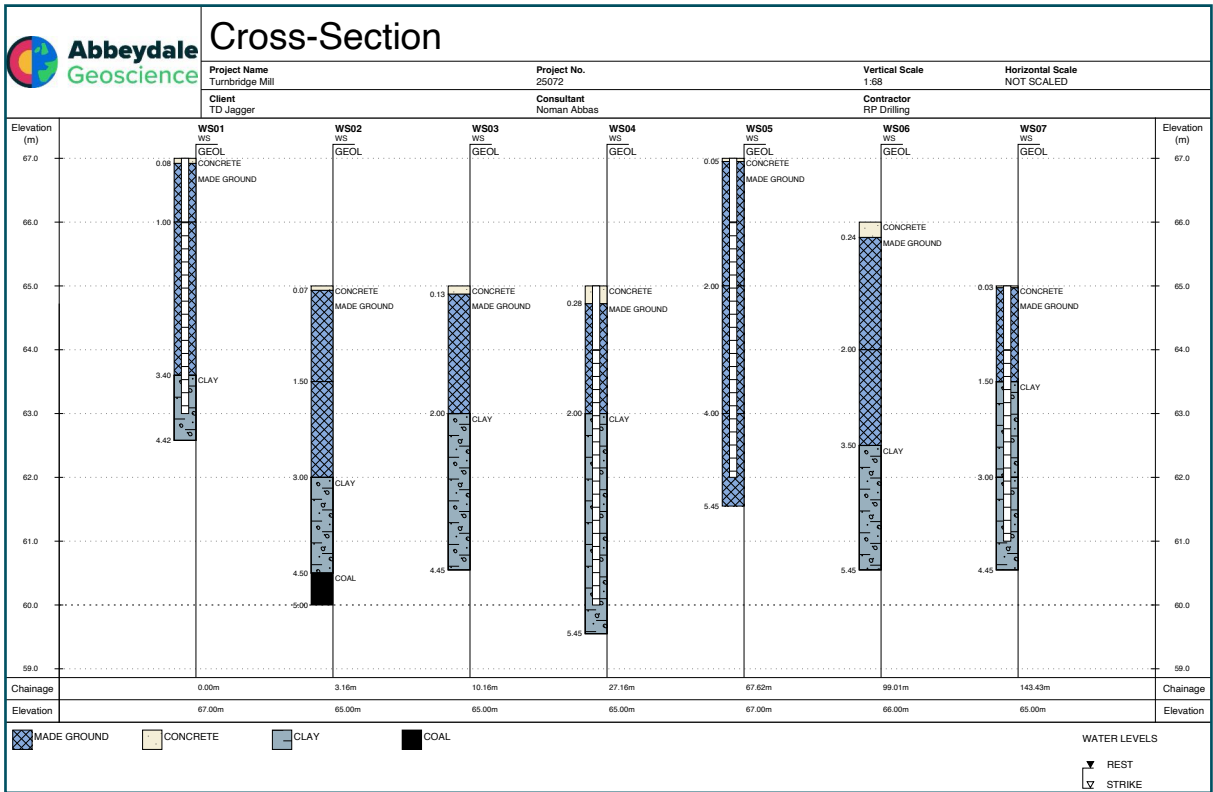
All of the laboratory testing results certificates are included in Appendix D.

## 10. GROUND CONDITIONS

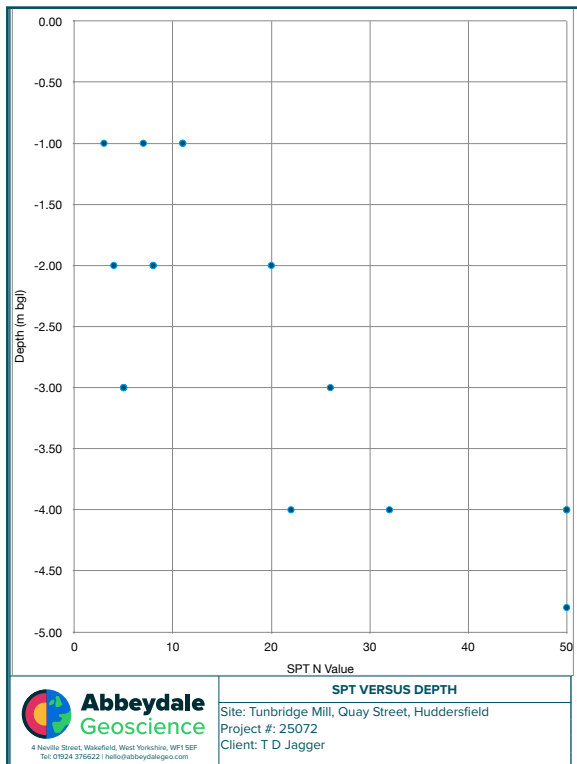
The exploratory logs appended to this report (Appendix C) provide detailed records of the ground conditions encountered at each location. A geological section, Figure 4, has been produced to summarise and depict this. The ground conditions between exploratory holes have been inferred and are shown purely for conjectural purposes, and provided for guidance purposes only. If critical, further investigation should be conducted to confirm the intermediate ground conditions.

Made ground was found from the surface in each window sample hole, typically consisting of sandy gravelly clay containing brick, clinker and sandstone. The made ground was found to maximum depth of 5.45m bgl in WS05. The CPT's N value in the made ground ranged from N3-N20, with a mean of N10 from the 16 tests carried out.

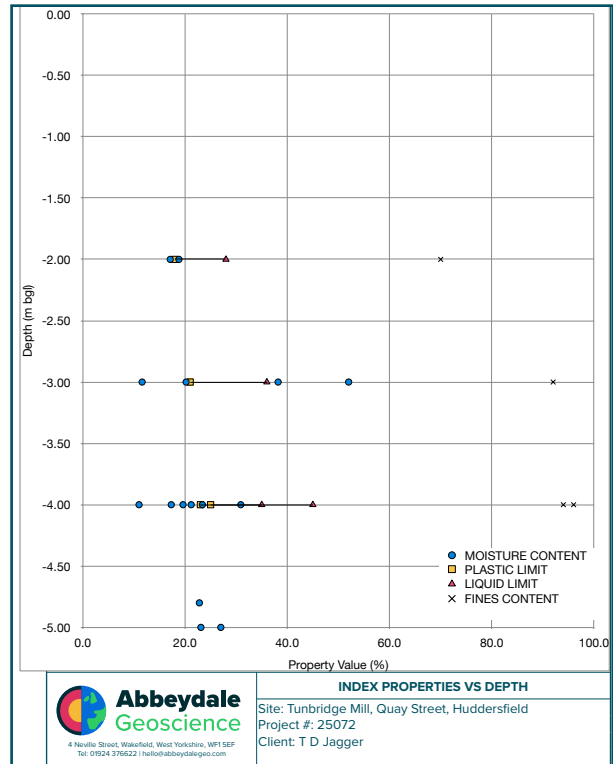
Sandy gravelly clay residual soil was found beneath the made ground to depths of 4.42m bgl to 5.45m bgl. The natural soil compared firm becoming very stiff brown grey sandy gravelly clay, with gravel consisting oddly of sandstone. Fifteen CPT's carried out within gravelly clay ranged from N0 (fell under self weight of the rods) to N50, with a mean of N21. As shown on Figure 5 a general increase in relative strength with depth is shown.



**FIGURE 4 - GEOLOGICAL SECTION**



**FIGURE 5 - N VALUE VS DEPTH GRAPH**



**FIGURE 6 - INDEX PROPERTIES VS DEPTH GRAPH**

Plasticity Index testing undertaken on four samples of natural clay soil, summarised

graphically on Figure 6, recorded moisture contents values to be generally just below the plastic limit of the samples, except WS04 at 3.00m bgl, where the moisture content value is slightly higher than the plastic limit value. Plasticity index values of the cohesive soils ranged between 10% and 20%, with corresponding modified plasticity index values of 7% to 19.2% in accordance with NHBC Ch.4.2 "Building Near Trees when factoring the fines content of the sample. This would classify the soils as non shrinkable (PI' < 10%) to low volume change potential (PI' 10%-20%).

In WS02 a layer of very weak black weathered coal was observed directly underlying the gravelly clay from 4.50m bgl, and extended beyond the basal depth of the window sample hole at 4.86m bgl.

Groundwater was encountered in WS02, WS05, and WS07 at depths of approximately 3.00m to 4.00m below ground level (bgl) during the ground investigation work. The water levels were at 3.00m in WS02 and WS05, at the base of the made ground and within the made ground respectively, and within the sandy gravelly clay alluvium at 4.00m bgl in WS07.

## 11. GEOTECHNICAL CONSIDERATIONS

### 11.1. General

An outline plan was available when completing this report. We understand that industrial premises are to be constructed at, or close to, existing ground levels. The proposed ground loadings were not known but for the purposes of this report are assumed to be less than 150 kN/m. If there are changes to these proposals, then some modification to the comments and recommendations given may be required.

### 11.2. Mining Precautions

The previous Phase 1 Desk Study report noted the resultant risk of unrecorded shallow mining affecting the site to be **low** based on the geological setting of the site. No signs of broken ground, soft ground or voids were noted in any of the window sample holes to suggest any upward migration of potential shallow mine workings in the exploratory holes.

No mine shafts have been highlighted on or within 20m of the site, with a **very low** potential of encountering unrecorded mine entries on the site.

The risk of unrecorded quarrying having affected the site is deemed to be **very low** based on the historical and geological setting of the site.

### 11.3. Foundations

The current development proposals include construction of new industrial buildings. We understand that the units will be of portal frame construction and founded on pad foundations.

Plasticity index testing carried out on samples of the stiff clay soils found the soils to have a low volume change potential in accordance with NHBC Ch.4.2.

Based on the variable depth to natural strata and low CPT's N values of the shallow natural soils, there is the potential for undue differential movement if the pad foundations were to be seated at shallow depth. This would particularly be the case if founding partly on clay soils and partly on sandy gravel.

In light of the recorded ground conditions it would be recommended to consider deep foundations, to carry loads down to more competent soils or bedrock, and reduce potential differential movement across the pad foundations.

The deep foundations could either be piles, or a form of ground improvement such as compacted stone columns or rigid inclusions. End bearing piles or compacted stone columns / rigid inclusions taken into the very stiff clay or weathered bedrock would likely be the most suitable option, however this should be determined by a specialist design contractor.

The actual available pile loadings would be dependent on the configuration of piles used, and should be specified by a specialist piling contractor. When designing the piles consideration should be given to the potential for negative skin friction from the made ground and the effects of any groundwater encountered. Consideration should also be given to the potential for large boulders or obstructions that may be present, within the made ground and superficial soils, even though not encountered by the window sample holes undertaken.

For any ground improvement techniques the need for pre-boring of holes may need to be considered, or turn over of the existing made ground to confirm that no obstructions are present, even though not encountered in any of the window sample holes undertaken.

#### **11.4. Floor Slabs**

With greater than 600mm of made ground present across the site, suspended floors are recommended unless a ground bearing floor slab is designed by a structural engineer to negate any undue movement of the floor slab due to differential settlement. Ground improvement techniques could be also be considered, either to improve the stiffness of the underlying soils, or to transfer loads down to more competent strata, such as using stone columns or rigid inclusions, or the floor slab could be supported by piles.

#### **11.5. New Hardstanding Areas**

Any new areas of highways and hardstanding will need to be constructed on re-engineered material. For design purposes a CBR of 2.5% may be assumed provided that the formation is proof rolled and any soft spots are either locally removed, or granular material rolled in to increase the stiffness of the soil matrix.

Where underlain by deep made ground consideration could be given to the use of geogrid to act as mechanical stabilisation and reduce the potential for

differential settlement, or the use of stone columns to transfer loads down to more competent strata and reduce potential differential settlement.

### **11.6. Surface Water Drainage & Excavations**

Some difficulties in excavation in the made ground and superficial soils should be anticipated. Consideration should be given to providing safe temporary support of excavations within made ground or where greater than 1.20m deep.

At this stage the potential requirement for dewatering of excavations and the potential for encountering running sand conditions cannot be discounted.

Given the ground conditions encountered and the urbanised nature of the surrounding area, soakaways are not considered to be suitable for this site. Attenuation and off-site drainage will therefore need to be considered. However, as the site is already covered by hardstanding and buildings it is unlikely that a significant increase in impermeable area will result from the proposed redevelopment. It may therefore be possible to reuse the existing surface water drainage system.

All drainage measures should meet Local Authority Sustainable Drainage Systems (SuDS) requirements.

### **11.7. Chemical Precautions**

To assess the potential for chemical attack of any buried concrete substructures by the existing soils, sulphate and pH testing was undertaken on six samples of the made ground as part of the chemical analysis suite indicate that Class DS-3 (ACEC Class AC-3) may need to be considered on this site in accordance with BRE Special Digest 1:2005.

Where in made ground, any new water supply pipes should be leachate resistant as a precautionary measure, unless agreement is reached with the local water authority to use different pipe materials.

### **11.8. Ground Source Heating**

Providing space heating and hot water using ground source heating could be considered for this site. If this method of heating is being proposed then a further assessment of the site and its underlying geology would be required to determine the most efficient ground loop configuration for the required heat load of the proposed building(s).

## **12. ENVIRONMENTAL RISK ASSESSMENT**

Contaminated Land is defined under Part 2A of the Environmental Protection Act 1990, implemented through Section 57 of the Environment Act 1995. This supports a 'suitable for use' based approach to the risk assessment of contaminated land. The evaluation is based on an assessment of plausible pollutant linkages, referred to as

the **source - pathway - receptor** model, based on the current or proposed use of the site.

A **pollutant linkage** is the relationship between a contaminant, a pathway and a receptor. Unless all three elements are present there is not considered to be a potential pollutant linkage.

However, where a potential pollutant linkage is deemed to be present, the resultant risk is based on the consequence should the event occur, and the probability that the event will occur, as outlined in CIRIA C552. A tabulated summary of the resultant risk matrix is provided below for contextual purposes.

		Consequence (C)			
		Severe	Medium	Mild	Minor
Probability (P)	High Likelihood	Very high risk	High risk	Moderate risk	Moderate / low risk
	Likely	High risk	Moderate risk	Moderate / low risk	Low risk
	Low likelihood	Moderate risk	Moderate / low risk	Low risk	Very low risk
	Unlikely	Moderate / low risk	Low risk	Very low risk	Very low risk

**RISK MATRIX FOR ENVIRONMENTAL RISK ASSESSMENT (BASED ON CIRIA C552)**

Part 2A states that for land to be defined as Contaminated Land by the Local Authority it needs to be in such a condition that:

- Significant harm is being caused, or there is significant possibility of such harm being caused.
- Pollution of controlled waters is being caused, or likely to be caused.

**12.1. Proposed Site Use**

We understand that the current development proposal is to construct new industrial buildings. A proposed layout plan is included in Appendix A.

No soft landscaping areas are proposed where future receptors could come into contact with underlying soils are proposed. The site is going to be entirely covered by buildings or hardstanding, which will break potential pathways between any underlying contaminants and future site users.

However, there is a potential for construction workers to come into contact with existing soils for a short interval whilst construction works are ongoing. Standard precautionary measures should be employed to reduce the potential for dermal contact and/or inhalation of dust or vapours, including maintaining good hygiene practises, and welfare facilities should also be provided for construction workers.

Based on the proposed end use of the site any chemical testing should be compared against current Soil Guideline Values for a commercial/industrial land use scenario when carrying out a Generic Quantitative Risk Assessment (GQRA) for human health purposes.

## 12.2. Potential Pathways

- Dermal contact (indoor and outdoor).
- Ingestion of soil and indoor dust.
- Indirect ingestion (indoor and outdoor).
- Inhalation of dust (indoor and outdoor).
- Inhalation of vapours (indoor and outdoor).
- Leaching to groundwater
- Surface water run-off.
- Direct contact with concrete substructures.
- Migration through the ground (vertical and horizontal).

## 12.3. On Site Contamination

The historic OS maps show the site to have been previously occupied by industrial buildings, with a subsequent **moderate to high** risk of potential contamination resulting from this usage.

No obvious visual or olfactory signs of potential contamination were identified during the intrusive investigation undertaken other than the presence of clinker in the made ground soils.

Based on the desk study information and findings of the intrusive fieldwork, undertaken the made ground was highlighted as the most likely source of any contamination. Chemical testing therefore focused on these soils, to determine the chemical suitability of the existing soils for reuse close to the surface should any soft landscaping areas be proposed.

Soil metals, polycyclic aromatic hydrocarbons (PAHs) and hydrocarbon testing, summarised on Tables 2A, 2B and 2C respectively in Appendix B, indicate that all values are below current GQRA threshold values for a commercial land use.

Asbestos fibres were detected in the made ground from two window sample boreholes: Chrysotile in WS01 at 1.00 m bgl, and Amosite in WS05 at 1.00 m bgl. Quantification testing was subsequently undertaken on these samples, and the results were found to be at or below the human health threshold value of 0.001% asbestos content, and therefore not considered to be of undue concern to human health receptors.

Care should be taken during excavation works for signs of potential asbestos fibres or asbestos containing materials (ACMs) given the historical industrial use of the site.

## 12.4. Off Site Contamination

With all chemical levels found to be below current GQRA threshold values. The risk of potential contamination from off-site sources is deemed to be **low** based on the available information.

## 12.5. Ground Gases

According to the Enviro Insight report the site is not within a radon affected area as defined by the Health Protection Agency (HPA) and radon protection measures are **not** required to be installed in any new buildings in accordance with Building Research Establishment (BRE) document BR211:2023.

Throughout the ground gas monitoring regime a peak methane (CH<sub>4</sub>) of 3.4% was recorded along with a peak carbon dioxide (CO<sub>2</sub>) of 2.7%, both in WS04 and both only for two rounds of monitoring. Due to these isolated methane results the monitoring programme was initially extended by a further three visits from the initially intended six post-investigation visits, with a three further readings undertaken in 2026, totalling 12 monitoring visits. See Table 3 in Appendix B.

No flow was recorded during any of the monitoring visits however for risk assessment purposes a nominal flow rate of 0.1 l/h has therefore been assumed for risk assessment, which is the limit of detection of the gas monitor used.

Using the design flow rate of 0.1 l/h and the highest recorded concentration of methane, a site wide Gas Screening Value (GSV) of 0.0034l/h has been adopted for ground gas risk assessment purposes.

In accordance with BS8485:2015 this equates to a **very low** risk from ground gases, within the limits of a Characteristic Situation 1 (CS1) classification, which would not require any special ground gas protection measures to be installed in any proposed new buildings.

Although the maximum recorded methane concentration exceeds 1%, which according to BS8485:2015 can allow consideration for upgrading the risk level to Characteristic Situation 2 (CS2), the methane was recorded as a short-term spike between the end of June 2025 and recommencement of the monitoring in mid-September 2025. No methane measurements were recorded prior to or following this period, indicating that the elevated values do not reflect a sustained or continuous risk. Furthermore, the ground conditions, historical data, and conceptual site model do not highlight a potential source of significant methane generation. It is also noted that carbon dioxide levels were increased in these two monitoring visits, as well as lower values of oxygen. The recorded concentrations are possibly due to varying standing water levels in WS04, which could have resulted in a pumping effect and either caused methane in the groundwater to come out of dissolution, or temporarily influenced methane occurrence by opening, blocking or displacing pathways within the ground. The methane would then likely become trapped at the top of the monitoring well.

Considering the proposed use as an industrial unit (Type D in accordance with BS 8485:2015), without any small or confined spaces, the overall risk from

methane is considered to be **very low**, and it is not considered to pose a potential risk to future site users.

As part of the scope of gas monitoring, Volatile Organic Compound (VOC) emissions were also monitored. No VOC's were recorded throughout the course of the monitoring works.

## **12.6. Invasive Species**

The vegetation in and around the site has been examined. No obvious signs of potential invasive plant species were noted during the site walkover undertaken. However, not seeing any signs of invasive plants during our brief time on site cannot be a guarantee that they are not present on or around the site.

## **12.7. Conceptual Site Model**

Using the information presented above and the **source - pathway - receptor** model, a Conceptual Site Model (CSM) has been formulated to determine whether a potentially significant pollutant linkage is perceivable and what potential risks are posed to the identified future receptor from each potential contaminant source.

The CSM is tabulated and shown graphically in Appendix E. Where required the CSM should be updated as further investigation and/or development works progress to reflect the potential risks to future receptors, especially if any previously unidentified ground conditions are encountered.

## **12.8. Remediation Requirements**

Based on the proposed development, which will be entirely covered by buildings or hardstanding, there will not be any potential pathways between future site users and the underlying soils. Accordingly no remediation measures are necessary.

From the ground gas monitoring data obtained it is not considered that any special gas protection measures need to be incorporated into the design of the proposed industrial unit. The proposed use of the building will not include any confined spaces at ground floor level, and the presence of a ground bearing floor slab will provide a structural barrier to reduce the ingress of ground gases into the extension.

## **12.9. Imported Soils**

If any imported soils were required to be brought to site for use in any soft landscaping areas they would need to be validated to confirm their chemical suitability, and that they do not pose a risk to future receptors. The soils should be validated in accordance with Yorkshire And Lincolnshire Pollution Advisory Group (YALPAG) guidance "*Verification Requirements for Cover Systems*" version 4.1, dated June 2021.

The scope and frequency of analysis required to validate any imported soils would be dependent on the source and/or historical setting of the source site and the volume of soils imported to site.

### **13. WASTE DISPOSAL**

Any waste arising from development of the site, such as excess soil or material deemed unsuitable for retention on site, should be disposed of in accordance with the Duty of Care Regulations. If any soils are being disposed directly to a landfill site Waste Acceptance Criteria (WAC) analysis may be required in addition to the environmental screen testing undertaken, to determine the most appropriate disposal facility for the waste, in accordance with the requirements of the current Landfill Directive.

### **14. REGULATORY APPROVAL**

The conclusions and recommendations in this report are based on a review of available information and observations made during the site walkover survey undertaken. The conclusions cannot be guaranteed to gain regulatory approval if this report is required as part of a planning application. If it is required as such it should be passed to the relevant regulatory bodies for their comment and approval

### **15. FURTHER INVESTIGATION**

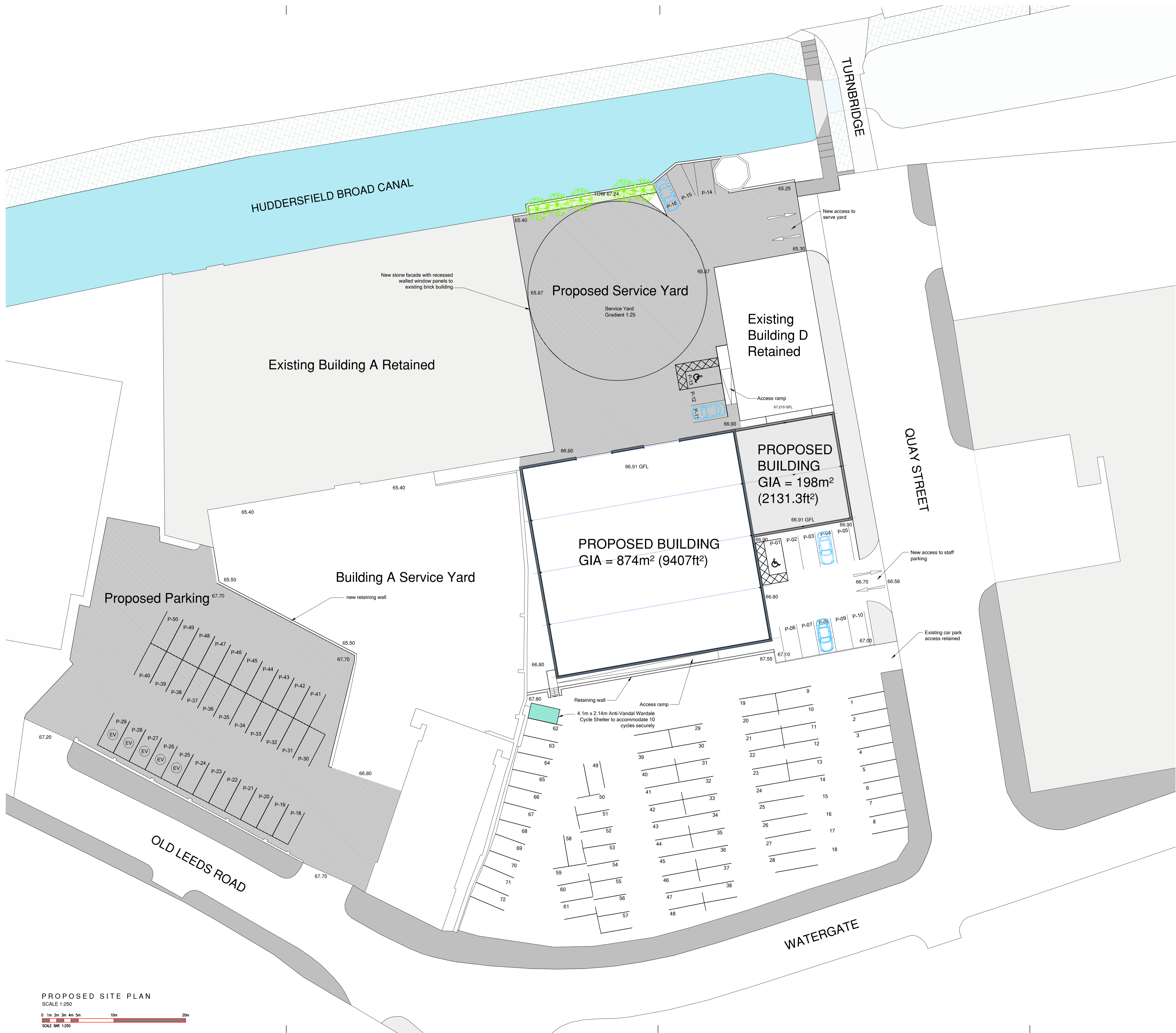
Based on the findings of the Phase 2 Ground Investigation it is not considered that any further investigation or assessment is needed prior to the proposed redevelopment of the site for geo-environmental purposes.

If any unexpected ground conditions or signs of potential unidentified contamination are encountered during earthworks then further geo-environmental advice should be sought and any additional risk assessment undertaken as required to assess the potential risks to future receptors.

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**Report 25072-GI-2 | March 2026**

# APPENDIX A - PROPOSED LAYOUT DRAWINGS



**PROPOSED SITE PLAN**  
SCALE 1:250

0 1m 2m 3m 4m 5m 10m 20m  
SCALE BAR 1:250

Rev	Note	Initial	Date
E	Spot levels added	TDJ	25.05.15
D	Scale bar updated	TDJ	25.05.06
C	Access ramp, EV charging, bike shelter and walkway added	CS	25.02.24
B	Boundary Updated	TDJ	25.02.04
A	Parking Updated	TDJ	25.01.15



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Client  
**JLB Group**

Project  
**Turnbridge Mills  
Quay Street  
Huddersfield**

Drawing  
**Proposed Site Plan**

Date	Drawn	Checked	Scale
Sep 2024	CS	TDJ	1:250@A1
Drwg. No.	Revision		
1908 205	E		

Drawings are to scale indicated for planning purposes. No scaling permitted for construction purposes. Information on this drawing is copyright. All rights reserved. No part of this work may be reproduced or transmitted in any form by any means, either electronically, mechanically, by photocopying, recording or otherwise stored in any retrieval system of any nature, without the express consent of T D Jagger Ltd.

Don't Ignore Health & Safety

It Might Just Save Your Life

## **APPENDIX B - TESTING SUMMARY TABLES**

Exploratory Hole	Depth (m bgl)	Moisture Content (%)	Liquid Limit - LL (%)	Plastic Limit - PL (%)	Plasticity Index - IP (%)	Passing 0.425mm (%)	Modified Plasticity - IP' (%)	PSD D <sub>60</sub>	PSD D <sub>10</sub>	Dry Density (Mg/m <sup>3</sup> )	Bulk Density (Mg/m <sup>3</sup> )
WS01	4.00	11.0	45	25	20.0	96	19.2				
WS02	2.00	18.8									
WS02	3.00	20.2									
WS02	4.00	17.3									
WS02	4.80	22.8									
WS03	4.00	21.2									
WS04	3.00	38.2	36	21	15.0	92	13.8				
WS04	4.00	30.9									
WS04	5.00	23.1									
WS06	3.00	52.0									
WS06	4.00	23.4	35	23	12.0	94	11.28				
WS06	5.00	27.0									
WS07	2.00	17.1	28	18	10.0	70	7				
WS07	3.00	11.6									
WS07	4.00	19.6									



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### GEOTECHNICAL RESULTS SUMMARY

Site: Turnbridge Mill, Quay Street, Huddersfield  
Project #: 25072  
Client: T D Jagger

**TABLE 1**







Exploratory Hole	Date	Flow Rate (l/h)	Methane Peak CH <sub>4</sub> (%)	Carbon Monoxide CO (ppm)	Hydrogen Sulphide H <sub>2</sub> S (%)	Carbon Dioxide CO <sub>2</sub> (%)	Oxygen O <sub>2</sub> (%)	VOCs (ppm)	Water Level (m bgl)	Pressure (mbars)	Pressure Rise/Fall/Steady	Remarks
WS01	25/06/2025	0.00	0.0	0.0	0.00	0.0	19.4	0.0	3.53	1005	S	Sunny
WS01	03/06/2025	0.00	0.0	0.0	0.00	0.4	18.6	0.0	3.14	1021	S	Overcast
WS01	09/06/2025	0.00	0.0	0.0	0.00	0.3	18.7	0.0	2.55	1015	S	Sunny
WS01	14/06/2025	0.00	0.0	0.0	0.00	0.5	18.3	0.0	2.59	1003	S	Cloudy
WS01	24/06/2025	0.00	0.0	0.0	0.00	0.2	18.4	0.0	2.58	1017	S	Sunny
WS01	30/06/2025	0.00	0.0	0.0	0.00	0.5	18.3	0.0	2.54	1010	S	Sunny
WS01	17/09/2025	0.00	0.0	0.0	0.00	0.0	18.3	0.0	2.75	1001	S	Raining
WS01	22/09/2025	0.00	0.0	0.0	0.00	0.0	18.4	0.0	2.20	1022	S	Sunny
WS01	06/10/2025	0.00	0.0	0.0	0.00	0.0	18.7	0.0	2.48	1016	S	Sunny
WS01	21/01/2026	0.00	0.0	0.0	0.00	0.0	20.1	0.0	2.20	979	F	Overcast, 7°C
WS01	28/01/2026	0.00	0.0	0.0	0.00	0.2	21.6	0.0	2.21	984	F	Sunny, 7°C
WS01	06/02/2026	0.00	0.0	0.0	0.00	0.3	21.2	0.0	2.57	979	F	Raining, 5°C



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NR = Not Recorded

**GAS MONITORING RESULTS - WS01**

Site: Turnbridge Mill, Quay Street,  
Project #: 25072  
Client: T D Jagger

**TABLE 3**

Exploratory Hole	Date	Flow Rate (l/h)	Methane Peak CH <sub>4</sub> (%)	Carbon Monoxide CO (ppm)	Hydrogen Sulphide H <sub>2</sub> S (%)	Carbon Dioxide CO <sub>2</sub> (%)	Oxygen O <sub>2</sub> (%)	VOCs (ppm)	Water Level (m bgl)	Pressure (mbars)	Pressure Rise/Fall/Steady	Remarks
WS04	25/06/2025	0.00	0.7	0.0	0.0	0.5	17.6	0.0	3.67	1005	S	Sunny
WS04	03/06/2025	0.00	0.0	0.0	0.0	0.9	18.4	0.0	3.75	1021	S	Overcast
WS04	09/06/2025	0.00	0.0	0.0	0.0	0.8	18.6	0.0	3.65	1015	S	Sunny
WS04	14/06/2025	0.00	0.0	0.0	0.0	0.9	18.1	0.0	3.62	1003	S	Cloudy
WS04	24/06/2025	0.00	0.0	0.0	0.0	0.6	18.2	0.0	3.52	1017	S	Sunny
WS04	30/06/2025	0.00	3.4	0.0	0.0	2.7	12.9	0.0	3.60	1010	S	Sunny
WS04	17/09/2025	0.00	3.4	0.0	0.0	2.3	12.8	0.0	3.26	1001	S	Raining
WS04	22/09/2025	0.00	0.0	0.0	0.0	0.8	16.7	0.0	3.08	1022	S	Sunny
WS04	06/10/2025	0.00	0.0	0.0	0.0	0.0	17.4	0.0	3.45	1016	S	Sunny
WS04	21/01/2026	0.00	0.0	0.0	0.0	1.1	19.2	0.0	3.19	978	F	Overcast, 7°C
WS04	28/01/2026	0.00	0.0	0.0	0.0	1.1	20.8	0.0	2.80	984	F	Sunny, 7°C
WS04	06/02/2026	0.00	0.0	0.0	0.0	1.0	20.7	0.0	2.82	978	F	Raining, 5°C



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NR = Not Recorded

**GAS MONITORING RESULTS - WS04**

Site: Turnbridge Mill, Quay Street,  
Project #: 25072  
Client: T D Jagger

**TABLE 3**

Exploratory Hole	Date	Flow Rate (l/h)	Methane Peak CH <sub>4</sub> (%)	Carbon Monoxide CO (ppm)	Hydrogen Sulphide H <sub>2</sub> S (%)	Carbon Dioxide CO <sub>2</sub> (%)	Oxygen O <sub>2</sub> (%)	VOCs (ppm)	Water Level (m bgl)	Pressure (mbars)	Pressure Rise/Fall/Steady	Remarks
WS05	25/06/2025	0.00	0.0	0.0	0.0	0.8	17.6	0.0	3.44	1005	S	Sunny
WS05	03/06/2025	0.00	0.0	0.0	0.0	2.1	16.8	0.0	3.53	1021	S	Overcast
WS05	09/06/2025	0.00	0.0	0.0	0.0	1.8	16.9	0.0	3.48	1015	S	Sunny
WS05	14/06/2025	0.00	0.0	0.0	0.0	2.2	15.5	0.0	3.44	1003	S	Cloudy
WS05	24/06/2025	0.00	0.0	0.0	0.0	1.6	15.7	0.0	3.36	1017	S	Sunny
WS05	30/06/2025	0.00	0.0	0.0	0.0	2.1	15.9	0.0	3.33	1010	S	Sunny
WS05	17/09/2025	0.00	0.0	0.0	0.0	1.2	16.8	0.0	3.32	1001	S	Raining
WS05	22/09/2025	0.00	0.0	0.0	0.0	1.2	17.2	0.0	3.48	1022	S	Sunny
WS05	06/10/2025	0.00	0.0	0.0	0.0	0.8	17.4	0.0	3.45	1016	S	Sunny
WS05	21/01/2026	0.00	0.0	0.0	0.0	1.4	19.1	0.0	3.45	979	F	Overcast, 7°C
WS05	28/01/2026	0.00	0.0	0.0	0.0	1.3	20.4	0.0	3.44	984	F	Sunny, 7°C
WS05	06/02/2026	0.00	0.0	0.0	0.0	1.4	20.0	0.0	3.45	979	F	Raining, 5°C

NR = Not Recorded

**GAS MONITORING RESULTS - WS05**

Site: Turnbridge Mill, Quay Street,  
 Project #: 25072  
 Client: T D Jagger



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**TABLE 3**

Exploratory Hole	Date	Flow Rate (l/h)	Methane Peak CH <sub>4</sub> (%)	Carbon Monoxide CO (ppm)	Hydrogen Sulphide H <sub>2</sub> S (%)	Carbon Dioxide CO <sub>2</sub> (%)	Oxygen O <sub>2</sub> (%)	VOCs (ppm)	Water Level (m bgl)	Pressure (mbars)	Pressure Rise/Fall/Steady	Remarks
WS07	25/06/2025	0.00	0.0	0.0	0.0	0	18.9	0.0	1.20	1005	S	Sunny
WS07	03/06/2025	0.00	0.0	0.0	0.0	0	18.5	0.0	1.22	1021	S	Overcast
WS07	09/06/2025	0.00	0.0	0.0	0.0	0.5	17.6	0.0	1.20	1015	S	Sunny
WS07	14/06/2025	0.00	0.0	0.0	0.0	0	17.9	0.0	1.21	1003	S	Cloudy
WS07	24/06/2025	0.00	0.0	0.0	0.0	0.2	18.1	0.0	1.20	1017	S	Sunny
WS07	30/06/2025	0.00	0.0	0.0	0.0	0.8	16.4	0.0	1.19	1010	S	Sunny
WS07	17/09/2025	0.00	0.0	0.0	0.0	0.4	16.9	0.0	1.21	1001	S	Raining
WS07	22/09/2025	0.00	0.0	0.0	0.0	0.3	17.8	0.0	1.22	1022	S	Sunny
WS07	06/10/2025	0.00	0.0	0.0	0.0	0.3	18.1	0.0	1.22	1016	S	Sunny
WS07	21/01/2026	0.00	0.0	0.0	0.0	0.6	20.2	0.0	1.18	978	F	Overcast, 7°C
WS07	28/01/2026	0.00	0.0	0.0	0.0	1.7	21.2	0.0	1.17	984	F	Sunny, 7°C
WS07	06/02/2026	0.00	0.0	0.0	0.0	1.7	20.9	0.0	1.18	977	F	Raining, 5°C



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NR = Not Recorded

**GAS MONITORING RESULTS - WS07**

Site: Turnbridge Mill, Quay Street,  
Project #: 25072  
Client: T D Jagger

**TABLE 3**

# APPENDIX C - EXPLORATORY HOLE LOGS



# Window Sampler

# WS01

Sheet 1 of 1

<b>Hole Type</b> WS	<b>Easting</b> 414871.00	<b>Northing</b> 416864.00	<b>Ground Level (m)</b> 67.00	<b>Scale</b> 1:50
<b>Project Name</b> Turnbridge Mill	<b>Project No.</b> 25072	<b>Start Date</b> 2025-19-06	<b>End Date</b> 2025-19-06	

<b>Client</b> TD Jagger	<b>Consultant</b> Noman Abbas	<b>Contractor</b> RP Drilling
----------------------------	----------------------------------	----------------------------------

Inst/ Backfill	Water Levels	Samples and Tests			Level (m)	Depth (m) <small>(Thickness)</small>	Strata	
		Depth (m)	Type/ Ref	Results			Legend	Description
		0.40	ES		66.92	(0.08) 0.08		CONCRETE Grey CONCRETE. No reinforcement bar is present. (0.00 - 0.08m)
		1.00 1.00	SPT ES	N=11 (2,3/3,3,2,3)	66.00	(0.92) 1.00		MADE GROUND MADE GROUND: Brown grey sandy gravelly clay. Gravel is medium to coarse angular to sub-angular of brick, glass and sandstone. (0.08 - 1.00m)
		2.00 2.00	SPT ES	N=8 (8,4/2,2,2,2)		(2.40)		MADE GROUND MADE GROUND: Black sandy gravelly clay. Gravel is medium to coarse angular to sub-angular of brick, tarmac and sandstone. (1.00 - 3.40m)
		3.00 3.00	SPT D	N=5 (1,1/1,1,1,2)				
		4.00	SPT	N=50 for 265mm (6,6/10,16,14,10 for 40mm)	63.60	(1.02) 3.40		Sandy gravelly CLAY Stiff brown sandy gravelly CLAY. Gravel is fine to medium angular to sub-angular of sandstone. (3.40 - 4.42m)
		4.00	D		62.58	4.42		End of Borehole at 4.42m

<b>Remarks</b> CAT Used to check for services. No groundwater encountered . Monitoring pipe installed at 4.00m bgl.	<b>Method, Plant, Stability, Dimensions</b> 0.00 - 4.42m WS Archway Competitor tracked Stable	<b>Logger</b> NA
--	---	---------------------

Checked By: Checker Approved By: Approver



# Window Sampler

## WS02

Sheet 1 of 1

<b>Hole Type</b> WS	<b>Easting</b> 414870.00	<b>Northing</b> 416867.00	<b>Ground Level (m)</b> 65.00	<b>Scale</b> 1:50
<b>Project Name</b> Turnbridge Mill	<b>Project No.</b> 25072	<b>Start Date</b> 2025-20-06	<b>End Date</b> 2025-20-06	

<b>Client</b> TD Jagger	<b>Consultant</b> Noman Abbas	<b>Contractor</b> RP Drilling
----------------------------	----------------------------------	----------------------------------

Inst/ Backfill	Water Levels	Samples and Tests			Level (m)	Depth (m) <small>(Thickness)</small>	Strata	
		Depth (m)	Type/ Ref	Results			Legend	Description
		0.40	ES		64.93	(0.07) 0.07		CONCRETE <i>Grey CONCRETE. No reinforcement bar is present. (0.00 - 0.07m)</i>
		1.00 1.00	SPT ES	N=3 (0,0/0,1,1,1)		(1.43)		MADE GROUND <i>MADE GROUND: Black sandy very gravelly clay. Gravel is medium to coarse angular to sub-angular of brick, tarmac and sandstone. (0.07 - 1.50m)</i>
		2.00 2.00	SPT ES	N=20 (2,3/3,5,5,7)		63.50 (1.50)		MADE GROUND <i>MADE GROUND: Black grey sandy gravelly clay. Gravel is medium to coarse angular to sub-angular of tarmac and sandstone. (1.50 - 3.00m)</i>
		3.00 3.00	SPT ES	N=26 (12,8/6,6,6,8)		62.00 (1.50)		Sandy gravelly CLAY <i>POSSIBLE MADE GROUND: Black grey sandy gravelly clay. Gravel is fine to medium angular to sub-angular of sandstone. (3.00 - 4.50m)</i>
		4.00 4.00	SPT ES	N=22 (2,3/4,4,7,7)		60.50 (0.50)		COAL <i>Black very weak weathered COAL. (4.50 - 4.86m)</i>
		4.80	SPT	N=50 for 10mm (25 for 50mm/50 for 10mm)		60.00	5.00	
		4.80	ES					

<b>Remarks</b> CAT Used to check for services. Groundwater encountered at 3.00m bgl. Backfilled with arisings on completion.	<b>Method, Plant, Stability, Dimensions</b> 0.00 - 4.90m WS Archway Competitor tracked Stable	<b>Logger</b> NA
---	---	---------------------

Checked By: Checker Approved By: Approver



# Window Sampler

## WS03

Sheet 1 of 1

<b>Hole Type</b> WS	<b>Easting</b> 414877.00	<b>Northing</b> 416867.00	<b>Ground Level (m)</b> 65.00	<b>Scale</b> 1:50
<b>Project Name</b> Turnbridge Mill	<b>Project No.</b> 25072	<b>Start Date</b> 2025-20-06	<b>End Date</b> 2025-20-06	

<b>Client</b> TD Jagger	<b>Consultant</b> Noman Abbas	<b>Contractor</b> RP Drilling
----------------------------	----------------------------------	----------------------------------

Inst/ Backfill	Water Levels	Samples and Tests			Level (m)	Depth (m) <small>(Thickness)</small>	Strata	
		Depth (m)	Type/ Ref	Results			Legend	Description
		0.40	ES		64.87	0.13 0.13		<b>CONCRETE</b> Grey CONCRETE. No reinforcement bar is present. (0.00 - 0.13m)
		1.00 1.00	SPT ES	N=7 (1,1/1,2,2,2)		(1.87)		<b>MADE GROUND</b> MADE GROUND: Dark grey black sandy very gravelly clay. Gravel is medium to coarse angular to sub-angular of brick, tarmac and sandstone. Hydrocarbon odors noted. (0.13 - 2.00m)
		2.00 2.00	SPT ES	N=4 (1,2/1,1,1,1)	63.00	2.00		<b>Silty gravelly CLAY</b> Stiff dark grey sandy gravelly CLAY. Gravel is fine to medium angular to sub-angular of sandstone. (2.00 - 4.45m)
		3.00 3.00	SPT D	N=5 (2,1/1,1,1,2)		(2.45)		
		4.00 4.00	SPT D	N=32 (6,6/5,8,10,9)				
					60.55	4.45		End of Borehole at 4.45m

<b>Remarks</b> CAT Used to check for services. No groundwater encountered. Backfilled with arisings on completion.	<b>Method, Plant, Stability, Dimensions</b> 0.00 - 4.45m    WS Archway Competitor tracked Stable	<b>Logger</b> NA
	<b>Checked By:</b> Checker <b>Approved By:</b> Approver	



# Window Sampler

# WS04

Sheet 1 of 1

<b>Hole Type</b> WS	<b>Easting</b> 414894.00	<b>Northing</b> 416867.00	<b>Ground Level (m)</b> 65.00	<b>Scale</b> 1:50
<b>Project Name</b> Turnbridge Mill	<b>Project No.</b> 25072		<b>Start Date</b> 2025-19-06	<b>End Date</b> 2025-19-06

<b>Client</b> TD Jagger	<b>Consultant</b> Noman Abbas	<b>Contractor</b> RP Drilling
----------------------------	----------------------------------	----------------------------------

Inst/ Backfill	Water Levels	Samples and Tests			Level (m)	Depth (m) <small>(Thickness)</small>	Strata	
		Depth (m)	Type/ Ref	Results			Legend	Description
		0.40	ES		64.72	(0.28) 0.28	CONCRETE	Grey CONCRETE. Reinforcement bar is present at 0.12m bgl. (0.00 - 0.28m)
		1.00 1.00	SPT ES	N=6 (0,1/2,2,1,1)		(1.72)	MADE GROUND	MADE GROUND: Dark grey black sandy very gravelly clay. Gravel is medium to coarse angular to sub-angular of brick, tarmac and sandstone. (0.28 - 2.00m)
		2.00 2.00	SPT ES	N=5 (1,2/1,1,1,2)	63.00	2.00	Sandy gravelly CLAY	Red grey slightly sandy gravelly CLAY. Gravel is fine to medium angular to sub-angular of sandstone. (2.00 - 5.45m)
		3.00 3.00	SPT ES	N=0 (0,0/0,0,0,0)		(3.45)		
		4.00 4.00	SPT D	N=19 (1,1/3,6,5,5)				
		5.00 5.00	SPT D	N=16 (2,2/4,4,4,4)	59.55	5.45		
							End of Borehole at 5.45m	

<b>Remarks</b> CAT Used to check for services. No groundwater encountered . Monitoring pipe installed at 5.00m bgl.	<b>Method, Plant, Stability, Dimensions</b> 0.00 - 5.45m WS Archway Competitor tracked Stable	<b>Logger</b> NA
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Checked By: Checker    Approved By: Approver



# Window Sampler

## WS05

Sheet 1 of 1

<b>Hole Type</b> WS	<b>Easting</b> 414868.00	<b>Northing</b> 416836.00	<b>Ground Level (m)</b> 67.00	<b>Scale</b> 1:50
<b>Project Name</b> Turnbridge Mill	<b>Project No.</b> 25072	<b>Start Date</b> 2025-19-06	<b>End Date</b> 2025-19-06	

<b>Client</b> TD Jagger	<b>Consultant</b> Noman Abbas	<b>Contractor</b> RP Drilling
----------------------------	----------------------------------	----------------------------------

Inst/ Backfill	Water Levels	Samples and Tests			Level (m)	Depth (m) <small>(Thickness)</small>	Strata	
		Depth (m)	Type/ Ref	Results			Legend	Description
		0.40	ES		66.95	0.05 0.05	CONCRETE	Grey CONCRETE. No reinforcement bar is present. (0.00 - 0.05m)
		1.00 1.00	SPT ES	N=20 (4,5/6,6,4,4)		(1.95)	MADE GROUND	MADE GROUND: Dark grey black sandy very gravelly clay. Gravel is medium to coarse angular to sub-angular of brick, tarmac and sandstone. (0.05 - 2.00m)
		2.00 2.00	SPT ES	N=4 (1,1/1,1,1,1)	65.00	2.00	MADE GROUND	MADE GROUND: Brown grey sandy gravelly clay. Gravel is medium to coarse angular to sub-angular of brick, glass and sandstone. (2.00 - 4.00m)
		3.00 3.00	SPT ES	N=18 (1,3/7,2,2,7)		(2.00)		
		4.00 4.00	SPT ES	N=13 (5,3/3,3,3,4)	63.00	4.00	MADE GROUND	MADE GROUND: Dark grey black sandy very gravelly clay. Gravel is medium to coarse angular to sub-angular of glass and sandstone. (4.00 - 5.45m)
		5.00 5.00	SPT ES	N=13 (2,3/3,3,3,4)		(1.45)		
					61.55	5.45	End of Borehole at 5.45m	

<b>Remarks</b> CAT Used to check for services. Groundwater encountered at 3.00m bgl. Monitoring pipe installed at 5.00m bgl.	<b>Method, Plant, Stability, Dimensions</b> 0.00 - 5.45m WS Archway Competitor tracked Stable	<b>Logger</b> NA
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Checked By: Checker Approved By: Approver



# Window Sampler

## WS06

Sheet 1 of 1

<b>Hole Type</b> WS	<b>Easting</b> 414895.00	<b>Northing</b> 416852.00	<b>Ground Level (m)</b> 66.00	<b>Scale</b> 1:50
<b>Project Name</b> Turnbridge Mill	<b>Project No.</b> 25072	<b>Start Date</b> 2025-19-06	<b>End Date</b> 2025-19-06	

<b>Client</b> TD Jagger	<b>Consultant</b> Noman Abbas	<b>Contractor</b> RP Drilling
----------------------------	----------------------------------	----------------------------------

Inst/ Backfill	Water Levels	Samples and Tests			Level (m)	Depth (m)	Strata	
		Depth (m)	Type/ Ref	Results			Legend	Description
		0.40	ES		65.76	(0.24) 0.24		<b>CONCRETE</b> Grey CONCRETE. No reinforcement bar is present. (0.00 - 0.24m)
		1.00 1.00	SPT ES	N=4 (1,2/1,1,1,1)		(1.76)		<b>MADE GROUND</b> MADE GROUND: Dark brown grey sandy very gravelly clay. Gravel is fine to medium angular to sub-angular of brick, clinker, tarmac and sandstone. (0.24 - 2.00m)
		2.00 2.00	SPT ES	N=4 (1,1/1,1,1,1)	64.00	2.00		<b>MADE GROUND</b> MADE GROUND: Black slightly sandy gravelly clay. Gravel is fine angular to sub-angular of Brock (2.00 - 3.50m)
		3.00 3.00	SPT ES	N=7 (1,1/2,1,2,2)		(1.50)		
		4.00 4.00	SPT D	N=27 (1,1/2,5,8,12)	62.50	3.50		<b>Sandy gravelly CLAY</b> Stiff Dark grey sandy gravelly CLAY. Gravel is medium to coarse angular to sun-angular of sandstone. (3.50 - 5.45m)
		5.00 5.00	SPT D	N=13 (3,2/3,3,3,4)		(1.95)		
				60.55	5.45			End of Borehole at 5.45m

<b>Remarks</b> CAT Used to check for services. No groundwater encountered. Backfilled with arisings on completion.	<b>Method, Plant, Stability, Dimensions</b> 0.00 - 5.45m WS Archway Competitor tracked Stable	<b>Logger</b> NA
	<b>Checked By:</b> Checker <b>Approved By:</b> Approver	



# Window Sampler

## WS07

Sheet 1 of 1

<b>Hole Type</b> WS	<b>Easting</b> 414872.00	<b>Northing</b> 416890.00	<b>Ground Level (m)</b> 65.00	<b>Scale</b> 1:50
<b>Project Name</b> Turnbridge Mill	<b>Project No.</b> 25072	<b>Start Date</b> 2025-20-06	<b>End Date</b> 2025-20-06	

<b>Client</b> TD Jagger	<b>Consultant</b> Noman Abbas	<b>Contractor</b> RP Drilling
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Inst/ Backfill	Water Levels	Samples and Tests			Level (m)	Depth (m) <small>(Thickness)</small>	Strata	
		Depth (m)	Type/ Ref	Results			Legend	Description
		0.40	ES		64.97	0.03		<b>CONCRETE</b> Grey CONCRETE. No reinforcement bar is present. (0.00 - 0.03m)
		1.00	SPT ES	N=13 (10,0/8,3,1,1)		(1.47)		<b>MADE GROUND</b> MADE GROUND: Black grey sandy gravelly clay. Gravel is medium to coarse angular to sub-angular of tarmac, clinker, brick and sandstone. (0.03 - 1.50m)
		2.00	SPT ES	N=22 (3,4/4,6,6,6)		(1.50)		<b>Sandy gravelly CLAY</b> Firm to stiff brown grey sandy gravelly CLAY. Gravel is medium to coarse angular to sub-angular of sandstone (1.50 - 3.00m)
		3.00	SPT ES	N=18 (4,6/4,4,4,6)		(1.45)		<b>Sandy gravelly CLAY</b> Firm to stiff brown grey sandy gravelly CLAY. Gravel is medium to coarse angular to sub-angular of sandstone (3.00 - 4.45m)
		4.00	SPT	N=50 for 295mm (6,12/12,14,12,12 for 70mm)		(1.45)		
		4.00	D		60.55	4.45		End of Borehole at 4.45m

<b>Remarks</b> CAT Used to check for services. Groundwater encountered at 4.00m bgl. Monitoring pipe installed at 4.00m bgl.	<b>Method, Plant, Stability, Dimensions</b> 0.00 - 4.45m WS Archway Competitor tracked Stable	<b>Logger</b> NA
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Checked By: Checker Approved By: Approver

## **APPENDIX D - LABORATORY TESTING RESULTS**



# LABORATORY REPORT



**Contract Number: PSL25/4828**

Report Date: 25 July 2025  
Client's Reference: 25072-4476  
Client Name: Abbeydale BEC  
4 Neville Street  
Wakefield  
WF1 5EF

**For the attention of: Noman Abbas**

Contract Title: Turnbridge Mill, Quay Street, Huddersfield  
Date Received: 30/06/2025  
Date Commenced: 30/06/2025  
Date Completed: 25/07/2025

**Notes: Opinions and Interpretations are outside the UKAS Accreditation**

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. 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 other than in full, without the prior written approval of the laboratory.


Checked and Approved Signatories:

A Watkins  
(Managing Director)

R Berriman  
(Associate Director)

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(Laboratory Manager)

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Page 1 of

# SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
WS01		D	4.00		Brown slightly sandy slightly gravelly CLAY.
WS02		D	2.00		Brown slightly gravelly sandy CLAY.
WS02		D	3.00		Brown slightly gravelly sandy CLAY.
WS02		D	4.00		Grey slightly gravelly slightly sandy CLAY.
WS02		D	4.80		Brown slightly gravelly sandy CLAY.
WS03		D	4.00		Brown slightly gravelly sandy CLAY.
WS04		D	3.00		Brown mottled grey slightly sandy slightly gravelly CLAY.
WS04		D	4.00		Brown slightly gravelly sandy CLAY.
WS04		D	5.00		Grey slightly gravelly slightly sandy CLAY.
WS06		D	3.00		Brown slightly gravelly sandy CLAY.
WS06		D	4.00		Brown mottled grey slightly sandy slightly gravelly CLAY.
WS06		D	5.00		Brown mottled grey slightly gravelly sandy CLAY.
WS07		D	2.00		Brown sandy slightly gravelly CLAY.
WS07		D	3.00		Brown slightly gravelly very sandy CLAY.
WS07		D	4.00		Brown slightly gravelly sandy CLAY.



Turnbridge Mill, Quay Street, Huddersfield

**Contract No:**

**PSL25/4828**

**Client Ref:**

**25072-4476**

# SUMMARY OF SOIL CLASSIFICATION TESTS

BS 1377 - Part 2 : 2022 in accordance with BS EN ISO 17892 (as below)

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Water Content %	Linear Shrinkage	Particle Density Mg/m <sup>3</sup>	Liquid Limit %	Plastic Limit %	Plasticity Index %	Passing 0.425mm %	Remarks
WS01		D	4.00		11.0			45	25	20	96	Medium Plasticity CIM
WS02		D	2.00		18.8							
WS02		D	3.00		20.2							
WS02		D	4.00		17.3							
WS02		D	4.80		22.8							
WS03		D	4.00		21.2							
WS04		D	3.00		38.2			36	21	15	92	Medium Plasticity CIM
WS04		D	4.00		30.9							
WS04		D	5.00		23.1							
WS06		D	3.00		52.0							
WS06		D	4.00		23.4			35	23	12	94	Medium Plasticity CIM
WS06		D	5.00		27.0							
WS07		D	2.00		17.1			28	18	10	70	Low Plasticity CIL
WS07		D	3.00		11.6							
WS07		D	4.00		19.6							

Water Content - BS 1377 - Part 2 : 2022 : Clause 4 in accordance with BS EN ISO 17892 - 1 : 2014 + A1 : 2022

Linear Shrinkage - BS 1377 - Part 2 : 2022 : Clause 7

Particle Density (Gas Jar method) - BS 1377 - Part 2 : 2022 : Clause 9

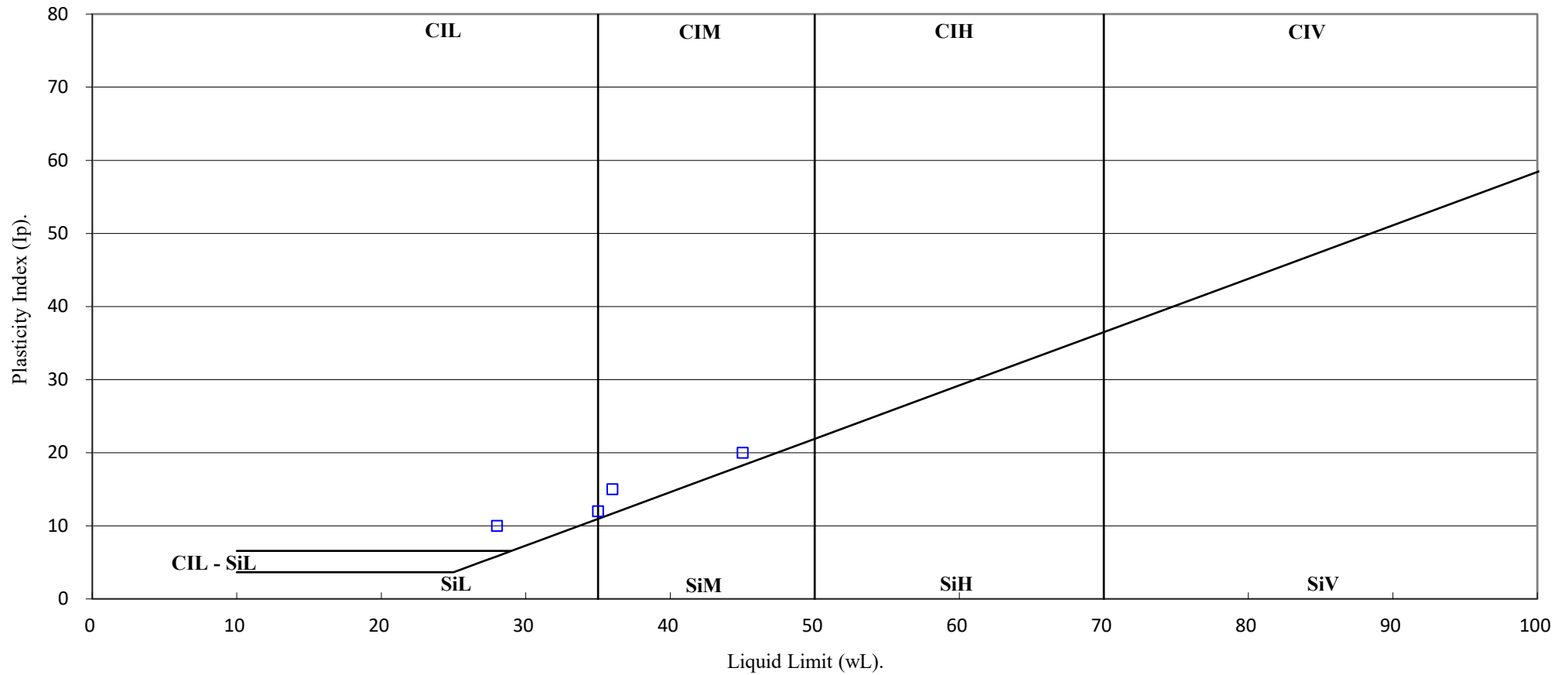
Liquid, Plastic Limit & Plasticity Index - BS 1377 - Part 2 : 2022 : Clause 5 & 6 in accordance with BS EN ISO 17892 - 12 : 2018 + A2 : 2022

**SYMBOLS : NP = Non Plastic**

		<p style="font-size: 1.2em; margin: 0;">Turnbridge Mill, Quay Street, Huddersfield</p>	<b>Contract No:</b>
			PSL25/4828
			<b>Client Ref:</b>
			25072-4476

# PLASTICITY CHART

BS EN ISO 14688-2:2017 Clause 4.4



Turnbridge Mill, Quay Street, Huddersfield

Contract No:

PSL25/4828

Client Ref:

25072-4476



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## **Analytical Report Number : 25-033356**

Replaces Analytical Report Number: 25-033356, issue no. 1

Additional analysis undertaken.

Asbestos Quantification added to Samples 592758 & 592761 as per Clients Request.

<b>Project / Site name:</b>	Turnbridge Mill, Quay Street, Huddersfield	<b>Samples received on:</b>	24/06/2025
<b>Your job number:</b>	25072	<b>Samples instructed on/ Analysis started on:</b>	24/06/2025
<b>Your order number:</b>	4475	<b>Analysis completed by:</b>	07/08/2025
<b>Report Issue Number:</b>	2	<b>Report issued on:</b>	08/08/2025
<b>Samples Analysed:</b>	6 soil samples		

**Signed:**

Charlotte Hall  
Customer Service Advisor  
**For & on behalf of i2 Analytical Ltd.**

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

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

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

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

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

Retention period for records and reports is minimum 6 years from the date of issue of the final report.

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

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

Analytical Report Number: 25-033356  
 Project / Site name: Turnbridge Mill, Quay Street, Huddersfield  
 Your Order No: 4475

Lab Sample Number	592758	592759	592760	592761	592762			
Sample Reference	WS01	WS03	WS04	WS05	WS06			
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied			
Water Matrix	N/A	N/A	N/A	N/A	N/A			
Depth (m)	1.00	2.00	1.00	1.00	2.00			
Date Sampled	19/06/2025	20/06/2025	19/06/2025	19/06/2025	19/06/2025			
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status					

Stone Content	%	0.1	NONE	53.7	< 0.1	36.3	56.5	< 0.1
Moisture Content	%	0.01	NONE	9.9	23	14	8	18
Total mass of sample received	kg	0.1	NONE	0.9	0.9	0.9	0.9	0.9

#### Asbestos

Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Detected	Not-detected	Not-detected	Detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	DSO	DSO	DSO	DSO	DSO
Analysis completed	N/A	N/A	N/A	03/07/2025	03/07/2025	03/07/2025	03/07/2025	03/07/2025
Actinolite detected	Type	N/A	ISO 17025	Not-detected	-	-	Not-detected	-
Amosite detected	Type	N/A	ISO 17025	Not-detected	-	-	Detected	-
Anthophyllite detected	Type	N/A	ISO 17025	Not-detected	-	-	Not-detected	-
Chrysotile detected	Type	N/A	ISO 17025	Detected	-	-	Not-detected	-
Crocidolite detected	Type	N/A	ISO 17025	Not-detected	-	-	Not-detected	-
Tremolite detected	Type	N/A	ISO 17025	Not-detected	-	-	Not-detected	-

Asbestos % by hand picking/weighing	%	0.001	ISO 17025	< 0.001	-	-	0.001	-
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Asbestos Containing Material Types Detected (ACM)	Type	N/A	ISO 17025	Loose Fibres	-	-	Loose Fibres	-
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#### General Inorganics

pH (L099)	pH Units	N/A	MCERTS	8.7	7.1	7.9	8.5	8.3
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Free Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Water Soluble SO <sub>4</sub> 1hr extraction	mg/kg	2.5	MCERTS	160	540	3700	170	330
Water Soluble SO <sub>4</sub> (2:1 Leach. Equiv.) 1hr extraction	mg/l	1.25	MCERTS	81.2	272	1830	83.3	163
Organic Matter (automated)	%	0.1	MCERTS	2.3	6.7	7.3	3.2	2.6

#### Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
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#### Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	0.89	< 0.05	2.4	0.43	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	0.07	< 0.05	0.1	0.06	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	0.59	< 0.05	0.27	0.94	< 0.05
Fluorene	mg/kg	0.05	MCERTS	0.5	< 0.05	0.38	0.6	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	4.6	0.3	5.7	7.2	< 0.05
Anthracene	mg/kg	0.05	MCERTS	1.1	< 0.05	1.7	1.6	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	5.3	0.12	6.1	11	< 0.05
Pyrene	mg/kg	0.05	MCERTS	4.5	0.11	6.6	9.8	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	2.2	0.06	4.1	4.7	< 0.05
Chrysene	mg/kg	0.05	MCERTS	2.1	0.13	3.8	4.9	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	2.3	0.15	4.5	5.5	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.94	< 0.05	1.6	2.4	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	2	< 0.05	4.3	4.9	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.98	< 0.05	2.3	2.6	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.25	< 0.05	0.49	0.65	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	1.1	0.1	2.9	2.9	< 0.05

Analytical Report Number: 25-033356  
 Project / Site name: Turnbridge Mill, Quay Street, Huddersfield  
 Your Order No: 4475

Lab Sample Number	592758				592759				592760				592761				592762			
Sample Reference	WS01				WS03				WS04				WS05				WS06			
Sample Number	None Supplied				None Supplied				None Supplied				None Supplied				None Supplied			
Water Matrix	N/A				N/A				N/A				N/A				N/A			
Depth (m)	1.00				2.00				1.00				1.00				2.00			
Date Sampled	19/06/2025				20/06/2025				19/06/2025				19/06/2025				19/06/2025			
Time Taken	None Supplied				None Supplied				None Supplied				None Supplied				None Supplied			
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status																	

**Total PAH**

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	29.2	0.97	47	60.2	< 0.80
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**Heavy Metals / Metalloids**

Element	mg/kg	Limit	MCERTS					
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	12	47	43	27	22
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.88	1.4	4.4	1.2	1.1
Boron (water soluble)	mg/kg	0.2	MCERTS	0.7	2.1	1.3	0.6	1
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	0.2	0.4	1.9	< 0.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8
Chromium (III)	mg/kg	1	NONE	18	21	41	17	22
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	18	21	41	17	22
Copper (aqua regia extractable)	mg/kg	1	MCERTS	47	76	140	360	36
Lead (aqua regia extractable)	mg/kg	1	MCERTS	120	120	170	150	81
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	0.6	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	20	31	59	22	20
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	1.6	2.5	1.6	1.6
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	25	37	89	27	32
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	82	130	220	430	46

**Petroleum Hydrocarbons**

TPHCWG - Aliphatic >EC5 - EC6	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPHCWG - Aliphatic >EC6 - EC8	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPHCWG - Aliphatic >EC8 - EC10	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPHCWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPHCWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	2.8	< 2.0	< 2.0	< 2.0	< 2.0
TPHCWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPHCWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	27	< 8.0	25	37	< 8.0
TPHCWG - Aliphatic >EC5 - EC35	mg/kg	10	NONE	30	< 10	25	37	< 10

TPHCWG - Aromatic >EC5 - EC7	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPHCWG - Aromatic >EC7 - EC8	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPHCWG - Aromatic >EC8 - EC10	mg/kg	0.02	MCERTS	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
TPHCWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	1	< 1.0	1.4	< 1.0	1.3
TPHCWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	4.6	< 2.0	5.4	6.3	3.7
TPHCWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	29	< 10	34	64	< 10
TPHCWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	46	< 10	82	110	< 10
TPHCWG - Aromatic >EC5 - EC35	mg/kg	10	NONE	81	< 10	120	180	< 10

**VOCs**

MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Benzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Toluene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	5.8	< 5.0
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
p & m-Xylene	µg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
o-Xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0

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

Analytical Report Number: 25-033356

Project / Site name: Turnbridge Mill, Quay Street, Huddersfield

Your Order No: 4475

<b>Lab Sample Number</b>				592763
<b>Sample Reference</b>				WS07
<b>Sample Number</b>				None Supplied
<b>Water Matrix</b>				N/A
<b>Depth (m)</b>				1.00
<b>Date Sampled</b>				20/06/2025
<b>Time Taken</b>				None Supplied
<b>Analytical Parameter (Soil Analysis)</b>	<b>Units</b>	<b>Test Limit of detection</b>	<b>Test Accreditation Status</b>	

Stone Content	%	0.1	NONE	43.9
Moisture Content	%	0.01	NONE	15
Total mass of sample received	kg	0.1	NONE	0.9

#### Asbestos

Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	DSO
Analysis completed	N/A	N/A	N/A	03/07/2025
Actinolite detected	Type	N/A	ISO 17025	-
Amosite detected	Type	N/A	ISO 17025	-
Anthophyllite detected	Type	N/A	ISO 17025	-
Chrysotile detected	Type	N/A	ISO 17025	-
Crocidolite detected	Type	N/A	ISO 17025	-
Tremolite detected	Type	N/A	ISO 17025	-

Asbestos % by hand picking/weighing	%	0.001	ISO 17025	-
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Asbestos Containing Material Types Detected (ACM)	Type	N/A	ISO 17025	-
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#### General Inorganics

pH (L099)	pH Units	N/A	MCERTS	8
Total Cyanide	mg/kg	1	MCERTS	< 1.0
Free Cyanide	mg/kg	1	MCERTS	< 1.0
Water Soluble SO <sub>4</sub> 1hr extraction	mg/kg	2.5	MCERTS	160
Water Soluble SO <sub>4</sub> (2:1 Leach. Equiv.) 1hr extraction	mg/l	1.25	MCERTS	79.2
Organic Matter (automated)	%	0.1	MCERTS	4.8

#### Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0
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#### Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	0.31
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	0.16
Fluorene	mg/kg	0.05	MCERTS	0.11
Phenanthrene	mg/kg	0.05	MCERTS	1.5
Anthracene	mg/kg	0.05	MCERTS	0.45
Fluoranthene	mg/kg	0.05	MCERTS	2.3
Pyrene	mg/kg	0.05	MCERTS	2.8
Benzo(a)anthracene	mg/kg	0.05	MCERTS	2.6
Chrysene	mg/kg	0.05	MCERTS	2.5
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	3.9
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	1.8
Benzo(a)pyrene	mg/kg	0.05	MCERTS	4.2
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	2.5
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.66
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	3.1

Analytical Report Number: 25-033356  
 Project / Site name: Turnbridge Mill, Quay Street, Huddersfield  
 Your Order No: 4475

<b>Lab Sample Number</b>	592763		
<b>Sample Reference</b>	WS07		
<b>Sample Number</b>	None Supplied		
<b>Water Matrix</b>	N/A		
<b>Depth (m)</b>	1.00		
<b>Date Sampled</b>	20/06/2025		
<b>Time Taken</b>	None Supplied		
<b>Analytical Parameter (Soil Analysis)</b>	<b>Units</b>	<b>Test Limit of detection</b>	<b>Test Accreditation Status</b>

#### Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	28.9
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#### Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	46
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.9
Boron (water soluble)	mg/kg	0.2	MCERTS	0.9
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.9
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8
Chromium (III)	mg/kg	1	NONE	26
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	26
Copper (aqua regia extractable)	mg/kg	1	MCERTS	86
Lead (aqua regia extractable)	mg/kg	1	MCERTS	66
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	42
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	2.5
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	46
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	900

#### Petroleum Hydrocarbons

TPHCWG - Aliphatic >EC5 - EC6 <sub>HS_ID_AL</sub>	mg/kg	0.01	MCERTS	< 0.010
TPHCWG - Aliphatic >EC6 - EC8 <sub>HS_ID_AL</sub>	mg/kg	0.01	MCERTS	< 0.010
TPHCWG - Aliphatic >EC8 - EC10 <sub>HS_ID_AL</sub>	mg/kg	0.01	MCERTS	< 0.010
TPHCWG - Aliphatic >EC10 - EC12 <sub>EH_CU_ID_AL</sub>	mg/kg	1	MCERTS	< 1.0
TPHCWG - Aliphatic >EC12 - EC16 <sub>EH_CU_ID_AL</sub>	mg/kg	2	MCERTS	< 2.0
TPHCWG - Aliphatic >EC16 - EC21 <sub>EH_CU_ID_AL</sub>	mg/kg	8	MCERTS	< 8.0
TPHCWG - Aliphatic >EC21 - EC35 <sub>EH_CU_ID_AL</sub>	mg/kg	8	MCERTS	< 8.0
TPHCWG - Aliphatic >EC5 - EC35 <sub>EH_CU+HS_ID_AL</sub>	mg/kg	10	NONE	< 10

TPHCWG - Aromatic >EC5 - EC7 <sub>HS_ID_AR</sub>	mg/kg	0.01	MCERTS	< 0.010
TPHCWG - Aromatic >EC7 - EC8 <sub>HS_ID_AR</sub>	mg/kg	0.01	MCERTS	< 0.010
TPHCWG - Aromatic >EC8 - EC10 <sub>HS_ID_AR</sub>	mg/kg	0.02	MCERTS	< 0.020
TPHCWG - Aromatic >EC10 - EC12 <sub>EH_CU_ID_AR</sub>	mg/kg	1	MCERTS	1.7
TPHCWG - Aromatic >EC12 - EC16 <sub>EH_CU_ID_AR</sub>	mg/kg	2	MCERTS	5.5
TPHCWG - Aromatic >EC16 - EC21 <sub>EH_CU_ID_AR</sub>	mg/kg	10	MCERTS	14
TPHCWG - Aromatic >EC21 - EC35 <sub>EH_CU_ID_AR</sub>	mg/kg	10	MCERTS	48
TPHCWG - Aromatic >EC5 - EC35 <sub>EH_CU+HS_ID_AR</sub>	mg/kg	10	NONE	69

#### VOCs

MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	MCERTS	< 5.0
Benzene	µg/kg	5	MCERTS	< 5.0
Toluene	µg/kg	5	MCERTS	< 5.0
Ethylbenzene	µg/kg	5	MCERTS	< 5.0
p & m-Xylene	µg/kg	8	MCERTS	< 8.0
o-Xylene	µg/kg	5	MCERTS	< 5.0

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



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**Analytical Report Number:** 25-033356  
**Project / Site name:** Turnbridge Mill, Quay Street, Hudde  
**Your Order No:** 4475

## Certificate of Analysis - Asbestos Quantification

### Methods:

### Qualitative Analysis

The samples were analysed qualitatively for asbestos by polarising light and dispersion staining as described by the Health and Safety Executive in HSG 248.

### Quantitative Analysis

The analysis was carried out using our documented in-house method A006 based on HSE Contract Research Report No: 83/1996: Development and Validation of an analytical method to determine the amount of asbestos in soils and loose aggregates (Davies et al, 1996) and HSG 248. Our method includes initial examination of the entire representative sample, then fractionation and detailed analysis of each fraction, with quantification by hand picking and weighing.

The limit of detection (reporting limit) of this method is 0.001 %.

The method has been validated using samples of at least 100 g, results for samples smaller than this should be interpreted with caution.

Both Qualitative and Quantitative Analyses are UKAS accredited.

Sample Number	Sample ID	Sample Depth (m)	Sample Weight (g)	Asbestos Containing Material Types Detected (ACM)	PLM Results	Asbestos by hand picking/weighing (%)	Total % Asbestos in Sample	Analysis completed	Analyst ID
592758	WS01	1.00-	90.5	Loose Fibres	<b>Chrysotile</b>	< 0.001	< <b>0.001</b>	07/08/2025	PKU
592761	WS05	1.00-	94.6	Loose Fibres	<b>Amosite</b>	0.001	<b>0.001</b>	07/08/2025	PKU

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

**Analytical Report Number : 25-033356**

**Project / Site name: Turnbridge Mill, Quay Street, Huddersfield**

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
592758	WS01	None Supplied	1	Brown sand with gravel and stones
592759	WS03	None Supplied	2	Brown clay and sand with gravel
592760	WS04	None Supplied	1	Brown sand with gravel and stones
592761	WS05	None Supplied	1	Brown sand with gravel and stones
592762	WS06	None Supplied	2	Brown sandy clay with gravel
592763	WS07	None Supplied	1	Brown sand with clinker and stones

Analytical Report Number : 25-033356

Project / Site name: Turnbridge Mill, Quay Street, Huddersfield

Water matrix abbreviations:

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

Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in Soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques	In-house method based on HSG 248, 2021	A001B	D	ISO 17025
Asbestos Quantification - Gravimetric	Asbestos quantification by gravimetric method - in house method based on references	HSE Report No: 83/1996, HSG 248 (2021), HSG 264 (2012) & SCA Blue Book (draft)	A006B	D	ISO 17025
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method)	In-house method	L009B	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight	In-house method based on British Standard Methods and MCERTS requirements.	L019B	D	NONE
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L038B	D	MCERTS
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES	In-house method based on Second Site Properties version 3	L038B	D	MCERTS
Sulphate, water soluble, in soil (1hr extraction)	Sulphate, water soluble, in soil (1hr extraction)	In-house method	L038B	D	MCERTS
Speciated PAHs and/or Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds (including PAH) in soil by extraction in dichloromethane and hexane followed by GC-MS	In-house method based on USEPA 8270	L064B	D	MCERTS
BTEX and/or Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS	In-house method based on USEPA 8260	L073B	W	MCERTS
Total petroleum hydrocarbons with carbon banding by GC-FID in soil	Determination of total petroleum hydrocarbons in soil by GC-FID with carbon banding aliphatic and aromatic	In-house method	L076B	D	MCERTS
Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil (Summed Bands)	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS with carbon banding aliphatic and aromatic (Summed Bands).	Calculation	L076B/L088-PL	D/W	NONE
Chromium III in soil	In-house method by calculation from total Cr and Cr VI	In-house method by calculation	L080-PL/L130B	W	NONE
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in NaOH and addition of 1,5 diphenylcarbazide followed by colorimetry	In-house method	L080-PL	W	MCERTS
Free cyanide in soil	Determination of free cyanide by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	MCERTS
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	MCERTS

Analytical Report Number : 25-033356

Project / Site name: Turnbridge Mill, Quay Street, Huddersfield

Water matrix abbreviations:

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

Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	MCERTS
Total petroleum hydrocarbons with carbon banding by HS-GC/MS in soil	Determination of total petroleum hydrocarbons in soil by HS-GC/MS with carbon banding aliphatic and aromatic	In-house method	L088-PL	W	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement	In-house method	L099-PL	D	MCERTS
Soil Descriptions	Textural classification	In-house method	L019B	W	NONE

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

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

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

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

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

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

The result for sum should be interpreted with caution

**Analytical Report Number : 25-033356**

**Project / Site name: Turnbridge Mill, Quay Street, Huddersfield**

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

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

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
WS01	N/A	S	592758	b	Asbestos Quantification - Gravimetric	A006B	b
WS01	N/A	S	592758	b	Asbestos identification in Soil	A001B	b
WS03	N/A	S	592759	b	Asbestos identification in Soil	A001B	b
WS04	N/A	S	592760	b	Asbestos identification in Soil	A001B	b
WS05	N/A	S	592761	b	Asbestos Quantification - Gravimetric	A006B	b
WS05	N/A	S	592761	b	Asbestos identification in Soil	A001B	b
WS06	N/A	S	592762	b	Asbestos identification in Soil	A001B	b
WS07	N/A	S	592763	b	Asbestos identification in Soil	A001B	b

# APPENDIX E - CONCEPTUAL SITE MODEL

Ref.	Hazard	Source	Pathway	Receptor	Pollutant Linkage ?	Current anticipated risk (1) *	Comment	Action	Residual Risk *^
1	Heavy metals	Made Ground	Ingestion of soil & indoor dust	Site users	✓	Very low / 100%	No risks at levels present	No further action deemed necessary	Very Low
2	Carcinogenic PAHs	Made Ground	Ingestion of soil & indoor dust	Site users	✓	Very low / 100%	No risks at levels present	No further action deemed necessary	Very Low
3	TPH	Made Ground	Ingestion of soil & indoor dust	Site users	✓	Very low / 100%	No risks at levels present	No further action deemed necessary	Very Low
4	Sulphate	Made Ground	Ingestion of soil & indoor dust	Concrete substructures	✓	Very low / 100%	No risks at levels present	No further action deemed necessary	Very Low
5	Leachable metals	Made Ground	Leaching to groundwater	Groundwater	✓	Very low / 100%	No risks at levels present	No further action deemed necessary	Very Low
6	Leachable PAH	Made Ground	Leaching to groundwater	Groundwater	✓	Very low / 100%	No risks at levels present	No further action deemed necessary	Very Low
7	Ground gases	Made Ground	Vertical migration through	Site users	✓	Very low / 100%	No risks at levels present	No further action deemed necessary	Very Low
8	Radon	Bedrock	Vertical migration through	Site users	✓	Very low / 100%	No risks at levels present	No further action deemed necessary	Very Low
9	Invasive plant species	Invasive plant species	Contact with concrete substructures	On site buildings	✓	Very low / 100%	None identified during site walkover survey undertaken	Maintain vigilance during construction	Very Low
10	Trees	N/A	Changes to soil moisture regime	On site buildings	✓	Very low / 100%	Dependent on proposed planting regime and ground conditions	Dependent on final development proposals	Very Low
11	Flooding	River	Over land flow	On site buildings	✓	Very low / 100%	No risks at levels present	No further action deemed necessary	Very Low

NOTES:

- (1) Anticipated risk over percentage site area.
- \* Refer to Risk Matrix Table within report text.
- ^ Anticipated risk after carrying out action

**CONCEPTUAL MODEL TABLE**

Client : T D Jagger  
 Project : Turnbridge Mill, Quay Street, Huddersfield  
 Job No : 25072

