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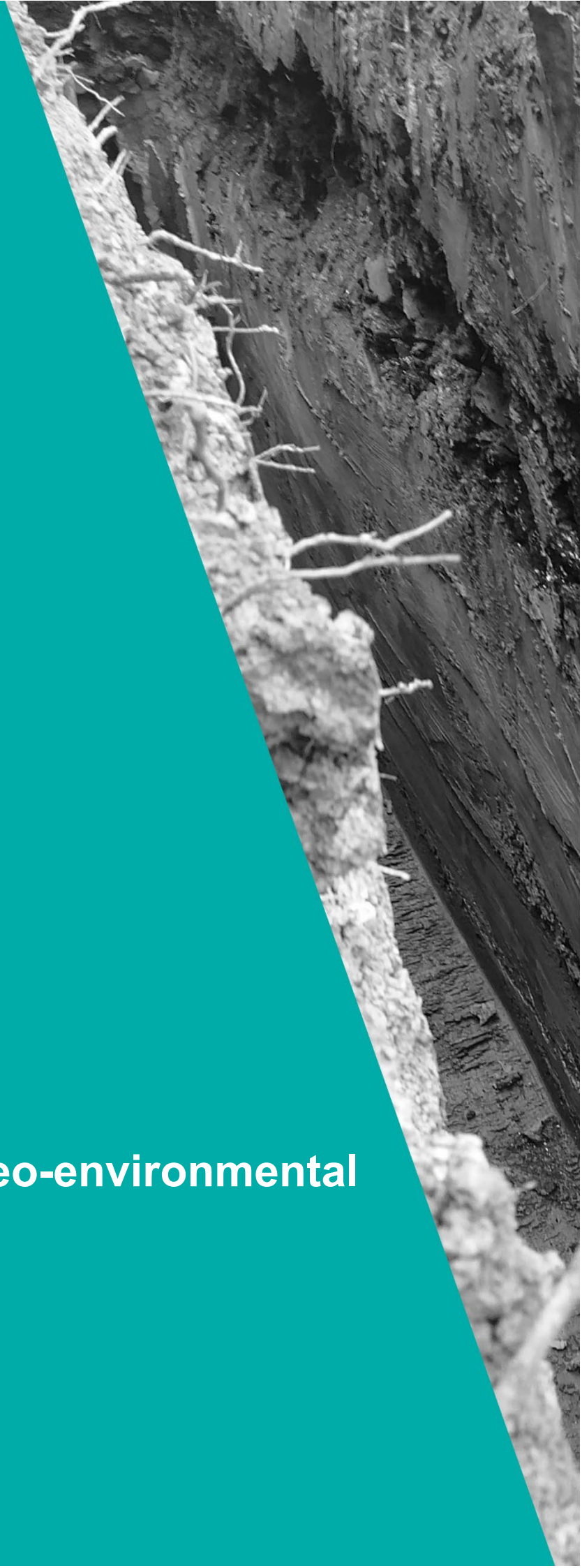

Phase 2
Geotechnical and Geo-environmental Site Investigation

CROFT STREET, BIRKENSHAW

RIVA HOMES

7 JANUARY 2025

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PHASE 2 GEOTECHNICAL AND GEO-ENVIRONMENTAL SITE INVESTIGATION

CROFT STREET, BIRKENSHAW

FOR

RIVA HOMES

ISSUE 3

48785-ECE-XX-XX-RP-C-0008

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ISSUE 3

Job No.	:	48785
Report Status	:	Issue 3
Document Date	:	7 January 2025

Approved :

Kate Edwards
Technical Director

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1.0 EXECUTIVE SUMMARY

1. The approximately 0.86-hectare site is located to the south of Croft Street in Birkenshaw, south east of Bradford. The site is centered on grid reference 420378, 428449. The site currently comprises a heavily vegetated vacant plot with a macadam surfaced road (Croft Street) in the northeast of the site. Birkenshaw Liberal Club occupies land adjacent to the northern boundary of the site, accessed from Croft Street. Surrounding the club there is an area of macadam surfacing used for car parking and to the west of the club there are an area containing a storage container, tipped material and a mound of topsoil.

2. Historically, the site was used as a bowling green and allotment gardens with terraced housing in the northeast of the site which have since been demolished.

3. The solid geology below the site is expected to comprise a sandstone band of the Pennine Lower Coal Measures. No superficial deposits are expected to be present.

4. The Wheatley Lime coal seam is inferred to outcrop 50 m to the west of the site corner. A rotary drilling investigation was undertaken and the seam was found below the site intact at depths of between 4.5 and 7.4 m bgl. One borehole recorded broken ground at a depth of 17.2 m (1.3 m thick) although this may be attributed to fracturing of strata from deeper coal workings. No drilling and grouting is proposed given the depth of the broken ground.

5. Up to 0.5 m of topsoil was encountered across the site. Macadam was observed at the surface of the car park and road to the north of the site. Reworked or made ground was encountered up to 1.6 m depth. The natural ground typically comprises firm to stiff clay, overlying predominantly sandstone bedrock encountered from between 1.3 to 2.3 m bgl.

6. Since there is a significant proportion of the site covered by trees and vegetation, it is expected that ultimately all foundations will need to extend onto the sandstone, assuming the underlying mudstone does not require additional deepening due to tree influence in accordance with NHBC Standards.

7. A number of retaining walls of various sizes were noted across the site. Care will need to be taken to ensure they are not destabilised during construction.

8. Groundwater was encountered in all trial pits apart from TPA. Most pits encountered groundwater within the upper 2 meters. Groundwater control may be necessary for deeper excavations.

9. A number of services are expected to run below the north of the site beneath the hardstanding comprising of electric cables, drains and water pipes.

10. Stands of Japanese Knotweed were noted in the south of the central third of the site. This will require specialist treatment to remove.

11. Due to the shallow groundwater encountered, soakaway drainage is not considered to be viable.

12. Basic radon precautions are required.

13. The site won topsoil is not considered suitable for re-use as it recorded asbestos fibres, elevated concentrations of lead, arsenic and mercury and a high proportion of extraneous material. During the site clearance works, once material has been screened, additional testing could be undertaken on the western topsoil to see if the material is suitable for re-use.

14. The made ground encountered below the former developed areas has recorded elevated lead and PAH concentrations. Where made ground remains in place below gardens and landscaped areas it should be capped with a 600 mm thick clean cover system which comprises at least 100 mm of topsoil.

15. The chemical results indicate DS-1 AC-2z sulphate precautions are required. The chemical test results will need to be submitted to the water supplier for review.

16. The conclusions made in this report are subject to agreement by the approving bodies, such as the Local Authority.

2.0 INTRODUCTION

2.1 Terms of Reference

This report presents the findings of a Phase 2 Geotechnical and Geo-environmental Site Investigation carried out by Eastwood Consulting Engineers (ECE) for, and on the behalf of Riva Homes. Any other parties using the information in this report do so at their own risk and any duty of care is excluded.

2.2 Context

ECE previously produced a Phase 1 Geotechnical and Geo-environmental Site Investigation referenced 48785-ECE-XX-XX-RP-C-0001; and dated 1 March 2024. This Phase 2 report should therefore be read in conjunction with the Phase 1 report.

2.3 Aims and Objectives

The aims and objectives of this investigation were as follows:

- Detail the ground conditions enabling outline foundation and drainage proposals to be made for the proposed residential development;
- Carry out tiered risk assessment to establish the likely risks to future receptors, involving the use of generic assessment criteria and where unacceptable risks are identified, site specific assessment criteria within a detailed quantitative risk assessment;
- Identify feasible remediation options if unacceptable risks are highlighted; and
- Develop an appropriate remediation strategy where remediation is required.

2.4 Scope of Investigation

The investigation consisted of intrusive works and laboratory analysis. The findings were used to test the conceptual model and produce a final risk assessment. The intrusive works comprised trial pits, rotary boreholes and window samples to allow:

- Examination of the upper few metres of ground;
- In situ description of soils, enabling any localised lateral and vertical changes in soil conditions to be logged;
- Assessment of any contamination identified using visual and olfactory methods;
- Infiltration tests;

- Collection of soil samples for geotechnical and chemical testing; and
- Investigation into the presence and condition of any shallow coal seams beneath the site.

2.5 Limitations of Investigation

This report is based on the assumption that the site will be developed with housing. Due to the slopes on the site, it is assumed that some regrading of ground levels is likely to be required. If this is not the case, then the advice given in this report may not be appropriate.

Where assessments of site areas affected in particular ways are given, these are approximate. All information, comments and opinions given in this report are based on the ground conditions encountered during the site work, on the results of laboratory testing carried out as part of the investigation and information gained from a geological and historical desk study. However, there may be conditions at the site that have not been taken into account, such as unpredictable soil strata and water conditions between or below investigation points. It should be noted that groundwater levels vary due to seasonal or other effects, and may at times differ from those measured during the investigation.

This report considers the ground and groundwater and does not cover any buildings or their fabric or the constituents of any existing hardstanding materials. Generally, testing has only been carried out for contaminants identified as potentially present with no assessment made of biological contamination. Risks to ecological receptors, such as bats, have not been considered.

3.0 THE SITE

The approximately 0.86-hectare site is located to the south of Croft Street in Birkenshaw, south east of Bradford. The site is centred on grid reference 420378, 428449.

The site currently comprises a heavily vegetated vacant plot with a macadam surfaced road (Croft Street) in the northeast of the site. A mature hedge divides the western half from the eastern half of the site. Birkenshaw Liberal Club occupies land adjacent to the northern boundary of the site, accessed from Croft Street. Surrounding the club there is an area of macadam surfacing used for car parking and to the west of the club there are an area containing a storage container, tipped material and a mound of topsoil.

A topographical survey has been reviewed. South of the road, the eastern half of the site slopes to the south from around 188 m AOD to 185 m AOD (~1 in 20). The more steeply sloping western half of the site slopes to the southwest from around 187.5 m AOD to 182.5 m AOD (~ 1 in 5 to 1 in 7). West of the club building, the site lies at around 187.5 m AOD.

Possible stands of Japanese Knotweed were noted in the southeast of the site.

The site is bounded in the north, south and west by retaining walls with sized varying between 0.3 to 2.5 m in height:

- The northern retaining wall is located between the site and the club to the north and is not continuous across the entire northern boundary and is around 0.3-0.5m in height;
- The southern boundary comprises a retaining wall approximately 2.5 m in height to the west decreasing in height to 0.3 m in the east, retaining site above the lower-lying houses;
- The western boundary also features a retaining wall around 1.5m in height, retaining site above housing to the west;
- A retaining wall was not observed along the eastern boundary.

Photographs from the investigation are included in the Appendix.

4.0 PHASE 1 SUMMARY

The below is based on our review of available historical maps, environmental records, geological maps and borehole records.

4.1 History

The Site

The earliest map available, dated 1854, shows the site to be open fields, with a possible structure/building in the far eastern corner adjacent to Birkenshaw Lane (later known as Old Road or Old Lane).

By 1893, Croft Street had been constructed in its current day position with terraced housing to the north, and two rows of terraced housing are shown off the road to the south. By 1922, the eastern half of the site is labelled as a bowling green. The access for the adjacent club extends through the northwest of the site. The 1938 map shows a rectangular building just west of the bowling green.

Between the late 1950s and 1971, the majority of the site is shown as allotment gardens. By 1985, the terraced housing has been demolished, as has the western rectangular building. The site is no longer labelled 'allotment gardens'. The site remains unchanged to the present.

Surrounding Area

The earliest historical map, dated 1854, shows the village of Birkenshaw to the north and west of the site. Birkenshaw Lane is present to the east, with fields and occasional buildings beyond. To the south lies more fields, with a church, a house and a school present. A small quarry is present around 150 m to the north west.

By 1893, the village has extended south, encompassing the site. The club building to the north has been constructed. The quarry to the northwest is labelled as 'old' and an iron works is shown just beyond it. A second old quarry is present around 240 m north of the site.

By 1908, the northwestern quarry is no longer shown, and the quarry to the north still shows its outline, but covered with woodland; by 1922, neither the outline or the woodland is shown. By this time, terraced housing is present to the southeast of the site. The area remains predominantly residential in use today.

4.2 Geology

The solid geology below the site is expected to comprise a sandstone band of the Pennine Lower Coal Measures.

On the 1999 SE22NW geological map a fault is inferred to cross the site, trending east-west along the southern boundary and downthrown to the south. South of this fault lies mudstone strata. The older Yorkshire 232NW geological map dated 1927 places this fault through the middle of the site, just south of the Birkenshaw liberal club. The Coal Authority also records an east-west trending fault which is in agreement with the 1927 BGS map.

No superficial deposits are recorded to underlie the site.

The solid geology appears to be sub-horizontal, with a shallow dip of around 2 degrees to the east.

The BGS GeoIndex Onshore viewer records 10 boreholes were carried out on site in 1974. These boreholes recorded a surfacing of 'topsoil and fill', occasionally cohesive fill featuring brick rubble, Natural soft to firm clay was noted below over sandstone bedrock, found from depths of around 0.55 and 2.7 m (but commonly less than 1.5 m).

4.3 Hydrology, Hydrogeology & Flooding

The underlying bedrock is classified as a Secondary A Aquifer. According to the Envirocheck, there are no water abstractions recorded within 500 m of the site and the site does not lie within a groundwater Source Protection Zone. The site lies in Flood Zone 1.

4.4 Extractive Industries

4.4.1 Coal Mining

A north to south trending coal seam, Wheatley Lime, is conjectured to outcrop around 50 m west of the site and is anticipated to be around 0.6 or 0.7 m thick and may be present at shallow depth beneath the northwest of the site.

Stratigraphically, the next shallowest underlying coal seam is the Blocking Coal seam. It is recorded to be around 0.2 and 0.5 m thick and according to the vertical section, present around 30 m below the Wheatley Lime. Therefore, it is not expected to be at shallow depth below the site.

The Coal Authority report states that there are no recorded instances of past underground mining beneath the site, but that probable unrecorded shallow workings may be present.

Due to the estimated depth to the coal seam and its recorded thickness, shallow unrecorded workings may be present. The presence or absence of workings should be confirmed by a rotary investigation.

4.4.2 Sandstone Quarrying

Historical maps show a number of quarries in the wider area from at least 150 m beyond the site boundaries. One of these old quarries is a BGS Recorded Mineral site. There is no evidence on the historical or geological mapping that any sandstone extraction occurred on or in the immediate surrounding area of the site.

4.5 Ground Gas

Basic radon protective measures are necessary.

The site once featured terraced housing which may have possessed basements that have since been infilled; Elsewhere on site, the regrading of ground levels appears to have taken place meaning a proportion of the site may be underlain by made ground. 1974 boreholes on site record predominantly cohesive fill with brick rubble, indicating the material may be relatively inert and of low gas generation potential.

There is potential for coal workings to be present below the site.

The Envirocheck does not record any historical or active landfills within 500 m of the site.

Two infilled features are recorded within 250 m of the site. These are located 174 m southeast and 246 m north of the site. Historical maps indicate the closest feature is a pond, infilled by the 1890s whilst the northern feature is a quarry shown on maps until 1922 when it was presumably backfilled. Historical maps also show an old quarry around 150 m northwest of the site which was backfilled by 1908. Given the distance from site of these features and the age of backfill, they are not considered to pose a gas risk to the site.

The only sources which may pose a risk to the site include the on-site made ground and possible shallow coal workings. Should an intrusive investigation record a significant thickness of made ground or workings, a gas monitoring programme will be required.

4.6 Outline Conceptual Model

The following table details the possible sources and associated contaminants of concern, pathways and receptors, highlighted by the Phase 1 as potentially present:

Source	Potential Contaminants	Potential Pathways	Potential Receptors
Made ground	Heavy metals/metalloids Asbestos PAHs TPH CWG	Ingestion Inhalation Direct contact Biological uptake Migration through ground	Site residents and visitors to the site Site construction workers Secondary A Aquifer Plants Water supply pipes
Made or natural ground	Sulphates Low pH	Direct contact	Below ground concrete
Made ground	Ground gas	Migration through ground	Site residents and visitors Construction workers Buildings

5.0 GROUND INVESTIGATION

5.1 Site Works

Eastwood Consulting Engineers (ECE) completed the following works over three visits:

4 and 5 March 2024:

- Thirteen trial pits (TP01 to TP08, SA01 to SA04, TPA) excavated to determine the shallow ground conditions. The pits reached depths of between 1.8 and 2.6 m below ground level (bgl) and were positioned to give good site coverage;
- SA01 to SA04 were excavated with the aim of undertaking infiltration tests.

A number of areas of the site were inaccessible to the JCB as they were either too overgrown or were blocked by trees. Additionally, possible Japanese Knotweed was noted in the in the south of the site. Areas such as along Croft Street, within the garden of the Birkenshaw Liberal club and along footpath in the east of the site were also not excavated as these were areas in active use by the public.

13 and 14 June 2024:

- Five rotary boreholes (BH01 to BH05) were completed and reached depths of 30m bgl in BH01 to BH04 and 24 m bgl in BH05, and were positioned to give good site coverage.

28 November 2024:

- Eight window sample boreholes (WS01 to WS08) were completed. These reached depths between 1.0 m and 2.3 m bgl.

This investigation aimed to investigate the ground conditions below the former terraced housing in the north of the site. The presence of services, trees and access for the adjacent club building prevent the most northern area from being investigated, but WS01 to WS03, WS07 and WS08 were undertaken below the southern part. WS05 and WS06 were undertaken in the centre and centre-west of the site.

Copies of the exploratory hole logs as well as investigation photographs are presented in Appendix 1, and their locations are shown on the Exploratory Hole Location Plan also in Appendix 1.

5.2 Laboratory Testing

Three samples of natural clay were sent for plasticity testing to Professional Soils Laboratory in Doncaster. Laboratory testing results are presented in Appendix 2 and discussed further in Section 7.0.

Fourteen samples of topsoil, three samples of made ground, two samples of reworked ground and six samples of natural ground were initially despatched for chemical testing. Soil samples were taken in 1 kg plastic tubs and 250 ml amber glass jars and analysed at i2 Analytical using MCERTs accredited methodologies where available. Laboratory testing results are presented in Appendix 3 and discussed further in Section 8.0.

6.0 GROUND CONDITIONS

6.1 Surface Covering

Topsoil was encountered in all trial pits and most window sample boreholes to depths between 0.15 and 0.5 m bgl. The topsoil was generally described as a gravelly, sandy clay with gravel of sandstone and occasional brick fragments.

Reworked topsoil was encountered in four trial pits and five window sample boreholes (SA03, TP01, TP06 ,TPA, WS01, WS02, WS06, WS07 and WS8) containing large brick and concrete clasts. TP01 contained fragments of possible clinker or slag.

Macadam road and hardstanding associated with the Birkenshaw Liberal Club was noted in the north of the site along Croft Street and as part of the car park to the club. WS04 recorded concrete at the surface to a depth of 0.2 m bgl.

6.2 Made Ground

Within TP01, the brown clay underlying the topsoil contained small fragments of coal or burnt wood as well as paleoroots, indicating this material may have been reworked. This material extended to 1.4 m bgl. A similar coloured clay was also present below the topsoil in SA01 (up to 0.6 m), TP02 (up to 1.0 m), TP06 (up to 0.7 m), but only TP02's pit contained coal fragments.

Within the window samples, made ground was encountered in five holes from depths between 0.2 and 1.6 m bgl. The made ground mainly consisting of a brown gravelly clay with brick and sandstone cobbles.

A number of BGS boreholes are recorded to have been drilled across the site in the 1970s. These have been reviewed and the position of these boreholes are shown on the Exploratory Hole Location Plan in Appendix 1. A number of these boreholes recorded fill or topsoil and fill to a depth of up to 1 m, but generally below 0.5 m. There is limited description of the fill encountered within these logs with only a handful mentioning red brick rubble was encountered. One borehole recorded ash fill between 0.25 and 0.3 m. However, it appears that the area was covered with macadam after this hole was excavated and so this ash layer may have been removed.

6.3 Natural Ground

The natural ground typically comprises of firm to stiff clay. Extremely weak to moderately weak sandstone bedrock was encountered across the entirety of the site, at depths between 1.3 to 2.3 m bgl. The trial pits terminated when the sandstone bedrock became too difficult to excavate using a JCB 3CX.

Within the window sample boreholes, the natural ground also comprised firm to stiff sandy clay. Extremely weak to moderately weak sandstone bedrock was encountered across the site at depths between 0.7m and 2.0 m bgl.

Due to the absence of mudstone encountered at shallow depth within the trial pits, as would be expected south of the fault shown on the geological maps, it is likely that the fault is positioned to the south of the site as per the 1999 mapping.

Within the rotary holes, mudstone was logged below the sandstone in BH03 to BH05 at depths of between 4 and 5 m bgl extending to between 18 and 24 m bgl. BH01 and BH02 logged mudstone below the shallow firm clay at a depth of 1.6 m bgl. Mudstone was also encountered in WS03 at 1.4m bgl and WS05 at 1.7m bgl and WS06 at 2 m.

An intact, 0.4 to 0.5 m thick, coal seam was encountered in four boreholes at a depth of between 4.5 and 7.4 m bgl. BH04 encountered a 0.4 thick layer of black mudstone between 5.8 and 6.2m bgl; due to the thickness and depth this band was encountered, it is likely this is a poor-quality coal and part of the same seam as encountered in the other boreholes.

BH03 encountered a second coal seam 0.7 m thick at a depth of between 25.3 m bgl. None of the other boreholes recorded a coal seam at this depth.

Broken ground was encountered in one borehole, BH05 at a depth of between 17.2 and 18.5 m bgl. There does not appear to be a seam in direct correlation with this broken ground in other boreholes; the closest would be the 0.7 m thick seam in BH03, but the base of this seam lies around 7 m lower than the base of the broken ground in BH05. Whilst the shallow intact coal seam undulates across the site, there is no more than ~4 m difference between the base of seam levels. This would indicate the broken ground and the deeper coal seam are not related to each other.

The broken ground could be a result of collapsed workings from depth; workings are recorded in the deeper Blocking Coal which is expected around 30 m below the Wheatley Lime Coal found at shallow depth in these boreholes. Collapse of workings can often cause fracturing in overlying ground, particularly in sandstone strata. The broken ground correlates with the top of a sandstone band, as encountered in the other four boreholes.

6.4 Groundwater

Groundwater ingresses were recorded in all trial pits, apart from TPA, between depths of 1.2 and 2.1 m bgl. SA01 to SA04 were left open overnight to observe the extent of groundwater ingress. SA01's water level had risen to 2.15 m bgl after 17 hours, SA02 had risen to 0.7 m bgl after 6 hours, SA03 had risen to 1.4 m bgl after 26 hours and SA04 had risen to 1.35 m bgl after 18 hours. The

water in SA01, SA03 and SA04 was still rising slowly whereas the water in SA02 had levelled out at 0.7 m.

No groundwater was encountered in any window sample boreholes; this could be due to the short length of time the holes were open.

7.0 GEOTECHNICAL APPRAISAL

7.1 General

The proposed development is to construct residential properties with associated hardstanding and public open spaces.

Due to the slope of the site, allowance should be made for including retaining and tanking structures in the new development.

Consideration will need to be given to ensure that the retaining walls are not destabilised during any construction works.

The Party Wall Act will need to be considered for structures associated with neighbouring properties along the site boundaries.

Ground Conditions

Up to 0.5 m of topsoil was encountered across the site. Macadam was observed at the surface of the car park and road to the north of the site.

Reworked ground or made ground was encountered in occasional exploratory holes up to 1.6 m bgl. The natural ground typically comprises firm to stiff clay, overlying sandstone bedrock encountered from between 1.3 to 2.3 m bgl.

A rotary borehole investigation has been undertaken and encountered the Wheatley Lime coal at shallow depth, with no evidence of workings. A band of broken ground was encountered in one borehole between depths of 17.2 and 18.5 m; this could be attributed to fractured ground associated with deeper collapsed workings. At a depth of 17.2 m and with a thickness of 1.3 m, the fractured ground has over 10 times its thickness in rock cover; drilling and grouting is therefore not considered to be necessary.

Groundwater ingresses were recorded in all the rotary boreholes and trial pits between 1.2 and 2.1 m. A shallow water table is expected across the site.

Geotechnical Testing

Hand Vane Readings

The clay below the topsoil was noted to be friable meaning it was not possible to obtain hand vane readings.

Atterberg Testing

Geotechnical testing was carried out on three samples of natural clay. One sample recorded a modified plasticity indices (PI) of 15%, which equates to low (10 to 20%) volume change potential (VCP). One sample recorded a modified PI of 20%, which equates to medium (20 to 40%) VCP. The final sample recorded a modified PI of 44% which equates to high (greater than 40%) VCP. Therefore, the ground below the site is considered to be of high-volume change potential.

Two samples (TP02 1.2 m and SA02 1.3m) are shown to be potentially significantly desiccated, based on the rule that if 0.4 x liquid limit is greater than the moisture content then the soil is potentially significantly desiccated.

SPTs were undertaken in the WS boreholes at periodic centres, recording the following N values:

Test Depth (m)	WS01	WS02	WS03	WS04	WS05	WS06	WS07	WS08
~1.00	40	50+	35	34	36	24	19	2
1.30				50+				
1.40							50+	
1.60	25							
1.70			50+		50+			26
2.00	50+					50+		
2.30								50+
Key	Made Ground	Natural Ground						

The natural ground in all window sample boreholes recorded N values of between 19 and 50+, indicative of a stiff to very stiff strata. SPTs within bedrock recorded N values of at least 50.

Within the two window sample boreholes that have SPTs in made ground, the N values are significantly different with WS08 at 1m bgl with a N value of 2 and WS01 at 1m bgl with an N value of 40.

7.2 Foundations

A minimum bearing capacity of 100 kPa is typically considered to be appropriate for the residual cohesive strata, increasing to at least 200 kPa for the underlying sandstone.

Traditional strip or trench fill footings are considered to be suitable. Footings should be taken through any made ground into the underlying natural strata to a minimum depth of 1000 mm in clay. The minimum depth for clay should be taken from the lowest of existing or finished ground level.

In accordance with NHBC Standards Chapter 4.2, foundations in cohesive ground will need to be deepened where within influencing distance of past, present or proposed trees.

Since there is a significant proportion of the site covered by trees and vegetation, it is expected that ultimately all foundations will need to extend onto the sandstone, found at around 1.3 to 2.3 m bgl. This assumes there is no shrinkable material below which could influence foundations from the past tree coverage.

Precautions against soil heave are likely to be required wherever the footing depth is increased to greater than 1500 mm due to the influence of past or present trees.

Trench fill foundations onto the sandstone may still be appropriate in areas of the site where ground levels are to be filled, however levels will need to be brought up in equal thickness layers either side of blockwork.

Foundations should bear onto the same bearing material to reduce the risk of differential settlement.

The trial pits identified that a shallow water table may be present in wetter times of year. Groundwater control may be necessary.

7.3 Ground Floors

It is considered that precast concrete floors with a minimum 150 mm high ventilated void (increasing to 250 or 300 mm for plots where heave precautions are required) will be required for all plots.

7.4 Superstructure Precautions

Additional superstructure precautions due to the ground conditions are not considered to be required.

7.5 Excavation Problems and Obstructions

Groundwater was encountered in all trial pits apart from TPA. Most pits encountered groundwater within the upper 2 meters.

Sandstone bedrock was encountered beneath the site between 1.30 and 2.30 m bgl. The sandstone was difficult to excavate using a JCB 3CX in most instances.

The trial pits remained stable with no collapse for the duration they were open. Some instabilities are to be expected if deeper made ground is found below the former terraced buildings.

A number of services are expected to run below the north of the site beneath the hardstanding comprising of electric cables, drains and water pipes.

Stands of Japanese Knotweed were noted in the south of the central third of the site. This will require specialist treatment to remove.

A number of former buildings are recorded on the historical maps. Due to access restrictions and the presence of services in these areas no trial pits were excavated to a significant depth within these areas, therefore the presence of cellars beneath these buildings could not be confirmed.

Support will be required in accordance with current Health & Safety Regulations wherever access is required to trenches deeper than 1.2 m or less where there is risk of collapse.

7.6 Roads & Hardstanding

A CBR value of at least 2% is likely to be appropriate. The ground should be assumed to be frost susceptible and a minimum construction thickness of 450 mm will therefore apply. It is recommended that CBR tests are undertaken prior to construction so that more accurate CBR values can be obtained.

7.7 Surface Water Drainage

Infiltration testing was undertaken in one trial pit (SA01); three other pits (SA02 to SA04) were opened with the intention of conducting infiltration testing, however shallow groundwater was encountered in all pits and towards the base of SA01. As a result, infiltration testing could not be undertaken in SA02 to SA04.

	Depth (m)	Test Material	Notes
SA01	2.6	Sandstone	Took 5 hours to drain 110 mm

After the 5 hours of monitoring the infiltration test in SA01, the water was removed by the JCB and all four pits were left open overnight to observe the extent of groundwater ingress. As discussed in Section 6.4, water levels rose to around 0.7 to 2.15 m overnight.

Since a shallow water table is present, soakaway drainage is not considered viable.

8.0 REFINEMENT OF OUTLINE CONCEPTUAL MODEL

8.1 Source Characterisation

An outline conceptual model, detailing the possible sources and associated contaminants of concern, potential pathways and receptors identified in the Phase 1 was detailed in Section 4.6.

This section of the report documents the works undertaken to obtain information to test and refine this model enabling a risk assessment to be produced and, where significant risks are expected, remediation recommendations.

8.2 Ground Gas

Basic radon protective measures are required.

Made ground in the form of reworked topsoil and clay was encountered in a number of trial pits and BGS boreholes. This made ground contained gravel and cobbles of brick within topsoil, which will not underlie plots. Elsewhere, reworked natural ground was encountered which is not considered to pose a significant gas risk.

8.3 Unexpected Contamination

No visual or olfactory evidence of contamination was noted during the investigation.

A number of empty petrol and oil containers were noted to have been fly-tipped in the northwest corner of the site. TP03 was excavated in this area but no evidence of visible or olfactory hydrocarbon impaction was noted.

8.4 Chemical Testing

Eight samples of topsoil, six samples of reworked topsoil, three samples of made ground, two samples of potentially reworked clay and six samples of natural ground were submitted for chemical testing and analysed for the suite of contaminants listed in the following table.

Contaminant Type	Actual Contaminants
Metals/Metalloids	Arsenic, cadmium, chromium (III and VI), lead, mercury, nickel, selenium copper and zinc
PAHs	Speciated PAH
Sulphates*	pH, water soluble sulphate, acid soluble sulphate and sulphur
Asbestos**	Fibres

*Made and natural ground samples only
**Topsoil and made ground samples only

In addition to the above:

- Ten samples of topsoil, two samples of made ground and one sample of natural ground were tested for total organic carbon (TOC);

The chemical test results are included in Appendix 3.

8.5 Assessment Criteria

Tables detailing the relevant assessment concentrations for a residential development with homegrown produce have been used.

8.6 Chemical Test Results

8.6.1 Topsoil

The samples recorded an average total organic carbon of 4.05%, which equates to 7% soil organic matter (SOM). Assessment criteria derived for 6% SOM have been used in this assessment.

A number of heavy metals/metalloids and PAHs recorded concentrations exceeding either (or both) the human health and phytotoxicity assessment values:

	Assessment Value (mg/kg)		Elevated Concentration (mg/kg)	Modified/Corrected Mean (mg/kg)
	Human Health	Phytotoxicity		
Arsenic	37	50	38, 38, 41, 44, 45, 47, 47, 48, 67, 57	50.6
Copper	2,400	100, 135, 200	240	-
Mercury	1.2	1.0	4.8, 6.2	2.07
Lead	200	300	210, 280, 290, 490, 990	271
Zinc	3,700	200, 300	220, 580	-
Benzo(b)fluoranthene	3.7	-	4.5, 4.6	2.54
Benzo(a)pyrene	3.0	-	3.1, 3.7, 3.9	2.17
Dibenz(a,h)anthracene	0.3	-	0.48, 0.48	0.26

Asbestos fibres were detected in two samples, both at <0.001%:

Sample	Asbestos Containing Material Type	Asbestos
TP06 (0.1 m)	Loose Fibres	Chrysotile
TP07 (0.1 m)	Loose Fibres	Chrysotile

Seven of the samples recorded elevated concentrations of heavy metals/metalloids in comparison to their phytotoxicity assessment values:

Contaminant	Sample	Phytotoxicity Assessment Value (mg/kg)	Elevated Concentration (mg/kg)
Arsenic	TP03 (0.1 m)	50	57, 67
Lead	TP06 (0.1 m)	300	290, 490, 990
Copper	TP06	135	240
Mercury	SA02(0.1 m)	1	6.2
	TP05(0.1 m)		4.8
Zinc	TP06 (0.1 m)	200	580
	TP08(0.1 m)		220

8.6.2 Made & Natural Ground

Assessment criteria derived for 1% SOM have been used in this assessment.

Two samples of made ground obtained from WS06 and WS08 recorded elevated lead concentrations whilst the sample from WS06 alos recorded elevated PAH concentrations:

	Assessment Value (mg/kg)		Elevated Concentration (mg/kg)
	Human Health	Phytotoxicity	
Lead	200	300	240, 830
Benzo(b)fluoranthene	2.6	-	4.4
Benzo(a)pyrene	2.2	-	4.3
Dibenz(a,h)anthracene	0.24	-	0.46

None of the samples of natural ground recorded elevated concentrations of any of the determinants when compared to their human health or phytotoxicity assessment values.

8.6.3 Sulphates

In accordance with BRE Special Digest 1, the site comes under the classification of ‘brownfield’ and groundwater is expected to be mobile. The following table displays a summary of the results:

	Range of Results	Characteristic Value
Reworked Ground		
Water Soluble Sulphate (mg/l)	11.1, 24.2	24.2
Total Sulphur (%)	0.015, 0.022	-
Total Potential Sulphate (%)	0.045, 0.066	0.066
pH	6.2, 7.4	6.2
Made Ground		
Water Soluble Sulphate (mg/l)	15.6, 27.6, 45.1	45.1
Total Sulphur (%)	0.011, 0.051, 0.065	-
Total Potential Sulphate (%)	0.033, 0.153, 0.195	0.195
pH	7.7, 7.9, 8.4	7.7
Natural Ground		
Water Soluble Sulphate (mg/l)	9.51 to 53.6	46.0
Total Sulphur (%)	0.005 to 0.021	-
Total Potential Sulphate (%)	0.015 to 0.063	0.051
pH	5.0 to 7.7	5.05

8.7 Significant Pollutant Linkages

The significant pollutant linkages identified are documented in the following table:

Source	Contaminant	Pathway	Receptor
Topsoil Made ground	Heavy metals/metalloids PAH Asbestos fibres	Ingestion Inhalation Direct contact Biological uptake Migration through ground	Site residents and visitors to the site Site construction workers Secondary A Aquifer Plants Water supply pipes
Made or natural ground	Sulphates Low pH	Direct contact	Below ground concrete
Bedrock	Radon	Migration through ground	Site residents and visitors to the site Site construction workers

10.0 RISK ASSESSMENT

10.1 Human Health: Future Site Users

Topsoil

Elevated concentrations of a number of heavy metals/metalloids compared to their relevant human health assessment criteria were recorded and asbestos fibres were detected in two samples. The site won topsoil is considered chemically unsuitable for re-use. The material also recorded a high proportion of extraneous materials including brick, concrete, plastic, glass and metal indicating it is also physically unsuitable for re-use.

The two pits which recorded asbestos fibres were located in the east of the site. Whilst no asbestos containing material was visible in the trial pits, its presence cannot be discounted. Should any visible ACM be encountered, it should be removed by a specialist contractor.

The topsoil in the central and eastern thirds of the site recorded elevated arsenic, mercury and benzo(a)pyrene concentrations. The four samples from the western third recorded elevated arsenic concentrations. During the site clearance works, once material has been screened, additional testing could be undertaken on the western topsoil to see if the material is suitable for re-use.

Made & Natural Ground

The made ground encountered below the former developed areas has recorded elevated lead and PAH concentrations. Where made ground remains in place below gardens and landscaped areas it should be capped with a 600 mm thick clean cover system which comprises at least 100 mm of topsoil.

No elevated concentrations of contaminants were recorded in the natural ground. Arisings can be considered suitable for re-use.

10.2 Human Health: During Construction

Groundworkers employed during the construction phase of the development are most at risk of harm due to them having direct contact with affected soils. However, the contact is generally of short duration, and all competent ground workers will be aware of the potential risks associated with the made ground soils. Therefore, the overall risk to the health of construction workers is considered to be low.

Normal site procedures, such as the wearing of gloves when handling soils and the washing of hands prior to eating, should be implemented at all times.

10.3 Plants

Copper, mercury, arsenic, lead and zinc exceeded its limit for phytotoxicity in the topsoil. The material is considered to be unsuitable for re-use.

The made ground recorded elevated lead concentrations which will require a capping in overlying gardens and landscaped areas.

10.4 Ground Gas

Basic radon protective measures are necessary.

The desk study identified the potential for the former terraced houses to be underlain by cellars, and for there to be a significant thickness of fill due to historical regrading of ground levels. Shallow coal workings could be present. Offsite sources included a pond infilled by the 1890s around 174 m southeast of the site and a quarry, 246 m north of the site and assumed to have been backfilled around 100 years ago.

The intrusive investigation did not record a significant thickness of made ground below the former developed portion of the site. The made ground predominantly comprised a reworked clay with brick and sandstone cobbles and there was no evidence of organic material or degradable materials within the material; there was also no evidence of 'cellar backfill', often comprising demolition rubble, or any brick walls or cellar bases. The made ground found within the exploratory holes did not exceed 1.6 m in depth and given its relatively inert appearance, it can be considered to be a low risk of gas generation potential.

A rotary borehole investigation has been undertaken and encountered the Wheatley Lime coal at shallow depth, with no evidence of workings. A band of broken ground was encountered in one borehole between depths of 17.2 and 18.5 m, attributed to fractured ground associated with deeper collapsed workings. At a depth of 17.2 m with no associated coal seam, the fractured ground is not considered to be a source of ground gas.

Given the distance from site of the offsite pond and quarry features and the age of backfill, they are not considered to pose a gas risk to the site.

In summary, the only gas measures considered to be necessary will be basic radon measures.

10.5 Construction Materials

The chemical results indicate DS-1 AC-2z sulphate precautions are required where sub-surface concrete is in contact with made and natural ground.

The chemical test results will need to be submitted to the water supplier for review so that appropriate water supply pipes can be selected.

10.6 Controlled Waters

The solid geology below the site is classified as a Secondary A Aquifer, and the site does not lie within a Groundwater Source Protection Zone. The nearest surface water feature is considered to be a watercourse 165 m to the east of the site.

Elevated concentrations of phytotoxic metals were recorded in topsoil, but no elevated concentrations were noted in the underlying ground indicating the contaminants are not leachable. The risks to controlled waters is considered to be low.

Standard good site practice during the construction phase of the development must still be adhered to in terms of surface water run-off control measures, to ensure there is no risk to controlled waters.

10.7 Unexpected Contamination

Should any unusual, brightly coloured, ashy, oily, fibrous or odorous material or material suspected of containing asbestos be encountered during construction this should be brought to the attention of the site staff and investigated.

10.8 Disposal of Material

If material needs to be removed, it should to be taken to a suitably licensed landfill or waste treatment facility. The costs of disposal and landfill tax can be substantial. The disposal of material should therefore be seen as a last resort with options such as treatment and reuse either on-site or off-site considered where possible.

The category of landfill which can accept the waste (inert, non-hazardous or hazardous) would need to be determined and will also have a significant effect on the costs. Additional testing may be required by the landfill operator and the acceptance of material is generally at their discretion.

Appendix 1

Exploratory Hole Location Plan, 48785-ECE-XX-XX-DR-C-0001 P04

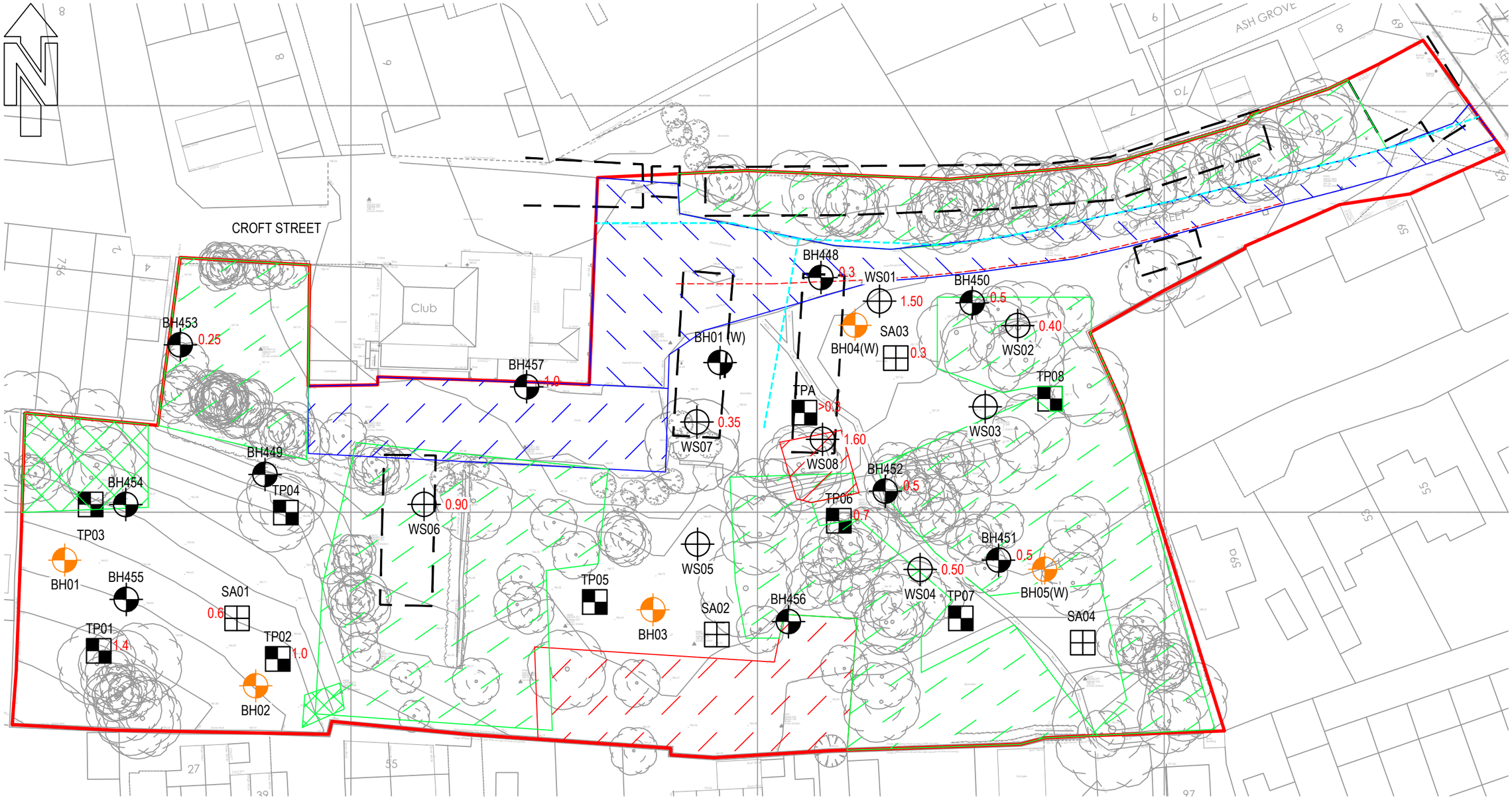
Trial Pit Logs, TP01 to TP08, SA01 to SA04, TPA

Window Sample Logs, WS01 to WS08

Borehole Logs, BH01 to BH05

Borehole Cross-Section

Site Investigation Photographs



KEY

- Trial pits excavated by ECE on 4 and 5 March 2024.
- Trial pits excavated by ECE on 4 and 5 March 2024.
- Boreholes excavated by BGS 6 and 9 December 1974. '(W)' indicates gas and ground water monitoring well installed.
- Rotary boreholes excavated by ECE on 13 and 14 June 2024.
- Club garden
- Japanese knotweed
- Heavily vegetated areas
- 1.4 Depth of made ground
- Approximate position of former building, taken from 1971 historical map.
- Approximate location of window sample borehole drilled by ECE on 28.11.2024.
- Road and carpark
- Tipped waste
- Small mound of topsoil and removed bushes
- 1.60 Approximate depth of made ground (m) found by ECE on 28.11.2024.

REV	DESCRIPTION	SIG	CHK	DATE
P01	First Issue.	AS	XXX	dd.mm.yyyy
P02	Proposed rotary boreholes added.	JL	KE	02.05.2024
P03	Updated to include 13 and 14 June boreholes.	DW	JDO	05.07.2024
P04	Window sample boreholes added.	JL	LF	07.01.2025

RIVA HOMES LTD

CROFT STREET, BIRKENSHAW, YORKSHIRE

EXPLORATORY HOLE LOCATION PLAN

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ECE PROJECT No	SCALE AT A3	STATUS	SUITABLE FOR
48785	1:500	S0	Initial

DRAWING NUMBER: 48785 - ECE - XX - XX - DR - C - 0001 (Project - Originator - Zone - Level - Type - Role - Number) REV: P04

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TrialPit No
TP01
Sheet 1 of 1

Project Name	Project No.	Co-ords: 420319.00 - 438433.00	Date
Croft Street, Birkenshaw	48785	Level: 183.40	05/03/2024
Location: Croft Street, Birkenshaw		Dimensions: 2.10m / 0.60m	Scale 1:25
Client: Riva Homes		Depth: 1.90m	Logged JDO

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
0.10	ES					REWORKED TOPSOIL: Dark brown slightly sandy slightly gravely CLAY with low cobble content. Gravel and cobble are angular to subangular clasts of brick, cement and sandstone. Occasional gravel sized fragments of plastic and glass. *Rare gravel sized fragments of slate and slag in the upper 100 mm.*
			0.50	182.90		
0.60	D					POSSIBLE MADE GROUND: Brown slightly sandy slightly gravelly silty CLAY. Gravel is fine to coarse angular clasts of sandstone. Occasional relict roots. *Occasional fragments of coal or burnt wood in the upper 400 mm.*
0.60	ES					
1.00	D					
1.00	ES					
			1.40	182.00		Extremely weak brown to grey SANDSTONE recovered as angular tabular gravel and cobbles.
			1.90	181.50		Trialpit Complete at 1.900m

Remarks: Terminated at 1.9m due to refusal in sandstone. Groundwater ingress at 1.7m. Backfilled with arisings upon completion.

Stability: Sides stable during excavation.

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TrialPit No
TP02
Sheet 1 of 1

Project Name	Project No.	Co-ords: 420341.00 - 428432.00	Date
Croft Street, Birkenshaw	48785	Level: 184.30	05/03/2024
Location: Croft Street, Birkenshaw		Dimensions: 2.10m (0.60m) Depth: 2.10m	Scale 1:25
Client: Riva Homes			Logged JDO

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
0.10	ES					TOPSOIL: Dark brown slightly sandy slightly gravely CLAY. Gravel is fine to coarse angular to subangular clasts of brick, slate and sandstone with rare fragments of porcelain, plastic and glass.
			0.30	184.00		POSSIBLE MADE GROUND: Brown silty slightly sandy slightly gravelly CLAY. Gravel is fine to coarse angular clasts of sandstone with occasional fragments of weathered coal.
0.60	D					
0.60	ES					
			1.00	183.30		Firm grey mottled orange sandy slightly gravely CLAY. Gravel is fine to coarse angular fragments of sandstone.
1.20	ES					
			1.50	182.80		Extremely weak brown SANDSTONE recovered as angular tabular gravel and cobbles.
2.00	ES					
			2.10	182.20		Trialpit Complete at 2.100m

Remarks: Terminated at 2.1m due to refusal in sandstone. Groundwater ingress at 1.8m. Backfilled with arisings upon completion.

Stability: Sides stable during excavation.

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TrialPit No
TP03
Sheet 1 of 1

Project Name	Project No.	Co-ords: 420318.00 - 428451.00	Date
Croft Street, Birkenshaw	48785	Level: 184.90	05/03/2024
Location: Croft Street, Birkenshaw		Dimensions: 2.10m, 0.60m, Depth: 2.20m	Scale 1:25
Client: Riva Homes			Logged JDO

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
0.10	ES					TOPSOIL: Dark brown slightly sandy slightly gravely CLAY. Gravel is fine to coarse angular to subangular clasts of brick, slate and sandstone with rare fragments of porcelain, plastic and glass.
			0.50	184.40		Firm grey mottled orange sandy slightly gravely CLAY. Gravel is fine to coarse angular fragments of sandstone.
1.00	D					
1.00	ES					
			1.80	183.10		Extremely weak brown SANDSTONE recovered as angular tabular gravel and cobbles.
			2.20	182.70		Trialpit Complete at 2.200m

Remarks: Terminated at 2.2m due to refusal in sandstone. Groundwater ingress at 2.1m. Backfilled with arisings upon completion.

Stability: Sides stable during excavation.

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TrialPit No
TP04
Sheet 1 of 1

Project Name	Project No.	Co-ords: 420342.00 - 428450.00	Date
Croft Street, Birkenshaw	48785	Level: 186.10	05/03/2024
Location: Croft Street, Birkenshaw		Dimensions: 2.10m, 0.60m, Depth: 1.80m	Scale 1:25
Client: Riva Homes			Logged JDO

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
0.10	ES					TOPSOIL: Dark brown slightly sandy slightly gravely CLAY. Gravel is fine to medium angular to subangular clasts of sandstone with occasional coal fragments.
			0.25	185.85		Firm grey mottled orange sandy slightly gravely CLAY. Gravel is fine to coarse angular fragments of sandstone and ironstone.
0.80	D					
0.80	ES					
			1.30	184.80		Extremely weak brown to grey SANDSTONE recovered as angular tabular gravel and cobbles.
			1.80	184.30		Trialpit Complete at 1.800m

Remarks: Terminated at 1.8m due to refusal in sandstone. Groundwater ingress at 1.7m. Backfilled with arisings upon completion.

Stability: Sides stable during excavation.

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TrialPit No
TP05
Sheet 1 of 1

Project Name	Project No.	Co-ords: 420380.00 - 428439.00	Date
Croft Street, Birkenshaw	48785	Level: 186.60	05/03/2024
Location: Croft Street, Birkenshaw		Dimensions: 2.10m (0.60m)	Scale 1:25
Client: Riva Homes		Depth: 2.10m	Logged JDO

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
0.10	ES		0.15	186.45		TOPSOIL: Dark brown slightly sandy slightly gravely CLAY. Gravel is fine to coarse angular to subangular clasts of sandstone with occasional coal fragments. *Fragments of plastic, brick and concrete in the upper 50 mm.*
0.60	ES					Firm grey mottled orange sandy slightly gravely CLAY. Gravel is fine to coarse angular fragments of sandstone.
0.90	D					
0.90	ES					
			1.70	184.90		Brown very sandy slightly clayey GRAVEL. Gravel is fine to coarse angular to subangular clasts of sandstone.
			2.00	184.60		Extremely weak brown to grey SANDSTONE recovered as angular tabular gravel and cobbles.
			2.10	184.50		Trialpit Complete at 2.100m

Remarks: Terminated at 2.1m due to refusal in sandstone. Groundwater ingress at 1.7m. Backfilled with arisings upon completion.

Stability: Sides stable during excavation.

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TrialPit No
TP06
Sheet 1 of 1

Project Name	Project No.	Co-ords: 420410.00 - 428449.00	Date
Croft Street, Birkenshaw	48785	Level: 186.75	05/03/2024
Location: Croft Street, Birkenshaw		Dimensions: 2.10m (0.60m) Depth: 2.10m	Scale 1:25
Client: Riva Homes			Logged JDO

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
0.10	ES					REWORKED TOPSOIL: Dark brown gravelly sandy CLAY with moderate cobble content. Gravel and cobbles are fine to coarse angular to subrounded clasts of brick, concrete, sandstone. Occasional fragments of glass, plastic and burnt wood.
			0.30	186.45		
0.40	D					POSSIBLE MADE GROUND: Brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse angular clast of sandstone.
0.40	ES					
			0.70	186.05		
0.80	D					Firm grey mottled orange sandy slightly gravely CLAY. Gravel is fine to coarse angular fragments of sandstone.
0.80	ES					
			1.50	185.25		Brown very sandy slightly clayey GRAVEL. Gravel is fine to coarse angular to subangular clasts of sandstone.
			1.90	184.85		Extremely weak brown to grey SANDSTONE recovered as angular tabular gravel and cobbles.
			2.10	184.65		Trialpit Complete at 2.100m

Remarks: Terminated at 2.1m due to refusal in sandstone. Groundwater ingress at 1.5m. Backfilled with arisings upon completion.

Stability: Sides stable during excavation.

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TrialPit No
TP07
Sheet 1 of 1

Project Name	Project No.	Co-ords: 420425.00 - 428437.00	Date
Croft Street, Birkenshaw	48785	Level: 186.20	05/03/2024
Location: Croft Street, Birkenshaw		Dimensions: 2.10m (0.60m) Depth: 2.10m	Scale 1:25
Client: Riva Homes			Logged JDO

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
0.10	ES					TOPSOIL: Dark brown gravelly sandy CLAY with low cobble content. Gravel and cobbles are fine to coarse angular to subrounded clasts of sandstone. Occasional fragments of glass and plastic.
			0.30	185.90		Firm grey mottled orange sandy slightly gravely CLAY. Gravel is fine to coarse angular fragments of sandstone.
0.60	D					
0.60	ES					
			1.60	184.60		Extremely weak brown to grey SANDSTONE recovered as angular tabular gravel and cobbles.
			2.10	184.10		Trialpit Complete at 2.100m

Remarks: Terminated at 2.1m due to refusal in sandstone. Groundwater ingress at 1.6m. Backfilled with arisings upon completion.

Stability: Sides stable during excavation.

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TrialPit No
TP08
Sheet 1 of 1

Project Name	Project No.	Co-ords: 420436.00 - 428464.00	Date
Croft Street, Birkenshaw	48785	Level: 187.20	05/03/2024
Location: Croft Street, Birkenshaw		Dimensions: 2.10m, 0.60m, Depth: 2.00m	Scale 1:25
Client: Riva Homes			Logged JDO

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
0.10	ES					TOPSOIL: Dark brown slightly gravelly sandy CLAY with low cobble content. Gravel and cobbles are fine to coarse angular to subrounded clasts of sandstone and brick with occasional fragments of glass and plastic.
			0.35	186.85		Firm grey mottled orange sandy slightly gravely CLAY. Gravel is fine to coarse angular fragments of sandstone.
0.80	D					
0.80	ES					
			1.50	185.70		Extremely weak brown to grey SANDSTONE recovered as angular tabular gravel and cobbles.
			2.00	185.20		Trialpit Complete at 2.000m

Remarks: Terminated at 2m due to refusal in sandstone. Groundwater ingress at 1.2m. Backfilled with arisings upon completion.

Stability: Sides stable during excavation.

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TrialPit No
SA01
Sheet 1 of 1

Project Name	Project No.	Co-ords: 420336.00 - 428437.00	Date
Croft Street, Birkenshaw	48785	Level: 184.50	04/03/2024
Location: Croft Street, Birkenshaw		Dimensions: 2.10m / 0.60m / Depth: 2.60m	Scale 1:25
Client: Riva Homes			Logged JDO

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
						TOPSOIL: Dark brown slightly sandy slightly gravelly CLAY. Gravel is fine to medium angular to subrounded clasts of sandstone.
			0.30	184.20		POSSIBLE MADE GROUND: Brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse angular clasts of sandstone.
			0.60	183.90		Firm grey and mottled orange slightly sandy gravelly CLAY with low cobble content. Gravel is fine to coarse angular clasts of sandstone. Cobbles are sub-angular of ironstone.
			1.80	182.70		Extremely weak grey SANDSTONE recovered as fine to coarse angular gravel and cobbles.
			2.60	181.90		Trialpit Complete at 2.600m

Remarks: Terminated at 2.6m to conduct infiltration test. Damp below 2m, slow groundwater ingress below 2.3m. Backfilled with arisings upon completion.

Stability: Sides stable during excavation.

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TrialPit No
SA02
Sheet 1 of 1

Project Name	Project No.	Co-ords: 420395.00 - 428435.00	Date
Croft Street, Birkenshaw	48785	Level: 186.60	04/03/2024
Location: Croft Street, Birkenshaw		Dimensions: 2.10m / 0.60m / Depth: 2.00m	Scale 1:25
Client: Riva Homes			Logged JDO

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
0.10	ES					TOPSOIL: Dark brown sandy CLAY.
			0.25	186.35		Firm grey mottled orange sandy slightly gravely CLAY with low cobble content. Gravel is fine to coarse angular fragments of sandstone. Cobbles are angular clasts of sandstone.
1.30	D					
1.30	ES					
			1.90	184.70		Grey and mottled orange slightly sandy clayey GRAVEL. Gravel is fine to coarse angular fragments of extremely weak sandstone.
			2.00	184.60		Trialpit Complete at 2.000m

Remarks: Terminated at 2.0m to observed groundwater ingress. Water ingress at 2m, water rose to 0.7m over around 4 hours. Backfilled with arisings upon completion.

Stability: Sides stable during excavation.

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TrialPit No
SA03
Sheet 1 of 1

Project Name	Project No.	Co-ords: 420417.00 - 428469.00	Date
Croft Street, Birkenshaw	48785	Level: 187.75	04/03/2024
Location: Croft Street, Birkenshaw		Dimensions: 2.10m / 0.60m / Depth: 2.60m	Scale 1:25
Client: Riva Homes			Logged JDO

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
0.10	ES					REWORKED TOPSOIL: Dark brown slightly sandy slightly gravely CLAY with low cobble content. Gravel and cobbles are angular to subangular clasts of brick, cement and sandstone.
			0.30	187.45		Firm grey and mottled orange sandy slightly gravely CLAY with low cobble content. Gravel is fine to coarse angular fragments of sandstone.
0.80	D					*400 mm diameter sandstone boulder encountered in southern end of trial pit*
0.80	ES					
			2.30	185.45		Extremely weak grey SANDSTONE recovered as angular tabular gravel and cobbles.
			2.60	185.15		Trialpit Complete at 2.600m

Remarks: Terminated at 2.6m to observe groundwater ingress. Groundwater ingress at 1.4m. Backfilled with arisings upon completion.

Stability: Sides stable during excavation.

Eastwood
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TrialPit No
SA04
Sheet 1 of 1

Project Name	Project No.	Co-ords: 420440.00 - 428434.00	Date
Croft Street, Birkenshaw	48785	Level: 185.70	04/03/2024
Location: Croft Street, Birkenshaw		Dimensions: 2.10m, 0.60m, Depth: 1.85m	Scale 1:25
Client: Riva Homes			Logged JDO

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
0.10	ES					TOPSOIL: Dark brown slightly sandy slightly gravely CLAY with low cobble content. Gravel and cobble are angular to subangular clasts of brick with occasional fragments of glass, plastic, wood and metal.
			0.35	185.35		Firm grey mottled orange sandy slightly gravely CLAY. Gravel is fine to coarse angular fragments of sandstone.
0.60	D					
0.60	ES					
			1.80	183.90		Extremely weak grey SANDSTONE. recovered as angular tabular gravel and cobbles.
			1.85	183.85		Trialpit Complete at 1.850m

Remarks: Terminated at 2.6m to observe groundwater ingress. Groundwater ingress at 1.6m. Backfilled with arisings upon completion.

Stability: Sides stable during excavation.

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TrialPit No
TPA
Sheet 1 of 1

Project Name	Project No.	Co-ords: 420407.00 - 428463.00	Date
Croft Street, Birkenshaw	48785	Level: 182.15	05/03/2024
Location: Croft Street, Birkenshaw		Dimensions: m Depth: m 0.30m	Scale 1:25
Client: Riva Homes			Logged JDO

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
			0.30	181.85		REWORKED TOPSOIL: Dark brown slightly sandy gravely CLAY with moderate cobble content. Gravel is fine to coarse angular to subrounded clasts of sandstone. Cobbles are angular to subangular clasts of brick and concrete. Occasional fragments of plastic and coal.
						Trialpit Complete at 0.300m

Remarks: Trial pit terminated at 0.3m due to encountering a water pipe. Backfilled with arisings upon completion.

Stability: Sides stable during excavation.

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Borehole No.
WS01
Sheet 1 of 1

Project Name: Croft Street, Birkenshaw	Project No.: 48785	Co-ords: 420415E - 428476N	Hole Type: WS
Location: Croft Street, Birkenshaw		Level: 187.90	Scale: 1:15
Client: Riva Homes		Dates: 28/11/2024	Logged By: LF

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
		0.20	ES		0.20	187.70		TOPSOIL (made ground): Dark brown slightly gravelly Slightly sandy CLAY with roots and rootlets. Gravel is fine to medium angular of brick with rare glass and plastic fragments.
		1.00	SPT	N=40 (25 for 115mm/16,10,7,7)				MADE GROUND: Soft gravelly CLAY with a high cobble content. Gravel is fine to coarse subangular to angular of brick and sandstone with rare plastic fragments.
		1.30	ES		1.30	186.60		MADE GROUND: Light brown very weathered sandstone recovered as fine to medium angular gravel.
		1.60	SPT	N=25 (6,4/5,7,6,7)	1.50	186.40		Stiff orangish brown mottled grey slightly sandy CLAY.
		1.80	ES					
		2.00	SPT	50 (6,8/50 for 215mm)	2.00	185.90		End of Borehole at 2.000m

Type | Results

Remarks
Terminated on sandstone bedrock. No groundwater encountered. Gas and groundwater monitoring well insalled to a depth of 2m.

Eastwood
CONSULTING ENGINEERS

Borehole No.
WS02
Sheet 1 of 1

Project Name: Croft Street, Birkenshaw	Project No.: 48785	Co-ords: 420432E - 428473N	Hole Type: WS
Location: Croft Street, Birkenshaw		Level: 187.47	Scale: 1:15
Client: Riva Homes		Dates: 28/11/2024	Logged By: LF

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
		0.20	ES		0.20	187.27		TOPSOIL (made ground): Dark brown slightly gravelly CLAY with roots and rootlets. Gravel is fine to medium of sandstone and brick.
		0.40	ES		0.40	187.07		MADE GROUND: Dark brown slightly sandy gravelly CLAY. Gravel is fine to coarse subangular to angular of sandstone and brick
		0.80	ES					Stiff brown mottled yellow slightly gravelly CLAY. Gravel is fine to medium of sandstone.
		1.00	SPT	N=50 (4,4/50 for 230mm)	1.00	186.47		End of Borehole at 1.000m
			Type	Results				

1
2

Remarks
Terminated on sandstone bedrock. No groundwater encountered.

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Borehole No.
WS03
Sheet 1 of 1

Project Name: Croft Street, Birkenshaw	Project No.: 48785	Co-ords: 420428E - 428463N	Hole Type: WS
Location: Croft Street, Birkenshaw		Level: 187.16	Scale: 1:15
Client: Riva Homes		Dates: 28/11/2024	Logged By: LF

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
		0.30	ES		0.40	186.76		TOPSOIL: Brown slightly gravelly CLAY withrootlets. Gravel is fine subangular of sandstone. occasional glass fragments.
					0.50	186.66		Firm light brown mottled orange slightly gravelly CLAY. Gravel is fine to medium angular of sandstone.
		0.60	ES					Extremely weak medium bedded sandstone.
		1.00	SPT	N=35 (3,4/10,8,7,10)	1.00	186.16		Stiff orange mottled grey slightly gravelly sandy CLAY. Gravel is fine to coarse subangular of sandstone .
		1.20	ES					
					1.40	185.76		Extremely weak grey weathered closely bedded mudstone.
		1.60	D					
		1.70	SPT	50 (10,14/50 for 160mm)	1.70	185.46		End of Borehole at 1.700m
			Type	Results				

Remarks

Terminated on mudstone bedrock. No groundwater encountered. Gas and groundwater monitoring well insalled to a depth of 1.7m.

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Borehole No.
WS04
Sheet 1 of 1

Project Name: Croft Street, Birkenshaw	Project No.: 48785	Co-ords: 420420E - 428443N	Hole Type: WS
Location: Croft Street, Birkenshaw		Level: 186.41	Scale: 1:15
Client: Riva Homes		Dates: 28/11/2024	Logged By: LF

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	ES		0.20	186.21		MADE GROUND: Concrete.
		0.40	ES					MADE GROUND: Soft light brown mottled orange slightly gravelly CLAY. Gravel is fine to medium angular of brick.
		0.80	ES		0.50	185.91		Stiff light brown mottled grey gravelly CLAY. Gravel is fine to coarse angular of sandstone.
		1.00	SPT	N=34 (4,4/4,6,9,15)				
		1.30	SPT	50 (25 for 95mm/50 for 90mm)	1.30	185.11		End of Borehole at 1.300m
			Type	Results				

Remarks
Terminated on sandstone bedrock. No groundwater encountered.

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Borehole No.
WS05
Sheet 1 of 1

Project Name: Croft Street, Birkenshaw	Project No.: 48785	Co-ords: 420393E - 428446N	Hole Type: WS
Location: Croft Street, Birkenshaw		Level: 186.65	Scale: 1:15
Client: Riva Homes		Dates: 28/11/2024	Logged By: LF

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	ES		0.30	186.35		TOPSOIL: Brown slightly gravelly CLAY with wood fragments and rootlets. Gravel is fine to coarse subangular of brick.
		0.50	ES					Soft light brown mottled grey CLAY.
		0.80	SPT	N=36 (7,5/8,8,9,11)	0.70	185.95		Extremely weak light brown sandstone.
		1.20	D		1.00	185.65		Stiff brown mottled grey slightly gravelly CLAY. Gravel is fine to medium angular of mudstone.
		1.50	ES					
		1.70	SPT	50 (24 for 125mm/50 for 120mm)	1.70	184.95		End of Borehole at 1.700m
			Type	Results				

Remarks

Terminated on mudstone bedrock. No groundwater encountered. Gas and groundwater monitoring well insalled to a depth of 1.7m.

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Borehole No.
WS06
Sheet 1 of 1

Project Name: Croft Street, Birkenshaw	Project No.: 48785	Co-ords: 420359E - 428451N	Hole Type: WS
Location: Croft Street, Birkenshaw		Level: 187.43	Scale: 1:15
Client: Riva Homes		Dates: 28/11/2024	Logged By: LF

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	ES		0.30	187.13		TOPSOIL (made ground): Dark brown slightly sandy gravelly CLAY. Gravel is fine to medium subangular to angular of sandstone with occasional fragments of glass.
		0.60	ES					MADE GROUND: Dark brown slightly sandy gravelly CLAY with rare cobble content. Gravel is fine to coarse subangular of brick and sandstone.
								Cobble of sandstone at 0.8m. (0.1x0.1x0.05)
		0.90	ES		0.90	186.53		Firm orangish brown mottled grey slightly gravelly CLAY. Gravel is fine to medium angular of mudstone.
		1.00	SPT	N=24 (2,2/7,6,6,5)				
		1.20	D					
		2.00	SPT	50 (7,13/50 for 80mm)	2.00	185.43		End of Borehole at 2.000m
		Type		Results				

Remarks
Terminated on mudstone bedrock. No groundwater encountered. Gas and groundwater monitoring well insalled to a depth of 2m.

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Borehole No.
WS07
Sheet 1 of 1

Project Name: Croft Street, Birkenshaw	Project No.: 48785	Co-ords: 420392E - 428461N	Hole Type: WS
Location: Croft Street, Birkenshaw		Level: 188.39	Scale: 1:15
Client: Riva Homes		Dates: 28/11/2024	Logged By: LF

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	ES		0.35	188.04		TOPSOIL (made ground): Dark brown slightly gravelly CLAY with rootlets. Gravel is fine subangular of sandstone and brick.
		0.60	ES					Firm orangish brown slightly sandy slightly gravelly CLAY. Gravel is fine subangular of sandstone.
		0.90	ES					
		1.00	SPT	N=19 (3,4/4,5,5,5)				
					1.30	187.09		*Becomes gravelly with fine to coarse gravels*
		1.40	SPT	50 (8,8/50 for 220mm)				
		1.50	D					End of Borehole at 1.500m
		Type		Results				

Remarks
Terminated on sandstone bedrock. No groundwater encountered. Gas and groundwater monitoring well insalled to a depth of 1.5 m.

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Borehole No.
WS08
Sheet 1 of 1

Project Name: Croft Street, Birkenshaw	Project No.: 48785	Co-ords: 420408E - 428459N	Hole Type: WS
Location: Croft Street, Birkenshaw		Level: 188.26	Scale: 1:15
Client: Riva Homes		Dates: 28/11/2024	Logged By: LF

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
								TOPSOIL (made ground): Dark brown slightly gravelly CLAY with rootlets. Gravel is fine subangular of sandstone and brick.
		0.20	ES		0.20	188.06		MADEGROUND: Concrete and brick recovered as subangular cobble.
		0.40	ES					*Little recovery due to pushing down an assumed cobble of brick from 0.2 m to 1.6 m.*
		1.00	ES					
		1.00	SPT	N=2 (1,1/2 for 225mm)				
					1.60	186.66		Firm Light brown mottled grey CLAY.
		1.70	SPT	N=26 (6,5/26 for 234mm)				
		2.00	D					
		2.30	SPT	50 (25 for 70mm/50 for 85mm)	2.30	185.96		End of Borehole at 2.300m
			Type	Results				

Remarks
Terminated on sandstone bedrock. No groundwater encountered. Gas and groundwater monitoring well insalled to a depth of 3m.

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Rotary Core Log

Borehole No.
BH01
Sheet 1 of 3

Project Name:	Croft Street, Birkenshaw	Project No. 48785	Co-ords:	420315.00 - 428444.00	Hole Type RO
Location:	Croft Street, Birkenshaw		Level:	184.30	Scale 1:50
Client:	Riva Homes		Dates:	13/06/2024 - 13/06/2024	Logged By Driller

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
							0.10	184.20		Topsoil Firm brown CLAY
							1.60	182.70		Grey MUDSTONE
							6.30	178.00		Coal
							6.70	177.60		Grey MUDSTONE/SILTSTONE
										Continued on next sheet

1 2 3 4 5 6 7 8 9 10

Remarks

Eastwood
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Rotary Core Log

Borehole No.
BH01
Sheet 2 of 3

Project Name:	Croft Street, Birkenshaw	Project No. 48785	Co-ords:	420315.00 - 428444.00	Hole Type RO
Location:	Croft Street, Birkenshaw		Level:	184.30	Scale 1:50
Client:	Riva Homes		Dates:	13/06/2024 - 13/06/2024	Logged By Driller

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description

11
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Continued on next sheet

Remarks

Eastwood
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Rotary Core Log

Borehole No.
BH01
Sheet 3 of 3

Project Name:	Croft Street, Birkenshaw	Project No. 48785	Co-ords:	420315.00 - 428444.00	Hole Type RO
Location:	Croft Street, Birkenshaw		Level:	184.30	Scale 1:50
Client:	Riva Homes		Dates:	13/06/2024 - 13/06/2024	Logged By Driller

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
							24.00	160.30		Brown SANDSTONE
							27.00	157.30		Grey MUDSTONE/SILTSTONE
							30.00	154.30		End of borehole at 30.00 m

21 22 23 24 25 26 27 28 29 30

Remarks

Eastwood
CONSULTING ENGINEERS

Rotary Core Log

Borehole No.
BH02
Sheet 1 of 3

Project Name:	Croft Street, Birkenshaw	Project No. 48785	Co-ords:	420338.00 - 428429.00	Hole Type RO
Location:	Croft Street, Birkenshaw		Level:	184.10	Scale 1:50
Client:	Riva Homes		Dates:	13/06/2024 - 13/06/2024	Logged By Driller

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
							0.10	184.00		Topsoil Firm brown CLAY
							1.60	182.50		Grey MUDSTONE/SILTSTONE
							7.00	177.10		Coal
							7.40	176.70		Grey MUDSTONE/SILTSTONE
										Continued on next sheet

1 2 3 4 5 6 7 8 9 10

Remarks

Eastwood
CONSULTING ENGINEERS

Rotary Core Log

Borehole No.
BH02
Sheet 2 of 3

Project Name:	Croft Street, Birkenshaw	Project No. 48785	Co-ords:	420338.00 - 428429.00	Hole Type RO
Location:	Croft Street, Birkenshaw		Level:	184.10	Scale 1:50
Client:	Riva Homes		Dates:	13/06/2024 - 13/06/2024	Logged By Driller

Well	Water Strikes	Depth (m)	Type / FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description
				TCR	SCR	RQD				

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Continued on next sheet

Remarks

Eastwood
CONSULTING ENGINEERS

Rotary Core Log

Borehole No.
BH02
Sheet 3 of 3

Project Name:	Croft Street, Birkenshaw	Project No. 48785	Co-ords:	420338.00 - 428429.00	Hole Type RO
Location:	Croft Street, Birkenshaw		Level:	184.10	Scale 1:50
Client:	Riva Homes		Dates:	13/06/2024 - 13/06/2024	Logged By Driller

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
							25.40	158.70		Brown SANDSTONE
							27.80	156.30		Grey MUDSTONE/SILTSTONE
							30.00	154.10		End of borehole at 30.00 m

21 22 23 24 25 26 27 28 29 30

Remarks

Eastwood
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Rotary Core Log

Borehole No.
BH03
Sheet 1 of 3

Project Name:	Croft Street, Birkenshaw	Project No. 48785	Co-ords:	420387.00 - 428438.00	Hole Type RO
Location:	Croft Street, Birkenshaw		Level:	186.60	Scale 1:50
Client:	Riva Homes		Dates:	13/06/2024 - 13/06/2024	Logged By Driller

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
							0.10	186.50		Topsoil Firm brown CLAY
							1.50	185.10		Brown SANDSTONE/Grey MUDSTONE
							4.50	182.10		Coal
							5.00	181.60		Grey MUDSTONE
										Continued on next sheet

Remarks

Eastwood
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Rotary Core Log

Borehole No.
BH03
Sheet 2 of 3

Project Name:	Croft Street, Birkenshaw	Project No. 48785	Co-ords:	420387.00 - 428438.00	Hole Type RO
Location:	Croft Street, Birkenshaw		Level:	186.60	Scale 1:50
Client:	Riva Homes		Dates:	13/06/2024 - 13/06/2024	Logged By Driller

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
							19.50	167.10		Brown SANDSTONE
										Continued on next sheet

11 12 13 14 15 16 17 18 19 20

Remarks

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Rotary Core Log

Borehole No.
BH03
Sheet 3 of 3

Project Name:	Croft Street, Birkenshaw	Project No. 48785	Co-ords:	420387.00 - 428438.00	Hole Type RO
Location:	Croft Street, Birkenshaw		Level:	186.60	Scale 1:50
Client:	Riva Homes		Dates:	13/06/2024 - 13/06/2024	Logged By Driller

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
							22.00	164.60		Grey MUDSTONE
							25.30	161.30		COAL
							26.00	160.60		Grey MUDSTONE/SILTSTONE
							30.00	156.60		End of borehole at 30.00 m

21 22 23 24 25 26 27 28 29 30

Remarks

Eastwood
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Rotary Core Log

Borehole No.
BH04
Sheet 1 of 3

Project Name:	Croft Street, Birkenshaw	Project No. 48785	Co-ords:	420412.00 - 428473.00	Hole Type RO
Location:	Croft Street, Birkenshaw		Level:	187.90	Scale 1:50
Client:	Riva Homes		Dates:	13/06/2024 - 13/06/2024	Logged By Driller

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
										Firm brown CLAY
							1.00	186.90		Brown SANDSTONE
							4.50	183.40		Grey MUDSTONE
							5.80	182.10		Dark shale MUDSTONE
							6.20	181.70		Grey MUDSTONE
										Continued on next sheet

1 2 3 4 5 6 7 8 9 10

Remarks
3m gas monitoring well installed.

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Rotary Core Log

Borehole No.
BH04
Sheet 2 of 3

Project Name:	Croft Street, Birkenshaw	Project No. 48785	Co-ords:	420412.00 - 428473.00	Hole Type RO
Location:	Croft Street, Birkenshaw		Level:	187.90	Scale 1:50
Client:	Riva Homes		Dates:	13/06/2024 - 13/06/2024	Logged By Driller

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
							18.00	169.90		Brown SANDSTONE/SILTSTONE
										Continued on next sheet

11 12 13 14 15 16 17 18 19 20

Remarks
3m gas monitoring well installed.

Eastwood
CONSULTING ENGINEERS

Rotary Core Log

Borehole No.
BH04
Sheet 3 of 3

Project Name:	Croft Street, Birkenshaw	Project No. 48785	Co-ords:	420412.00 - 428473.00	Hole Type RO
Location:	Croft Street, Birkenshaw		Level:	187.90	Scale 1:50
Client:	Riva Homes		Dates:	13/06/2024 - 13/06/2024	Logged By Driller

Well	Water Strikes	Depth (m)	Type / FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description
				TCR	SCR	RQD				
							30.00	157.90		End of borehole at 30.00 m

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Remarks
3m gas monitoring well installed.

Eastwood
CONSULTING ENGINEERS

Rotary Core Log

Borehole No.
BH05
Sheet 1 of 3

Project Name:	Croft Street, Birkenshaw	Project No. 48785	Co-ords:	420435.00 - 428443.00	Hole Type RO
Location:	Croft Street, Birkenshaw		Level:	186.60	Scale 1:50
Client:	Riva Homes		Dates:	13/06/2024 - 13/06/2024	Logged By Driller

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
										Firm brown CLAY
							1.30	185.30		Brown SANDSTONE
							4.00	182.60		Grey MUDSTONE
							5.00	181.60		COAL
							5.50	181.10		Grey MUDSTONE
										Continued on next sheet

Remarks
3m gas monitoring well installed.

Eastwood
CONSULTING ENGINEERS

Rotary Core Log

Borehole No.
BH05
Sheet 2 of 3

Project Name:	Croft Street, Birkenshaw	Project No. 48785	Co-ords:	420435.00 - 428443.00	Hole Type RO
Location:	Croft Street, Birkenshaw		Level:	186.60	Scale 1:50
Client:	Riva Homes		Dates:	13/06/2024 - 13/06/2024	Logged By Driller

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
							17.20	169.40		Broken Ground
							18.50	168.10		Solid strata
										Continued on next sheet

11 12 13 14 15 16 17 18 19 20

Remarks
3m gas monitoring well installed.

Eastwood
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Rotary Core Log

Borehole No.
BH05
Sheet 3 of 3

Project Name:	Croft Street, Birkenshaw	Project No. 48785	Co-ords:	420435.00 - 428443.00	Hole Type RO
Location:	Croft Street, Birkenshaw		Level:	186.60	Scale 1:50
Client:	Riva Homes		Dates:	13/06/2024 - 13/06/2024	Logged By Driller

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
							24.00	162.60		End of borehole at 24.00 m

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Remarks
3m gas monitoring well installed.

Project Id: 48785	Title: Section Line
Project Title: Croft Street, Birkenshaw	Vertical Scale: 1:261
Location: Croft Street, Birkenshaw	Horizontal Scale: 1:916
Client: Riva Homes	Engineer:

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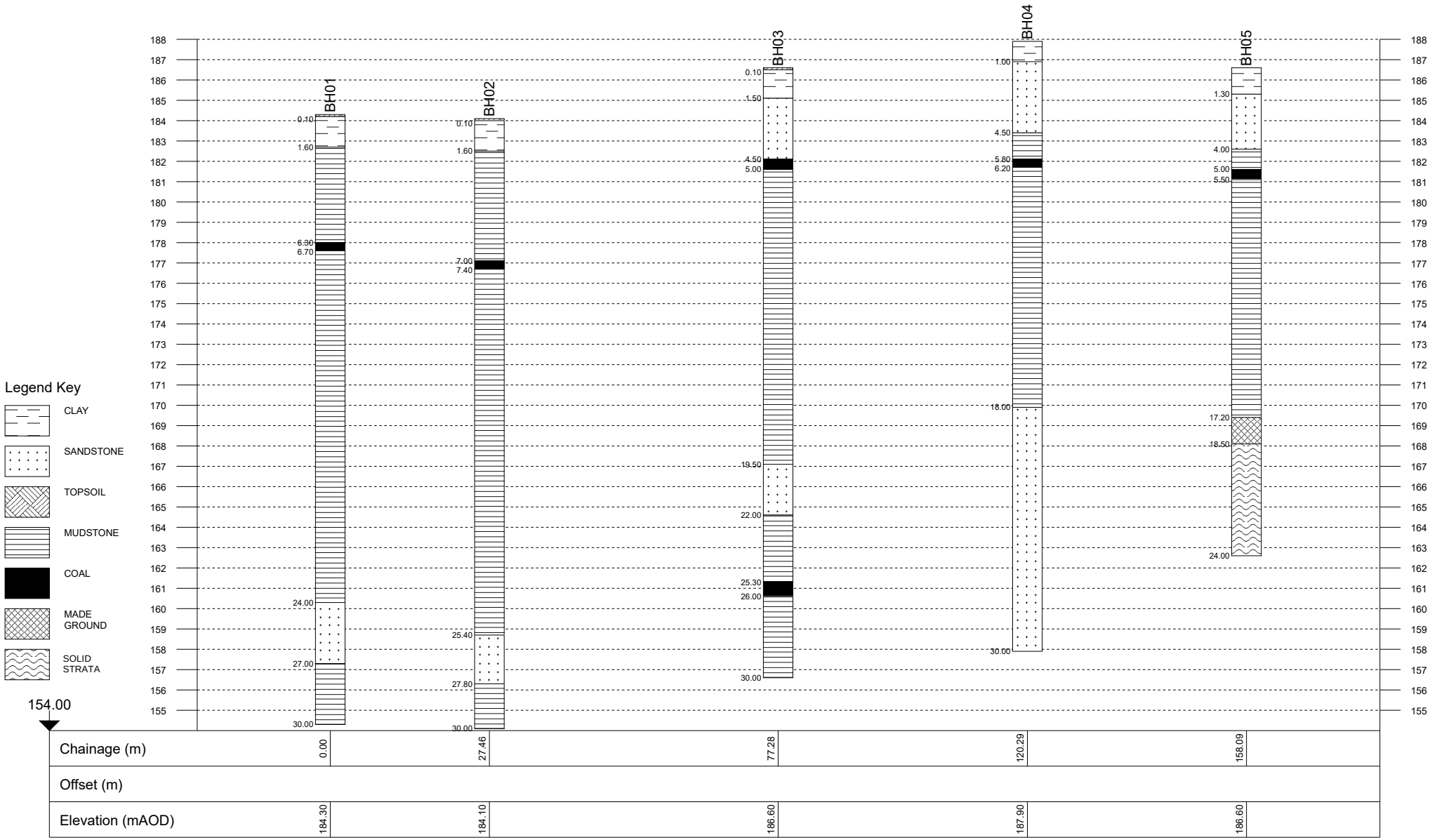

View of the central third of the site. Multiple mature trees are visible. Looking south.

View of the western third of the site. Mature trees visible to the south, east and west. Looking southwest.

Prepared	JDO	Checked		Job No.	48785	Date	04.03.24	Photograph No.	1&2

CROFT STREET, BIRKENSHAW

RIVA HOMES

SITE PHOTOGRAPHS

Eastwood
CONSULTING ENGINEERS

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View down the path from the north of the site. Multiple mature trees are visible. Looking south.

View up the path from the southeast of the site. Multiple mature trees are visible. Looking northwest.

Prepared	JDO	**Checked**		**Job No.**	48785	**Date**	04.03.24	**Photograph No.**	**3&4**

CROFT STREET, BIRKENSHAW

RIVA HOMES

SITE PHOTOGRAPHS

Eastwood
CONSULTING ENGINEERS

St Andrew's House
23 Kingfield Road
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E: mail@eastwoodce.com
eastwoodce.com

View of the north of the site. Mature trees visible in the background. Hardstanding of the car park and road visible in the foreground. Street light visible in the background of the middle of the image. Looking north.

Fly tipped waste in the northwest of the site. Mature trees visible on the north. Looking west.

Prepared	JDO	Checked		Job No.	48785	Date	04.03.24	Photograph No.	5&6

CROFT STREET, BIRKENSHAW

RIVA HOMES

SITE PHOTOGRAPHS

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View of the possible Japanese Knotweed stands in the south of the site.

View down the retaining wall along the southern boundary of the site. Looking south.

Prepared	JDO	Checked		Job No.	48785	Date	04.03.24	Photograph No.	7&8

CROFT STREET, BIRKENSHAW

RIVA HOMES

SITE PHOTOGRAPHS

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SA02 – Clay below topsoil with sandstone at base. Groundwater pooling at bottom. Photo taken around 30 minutes after pit was opened.

SA02 – Approximately 3 hours after opening.

Prepared	JDO	Checked		Job No.	48785	Date	04.03.24	Photograph No.	9&10

CROFT STREET, BIRKENSHAW

RIVA HOMES

SITE PHOTOGRAPHS

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Lead pipe uncovered in TPA

SA03 – Clay below topsoil, sandstone at base. Groundwater ingress, pooling at bottom of pit.

Prepared	JDO	Checked		Job No.	48785	Date	04.03.24	Photograph No.	11&12

CROFT STREET, BIRKENSHAW

RIVA HOMES

SITE PHOTOGRAPHS

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CONSULTING ENGINEERS

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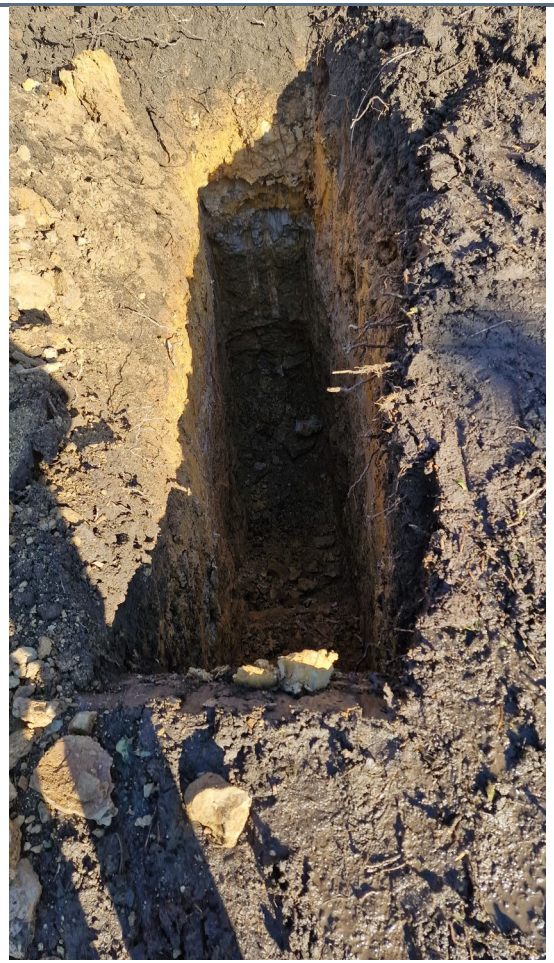
eastwoodce.com



SA01 – Clay below topsoil, sandstone at base.

TP01 – Clay below topsoil. Sandstone at base.

Prepared	JDO	Checked		Job No.	48785	Date	04.03.24	Photograph No.	13&14

CROFT STREET, BIRKENSHAW

RIVA HOMES

SITE PHOTOGRAPHS

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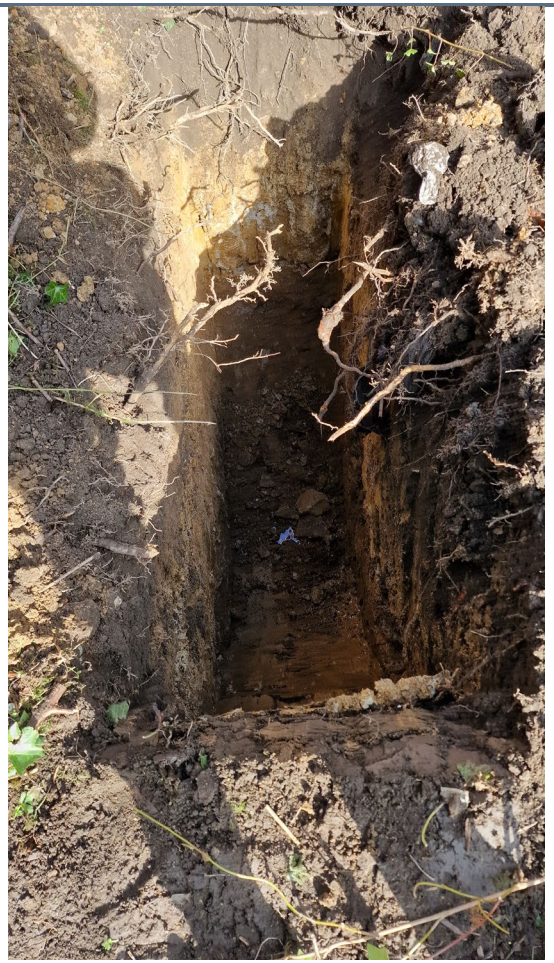
eastwoodce.com

TP03 – Clay below topsoil. Sandstone at base.



TP07 – Clay below topsoil with sandstone at the base. Groundwater pooling at base.

Prepared	JDO	Checked		Job No.	48785	Date	04.03.24	Photograph No.	15&16

CROFT STREET, BIRKENSHAW

RIVA HOMES

SITE PHOTOGRAPHS

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WS01

WS05

Prepared	LF	Checked		Job No.	48785	Date	28.11.2024	Photograph No.	17&18

CROFT STREET, BIRKENSHAW

RIVA HOMES

SITE PHOTOGRAPHS

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WS06

WS08

Prepared	LF	**Checked**		**Job No.**	48785	**Date**	28.11.2024	**Photograph No.**	**19&20**

CROFT STREET, BIRKENSHAW

RIVA HOMES

SITE PHOTOGRAPHS

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Appendix 2

Geotechnical Test Results, PSL24/2371

LABORATORY REPORT

Contract Number: PSL24/2371

Report Date: 10 April 2024

Client's Reference: 48785

Client Name: Eastwood Consulting Engineers
St Andrews House
23 Kingfield Road
Sheffield
S11 9AS

For the attention of: Jack Ditchfield-Ogle

Contract Title: Croft Street, Birkenshaw

Date Received: 4/4/2024
Date Commenced: 4/4/2024
Date Completed: 10/4/2024

Notes: Opinions and Interpretations are outside the UKAS Accreditation

Checked and Approved Signatories:

A Watkins (Managing Director)	R Berriman (Associate Director)	S Royle (Laboratory Manager)
L Knight (Assistant Laboratory Manager)	S Eyre (Senior Technician)	A Fry (Section Manager)

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Tel: 01302 768098
Email: rberriman@prosoils.co.uk
awatkins@prosoils.co.uk

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
SA02		D	1.30		Brown mottled grey slightly gravelly slightly sandy CLAY.
TP02		D	1.20		Brown mottled grey slightly sandy CLAY.
SA03		D	0.80		Brown mottled grey gravelly slightly sandy CLAY.

UKAS TESTING 4043

PROFESSIONAL SOILS LABORATORY
A PHENNA GROUP COMPANY

Croft Street, Birkenshaw

Contract No:
PSL24/2371
Client Ref:
48785

SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Moisture Content % Clause 3.2	Linear Shrinkage % Clause 6.5	Particle Density Mg/m^3 Clause 8.2	Liquid Limit % Clause 4.3/4	Plastic Limit % Clause 5.3	Plasticity Index % Clause 5.4	Passing .425mm %	Remarks
SA02		D	1.30		17			46	25	21	94	Intermediate Plasticity CI
TP02		D	1.20		30			77	33	44	100	Very High Plasticity CV
SA03		D	0.80		23			41	23	18	86	Intermediate Plasticity CI

SYMBOLS : **NP : Non Plastic** *** : Liquid Limit and Plastic Limit Wet Sieved.**

UKAS TESTING 4043

PSL PROFESSIONAL SOILS LABORATORY A PHENNA GROUP COMPANY

Croft Street, Birkenshaw

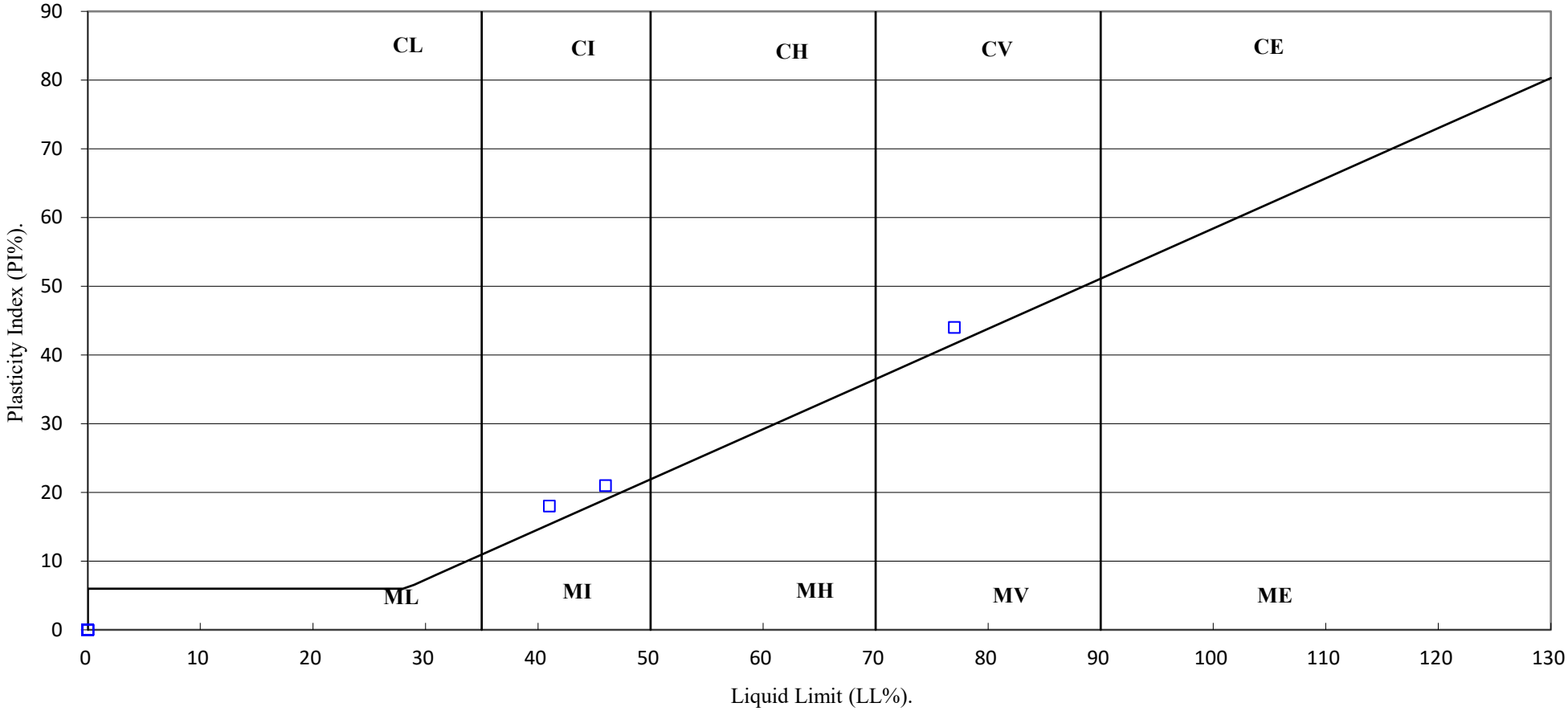
Contract No:

PSL24/2371

Client Ref:

48785

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.



UKAS TESTING 4043	PSL PROFESSIONAL SOILS LABORATORY A PHENNA GROUP COMPANY	**Croft Street, Birkenshaw**

Contract No:
PSL24/2371
Client Ref:
48785

PARTICLE SIZE DISTRIBUTION TEST

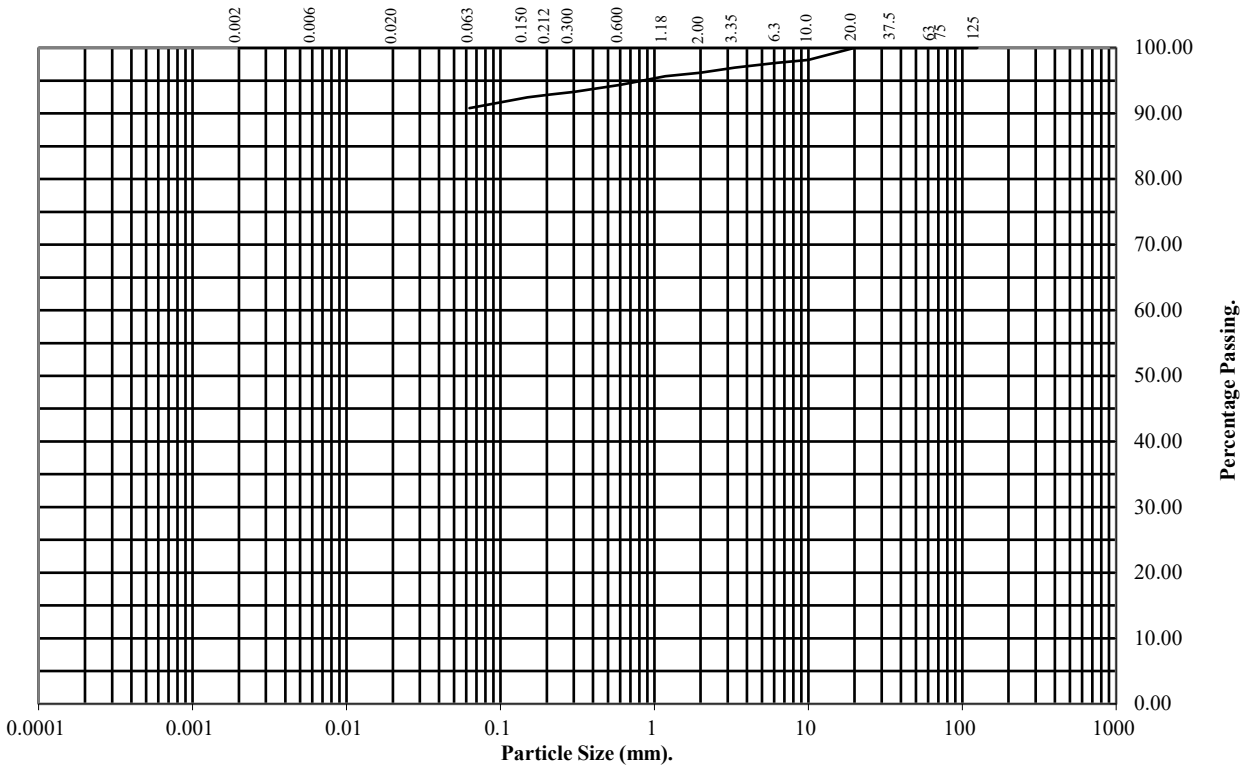
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: SA02 **Top Depth (m):** 1.30

Sample Number: **Base Depth(m):**

Sample Type: D



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	98
6.3	98
3.35	97
2	96
1.18	96
0.6	94
0.3	93
0.212	93
0.15	92
0.063	91

Soil Fraction	Total Percentage
Cobbles	0
Gravel	4
Sand	5
Silt/Clay	91

Remarks:
See Summary of Soil Descriptions

PARTICLE SIZE DISTRIBUTION TEST

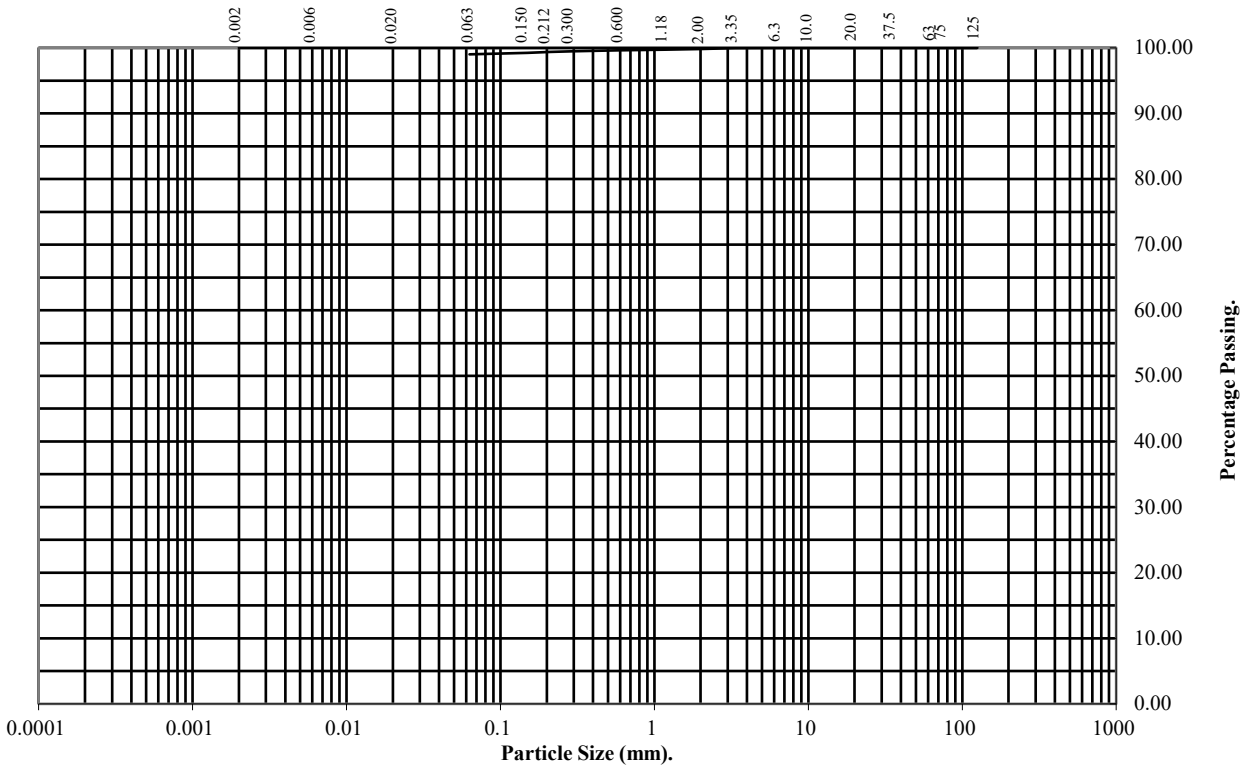
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: TP02 **Top Depth (m):** 1.20

Sample Number: **Base Depth(m):**

Sample Type: D



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	100
2	100
1.18	100
0.6	100
0.3	99
0.212	99
0.15	99
0.063	99

Soil Fraction	Total Percentage
Cobbles	0
Gravel	0
Sand	1
Silt/Clay	99

Remarks:

See Summary of Soil Descriptions

PARTICLE SIZE DISTRIBUTION TEST

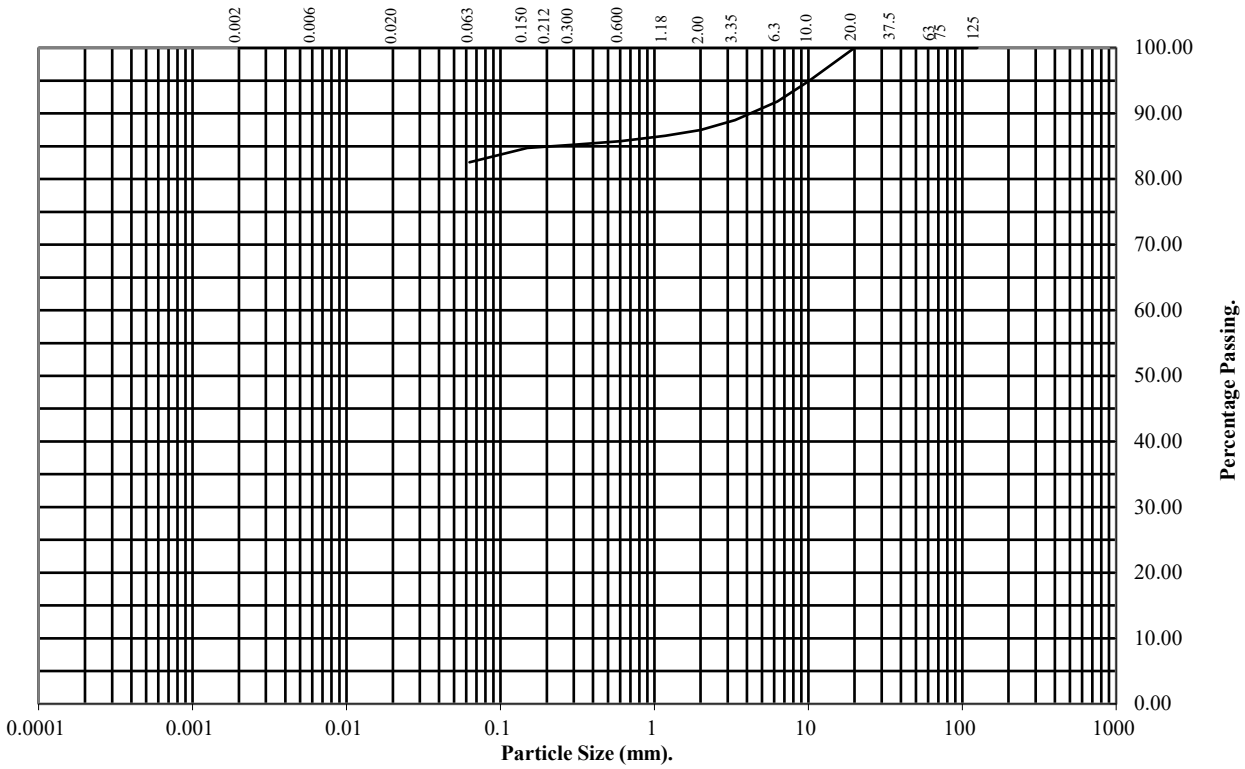
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: SA03 **Top Depth (m):** 0.80

Sample Number: **Base Depth(m):**

Sample Type: D



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	95
6.3	92
3.35	89
2	87
1.18	87
0.6	86
0.3	85
0.212	85
0.15	85
0.063	83

Soil Fraction	Total Percentage
Cobbles	0
Gravel	13
Sand	4
Silt/Clay	83

Remarks:
See Summary of Soil Descriptions

UKAS TESTING 4043

PSL PROFESSIONAL SOILS LABORATORY A PHENNA GROUP COMPANY

Croft Street, Birkenshaw

Contract No: PSL24/2371

Client Ref: 48785

Appendix 3

Chemical Test Results, i2 Analytical Report 24-007928-2 and 24-059164-1

Table of Assessment Values – Residential with Home-grown Produce

Corrected/Modified Means – Arsenic, Lead, Mercury, Benzo(b)fluoranthene, Benzo(a)Pyrene, Dibenz(a,h)anthracene

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Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404
f: 01923 237404
e: reception@i2analytical.com

Analytical Report Number : 24-007928

Replaces Analytical Report Number: 24-007928, issue no. 1
Additional analysis undertaken.
Asbestos quantification added as per clients request

Project / Site name:	Croft Street, Bikenshaw	**Samples received on:**	08/03/2024
Your job number:	48785	**Samples instructed on/ Analysis started on:**	08/03/2024
Your order number:		**Analysis completed by:**	15/03/2024
Report Issue Number:	2	**Report issued on:**	11/04/2024
Samples Analysed:	19 soil samples		

Signed:

Joanna Wawrzeczko
Senior Reporting Specialist
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

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

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: 24-007928
Project / Site name: Croft Street, Bikenshaw

Lab Sample Number				139616	139617	139618	139619	139620
Sample Reference				SA02	SA03	SA04	TP01	TP02
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.10	0.10	0.10	0.10
Date Sampled				05/03/2024	05/03/2024	05/03/2024	05/03/2024	05/03/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	41.6	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	24	16	16	20	22
Total mass of sample received	kg	0.1	NONE	0.3	0.9	0.9	0.8	0.9
Asbestos								
Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	MMI	MMI	MMI	MMI	MMI
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	-	-	-	-	-
Asbestos Containing Material Types Detected (ACM)	Type	N/A	ISO 17025	-	-	-	-	-
General Inorganics								
pH (L099)	pH Units	N/A	MCERTS	6.7	8.6	7.6	7.5	7.7
Total Sulphate as SO_4	%	0.005	MCERTS	-	-	-	-	-
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	-	-	-	-	-
Water Soluble SO_4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	-	-	-	-
Water Soluble SO_4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	-	-	-	-
Total Sulphur	mg/kg	50	MCERTS	-	-	-	-	-
Total Sulphur	%	0.005	MCERTS	-	-	-	-	-
Organic Matter (automated)	%	0.1	MCERTS	-	-	-	-	-
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	5.2	3.1	5	4.2	3.5
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	1.1	0.21	0.29	0.36	0.36
Acenaphthylene	mg/kg	0.05	MCERTS	0.16	< 0.05	0.22	< 0.05	0.05
Acenaphthene	mg/kg	0.05	MCERTS	0.12	0.07	0.11	0.14	0.07
Fluorene	mg/kg	0.05	MCERTS	0.24	0.06	0.19	0.11	0.07
Phenanthrene	mg/kg	0.05	MCERTS	1.5	0.99	3.2	1.2	0.92
Anthracene	mg/kg	0.05	MCERTS	0.36	0.2	0.65	0.25	0.17
Fluoranthene	mg/kg	0.05	MCERTS	2.1	2.1	6.6	2.3	1.7
Pyrene	mg/kg	0.05	MCERTS	1.8	1.9	5.8	2.1	1.5
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.96	1.2	3.5	1.2	0.85
Chrysene	mg/kg	0.05	MCERTS	1	1.1	3.1	1.3	0.91
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	1.4	1.3	3.2	1.5	0.98
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.44	0.55	1.7	0.61	0.47
Benzo(a)pyrene	mg/kg	0.05	MCERTS	1.3	1.1	3.1	1.2	0.83
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.45	0.54	1.6	0.59	0.48
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.14	0.17	< 0.05	0.19	0.13
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.48	0.64	1.8	0.71	0.52
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	13.4	12.1	35	13.8	10.1
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	38	27	41	47	47

Analytical Report Number: 24-007928
Project / Site name: Croft Street, Bikenshaw

Lab Sample Number				139616	139617	139618	139619	139620
Sample Reference				SA02	SA03	SA04	TP01	TP02
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.10	0.10	0.10	0.10
Date Sampled				05/03/2024	05/03/2024	05/03/2024	05/03/2024	05/03/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	21	21	24	33	44
Copper (aqua regia extractable)	mg/kg	1	MCERTS	110	56	74	72	68
Lead (aqua regia extractable)	mg/kg	1	MCERTS	110	150	200	130	170
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	6.2	0.6	0.5	0.9	0.5
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	22	23	21	22	25
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	120	180	290	160	200

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

Analytical Report Number: 24-007928
Project / Site name: Croft Street, Bikenshaw

Lab Sample Number				139621	139622	139623	139624	139625
Sample Reference				TP03	TP04	TP05	TP06	TP07
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.10	0.10	0.10	0.10
Date Sampled				05/03/2024	05/03/2024	05/03/2024	05/03/2024	05/03/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	20	21	24	19	20
Total mass of sample received	kg	0.1	NONE	0.8	0.8	0.8	0.9	0.9
Asbestos								
Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Detected	Detected
Asbestos Analyst ID	N/A	N/A	N/A	MMI	MMI	MMI	MMI	MMI
Actinolite detected	Type	N/A	ISO 17025	-	-	-	Not-detected	Not-detected
Amosite detected	Type	N/A	ISO 17025	-	-	-	Not-detected	Not-detected
Anthophyllite detected	Type	N/A	ISO 17025	-	-	-	Not-detected	Not-detected
Chrysotile detected	Type	N/A	ISO 17025	-	-	-	Detected	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
Asbestos Containing Material Types Detected (ACM)	Type	N/A	ISO 17025	-	-	-	Loose Fibres	Loose Fibres
General Inorganics								
pH (L099)	pH Units	N/A	MCERTS	6	6.2	5.7	6.3	7.2
Total Sulphate as SO_4	%	0.005	MCERTS	-	-	-	-	-
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	-	-	-	-	-
Water Soluble SO_4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	-	-	-	-
Water Soluble SO_4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	-	-	-	-
Total Sulphur	mg/kg	50	MCERTS	-	-	-	-	-
Total Sulphur	%	0.005	MCERTS	-	-	-	-	-
Organic Matter (automated)	%	0.1	MCERTS	-	-	-	11	-
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	4.3	-	4.3	6.2	-
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	0.31	0.27	0.26	0.36	0.29
Acenaphthylene	mg/kg	0.05	MCERTS	0.07	< 0.05	< 0.05	0.06	0.08
Acenaphthene	mg/kg	0.05	MCERTS	0.12	0.09	0.08	0.06	0.14
Fluorene	mg/kg	0.05	MCERTS	0.1	0.08	0.07	0.06	0.12
Phenanthrene	mg/kg	0.05	MCERTS	1.6	0.94	1.1	0.99	2
Anthracene	mg/kg	0.05	MCERTS	0.33	0.19	0.23	0.19	0.41
Fluoranthene	mg/kg	0.05	MCERTS	3	1.6	1.9	2.4	3.9
Pyrene	mg/kg	0.05	MCERTS	2.6	1.4	1.7	2.2	3.7
Benzo(a)anthracene	mg/kg	0.05	MCERTS	1.5	0.78	0.94	1.4	1.7
Chrysene	mg/kg	0.05	MCERTS	1.5	0.79	0.96	1.4	1.9
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	1.7	0.97	0.96	1.6	2.1
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.6	0.34	0.49	0.81	0.93
Benzo(a)pyrene	mg/kg	0.05	MCERTS	1.3	0.72	0.83	1.4	1.8
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.66	0.39	0.45	0.88	1
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.23	< 0.05	0.15	< 0.05	0.29
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.71	0.43	0.48	1	1.2
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	16.4	9.05	10.6	14.9	21.6
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	67	44	38	35	45

Analytical Report Number: 24-007928
Project / Site name: Croft Street, Bikenshaw

Lab Sample Number				139621	139622	139623	139624	139625
Sample Reference				TP03	TP04	TP05	TP06	TP07
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.10	0.10	0.10	0.10
Date Sampled				05/03/2024	05/03/2024	05/03/2024	05/03/2024	05/03/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	1.9	< 1.8	< 1.8	< 1.8	< 1.8
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	40	40	22	25	29
Copper (aqua regia extractable)	mg/kg	1	MCERTS	92	62	88	240	60
Lead (aqua regia extractable)	mg/kg	1	MCERTS	130	160	120	990	210
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.5	0.8	4.8	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	28	29	22	29	23
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	190	160	120	580	190

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

Analytical Report Number: 24-007928
Project / Site name: Croft Street, Bikenshaw

Lab Sample Number				139626	139627	139628	139629	139630
Sample Reference				TP08	SA03	TP01	TP03	TP05
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.80	0.60	1.00	0.60
Date Sampled				05/03/2024	05/03/2024	05/03/2024	05/03/2024	05/03/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	22	16	8.5	6.1	8.4
Total mass of sample received	kg	0.1	NONE	1	1.1	0.9	1	1.1
Asbestos								
Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Not-detected	-	-	-	-
Asbestos Analyst ID	N/A	N/A	N/A	MMI	-	-	-	-
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	-	-	-	-	-
Asbestos Containing Material Types Detected (ACM)	Type	N/A	ISO 17025	-	-	-	-	-
General Inorganics								
pH (L099)	pH Units	N/A	MCERTS	6.5	7.7	7.4	5.1	6.9
Total Sulphate as SO_4	%	0.005	MCERTS	-	0.007	0.047	0.019	0.029
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	-	32	22	32	19
Water Soluble SO_4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	0.01595	0.01112	0.01584	0.00951
Water Soluble SO_4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	16	11.1	15.8	9.51
Total Sulphur	mg/kg	50	MCERTS	-	< 50	220	76	120
Total Sulphur	%	0.005	MCERTS	-	< 0.005	0.022	0.008	0.012
Organic Matter (automated)	%	0.1	MCERTS	-	-	-	-	-
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	-	-	1.6	0.4	-
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	0.45	0.12	0.17	< 0.05	0.1
Acenaphthylene	mg/kg	0.05	MCERTS	0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	0.06	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	0.08	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.91	< 0.05	< 0.05	< 0.05	< 0.05
Anthracene	mg/kg	0.05	MCERTS	0.2	< 0.05	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	1.8	< 0.05	< 0.05	< 0.05	< 0.05
Pyrene	mg/kg	0.05	MCERTS	1.8	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	1	< 0.05	< 0.05	< 0.05	< 0.05
Chrysene	mg/kg	0.05	MCERTS	1.1	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	1.4	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.47	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	1.1	< 0.05	< 0.05	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.55	< 0.05	< 0.05	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.16	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.62	< 0.05	< 0.05	< 0.05	< 0.05
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	11.7	< 0.80	< 0.80	< 0.80	< 0.80
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	48	4.8	17	4.9	7.3

Analytical Report Number: 24-007928
Project / Site name: Croft Street, Bikenshaw

Lab Sample Number				139626	139627	139628	139629	139630
Sample Reference				TP08	SA03	TP01	TP03	TP05
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.80	0.60	1.00	0.60
Date Sampled				05/03/2024	05/03/2024	05/03/2024	05/03/2024	05/03/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	25	22	19	20	22
Copper (aqua regia extractable)	mg/kg	1	MCERTS	65	16	29	17	17
Lead (aqua regia extractable)	mg/kg	1	MCERTS	280	8.4	30	13	15
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	24	20	20	18	21
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	1.6	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	220	58	71	56	68

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

Analytical Report Number: 24-007928
Project / Site name: Croft Street, Bikenshaw

Lab Sample Number				139631	139632	139633	139634
Sample Reference				TP06	TP07	TP08	TP06
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.40	0.60	0.80	0.80
Date Sampled				05/03/2024	05/03/2024	05/03/2024	05/03/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**				
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	23	15	19	12
Total mass of sample received	kg	0.1	NONE	1	1	1.1	1
Asbestos							
Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Not-detected	-	-	-
Asbestos Analyst ID	N/A	N/A	N/A	MMI	-	-	-
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	-	-	-	-
Asbestos Containing Material Types Detected (ACM)	Type	N/A	ISO 17025	-	-	-	-
General Inorganics							
pH (L099)	pH Units	N/A	MCERTS	6.2	5.2	5	5.1
Total Sulphate as SO_4	%	0.005	MCERTS	0.026	0.034	0.025	0.06
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	48	77	69	110
Water Soluble SO_4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.02417	0.03828	0.0347	0.05356
Water Soluble SO_4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	24.2	38.3	34.7	53.6
Total Sulphur	mg/kg	50	MCERTS	150	130	130	210
Total Sulphur	%	0.005	MCERTS	0.015	0.013	0.013	0.021
Organic Matter (automated)	%	0.1	MCERTS	-	-	-	-
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	-	-	-	-
Speciated PAHs							
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	0.15	0.19	0.31
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Total PAH							
Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	< 0.80	< 0.80	< 0.80	< 0.80
Heavy Metals / Metalloids							
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	6.8	4.1	5	5.4

Analytical Report Number: 24-007928
Project / Site name: Croft Street, Bikenshaw

Lab Sample Number				139631	139632	139633	139634
Sample Reference				TP06	TP07	TP08	TP06
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.40	0.60	0.80	0.80
Date Sampled				05/03/2024	05/03/2024	05/03/2024	05/03/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**				
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	< 1.8	< 1.8
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	25	21	23	25
Copper (aqua regia extractable)	mg/kg	1	MCERTS	12	19	20	27
Lead (aqua regia extractable)	mg/kg	1	MCERTS	15	11	12	16
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	21	23	20	32
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	74	75	60	91

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

Analytical Report Number: 24-007928
Project / Site name: Croft Street, Bikenshaw
Your Order No:

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
139624	TP06	0.10	102	Loose Fibres	**Chrysotile**	< 0.001	**< 0.001**
139625	TP07	0.10	112	Loose Fibres	**Chrysotile**	< 0.001	**< 0.001**

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

Analytical Report Number : 24-007928
Project / Site name: Croft Street, Bikenshaw

* 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 *
139616	SA02	None Supplied	0.1	Brown clay and loam with gravel and vegetation
139617	SA03	None Supplied	0.1	Brown loam and clay with stones and vegetation
139618	SA04	None Supplied	0.1	Brown loam and sand with gravel and vegetation
139619	TP01	None Supplied	0.1	Brown loam and sand with gravel and vegetation
139620	TP02	None Supplied	0.1	Brown clay and loam with gravel and vegetation
139621	TP03	None Supplied	0.1	Brown loam and sand with gravel
139622	TP04	None Supplied	0.1	Brown clay and loam with gravel and vegetation
139623	TP05	None Supplied	0.1	Brown clay and loam with gravel and vegetation
139624	TP06	None Supplied	0.1	Brown loam and sand with gravel and vegetation
139625	TP07	None Supplied	0.1	Brown loam and sand with gravel and vegetation
139626	TP08	None Supplied	0.1	Brown loam and sand with gravel and vegetation
139627	SA03	None Supplied	0.8	Brown clay and sand
139628	TP01	None Supplied	0.6	Brown clay and sand with gravel
139629	TP03	None Supplied	1	Brown clay and sand with vegetation
139630	TP05	None Supplied	0.6	Brown clay and sand with vegetation
139631	TP06	None Supplied	0.4	Brown clay and sand with vegetation
139632	TP07	None Supplied	0.6	Brown clay and sand
139633	TP08	None Supplied	0.8	Brown clay and sand with vegetation
139634	TP06	None Supplied	0.8	Brown clay and sand with gravel

Analytical Report Number : 24-007928
Project / Site name: Croft Street, Bikenshaw

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (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
Total organic carbon (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
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES	In-house method	L038B	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Sulphate, water soluble, in soil (16hr extraction)	In-house method	L038B	D	MCERTS
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES	In-house method	L038B	D	MCERTS
Speciated EPA-16 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
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	W	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement	In-house method	L099	D	MCERTS

For method numbers ending in 'UK' or 'A' analysis have been carried out in our laboratory in the United Kingdom (Watford).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL' or 'B' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Eastwood Consulting Engineers

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Analytical Report Number : 24-059164

Project / Site name:	Croft Street, Birkenshaw	**Samples received on:**	09/12/2024
Your job number:	48785	**Samples instructed on/ Analysis started on:**	13/12/2024
Your order number:		**Analysis completed by:**	18/12/2024
Report Issue Number:	1	**Report issued on:**	18/12/2024
Samples Analysed:	6 soil samples		

Signed:

Dominika Liana
Junior Reporting Specialist
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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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: 24-059164
Project / Site name: Croft Street, Birkenshaw

Lab Sample Number				406721	406722	406723	406724	406725
Sample Reference				WS01	WS02	WS06	WS06	WS08
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)				1.30	0.20	0.20	0.60	0.20
Date Sampled				28/11/2024	28/11/2024	28/11/2024	28/11/2024	28/11/2024
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	< 0.1	< 0.1	< 0.1	43.8	< 0.1
Moisture Content	%	0.01	NONE	7.9	22	22	17	27
Total mass of sample received	kg	0.1	NONE	0.8	0.7	0.8	0.6	0.7
Asbestos								
Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	DOC	DOC	DOC	DOC	DOC
General Inorganics								
pH (L099)	pH Units	N/A	MCERTS	7.7	7.8	7.7	7.9	7.6
Total Sulphate as SO_4	%	0.005	MCERTS	0.03	-	-	0.095	-
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	31	-	-	55	-
Water Soluble SO_4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.0156	-	-	0.0276	-
Water Soluble SO_4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	15.6	-	-	27.6	-
Total Sulphur	mg/kg	50	MCERTS	110	-	-	510	-
Total Sulphur	%	0.005	MCERTS	0.011	-	-	0.051	-
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	-	5.2	2.9	-	-
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	0.2	0.12	0.2	0.19
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	0.3	0.25	0.31	0.07
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	0.18	0.17	0.14	0.11
Fluorene	mg/kg	0.05	MCERTS	< 0.05	0.13	0.2	0.2	0.1
Phenanthrene	mg/kg	0.05	MCERTS	0.07	1.8	3.9	3.3	1.1
Anthracene	mg/kg	0.05	MCERTS	< 0.05	0.57	0.59	0.91	0.25
Fluoranthene	mg/kg	0.05	MCERTS	0.12	4.9	7.4	7.2	1.8
Pyrene	mg/kg	0.05	MCERTS	0.12	4.5	6.7	6.8	1.6
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.07	3.1	3.1	3.7	0.91
Chrysene	mg/kg	0.05	MCERTS	0.07	3.1	3.7	3.9	1.1
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	4.6	4.5	4.4	1.2
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	1.7	1.9	2.4	0.54
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	3.9	3.7	4.3	1
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.06	1.9	1.9	1.9	0.49
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	0.48	0.48	0.46	0.14
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.06	2.1	2.1	2.1	0.56
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	< 0.80	33.3	40.8	42.1	11.1

Analytical Report Number: 24-059164
Project / Site name: Croft Street, Birkenshaw

Lab Sample Number				406721	406722	406723	406724	406725
Sample Reference				WS01	WS02	WS06	WS06	WS08
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)				1.30	0.20	0.20	0.60	0.20
Date Sampled				28/11/2024	28/11/2024	28/11/2024	28/11/2024	28/11/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	5.7	12	57	22	11
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	0.3	< 0.2	1.7	0.3
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	15	15	26	15	7.4
Copper (aqua regia extractable)	mg/kg	1	MCERTS	13	41	73	95	33
Lead (aqua regia extractable)	mg/kg	1	MCERTS	34	130	490	240	290
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	0.9	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	17	16	25	19	7.5
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	1.5	1.5	1.1	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	69	90	190	190	80

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

Analytical Report Number: 24-059164
Project / Site name: Croft Street, Birkenshaw

Lab Sample Number				406726
Sample Reference				WS08
Sample Number				None Supplied
Water Matrix				N/A
Depth (m)				1.00
Date Sampled				28/11/2024
Time Taken				None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**	
Stone Content	%	0.1	NONE	76.3
Moisture Content	%	0.01	NONE	11
Total mass of sample received	kg	0.1	NONE	0.6

Asbestos

Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	DOC

General Inorganics

pH (L099)	pH Units	N/A	MCERTS	8.4
Total Sulphate as SO_4	%	0.005	MCERTS	0.186
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	90
Water Soluble SO_4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.0451
Water Soluble SO_4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	45.1
Total Sulphur	mg/kg	50	MCERTS	650
Total Sulphur	%	0.005	MCERTS	0.065
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	0.5

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	0.08
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.13
Anthracene	mg/kg	0.05	MCERTS	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	0.17
Pyrene	mg/kg	0.05	MCERTS	0.15
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.09
Chrysene	mg/kg	0.05	MCERTS	0.08
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	0.13
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.06
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	0.95

Analytical Report Number: 24-059164
Project / Site name: Croft Street, Birkenshaw

Lab Sample Number				406726
Sample Reference				WS08
Sample Number				None Supplied
Water Matrix				N/A
Depth (m)				1.00
Date Sampled				28/11/2024
Time Taken				None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**	
Heavy Metals / Metalloids				
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	11
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	20
Copper (aqua regia extractable)	mg/kg	1	MCERTS	25
Lead (aqua regia extractable)	mg/kg	1	MCERTS	830
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	14
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	280

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

Analytical Report Number : 24-059164
Project / Site name: Croft Street, Birkenshaw

* 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 *
406721	WS01	None Supplied	1.3	Brown sand with gravel and brick
406722	WS02	None Supplied	0.2	Brown loam and sand with gravel and vegetation
406723	WS06	None Supplied	0.2	Brown loam and clay with gravel and vegetation
406724	WS06	None Supplied	0.6	Brown loam and clay with vegetation and stones
406725	WS08	None Supplied	0.2	Brown loam and clay with gravel and vegetation
406726	WS08	None Supplied	1	Brown sand with brick and stones

Analytical Report Number : 24-059164
Project / Site name: Croft Street, Birkenshaw

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
Total organic carbon (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
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES	In-house method	L038B	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Sulphate, water soluble, in soil (16hr extraction)	In-house method	L038B	D	MCERTS
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES	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
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in NaOH and addition of 1,5 diphenylcarbazide followed by colorimetry	In-house method	L080-PL	W	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement	In-house method	L099-PL	D	MCERTS

For method numbers ending in 'UK' or 'A' analysis have been carried out in our laboratory in the United Kingdom (Watford).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL' or 'B' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Quality control parameter failure associated with individual result applies to calculated sum of individuals.
The result for sum should be interpreted with caution

Sample Deviation Report

Analytical Report Number : 24-059164
Project / Site name: Croft Street, Birkenshaw

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 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	406721	bc	Speciated PAHs and/or Semi-volatile organic compounds in soil	L064B	bc
WS02	N/A	S	406722	c	Speciated PAHs and/or Semi-volatile organic compounds in soil	L064B	c
WS06	N/A	S	406723	c	Speciated PAHs and/or Semi-volatile organic compounds in soil	L064B	c
WS06	N/A	S	406724	c	Speciated PAHs and/or Semi-volatile organic compounds in soil	L064B	c
WS08	N/A	S	406725	c	Speciated PAHs and/or Semi-volatile organic compounds in soil	L064B	c
WS08	N/A	S	406726	c	Speciated PAHs and/or Semi-volatile organic compounds in soil	L064B	c

Inorganic Compounds	Human Health - Residential with Homegrown Produce (mg/kg)
Arsenic	37
Cadmium	11
Chromium (III)	910
Chromium (VI)	6
Lead	200
Mercury	1.2
Nickel	180
Selenium	250
Copper	2400
Zinc	3700

Organic Compounds	Human Health - Residential with Homegrown Produce (mg/kg)		
	1% SOM	2.5% SOM	6% SOM
Naphthalene	2.3	5.6	13
Acenaphthene	210	510	1100
Acenaphthylene	170	420	920
Fluorene	170	400	860
Phenanthrene	95	220	440
Anthracene	2400	5400	11000
Fluoranthene	280	560	890
Pyrene	620	1200	2000
Benzo(a)anthracene	7.2	11	13
Chrysene	15	22	27
Benzo(b)fluoranthene	2.6	3.3	3.7
Benzo(k)fluoranthene	77	93	100
Benzo(a)pyrene	2.2	2.7	3.0
Dibenz(a,h)anthracene	0.24	0.28	0.3
Indeno(1,2,3-cd)pyrene	27	36	41
Benzo(g,h,i)perylene	320	340	350
Benzene	0.087	0.17	0.37
Toluene	130	290	660
Ethylbenzene	47	110	260
o-Xylene	60	140	330
m-Xylene	59	140	320
p-Xylene	56	130	310

Prepared	LM	Checked	KE	Date	12.04.24	Job No	48785

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CROFT STREET, BIRKENSHAW

RIVA HOMES

ASSESSMENT CRITERIA – RESIDENTIAL WITH HOMEGROWN PRODUCE

Contaminant	Phytotoxicity			
	pH 5.0 to 5.5	pH 5.5 to 6.0	pH 6.0 to 7.0	pH >7.0
Arsenic	50			
Cadmium	3			
Chromium	400			
Lead	300			
Mercury	1			
Nickel	50	60	75	110
Copper	80	100	135	200
Zinc	200	200	200	300

The assessment concentration for lead is the Category 4 Screening Level produced by Contaminated Land: Applications in Real Environments (CL:AIRE) and outlined in Appendix H of their report SP1010. The others have been taken from Nathanail, C. P., McCaffrey, C., Gillett, A., Ogden, R., and Nathanail, J., 2015, *'The LQM/CIEH S4ULs for Human Health Risk Assessment'*, Land Quality Press, Nottingham. The metals/metalloids are based on a sandy loam soil and 6% soil organic matter. The assessment values are not intended to be applied to individual sample results where materials are similar, as the levels of contaminants will have a natural variability across the site. Instead, the modified mean value should be compared with the assessment concentration.

The assessment values for phytotoxicity are the levels at which plant growth is thought to be affected. They are taken from the maximum permissible and advisable concentrations in soil after application of soil sludge given in the *'The Code of Good Agricultural Practice for the Protection of Soil*', MAFF, 1998.

The assessment of sulphate, water soluble sulphate, elemental sulphur and sulphide is to determine the aggressive nature of the ground with respect to concrete and consequently the results are compared with BRE Special Digest 1:2005 '*Concrete in Aggressive Ground*'.

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CROFT STREET, BIRKENSHAW

RIVA HOMES

ASSESSMENT CRITERIA – RESIDENTIAL WITH HOMEGROWN PRODUCE

TPH Fraction	Intended Land Use Residential (mg/kg)		
	1% SOM	2.5% SOM	6% SOM
Aliphatic EC 5-6	42	78	160
Aliphatic EC >6-8	100	230	530
Aliphatic EC >8-10	27	65	150
Aliphatic EC >10-12	130 (48)[vap]	330 (118)[vap]	760 (283)[vap]
Aliphatic EC >12-16	1100 (24)[sol]	2400 (59)[sol]	4,300 (142)[sol]
Aliphatic EC >16-35	65,000 (8.48)[f,sol]	92,000 (21)[f,sol]	110,000[f]
Aliphatic EC >35-44	65,000 (8.48)[f, sol]	92,000 (21)[f,sol]	110,000[f]
Aromatic EC 5-7	70	140	300
Aromatic EC >7-8	130	290	660
Aromatic EC>8-10	34	83	190
Aromatic EC >10-12	74	180	380
Aromatic EC >12-16	140	330	660
Aromatic EC >16-21	260[f]	540[f]	930[f]
Aromatic EC >21-35	1,100[f]	1,500[f]	1,700[f]
Aromatic EC >35-44	1,100[f]	1,500[f]	1,700[f]

[f] oral, dermal, and inhalation exposure compared with oral HCV

[sol] S4UL presented exceeds the solubility saturation limit, which is presented in brackets

[vap] S4UL presented exceed the vapour saturation limit, which is presented in brackets

The assessment criteria for each of the petroleum hydrocarbon fractions have been taken from Nathanail, C. P., McCaffrey, C., Gillett, A., Ogden, R., and Nathanail, J., 2015, *'The LQM/CIEH S4ULs for Human Health Risk Assessment'*, Land Quality Press, Nottingham. These are also all based on a sandy loam soil.

Within the Environment Agency Science Report P5-080/TR3, Askari, K. & Pollard, S., 2005 *'The UK Approach for Evaluating Human Health Risks from Petroleum Hydrocarbons in Soils'* it is stated that the assessment values should not be considered individually; instead the potential additive effects should be calculated. This is achieved by calculating an individual Hazard Quotient (HQ) for each fraction. The HQ is the proportion of the assessment concentration represented by the recorded concentration. The HQs are then added together to form a Hazard Index (HI) and where this exceeds unity a potential significant risk to human health may exist.

Prepared	LM	Checked	KE	Date	12.04.24	Job No	48785

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CROFT STREET, BIRKENSHAW

RIVA HOMES

ASSESSMENT CRITERIA – RESIDENTIAL WITH HOMEGROWN PRODUCE

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SITE: Croft Street, Birkenshaw	Job No. 48785	Date 20.12.2024
SUBJECT: Mean and Max Test Topsoil - Arsenic	Prepared JDO	Checked KE

Results	Sample	Log x = y
38	SA02	1.580
27	SA03	1.431
41	SA04	1.613
47	TP01	1.672
47	TP02	1.672
67	TP03	1.826
44	TP04	1.643
38	TP05	1.580
35	TP06	1.544
45	TP07	1.653
48	TP08	1.681
12	WS02	1.079
57	WS06	1.756
11	WS08	1.041

Number of results : n =	14
Mean : X =	43.36
Standard deviation : s =	15.31
T value : t =	1.771

Corrected mean (95% confidence)

= X + t * s / n^0.5 = 50.61

Max value =	67.00
log xm = ym =	1.826
Number of results : N =	14
Mean y =	1.555
Standard deviation of y : S =	0.230
T = (ym-ya) / S =	1.180
Tcrit (fom table A1.3) =	2.21

Result probably not an outlier

Eastwood
CONSULTING ENGINEERS

PROJECT: Croft Street, Birkenshaw	Job No. 48785	Date 20.12.24
SUBJECT: Mean Value Test for Lead in Topsoil	Prepared JDO	Checked KE

In accordance with appendix A, CLR 7 "Assessment of risk to human health from land contamination : an overview of the development of soil guideline values and related research" produced by the Environment Agency. This method uses the geometric mean rather than the arithmetic mean which is used for other contaminants.

Sample results mg/kg		Log sample results
110	SA02 at 0.1 m	2.041
150	SA03 at 0.1 m	2.176
200	SA04 at 0.1 m	2.301
130	TP01 at 0.1 m	2.114
170	TP02 at 0.1 m	2.230
130	TP03 at 0.1 m	2.114
160	TP04 at 0.1 m	2.204
120	TP05 at 0.1 m	2.079
990	TP06 at 0.1 m	2.996
210	TP07 at 0.1 m	2.322
280	TP08 at 0.1 m	2.447
130	WS02 0.2 m	2.114
490	WS06 0.2 m	2.690
290	WS08 0.2 m	2.462

Calculations based on log results

Number of results : n =	14
Mean : X =	2.307
Standard deviation : s =	0.268
T value : t =	1.771
Corrected mean (95% confidence) =	
= X + t * s / n^0.5 =	2.433

Final results

Mean : X =	203 mg/kg
Corrected mean (95% confidence) =	**271 mg/kg**

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SITE: Croft Street, Birkenshaw	Job No. 48785	Date 20.12.24
SUBJECT: Mean and Max Text Topsoil - Mercury	Prepared JDO	Checked KE

Results	Sample	Log x = y
6.2	SA02	0.792
0.6	SA03	-0.222
0.5	SA04	-0.301
0.9	TP01	-0.046
0.5	TP02	-0.301
0.5	TP03	-0.301
0.8	TP04	-0.097
4.8	TP05	0.681
0.3	TP06	-0.523
0.3	TP07	-0.523
0.3	TP08	-0.523
0.3	WS02	-0.523
0.3	WS06	-0.523
0.3	WS08	-0.523

Number of results : n =	14
Mean : X =	1.19
Standard deviation : s =	1.86
T value : t =	1.771

Corrected mean (95% confidence)

= X + t * s / n^0.5 = 2.07

Max value =	6.20
log xm = ym =	0.792
Number of results : N =	14
Mean y =	-0.209
Standard deviation of y : S =	0.434
T = (ym-ya) / S =	2.307
Tcrit (fom table A1.3) =	2.21

Result probably an outlier

Eastwood
CONSULTING ENGINEERS

SITE: Croft Street, Birkenshaw	Job No. 48785	Date 20.12.2024
SUBJECT: Mean and Max Test Topsoil - Benzo(b)fluoranthene	Prepared JDO	Checked KE

Results	Sample	Log x = y
1.4	SA02	0.146
1.3	SA03	0.114
3.2	SA04	0.505
1.5	TP01	0.176
0.98	TP02	-0.009
1.7	TP03	0.230
0.97	TP04	-0.013
0.96	TP05	-0.018
1.6	TP06	0.204
2.1	TP07	0.322
1.4	TP08	0.146
4.6	WS02	0.663
4.5	WS06	0.653
1.2	WS08	0.079

Number of results : n =	14
Mean : X =	1.96
Standard deviation : s =	1.24
T value : t =	1.771

Corrected mean (95% confidence)

= X + t * s / n^0.5 = 2.54

Max value =	4.60
log xm = ym =	0.663
Number of results : N =	14
Mean y =	0.229
Standard deviation of y : S =	0.229
T = (ym-ya) / S =	1.896
Tcrit (fom table A1.3) =	2.21

Result probably not an outlier

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SITE: Croft Street, Birkenshaw	Job No. 48785	Date 20.12.2024
SUBJECT: Mean and Max Test Topsoil - Benzo(a)pyrene	Prepared JDO	Checked KE

Results	Sample	Log x = y
1.3	SA02	0.114
1.1	SA03	0.041
3.1	SA04	0.491
1.2	TP01	0.079
0.83	TP02	-0.081
1.3	TP03	0.114
0.72	TP04	-0.143
0.83	TP05	-0.081
1.4	TP06	0.146
1.8	TP07	0.255
1.1	TP08	0.041
3.9	WS02	0.591
3.7	WS06	0.568
1	WS08	0.000

Number of results : n =	14
Mean : X =	1.66
Standard deviation : s =	1.08
T value : t =	1.771

Corrected mean (95% confidence)

= X + t * s / n^0.5 = 2.17

Max value =	3.90
log xm = ym =	0.591
Number of results : N =	14
Mean y =	0.153
Standard deviation of y : S =	0.239
T = (ym-ya) / S =	1.834
Tcrit (fom table A1.3) =	2.21

Result probably not an outlier

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SITE: Croft Street, Birkenshaw	Job No. 48785	Date 20.12.2024
SUBJECT: Mean and Max Test Topsoil - Dibenz(a,h)anthracene	Prepared JDO	Checked KE

Results	Sample	Log x = y
0.14	SA02	-0.854
0.17	SA03	-0.770
0.05	SA04	-1.301
0.19	TP01	-0.721
0.13	TP02	-0.886
0.23	TP03	-0.638
0.05	TP04	-1.301
0.15	TP05	-0.824
0.05	TP06	-1.301
0.29	TP07	-0.538
0.16	TP08	-0.796
0.48	WS02	-0.319
0.48	WS06	-0.319
0.14	WS08	-0.854

Number of results : n =	14
Mean : X =	0.19
Standard deviation : s =	0.14
T value : t =	1.771

Corrected mean (95% confidence)

= X + t * s / n^0.5 = 0.26

Max value =	0.48
log xm = ym =	-0.319
Number of results : N =	14
Mean y =	-0.816
Standard deviation of y : S =	0.320
T = (ym-ya) / S =	1.555
Tcrit (fom table A1.3) =	2.21

Result probably not an outlier

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